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Métricas alternativas e suas aplicações:

mapeamento do conhecimento científico em torno da Altmetria

Florianópolis
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RESUMO

O estudo teve como objetivo investigar e mapear o conhecimento científico em torno da Altmetria, por meio da: a) análise o perfil das publicações científicas sobre altmetria; b) identificação dos assuntos de aplicação temática da altmetria; c) averiguação dos métodos, técnicas e aplicações empregados nos estudos altmétricos; d) investigação dos desafios e tendências da altmetria, com base na literatura. A metodologia científica contou com a triangulação de métodos, que permitiu constituir um estudo, quanto à natureza do objetivo, de caráter exploratório e empírico, de aplicação básica; quanto à natureza dos procedimentos, trata-se de um estudo com aplicação bibliográfica, documental, de cunho quantitativo e qualitativo; por meio da aplicação da revisão sistemática e análise de conteúdo. O estudo possibilitou observar o perfil das pesquisas ao em torno da temática; perfil dos pesquisadores, predominância de formato de publicação, base de dados, periódicos e instituições de origem. O recorte da temática oportunizou realizar a análise lexicográfica; e a análise fatorial de correspondência, que validou o recorte da amostra de pesquisa, por apresentar um alto índice de correspondência temática; assim como o método da classificação e análise de similitude, que observou temas recorrentes, correlatos e dispersos, assim como os grupos temáticos e suas correlações com subtemas. Também foi possível verificar os modelos, leis e aplicações matemática e estatística desses estudos, assim como, as ferramentas, fontes e recursos utilizados para a coleta, obtenção, validação e análise dos dados dessas pesquisas. O último objetivo focou na observação e investigação da indicação de desafios e tendências, obtidos da amostra do estudo; como desafios os estudos sinalizaram vários aspectos, os mais recorrentes apontaram para os aspectos tecnológico, metodológicos, da qualidade dos dados e da necessidade de estudos qualitativos, com abordagem social; por sua vez, os relatos de tendências sinalizaram para um caminho de estudos conduzido para observar as pessoas, análise de sentimentos, produtividade acadêmica, influência dos estudos, audiência, atenção *on-line*, análise de redes, avaliação por pares e financiamento de pesquisas. Apesar dos estudos terem apresentado mais desafios do que tendências, foi possível observar que esses desafios estão correlacionados, como causa e efeito, assim que os problemas estruturais forem sanados, as preocupações temáticas, naturalmente passam a ser outras. Para concluir, o estudo observou que o perfil dessas pesquisas está focado nos problemas estruturais, em estudos empíricos e de cunho quantitativo, e que carece de um olhar mais humanístico, direcionado para a observação e análise dos usos do conteúdo científico por pessoas, de forma fragmentada, por meio de recursos e ferramentas gratuitas; que os estudiosos atendam aos requisitos da ciência aberta, a qual deu origem aos princípios para a reflexões da altmetria. Sendo assim, a altmetria é constituída por um conjunto de indicadores e filtros de interação *on-line*, mensurando a relação entre os usuários, as ferramentas e as publicações científicas nos diversos canais de comunicação.

Palavras-chave: Altmetria. Métricas alternativas. Mensuração da pesquisa científica. Mapeamento do conhecimento científico.

RESUMEN

El estudio tuvo como objetivo investigar y mapear el conocimiento científico en torno a Altmetrics, a través de: a) análisis del perfil de las publicaciones científicas sobre Altmetrics; b) identificación de temas de aplicación temática de altmetrics; c) investigación de los métodos, técnicas y aplicaciones utilizadas en los estudios altmétricos; d) investigación de los desafíos y tendencias de altmetrics, con base en la literatura. La metodología científica se basó en la triangulación de métodos, lo que permitió constituir un estudio, en cuanto a la naturaleza del objetivo, de carácter exploratorio y empírico, de aplicación básica; en cuanto a la naturaleza de los procedimientos, se trata de un estudio con carácter bibliográfico, documental, cuantitativo y cualitativo; mediante la aplicación de la revisión sistemática y el análisis de contenido. El estudio permitió observar el perfil de la investigación en torno al tema; perfil de los investigadores, predominio del formato de publicación, base de datos, revistas e instituciones de procedencia. El corte del tema permitió realizar el análisis lexicográfico; y el análisis factorial de correspondencia, que validó el corte de la muestra de investigación, por presentar un alto índice de correspondencia temática; así como el método de clasificación y análisis de similitud, que observó temas recurrentes, correlacionados y dispersos, así como grupos temáticos y sus correlaciones con subtemas. También fue posible verificar los modelos, leyes y aplicaciones matemáticas y estadísticas de estos estudios, así como las herramientas, fuentes y recursos utilizados para recolectar, obtener, validar y analizar datos de estas investigaciones. El último objetivo se centró en la observación e investigación del indicio de desafíos y tendencias, obtenidos de la muestra de estudio; como desafíos, los estudios señalaron varios aspectos, siendo los más recurrentes los aspectos tecnológicos, metodológicos, de calidad de los datos y la necesidad de estudios cualitativos, con enfoque social; a su vez, los informes de tendencias señalaron un camino de estudios realizados para observar personas, análisis de sentimientos, productividad académica, influencia de estudios, audiencia, atención en línea, análisis de redes, revisión por pares y financiación de investigaciones. Si bien los estudios presentaron más desafíos que tendencias, fue posible observar que estos desafíos están correlacionados, como causa y efecto, en cuanto se resuelven los problemas estructurales, las preocupaciones temáticas cambian naturalmente a otras. Para concluir, el estudio observó que el perfil de estas investigaciones está centrado en problemas estructurales, en estudios empíricos y cuantitativos, y que carece de una mirada más humanista, dirigida a la observación y análisis de los usos de los contenidos científicos por parte de las personas, en un sentido forma que fragmentado, a través de recursos y herramientas libres; que los académicos cumplan con los requisitos de la ciencia abierta, lo que dio lugar a los principios de las reflexiones altmétricas. Así, altmetrics consiste en un conjunto de indicadores y filtros para la interacción online, midiendo la relación entre usuarios, herramientas y publicaciones científicas en los distintos canales de comunicación.

Palabras-clave: *Altmetrícs. Métricas alternativas. Medición de la investigación científica. Mapeo del conocimiento científico.*

ABSTRACT

The study aimed to investigate and map the scientific knowledge around Altmetrics, through; a) analysis of the profile of scientific publications on Altmetrics; b) identification of subjects of thematic application of altmetrics; c) investigation of the methods, techniques and applications used in altmetric studies; d) investigation of the challenges and trends of altmetrics, based on the literature. The scientific methodology relied on the triangulation of methods, which made it possible to constitute a study, in terms of the nature of the objective, of an exploratory and empirical nature, of basic application; as for the nature of the procedures, it is a study with bibliographic, documentary, quantitative and qualitative nature; through the application of systematic review and content analysis. The study made it possible to observe the profile of research around the theme, profile of researchers, predominance of publication format, database, journals, and institutions of origin. The cut of the theme made it possible to carry out the lexicographical analysis; and the correspondence factor analysis, which validated the cut of the research sample, for presenting a high index of thematic correspondence; as well as the method of classification and analysis of similarity, which observed recurring, correlated, and dispersed themes, as well as thematic groups and their correlations with sub-themes. It was also possible to verify the models, laws, and mathematical and statistical applications of these studies, as well as the tools, sources and resources used to collect, obtain, validate, and analyze data from this research. The last objective focused on the observation and investigation of the indication of challenges and trends, obtained from the study sample; as challenges, the studies signaled several aspects, the most recurrent pointed to the technological, methodological, data quality aspects and the need for qualitative studies, with a social approach; in turn, the trend reports signaled a path of studies conducted to observe people, sentiment analysis, academic productivity, influence of studies, audience, online attention, network analysis, peer review and research funding. Although the studies presented more challenges than trends, it was possible to observe that these challenges are correlated, as cause and effect, as soon as the structural problems are resolved, the thematic concerns naturally change to others. To conclude, the study observed that the profile of these research is focused on structural problems, on empirical and quantitative studies, and that it lacks a more humanistic look, directed to the observation and analysis of the uses of scientific content by people, in a way that fragmented, through free resources and tools; those scholars meet the requirements of open science, which gave rise to the principles for altmetrics reflections. Thus, altmetrics consists of a set of indicators and filters for online interaction, measuring the relationship between users, tools, and scientific publications in the various communication channels.

Keywords: *Altmetrics. Alternative metrics. Measurement of scientific research. Mapping of scientific knowledge.*

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LISTA DE ABREVIATURAS E SIGLAS

ALLEA	-	Federação Europeia de Academias de Ciências e Humanidades
APCs	-	Taxas de processamento de artigo
API	-	Interface de programação de aplicações
BDTD	-	Biblioteca Digital de Teses e Dissertações
BOIA	-	Budapest Open Access Initiative
CAPES	-	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
CI	-	Ciência da Informação
COPE	-	Committee on Publication Ethics
CSV	-	Arquivos Comma-separated values
DOAJ	-	Directory of Open Access Journals
DOI	-	Digital Object Identifier
ERIH PLUS	-	Índice de Referência Europeu para Humanidades
FAIR	-	Findable, Accessible, Interoperable and Reusable
FCR	-	Taxa de citação de campo
FI	-	Fator de Impacto
FOSTER	-	Facilitate Open Science Training for European research
GRID	-	Banco de dados de identificadores de pesquisa global
ICSU	-	Conselho Internacional para a Ciência
ID	-	Identificador
ID Dimensions	-	Identificador Dimensions
IEEE	-	Instituto de Engenheiros Eletricistas e Eletrônicos
IFLA	-	Federação Internacional de Associações e Instituições de Bibliotecários
ISI	-	Institute Scientific Information
JCR	-	Journal Citation Reports
LILACS	-	Literatura Latino-americana e do Caribe em Ciências da Saúde
MeSH	-	Medical Subject Headings - vocabulário controlado da saúde
OA	-	Acesso aberto
PEER REVIEW	-	Revisão por pares
PLOS	-	Biblioteca Pública de Ciências

PMCID	-	Identificador Pubmed Central
PMID	-	Identificador Pubmed
PPTS	-	Power Point Templates
RCR	-	Razão de Citação Relativa
SciELO	-	Scientific Electronic Library Online
SJR	-	Scimago Journal & Country Rank
SNIP	-	Source Normalized Impact per Paper
VPN	-	Rede Privada Virtual
WoS	-	Web of Science Citation

SUMÁRIO

1 INTRODUÇÃO

Na atualidade a altmetria se apresenta como um conjunto de indicadores, quantitativos e qualitativos, depende da aplicação e olhar feito para o dado ou amostra. Tudo começou com a ideia que deveria ser um indicador para mensurar o impacto alternativo da publicação científica nos mais diversos canais de divulgação. O primeiro estudo sobre a temática foi de Taraborelli (2008), com enfoque nos sistemas alternativos de medida, análise por pares, *software* social, distribuído e avaliação científica.

De acordo com o Manifesto de Priem *et al.* (2010), a altmetria se configura como um filtro que verifica as interações dadas ao conteúdo científico nas redes, o que possibilita olhar para o que causa e como causa impacto na comunicação científica.

As redes da Internet foram as grandes influenciadoras, pois proporcionaram a disseminação do conteúdo científico nos mais variados meios, principalmente os informais. Os periódicos passaram a incentivar que os pesquisadores postassem e repostassem seus textos nas redes, a fim de alavancar a visibilidade e uso desses textos, no entanto, não havia uma contrapartida, que seria o reconhecimento de que esse tipo de ação desencadeava usos não científicos, como o compartilhamento, comentários, curtidas etc., o que começou a causar um certo desconforto na comunidade científica, da qual tinha as pesquisas amplamente divulgadas, mas essa ação não influenciava para o impacto do autor e tão pouco servia para as agências de fomento e de pesquisa. Essa situação causou uma inquietude, juntamente com o descontentamento do sistema de impacto tradicional, o fator de impacto – FI de Garfield (1972), que mensura apenas por meio da citação, levando a comunidade científica a discutir meios e maneiras de avaliar o impacto do texto e do autor nas redes da *web*, sabendo que esses canais de comunicação informais seriam a tendência crescente para um futuro próximo (BOSSY, 1995).

Outro questionamento se deu por meio das restrições de acesso e dos elevados custos para publicar em uma base de dados internacional. As mesmas bases que alimentam o índice de citação FI, são as mesmas que norteiam toda a comunicação científica mundial, por isso havia a necessidade de criar um sistema que pudesse substituir o FI, possibilitando um olhar mais completo sobre as interações da publicação científica, disponível na *web* (PRIEM; GROTH; TARABORELLI, 2012), mas o que os autores descobriram é que o sistema tradicional de avaliação possibilita a conferencia/auditoria dos dados, o que as altmetrics ainda não conseguem fazer, pela natureza dinâmica das redes, assim como a de seus usuários que apagam um comentário com a mesma facilidade que postam. Bossy (1995) frisou a respeito da

heterogeneidade das redes, assim como indicou que seria nas redes que poderíamos ver a ciência e ação, efetivamente.

No entanto, os indicadores alternativos se mostram complementares aos tradicionais, possibilitando uma infinidade de estudos sobre a comunicação científica, redes e comunicação, da Internet, comportamento social, comportamento de pesquisadores, interação automática por meio de máquinas, disseminação do conhecimento, interação social com a ciência, de distintos canais formais e informais de comunicação, e dos usos feitos desse tipo de conteúdo nas redes. O Committee on Publication Ethics (COPE) enfatiza que a visibilidade do conteúdo em formato on-line possibilita identificar vertentes, áreas e temas em construção, assim como facilita detectar plágios através dos sistemas de análises aplicados ao conteúdo científico, algo que vem crescendo neste meio (COPE, 2019).

É neste cenário que a rápida adesão de estudos altmétricos foi fortalecida pelo reconhecimento da legitimidade do movimento, tendo o viés democratizador, principalmente pelos adeptos do movimento do acesso aberto, testando e experimento as possibilidades desse conjunto de indicadores, nos mais diversos materiais e canais de comunicação (VANTI; SANZ-CASADO, 2016).

Após a expansão do movimento do acesso aberto para a ciência aberta, a altmetria ganha um novo espaço, sendo reconhecida como métricas responsáveis, que avaliam a "repercussão" de uma publicação nas redes (LOTERRE, 2021), representando uma mudança na forma de ver esse indicador para parte de uma ecologia integrada ao movimento que visa o acesso, o compartilhamento, a cooperação, transparência, a ética entre outros aspectos evolutivos do fazer da comunicação científica, no moldes da ciência atual.

Portanto, a ciência é o campo de estudo que produz conhecimento a ser publicado nos canais de comunicação — formais e informais —, dos quais contam com os recursos da *web* para a propagação, uso, interação; assim como, a aplicação de sistemas de medida e avaliação da pesquisa, inferindo o impacto e as regras de produção, publicação e de recebimento de fomento para a pesquisa. É um sistema complexo, mas que vem ganhando novas configurações no seu fazer.

Dessa maneira, com base no entendimento de que essa dinâmica impacta na sociedade, o presente estudo buscou verificar na literatura qual era o debate científico em torno da altmetria, a fim de constatar o perfil das publicações, os assuntos e as aplicações temáticas, métodos e técnicas, desafios e tendências da temática. O manifesto de Priem *et al.* é considerado o marco dos estudos, o pontapé inicial desse novo campo de conhecimento, que passa a se configurar em um cenário controverso da informação e da Internet.

1.1 PROBLEMA DE PESQUISA

A altmetria foi cunhada por Priem *et al.* (2010) como um indicador alternativo de impacto social da pesquisa; foi pensado para ser uma forma de democratizar o sistema de avaliação e recompensa da produção científica, e ainda, para representar os usos feitos pela academia e sociedade em ambientes não tradicionais, como quais estudos estão causando impacto nas redes sociais, prática que até então era despercebida pela comunidade científica.

A altmetria foi considerada como um modelo para criar e utilizar indicadores de "visualizações, downloads, citações, reutilizações, compartilhamentos, etiquetagens, comentários, entre outros — relacionados à interação de usuários com produtos de pesquisas diversos, no âmbito da Web Social" (SOUZA, 2014, p. 47), a partir da aplicação de ferramentas e recursos de *big date*, *web* semântica e inteligência artificial.

Sugimoto (2015) enfatiza que, a altmetria derivou das críticas e insatisfação do método de avaliação tradicional, assim como a "expansão de dados, fontes e o aumento do uso para avaliação, trouxeram uma preocupação renovada em torno dos princípios éticos das métricas de pesquisa", e nesse sentido, a altmetria se apresentou como uma possível solução.

Timilsina *et al.* (2017) apontam que a altmetria é um novo campo da cientometria, mas os autores enfatizam que os estudos baseados em contagem ou quantificações que utilizam a altmetria para mensurar o impacto, "são sensíveis a jogos", pois faltam referências concretas que os remetam às fontes primárias.

No entanto, a altmetria por ser um campo recente e que ainda está em consolidação, que apresenta lacunas, desafios e problemas a serem solucionados. Souza (2015b, p. 58), destaca que essas lacunas são de ordem técnica e teórica. A primeira está na "falta de padrões para coleta e tratamento das métricas alternativas", e a segunda, na falta de definições teóricas a respeito do que "significam esses dados".

Esse pensamento de Souza (2015b) é compartilhado por Haustein (2016, p. 415-420), quando a autora assinala que a altmetria ainda tem grandes desafios pela frente, suas lacunas são de ordem teórico-conceituais e práticas, como a heterogeneidade, qualidade dos dados e dependências:

a) Heterogeneidade: está refletida nos eventos e diversidade dos dados dispostos *on-line*, na maioria em plataformas de mídia social, o que dificulta o estabelecimento de uma definição comum e de estruturas conceituais;

b) O problema de qualidade e aparente falta de precisão, consistência e replicabilidade

de vários dados altmétricos, os quais, são amplamente afetados pela natureza dinâmica e pelo ambiente e eventos das mídias sociais;

c) Dados altmétricos moldados por possibilidades técnicas, dos quais, dependem da disponibilidade de *APIs* e do uso de *DOI,* fortemente dependentes de provedores e agregadores de dados, e, potencialmente influenciados por recursos técnicos de plataformas subjacentes (HAUSTEIN, 2016, tradução nossa).

Assim como enfatiza Liu e Adie (2013, p. 33-34, tradução nossa), quando apresentam cinco desafios referentes à aplicação da altmetria:

> (a) definir o que se pode e deve ser medido;
> (b) indicar quais fontes de dados devem ser usados;
> (c) mapear a atenção dada para as publicações de pesquisa;
> (d) identificar a duplicidade de versões e de identificadores de uma publicação;
> (e) determinar como interpretar os dados.

Por sua vez, Sugimoto (2015), indica que um dos desafios é identificar o perfil do público que geram os "traços de atenção" *on-line* das publicações científicas; um outro se refere à falta de delimitação e escopo de aplicação na área. Sugimoto *et al.* (2017) também indicam que falta clareza nos dados e nas redes utilizadas nas pesquisas altmétricas, sobre o que realmente é medido, como é feito, qual método é aplicado, indicadores etc., faltam informações que fazem com que estudos científicos possam ter confiabilidade e replicabilidade científica.

Galligan e Dyas-Correia (2013) assinalam que a maior desvantagem do uso da altmetria é a aplicação de análises que não viabilizam de forma simples e eficaz a interpretação clara dos dados. O motivo disso é que cada rede tem uma forma diferente de medir a interação de seus usuários, assim como o uso de pesos distintos para esse tipo de mensuração.

Outro aspecto apontado pelos autores é que, os recursos da *web* ainda não são apropriados para realizarem adequadamente as mensurações da interação dos usuários com o conteúdo científico em distintos ambientes, como o caso do *Facebook*. Nos estudos de Enkhbayar e Alperin (2018) e de Barata (2019), os autores destacam que há limitações na coleta e análise de dados de algumas redes sociais, blogs e páginas; o *Facebook* é um exemplo, tendo em vista que não dispõe de recursos abertos para a coleta de dados de interação de seus usuários em postagens específicas de conteúdos científico, só é possível via *API* de ferramentas altmétricas, e mesmo assim, as ferramentas de análise altmétricas têm limitações de rastreamento em tais redes, recuperando apenas as interações feitas por páginas e instituições, desconsiderando os indivíduos que participam desse processo.

No entender de Nascimento (2016, p. 54) os desafios da altmetria são: métodos limitados de identificação única de artigos e autores; Qualidade e disponibilidade de metadados; Efemeridade das fontes de dados, indicadores e ferramentas; Possibilidade de manipulação dos dados de citação; Concentração da origem e idioma das fontes de citações; Necessidade de contexto/significado; E, maior adoção de práticas de pesquisa *on-line* pela comunidade acadêmica. As limitações apontadas pela referida autora estão relacionadas aos usos de dados oriundos de serviços e plataformas de terceiros (*Facebook, Twitter* etc.), os quais não têm a preocupação com o gerenciamento e a criação de mecanismos que possibilitem confiabilidade e replicabilidade dos dados coletados em seus ambientes informacionais dinâmicos. Outra questão é o acesso a esse tipo de dado, pois os serviços e ferramentas privados ou pagas não disponibilizam abertamente essas informações, o que dificulta ainda mais o desenvolvimento de pesquisas que possam ajudar a solucionar alguns desses problemas.

Destaca-se ainda as limitações geopolíticas, como os países fechados que proíbem o uso de determinadas redes sociais, prejudicando a cobertura, a coleta e a análise de dados altmétricos. A título de exemplo apresenta-se o caso da China, o país mais populoso do mundo, com cerca de 1.44 bilhões de pessoas; o relatório dos usos da w*eb* na China, feito pela *We are Social* (2020), indica que 59% da população têm acesso à *internet,* 72% da população utilizam redes sociais como: o app de mensagem Chinês *Wechat, Sina Weibo, Baidu Tieba, Xiachongshu, Tencent Weibo, Kuaishou, Douban, Douyu, Meitu, Meipai, Yizhbo, Huya, Yammer* e *Slack,* das redes utilizadas no país as que são globalmente mais conhecidas são o *Linkedin* e o *Skype*, as demais são todas asiáticas (KEMP, 2020). Essas limitações geopolíticas tendem a inviabilizar estudos maiores, já que o país mais populoso utiliza de sistemas próprios, com baixa aderência para a coleta e disponibilidade de dados altmétricos para outros países.

Como visto, a altmetria por ser um campo novo em um cenário inexplorado na comunicação científica, que se inicia com várias limitações e lacunas devido à natureza dos dados, usuários e ambiente no qual se constitui. Por isso, entende-se que o campo da altmetria envolve sete elementos distintos, conforme a ecologia da informação proposta por Saracevic (1996):

a) Produtores de conhecimento (autores, pesquisadores);
b) O suporte informacional para a divulgação científica;
c) Financiadores de pesquisa;
d) Os canais de comunicação, formais e informais;
e) Editores e o sistema de publicação científica;

f) Os usuários da informação científica (acadêmicos ou público geral);
g) As ferramentas de medida, aplicadas ao conteúdo científico.

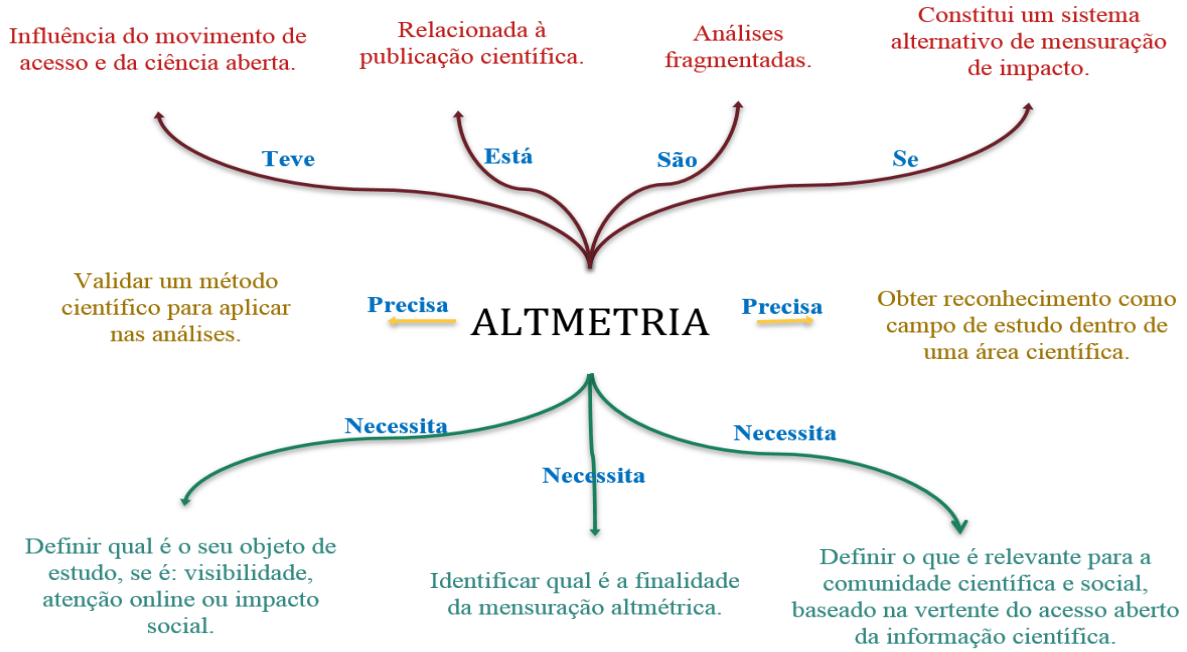
Em linhas gerais, os autores e pesquisadores são produtores e consumidores do conhecimento científico, eles estão na ponta de *iceberg*. Nessa ecologia informacional os suportes informacionais passaram a ser meios múltiplos de divulgação do conhecimento científico. Outro fator impactante são os financiadores de pesquisa, eles que ditam o que deve ou não ser pesquisado, e direcionam o modelo e local de publicação de cada pesquisa financiada. Com a *internet*, os canais de comunicação tornaram-se dinâmicos e mutáveis — tantos os informais quanto os formais. Os editores são responsáveis por direcionar o conteúdo para a arguição de pares, utilizando sistemas editoriais para a publicação desse tipo de conteúdo. A *web* possibilita aos diversos usuários de informação acessar publicações científicas do seu interesse; esse ambiente dinâmico e amplo dificulta definir quem são esses usuários em determinadas áreas de conhecimento. E por último, o surgimento de diversas ferramentas de mensuração que não conseguem, em seus modelos tradicionais, representar este novo contexto em que a informação científica se encontra.

Os elementos descritos são partes da ecologia informacional do conhecimento científico, que por sua vez requer o reconhecimento de que é um sistema dinâmico e em mutação, e que norteiam um sistema socioecológico complexo e interrelacionado com várias áreas do conhecimento (SARACEVIC, 1996).

E ainda, para Saracevic (1996, p. 59), "Os problemas tratados pela CI, ou por algum outro campo relacionado com qualquer aspecto da ecologia informacional, devem ser enfocados como complexos problemas ecológicos", esses incluem fatores sociais, econômicos, político-culturais e educacionais.

Para melhor representar a ecologia em torno da altmetria, sob a ótica da Ciência da Informação, delineou-se um esquema por meio do mapa mental, exposto na Figura 1.

Figura 1 - Mapa do cenário da altmetria



Fonte: Elaborado pela autora (2018), com base nas pesquisas de: Galligan e Dyas-Correia (2013), Haustein (2016), Liu e Adie (2013), Maricato e Martins (2017), Nascimento (2016, 2017), Souza (2014, 2015b), Sugimoto (2015), Vanti e Sanz-Casado (2015, 2016), Zahedi, Costas e Wouters (2014).

Todos os apontamentos, dos autores mencionados acima, direcionam o estudo para a necessidade de conhecer melhor todo o contexto que envolve essa ecologia informacional, incluindo os vários elementos que norteiam a prática, a aplicação e o uso desse tipo de informação, por meio da análise da arquitetura da informação, a cultura e comportamento em relação à informação em redes e todas as nuances que envolvem essa ecologia (DAVENPORT, 1998).

Conforme o que foi apresentado, para a CI, a altmetria é um campo que gera várias perguntas e respostas, pois se passaram doze anos desde o início do movimento, e por isso, entende-se que este tipo de pesquisa, de mapeamento científico, colabora para observar se as problemáticas apontadas foram resolvidas, e quais elementos a comunidade científica tem elencado em suas discussões a respeito do *status quo* da altmetria.

1.2 JUSTIFICATIVAS

A justificativa para este estudo, do debate a respeito da altmetria na literatura científica internacional, é de cunho social, científico e profissional, os quais apresentam-se na sequência.

1.2.1 Justificativa Social

Uma vez que a publicação de pesquisa migrou para o formato digital e em alguns casos de acesso aberto (OA), houve a possibilidade de ampliação da divulgação científica; sendo que esta deixou de ser direcionada somente para a academia e passou a estar ao alcance de toda sociedade. Gouveia (2016) sinaliza que a "altmetria é a interface entre a ciência e a sociedade", ou seja, o acesso à publicação científica não é mais exclusividade de acadêmicos, qualquer interessado no assunto pode acessar o material, se este estiver disponível na *web*.

No manifesto do altmetric.org, Priem *et al.* (2010) sinalizam a necessidade de estudos que possam ajustar os sistemas de "filtro" para mensurar e validar a publicação científica. O modelo padrão de validação, que aplica — a revisão por pares, contagem de citação, média de citações de um periódico para avaliar um artigo — são sistemas que já não representam mais os indicadores de impactos científicos e sociais, aos quais as pesquisas científicas estão sujeitas. Há novas necessidades no fluxo e usos da comunicação científica, os quais carecem de um novo olhar sob os aspectos de validação e mensuração do conhecimento produzido.

As ferramentas *on-line* de divulgação facilitam o acesso de conteúdo, no qual é possível verificar por meio de indicadores dinâmicos o rápido desempenho de pesquisas científicas, principalmente as pesquisas de financiamento público. Um exemplo desse contexto é a Biblioteca Pública de Ciências (PLOS), um sistema de publicação científico, criado aos moldes do acesso aberto, que utiliza a mensuração científica tradicional e a verificação alternativa e dinâmica dos usos de cada texto publicado em seu acervo. Outra questão é a ampla propagação de seu conteúdo em diversos canais, mais de 1.700 meios de comunicação republicam o conteúdo científico da PLOS, incluindo: *The New York Times, The Times of India, The Guardian, BBC, NPR, National Geographic* e muito mais, isso mostra que a sociedade tem buscado saber o que a comunidade científica está pesquisando, quais são as novas descobertas e suas aplicações sociais, científicas e tecnológicas.

Um exemplo desse movimento em ampla escala é o projeto FOSTER (2018), que visava criar instrumento regulamentários e diretrizes para que fosse possível capacitar autores, instituições, editores e sistemas de publicação nos padrões da ciência aberta, buscando: (1) o gerenciamento e compartilhamento de dados de pesquisa; (2) uso de software de código aberto para o fluxo de trabalho; (3) proteção de dados e ética; (4) aplicação do licenciamento Aberto; (5) publicação em acesso aberto; (6) compartilhamento de pré-impressões; (7) revisão por pares aberta; (8) uso de dados abertos no ensino; (9) viabilização de localizabilidade, acessibilidade, interoperabilidade e reutilização de dados de pesquisa, pois o movimento entende que a

inovação responsável é aceleradas por meio da Ciência Aberta.

O projeto FOSTER visava disponibilizar, até 2020, todo conhecimento científico produzidos com financiamento de verba pública, oriunda da União Europeia. O projeto criou o Portal Europeu de dados para dispor todos o conteúdo de pesquisa, de forma acessível, o qual conta com 1.262.405 conjuntos de dados, de 36 países (PORTAL EUROPEU DE DADOS, 2021).

No Brasil, a portaria 206 da CAPES (2018) exige que o pesquisador indique em suas publicações e apresentações a fonte financiadora da pesquisa. Alguns programas de pós-graduação exigem que o pesquisador, benificiário de recursos, indique a fonte financiadora na publicação dos resultados e produtos, oriundos do estudo, principalmente quando a pesquisa é proveniente de verba pública. São pontos pertinentes para a prestação de contas dos usos feitos dos recursos públicos para com a sociedade; é por isso que todas as teses e dissertações devem ser disponibilizadas na Biblioteca Digital de Teses e Dissertações (BDTD) para o livre acesso.

Devido a esta questão, a ciência da informação tem interesse no referido estudo, partindo do princípio de que o tema envolve elementos pertinentes à área, tais como divulgação científica, usuários da informação científica e a mensuração dos usos do conteúdo científico. Todos são objetos de estudo desta área, que visa estudar o comportamento, propriedades, fluxo e processamento da informação para a visibilidade e acessibilidade de acervos, independente do suporte, restrição ou ambiente de acesso.

Saracevic (1996), indica em seus estudos que a CI se ocupa em solucionar problemas que envolve a aplicação e uso de tecnologias informacionais pela sociedade, e na atualidade essa máxima se reforça, pois é no ambiente informacional que as métricas alternativas ganham espaço de reflexão, por meio de estudos do comportamento dos usos da informação científica, feitos pela sociedade, como forma de viabilizar melhorias na prestação desses serviços informacionais.

Pois já é de conhecimento comum que o século XXI é marcado pelos movimentos sociais e reivindicatórios, acesso informacional, transparência, governança aberta, ciência aberta, dados abertos; todas essas exigências, nunca vista antes, é característica de uma sociedade empoderada, reivindicando o que lhe pertence (SCHERER-WARREN; LÜCHMANN, 2011; CASTELLS, 2015), principalmente quando se fala em pesquisa financiada com dinheiro público. “Um dos postulados básicos da ciência aberta é que a pesquisa deve ser feita com e para a sociedade” (ANGLADA; ABADAL, 2018, p. 294). É nesta vertente que segue a sociedade, consumindo cada vez mais a comunicação científica, que esteja acessível.

O fazer científico busca aprimorar-se por meio do conhecimento obtido das circunstâncias sociais, científicas e tecnológicas. Os problemas sociais são objeto de estudo da academia e, como resultado, esta deve propor possíveis soluções de aplicação na própria sociedade, e isso se faz em todas as áreas do conhecimento; por isso, o estudo sobre altmetria atentou em apresentar o cenário dessas pesquisas como meio de identificar as possibilidades de aplicações ao entorno da própria ciência e com a participação da sociedade.

1.2.2 Justificativa Científica

O acesso aberto (OA), possibilita um fazer científico mais democrático, principalmente sobre a questão de custo de acesso, publicar uma pesquisa se tornou mais simples, justamente pela quantidade de periódicos em formato de OA, assim como o acesso para os leitores, usuários e interessados no conteúdo científico. No Brasil, 74% das publicações são de acesso aberto, mas a concentração mundial desse tipo de publicação é apenas de 15%, do total de todo conteúdo que se publica (SCIENCE-METRIX, 2018). As mídias acadêmicas e sociais facilitaram esse processo de divulgação da informação em meio eletrônico e, nesse caso, os pesquisadores e toda comunidade científica passaram a ter maior visibilidade e retorno dos estudos publicados.

A CI está "preocupada com o corpo de conhecimentos relacionados à origem, coleção, organização, armazenamento, recuperação, interpretação, transmissão, transformação, e utilização da informação" (BORKO, 1968, p. 05). Os apontamentos de Borko demonstram que essas ainda são questões de relevância para a CI, pois com o advento da *Internet*, da multiplicidade da informação e de canais de comunicação, são elementos que possibilitam ampla disseminação do conteúdo informacional nas redes da *web*, é nesse cenário que a altmetria amplia a visão sobre os aspectos de mensuração de impacto, e volta o olhar para o que está causando esse impacto no ecossistema acadêmico (PRIEM *et al*., 2010).

O movimento do OA abre as fronteiras entre o fazer científico e o acesso deste conhecimento para toda sociedade. Conforme a Comissão Europeia (2017), as tecnologias digitais têm influenciado para sejam realizadas mudanças na forma de fazer ciência, impactando em todo o ciclo da pesquisa, "mas a mudança não está no que é feito, mas sim em como está sendo feito" (ANGLADA; ABADAL, 2018, p. 293).

É nessa mudança do fazer científico que as métricas alternativas ganharam espaço, vislumbrando a interação do usuário da informação científica em diversos canais de comunicação, focados no panorama atual dos usos de material e conteúdo dispostos na *web*.

Gouveia (2016) sinaliza que o modelo de avaliação de impacto por meio de citação é um mecanismo que mensura o que já foi publicado, "só olha para o passado", e na produção científica um texto pode demorar ou nunca obter uma citação, por isso, esse sistema não dá indicativos do que impacta agora ou futuramente, quanto ao uso de uma publicação.

Galligan e Dyas-Correia (2013, p. 61), enfatizam que "somente o tempo dirá que papel a altmetria acabará desempenhando na análise do trabalho acadêmico e dos impactos dos estudos em campos acadêmicos [...]". Mas uma coisa é fato, o quantitativo de estudos altmétricos estão aumentando a cada ano, basta saber em quais vieses a altmetria pode contribuir com a mensuração de usos do conhecimento científico.

Por esse motivo entende-se que os estudos sobre o debate científico da altmetria seja relevante, pois além de ser um campo novo e que carece ser acompanhado pela CI, impacta diretamente na forma de ver a divulgação da comunicação científica, no dinamismo dos canais de comunicação formais e informais, e nos usos e usuários da informação especializada; além de representar uma mudança de paradigma no movimento *Open Science,* que se relaciona diretamente as TICs, com a sociedade globalizada e o acesso à informação pela *internet*, representando o futuro da comunicação da Ciência.

1.2.3 Justificativa Profissional

Profissionalmente, o assunto também carece de atenção, tendo em vista que profissionais da informação necessitam acompanhar a evolução da área, para que seja possível avaliar como prestar um serviço informacional eficiente e de qualidade. Se a forma de acesso a um conteúdo mudou, cabe ao profissional verificar o que mudou, porque mudou e se as necessidades informacionais de seus usuários continuam as mesmas.

De acordo com Saracevic (1996, p. 55), "os problemas da informação não estão diminuindo, mas sendo transformados". A CI na sua interdisciplinaridade está interligada à tecnologia da informação e o imperativo tecnológico influencia a ciência da informação e seus serviços informacionais, possuindo um importante papel na dimensão social e científica da informação.

Cabe ao profissional da informação se aprofundar nos temas que impactam socialmente os usuários de informação, verificar se há a necessidade de melhorias no sistema de captura, análise e mensuração de dados na *web*, como o caso das métricas alternativas que investigam os usos dados à informação em ambiente digital.

Vega-Almeida, Fernández-Molina e Linares (2009, p. 09) apontam para a CI como "campo de prática profissional e investigação científica, a disciplina enfoca os problemas de comunicação efetiva dos registros do conhecimento entre humanos e o contexto das organizações sociais, assim como as necessidades e usos da informação pelos indivíduos".

Se os indivíduos usam as redes para obter, curtir e compartilhar informação científica, ela certamente passa a ser objeto de estudo dos profissionais de informação, assim como a dos cientistas e dos editores de periódicos, pois todos estão conectados ao ecossistema informacional que interliga os usuários, o conteúdo e os autores deste conteúdo em um único ambiente, a *web*.

Para entender as propriedades, o comportamento e uso da informação (BORKO, 1968) nesse ambiente digital, é importante começar pela base, pelos estudos de análise da fundamentação, da reflexão e da constituição da altmetria para a publicação científica, para que haja a estruturação de linhas de pesquisa para este novo campo; é preciso identificar os elementos que enredam esse cenário, verificar as possibilidades de mensuração dos usos do conhecimento científico pela sociedade e comunidade científica.

Pelos motivos aqui elencados acredita-se que a CI possa contribuir para com a sociedade e com a ciência, assim como, para a melhoria da atuação do profissional, o qual pode acompanhar as tendências da sociedade em sua natureza dinâmica e mutável.

1.3 OBJETIVOS

Os objetivos se dividem-se em geral e específicos, os quais propõem aplicações específicas para que seja possível a execução da pesquisa.

1.3.1 Objetivo Geral

Investigar e mapear, na literatura científica, os debates científicos em torno da Altmetria.

1.3.2 Objetivos Específicos

a) Analisar o perfil das publicações científicas sobre altmetria;
b) Identificar os assuntos de aplicação temática da altmetria;
c) Averiguar os métodos, técnicas e aplicações nos estudos altmétricos;
d) Investigar os desafios e tendências da altmetria, com base na literatura.

2 FUNDAMENTAÇÃO TEÓRICA

Neste estudo, a revisão de literatura visa apresentar o tema e subtemas relevantes à proposição de pesquisa, o qual se ampara na literatura existente como aporte teórico e de reflexão. O estudo dividiu-se em seis subseções, apresentadas na sequência.

2.1 EVOLUÇÃO SOCIAL E TECNOLÓGICA

As mudanças sociais refletem diretamente no fazer científico, pois o homem e o meio são mutáveis, estão em constante evolução, de forma dinâmica e contínua. Maturana e Varela (1995, p. 18), enfatizam a necessidade de estudar e entender o processo de evolução do conhecimento humano, de refletir sobre as mudanças do meio, "o universo de conhecimentos, de experiências, de percepções do ser humano não é passível de explicação a partir de uma perspectiva independente desse mesmo universo"; principalmente, no que diz respeito às questões relacionadas ao uso de tecnologias de informação e comunicação pelos humanos, o que os autores chamam de acoplamento tecnológico, que é a interação do homem com as tecnologias/máquinas.

A transformação social advinda do uso de tecnologias, fizeram com que o mundo se ajustasse para se encaixar à uma nova demanda. Todos os países, aos poucos, começaram a pôr programas de desenvolvimento tecnológico e informacional, o que colaborou para o desenvolvimento das redes de comunicação a distância, e toda infraestrutura por trás dessas redes, que hoje conhecemos por *web* (GONZÁLEZ DE GÓMES, 2002). A *internet* se tornou parte integrante da nova geração da sociedade do conhecimento, e o século XIX ficou caracterizado pela mudança dos meios de comunicação e registro do conhecimento (CASTELLS, 2011). As gerações também foram marcadas por distinção de períodos de "transformação": X, Y, Z e a Alfa, cada uma delas têm um perfil diferente, cada uma se caracteriza pelo método de consumo, trabalho e aprendizagem, assim como as habilidades tecnológicas; porém, todas estão conectadas, de alguma forma, com as tecnologias (EZENWABASILI, 2016).

As mudanças advindas das tecnologias são expostas no texto de González de Gómes (2006, p. 52) "E-topia", o qual trata sobre as transformações nas diversas áreas, como, "e-comércio, e-ciência, e-conhecimento, e-governo, e-cidadania", no qual a autora enfatiza que, "as tecnologias são sociais em sua produção e em seu uso", quer dizer que, são feitas por pessoas para o uso de pessoas. A evolução social e tecnológica fez com que o pensar e fazer, nas diversas

esferas sociais fossem reestruturadas, repensadas, pois o dinamismo no ambiente da *web* é diferente do ambiente físico.

A "modernidade líquida" prefere se relacionar via redes do que de forma física. As novas gerações têm outros costumes sociais que são bem diferentes das gerações anteriores. Bauman (2007) escreve em seu livro "Tempos líquidos" que a humanidade está em constante movimento, as fronteiras sociais e culturais se distanciam cada vez mais, o consumismo, a organização social, governamental, o método de trabalho e consumo, tudo em plena mudança, se modernizando, pois os moldes exigem adequação e integração ao meio, para que se possa fazer parte, como um membro da sociedade. E assim se fez. A sociedade passa da fase do trabalho braçal para o industrial, depois para a fase informacional, posteriormente para tecnológica e, por último, estima-se que seja a era do conhecimento (ANGELONI; FERNANDES, 2000; CARNEIRO LEÃO, 2003). Cada uma dessas fases foi agregada à uma nova fase, e com isso construiu-se um novo momento. A informação e o conhecimento passam a ter papel fundamental nesta evolução social.

D'Amaral (2003), em "A sociedade do conhecimento", menciona como se deu o processo de inclusão dos membros da sociedade na era digital. O autor menciona que, basicamente, se constituiu em utilizar um equipamento tecnológico conectado às redes, em realizar a busca e o consumo de informação, com isso, estariam integrados o novo meio da sociedade do conhecimento configurada na *web*.

Carneiro Leão (2003, p. 14) afirma que na sociedade do conhecimento tudo é mutável, "conhecer é um supermodo de organização e controle. Tanto desencadeia as forças produtivas como segura e contém os modos de produção dentro do poder e não-poder de uma globalização planetária". É dessa forma que vem ocorrendo a evolução social, na busca do conhecimento e com amplo uso de tecnologias de comunicação, baseada no acesso à informação.

Morin (2005) enfatiza que as tecnologias de comunicação são usadas como ferramentas de mobilização social, em que os indivíduos conseguem comunicar-se instantaneamente, com diversas regiões do planeta, polinizando culturas e práticas como a música, a arte e a cultura. Da mesma forma que pode ser um instrumento de controle e exclusão para os que não estão inseridos ao meio.

Mas, todas as mudanças sociais fazem parte do processo de globalização, ao qual Bauman (1999) chama de "destino irremediável" de um mundo em um processo de evolução irreversível. A natureza está em constante mutação e com ela a humanidade, sendo que essa evolução pode ser claramente vista na forma de fazer as coisas.

A exemplo, pode-se observar como se constituiu o tratamento de doenças como o

câncer, em que os avanços científicos e tecnológicos auxiliam para um diagnóstico preciso, os relatos científicos mostram que, na maioria dos casos, o tratamento era baseado na intervenção cirúrgica, sem combater a causa do problema, na atualidade se fala de tratamento inteligente, aqueles que combatem cada tipo específico de câncer e que é menos invasivo (VARELLA, 2019). "Câncer é um conjunto de mais de 100 doenças distintas, que apresentam em comum apenas o fato de terem em sua origem a transformação de uma célula normal em maligna" (VARELLA, 2019). O exemplo ilustra o quanto a ciência colaborou e impactou para as mudanças sociais mencionadas. Sem os avanços científicos e tecnológicos muitos problemas sociais continuariam da mesma forma que a de épocas distantes, como a forma de trabalho, a qual conhecemos.

O *World Bank* (2018, p. 6) publicou um relatório sobre a natureza das mudanças do trabalho e as perspectivas para 2019. Nesse relatório é mencionado que haveria várias mudanças no perfil do mercado de trabalho, no mundo todo, "*la tecnología está redefiniendo las habilidades necesarias para el trabajo"*. Fator esse que influencia no desencadeamento das mudanças advindas do progresso tecnológico, "*está aumentando la demanda de habilidades cognitivas avanzadas y habilidades socioconductuales, así como de combinaciones de habilidades asociadas con una mayor capacidad de adaptación"* (WORLD BANK, 2018, p. 7). O relatório citado explicita cada uma dessas habilidades, exaltadas para um novo campo de trabalho, e o intelectual é direcionado para as habilidades do uso de tecnologias.

Nada disso seria imaginável sem que houvesse estudos científicos de aplicações e análises sociais, agregados aos fatores tecnológicos. Os problemas científicos advêm das necessidades sociais, por isso estão diretamente interligados.

Fica claro que a humanidade está em constante transformação, como foi mencionado, é inerente à natureza humana. Em estudos como o de Maturana e Varela (1995), "A árvore do conhecimento" e de Darwin (2003), "Origem das espécies", os pesquisadores chegam à premissa de que, para que haja perpetuação das espécies é preciso haver adaptação, pois o meio é dinâmico, está em constante mudança, bem como a sociedade, principalmente com o uso das tecnologias. Pensar nas mudanças sociais sem pensar na influência tecnológica é quase que impossível, considerando a estrita relação entre ambos (CASTELLS, 2011).

A sociedade se inova e se aperfeiçoa o tempo todo, está em constante busca por conhecimento, soluções de problemas, melhorias na qualidade de vida, cura e tratamento de doenças, longevidade, entre outras preocupações. Essa é a principal característica da sociedade moderna: o uso do conhecimento para uma constante mutação social, possibilitada por meio da tecnologia, que ficou altamente difundida entre a espécie, e a ciência é a provedora desse meio

mutável, tão desejado.

2.2 EVOLUÇÃO CIENTÍFICA

Kuhn (2006) organiza as fases da evolução científica em: a ciência normal, focada em seus paradigmas já consolidados; a fase da crise, que se refere à necessidade de mudança e reestruturação; por sua vez, a fase da revolução científica está relacionada às mudanças, aos novos paradigmas que foram constituídos com base na visão de mundo. Cada etapa está relacionada à aplicação dos estudos focados no mundo, no homem, no meio, seguindo as mudanças de paradigmas que naturalmente ocorrem na ciência, o que o autor chama de invisibilidade das revoluções científicas.

Os povos antigos, como os sumérios (3.000 a.C.), desenvolveram estudos científicos em astronomia e matemática, por mais que não os chamassem assim, porém, a forma de comunicação e propagação se limitava aos poucos estudiosos que se dedicavam à causa. Muitos estudos da antiguidade, como os dos Sumérios, de Platão e Aristóteles, entre muitos outros, ainda refletem na ciência moderna até os dias atuais (FERREIRA, 2015).

No entanto, essa invisibilidade foi mudando. As primeiras universidades foram constituídas pelas escolas especializadas em: artes, direito, medicina, teologia, surgiram por volta do século XII-XIII, em Paris, Bolonha e Oxford, e se consagraram como uma unidade de ensino superior reconhecida, em meados do século XIV (HASKINS, 1927; OLIVEIRA, 2007), um modelo diferente de universidade, das que existem hoje. No modelo atual de universidade, a pesquisa passa a fazer parte do processo de ensino e aprendizagem, advindas da onda do renascimento e humanismo, das quais ensinavam: aritmética, geometria, astronomia, música, gramática, retórica, dialética, como núcleo comum, feito isso, os alunos podiam se especializar em: direito, medicina, teologia ou em artes (OLIVEIRA, 2006), fazendo com que o fazer científico se institucionaliza-se nesse ambiente, em especial.

É a partir da constituição das universidades que os estudos científicos ganham um formato organizado no fazer e publicar ciência, estruturado no surgimento dos primeiros canais de comunicação formal, por meio dos periódicos científicos em 1665, o Francês *Journal des Savants* e o Britânico *Philosophical Transactions of the Royal Society*, precursores do sistema de comunicação científica padronizados, os quais foram se aperfeiçoando aos moldes dos que existe nos dias de hoje (POBLACIÓN *et al.,* 2012). Esses periódicos são o marco da evolução científica, se tornando a principal estruturada de avaliação e comunicação do conhecimento produzido, ambos existem até os dias atuais.

A padronização da publicação científica alavancou e otimizou o fazer científico, difundiu ideias, conhecimento entre os estudiosos, desencadeando eventos de área, organização de classe, todos os segmentos da comunidade científica passam a usar dessa estrutura para avaliar e divulgar a ciência; essa ampla difusão do conhecimento possibilitou o aperfeiçoamento de áreas e subáreas de conhecimento.

A ciência continua a mesma, tem credibilidade, leis, teorias, métodos, ainda aplica os processos para a avaliação e validação científica; no entanto, o que mudo foi o conhecimento científico, a humanidade continua se deparando com novas descobertas, lidando com as complexidades do universo, construído sondas e satélites que chegam mais longo, que possibilitam observa melhor a galáxia, obtendo achados de novas estrelas, planetas etc.

Por tanto, a evolução científica se dá por meio das descobertas científicas, por meio do fazer científico, isso quer dizer que a ciência continuai igual, porém, a forma de fazer pesquisa, de avaliar, publicar e mensura é que estão mudando. As redes da *web* impacta no fazer científico; o processo para anunciar um achado científico, antes das tecnologias de comunicação, levava meses para chegar até as pessoas, na atualidade, os pesquisadores publicam o fato no *Twitter* e toda a comunidade passa a falar sobre o assunto. O fazer científico só se reorganizou para atender as demandas e as necessidades atuais.

De acordo com San Segundo (2012, p. 249, tradução nossa), a evolução da organização do fazer científico está ligada a trajetória cultural, política, econômica e tecnológica, em constante transformação, esse dinamismo deve-se ao meio digital, e a todas as estruturas sociais.

Nessa conjuntura, os das tecnologias, o que muda no fazer científico são os processos de produção, de comunicação e difusão das pesquisas. Quando Merton (1942) dizia que os cientistas precisavam sair da caixa, era disso que ele estava falando, da integração da ciência com a sociedade.

As tecnologias popularizaram o fazer científico, as pessoas consomem ciência, consultam fenômenos nas redes, estudam *online,* discutem temas, assistem palestras de especialistas, que ficam gravadas ou são dispostas no ao vivo, todas essas mudanças fazem parte da evolução da ciência, é a ciência se abrindo, compartilhando, ensinando, e todos podem usufruir.

Nesse cenário, a comunicação científica tem um papel importante, no processo de evolução da ciência, é ela quem dissemina os novos conhecimentos, promove a reflexão, a difusão do saber, com isso a informação se amplia, a todo o momento, e os impactos causados pelo novo modelo de divulgação da comunicação cientifica reverbera na evolução da ciência, na atualidade.

2.3 CENÁRIO DA COMUNICAÇÃO CIENTÍFICA

Meadows (1999, p. 3), enfatiza que, “ninguém pode afirmar quando foi que se começou a fazer pesquisa científica e, por conseguinte, quando, pela primeira vez, houve comunicação científica”. Mas o fato é que, desde que achados científicos foram sendo descobertos e aplicados na sociedade, o fazer científico se tornou uma prática importante no processo da evolução da humanidade. A forma de fazer ciência continua a mesma, porém, os moldes dessa comunicação vêm mudando.

A comunicação científica é oriunda de estudos que visam dar aporte para uma pesquisa ou uma área de conhecimento, já a publicação científica é o resultado desses estudos, os quais apresentam conclusões e reflexões para a comunidade científica. Esse processo tem a função de validar e disseminar o conhecimento, dar continuidade ao fazer científico, definir e legitimar novas disciplinas e campos de estudos (GARVEY, 1979, p. 36). Algumas características fazem com que o conhecimento científico tenha reconhecimento junto aos seus pares: autenticidade, imparcialidade, qualidade, confiabilidade, credibilidade e replicabilidade, ou seja, ciência feita de cientistas para cientistas. Neubert (2013), indica que é na publicação formal de um estudo que o pesquisador garante a certificação e validação desse estudo perante a comunidade científica.

Com o número crescente de pesquisadores, periódicos e de publicações, a comunicação científica passa por um processo de transformação, que se constitui na existência de um novo paradigma, conforme a descrição de Kuhn (2006). Nesse cenário, a sociedade científica vem questionando a função da comunicação científica para além da ciência, como uma missão também social, focada na disposição e acesso do conteúdo científico, produzido por inúmeros pesquisadores, os quais detém de vínculo com instituições de pesquisa e financiamento.

A comunicação científica caminha para o modelo da ciência aberta — *Open Science*; seu novo formato de avaliação e publicação tem revolucionado o fazer científico tradicional, em quase todas as etapas do processo; pois o modelo aberto trabalha de forma transparente e colaborativa, promovendo a “reutilização, redistribuição e reprodução da pesquisa, de seus dados e de seus métodos” (FOSTER, 2021). A ciência aberta vai além da ideia de ciência cidadã, democrática, ciência responsável, pois visa a abertura de todo o processo científico, desde a produção, publicação, divulgação e o acesso do conhecimento científico.

Todo esse movimento começou com a declaração de Budapeste de 2002 — *Budapest Open Access Initiative* (BOAI) — documento que estipula o acesso aberto para a literatura acadêmica e documentos de pesquisa (*Statementon Open Access to Scholarly Literature and*

Research Documentation). Conforme Fausto (2013), "A BOAI 2002 também definiu o 1º protocolo de interoperabilidade entre fontes *on-line,* o *Open Access Initiative-Protocol for Metadata Harvesting* (OAI-PMH)".

Em 05 de dezembro de 2003, a Federação Internacional de Associações e Instituições de Bibliotecários (IFLA) lança a Declaração da IFLA sobre Acesso Aberto à Literatura Científica e Documentação de Pesquisa, na qual se compromete em garantir o amplo acesso à informação para todos (IFLA, 2016).

Em 23 de maio de 2014 foi apresentada a LIS - *Open Access Declaration*, da área de Biblioteconomia e Ciência da Informação, visando disponibilizar o acesso aberto ao conhecimento científico para toda sociedade interessada (OADWIKI, 2019).

Na mesma linha de ação, a declaração de 9 de novembro de 2015, do Conselho Latino-Americano em Ciências Sociais, trata o conhecimento científico como um bem comum, que deve ser disponibilizado em acesso aberto (ALPERIN; FISCHMAN, 2015).

O conhecimento científico é tão importante para a sociedade que, a declaração de acesso aberto da União Europeia foi apresentada em 27 maio de 2016, nela é estipulada que, toda pesquisa científica financiada com dinheiro público, deveria estar disponível e de acesso aberto até 2020; o projeto foi implantado e segue trabalhando intensamente.

Outra versão da "Declaração de dados abertos na Ciência Europeia" de maio de 2018 — apresentada pelo Conselho Internacional para a Ciência (ICSU) e a Federação Europeia de Academias de Ciências e Humanidades (ALLEA) — enfatiza que as pesquisas financiadas com dinheiro público devem disponibilizar seus dados de forma aberta, para que sejam aproveitados por outros pesquisadores (INTERNATIONAL SCIENCE COUNCIL, 2018).

Desde o advento da *internet*, redes sociais e a publicização da ciência em acesso aberto, o fazer científico ganha o olhar de toda sociedade, interessada no que a academia está produzindo, estudando e publicando. O conhecimento científico aufere uma proporção maior, devido às mudanças sociais, principalmente com o movimento do *open Science,* fundamentado nos eixos do: *open access, open data, open review* (SPINAK, 2018), que são modalidades que alavancam novas maneiras de fazer, divulgar e ter acesso ao conhecimento advindo da ciência.

Essas iniciativas fizeram com que houvesse mudanças na forma como a comunicação científica tem sido feita, como enfatizam Anglada e Abadal (2018, p. 293, tradução nossa): "Isso não muda substancialmente com relação às suas motivações e objetivos, mas o faz (substancialmente) em termos de seus métodos"; a mudança está focada na abertura, na colaboração, desenvolvida com e para a sociedade.

São vertentes que encabeçam a disposição da informação acessível a todos, assim como

os dados e as fontes utilizadas para constituir uma pesquisa; há a colaboração entre instituições, pesquisadores e países, para cooperar no esforço contínuo da promoção do acesso ao conteúdo científico. São esses os movimentos que romperam com o paradigma da ciência tradicional, feita para cientistas, o qual propõem dar visibilidade para o conhecimento científico que está sendo produzido no mundo afora, que vem ao encontro com a ideia das fases da ciência, expostas por Kuhn (2006).

Fachin e Araújo (2018), enfatizam que vários pesquisadores altruístas dispendem de esforços para cooperar com as demandas dos serviços gratuitos e acessíveis a toda humanidade, no projeto de acesso à ciência aberta, e as mudanças científicas e estruturais mostram que essa transformação é um caminho sem volta.

Pois, no processo de comunicação científica, o autor busca ser lido, o editor busca visibilidade para o periódico do qual trabalha, a instituição financiadora quer obter retorno do investimento em estudos e pesquisas, o leitor quer encontrar na *web* respostas para as suas indagações, essa é uma rede complexa, que conecta vários atores com necessidades e interesses distintos; e nesse contexto, a evolução da divulgação científica na *web* possibilitou um novo olhar sobre a forma de fazer e publicar a pesquisa.

Um dos impactos visíveis foi a forma de divulgação dos estudos científicos, os quais ganham maior visibilidade e atenção nas redes sociais; autores passaram a ter rosto e voz, ao contrário do modelo anterior, no qual os autores eram figuras místicas por trás das escritas em periódicos científicos pagos, sem acesso para o povo.

Para Ollé e López-Borull (2017, p. 198) *"Las redes sociales has transformado el modelo de comunicación y la forma de relacionarmos, así como la búsqueda, recepción y compartición de información, en su mayoría, mediatizada por internet"*. As redes ajudam ampliar a propagação científica na medida em que proporcionam a criação de perfis gratuitos dentro da plataforma, permitem a construção de uma 'teia' de usuários para compartilhar conteúdos, que possibilitam verificar dados e usos das informações, feitas pelos usuários desses ambientes. Se os usuários da informação científica estão nesses ambientes, então é natural que a disseminação da informação científica também aconteça nessa atmosfera, gerando maior visibilidade para o material que está disponível na rede.

A ciência, ao ser exposta na *web* social e acadêmica, ganha um espaço privilegiado, tornando-se um canal de comunicação direto, no qual aufere leitores dos mais diversos tipos, que passam a acessar esse conhecimento de forma irrestrita.

Seguindo essa linha, Fecher e Friesike (2013, p. 8, grifo nosso) enfatizam que a ciência aberta segue a cinco modelos ou vertentes de pensamento:

> a) vertente democrática, direcionada para o acesso do conhecimento igualitário;
> b) pragmática, preocupada com a pesquisa e a colaboração dos pesquisadores;
> c) vertente da infraestrutura, focada no acesso e uso de ferramentas e estruturas acessíveis e abertas;
> d) vertente pública, aflita com as questões em tornar a ciência acessível ao público/sociedade;
> e) *e a vertente das métricas que se preocupam com a medição dos impactos alternativos para a ciência*.

Todas essas modalidades de estudo e aplicações da ciência ecoam na comunicação científica, desencadeando as tendências e práticas, no cenário atual. O movimento desencadeado pelo acesso aberto fez com que houvesse uma nova dinâmica, influenciando em todas as etapas da pesquisa, desde a produção, avaliação, publicação e acesso do conhecimento científico. O acesso aberto conforme a declaração de Budapeste (2002), visa a possibilidade de acesso gratuito ao conteúdo científico para que qualquer um possa ler, baixar, utilizar, copiar, redistribuir ou qualquer que seja a finalidade, de forma lícita, sem custo ou impedimento financeiro, jurídico ou técnico, na obtenção desse material. Nos arquétipos da ciência aberta, o ciclo da comunicação científica fica mais transparente, possibilitando as diversas formas de registro do saber (NASSI-CALÒ, 2017).

Das modalidades da ciência aberta, a mudança mais impactante é a revisão pelos pares, uma estrutura que foi apresentada por William Whewell em 1831, na época, visava ajudar os pesquisadores com temáticas e áreas das quais eles não dominavam muito bem, por isso a avaliação de um especialista passou a ser um fator decisivo para a validação do conhecimento de um estudo científico, até os dias atuais. Atualmente existem duas formas de revisão por pares, a revisão tradicional e a aberta (NASSI-CALÒ, 2017). Nesse processo de revisão, há dois elementos: o primeiro diz respeito à avaliação do material submetido, seja ela fechada ou aberta; o segundo elemento diz respeito ao parecer deste material, que pode ser publicado ou não. Na avaliação tradicional, o formato pode ser simples ou duplo cegas. Na opção de revisão simples, o autor não sabe quem é o revisor, mas o revisor sabe quem é o autor; na revisão dupla cegas, apenas o editor sabe quem é o revisor e o autor do texto. Nessa modalidade de avaliações foi integrada uma opção, oriunda da ciência aberta, a possibilidade de publicar o parecer depois do aceito do material avaliado; esse parecer pode ser publicado de caráter aberto ou com o anonimato do parecerista. Cabe ao autor e ao parecerista concordarem com as opções: a de publicar, e a de usar ou não o anonimato no parecer do texto.

Na modalidade de revisão aberta, Ross-Hellauer (2017, p. 07, tradução nossa), indica que existem sete modelos, ou formato de avaliação:

> a) Identidades abertas: Autores e revisores estão cientes da identidade uns dos outros;
> b) Relatórios abertos: relatórios de revisão são publicados juntamente com o artigo relevante;
> c) Participação aberta: A comunidade mais ampla é capaz de contribuir para o processo de revisão;
> d) Interação aberta: discussão recíproca direta entre autor (es) e revisores, e / ou entre revisores, é permitido e encorajado;
> e) Manuscritos de pré-revisão abertos: Os manuscritos são feitos imediatamente disponível (por exemplo, por meio de servidores de pré-impressão como *arXiv*) em antes de quaisquer procedimentos formais de revisão por pares;
> f) Abrir comentários da versão final: revisar ou comentar publicações finais da "versão do registro";
> g) Plataformas abertas ("revisão dissociada"): A revisão é facilitada por uma entidade organizacional diferente do local de publicação.

A publicação do parecer dos avaliadores faz parte da modalidade aberta, só que ela pode ser anônima ou não, cabe ao parecerista decidir se quer ser identificado ou não. A avaliação por pares aberta "aumenta a transparência, eficiência e a responsabilidade do processo de revisão", já o anonimato dos pareceristas continua sendo uma questão pertinente e relevante para a comunidade científica, pois são poucos os pesquisadores que aceitam expor sua identidade, os seniores que têm vínculo acadêmico preferem o conforto da avaliação aberta, porém com o anonimato na publicação do parecer (NASSI-CALÒ, 2015b, 2017, 2019).

Assim como a avaliação aberta, o uso e publicação de dados abertos — *open data*, têm sidos incentivados pela comunidade científica, com maior aderência pela área da saúde, principalmente durante a pandemia da Covid-19. O benefício está em maximizar o olhar sobre um fenômeno e agilizar o processo de pesquisa, na obtenção de dados que já foram coletados e estruturados, facilitando novas análises e aplicações da ciência, que pode ser em uma mesma área ou em áreas distintas.

Spinak (2013) sinalizou que os dados abertos visam a acessibilidade para todos; que os custos devem ser marginais ou gratuito a esse tipo de dados; assim como dispor de forma aberta o direito de uso e distribuição dos dados de pesquisa; fala a respeito da necessidade de legibilidade dos dados por máquinas e pessoas. O autor afirma que a abertura dos dados de pesquisa pode acabar com as lacunas de informação, servindo de aporte para novas pesquisas em diversos setores, ajudando na inovação, produtividade e economia em novos estudos (SPINAK, 2013, 2015).

Mas a disposição dos dados de pesquisa, de forma aberta, requer estrutura, organização e gestão desses dados, capacitação de autores, legislação universal de armazenamento, uso e

reuso desse tipo de dados, políticas públicas de incentivo, e do dever para com os recursos públicos de pesquisa; visto que a disposição de dados de pesquisa, de forma aberta, não é uma tarefa fácil já que envolve uma grande mudança cultural no fazer científico e social.

Spinak (2019), ao analisar o relatório de dados abertos da *Findable, Accessible, Interoperable and Reusable* (FAIR), aponta que "apenas 17% relatam que seus dados são divulgados gratuitamente na *web*, em acesso aberto", e que apenas 7% dos respondentes da pesquisa afirmam que aplicam o gerenciamento de dados, que atendem aos quatro critérios: Publicar os dados *on-line*; permitir o acesso gratuito de pelo menos uma parte dos dados; dispor em formatos de dados interoperável, acessível as máquinas e pessoas; 18% dos respondentes indicaram, no relatório apresentado por Spinak (2019), que atendem a três dos quatros critérios definidos pela FAIR. Isso se dá, pela existência de barreiras, como a falta de conhecimento de como fazer, onde e como dispor desses dados, e, sobre a questão dos direitos autorais de conteúdos e materiais que detém de embargo financeiro, vindo a limitar a prática.

Porém, a iniciativa da *Public Library of Science* (2020) e do *Wellcome Open Research* (2020) são exemplos de plataformas desenvolvidas com infraestrutura para a ciência aberta, a qual possibilita a publicação rápida da pesquisa e de seus dados, promovem a avaliação por pares transparente e aberta, com suporte editorial em todo o processo. Um aspecto importante dessas plataformas é que há um custo menor de processamento dos dados no fluxo editorial, que fica por volta 64% mais barato que o sistema tradicional pago (KILEY; MARKIE, 2019). Os autores citados mencionam que, fundações como a Bill e Melinda Gates, entre outras que financiam pesquisas, estão desenvolvendo suas próprias plataformas para a publicação e disposição de pesquisas nos moldes da ciência aberta.

Outra questão sobre a atual conjuntura da comunicação científica são os formatos de rápida publicação de textos. As modalidades que agilizam a publicação do conteúdo científico são:

(a) *Preprint*: publicação da versão para avaliação aberta;
(b) *Ahead of print*: publica a versão final do texto com paginação e sumário temporário;
(c) Publicação contínua: na qual o texto é avaliado, aceito, preparado e publicado no periódico, sem a necessidade de esperar fechar uma edição;
(d) *Articles in Press*: publica o artigo que já foi aceito, mas que falta a formatação da edição final, o que pode ser chamado de formato no prelo.

O formato do *preprints*, é um modelo que "disponibiliza o manuscrito em um repositório sem a avaliação por pares" (SILVEIRA *et al.,* 2021, p. 14), e que ganhou espaço na ciência

aberta, pois a comunidade científica entende que as pesquisas preliminares podem ser dispostas de forma pública, a fim de receber pareceres voluntários dos pesquisadores, e que está tudo bem se não houver anonimato nesse processo, pois todos ganham com a melhoria da pesquisa e avanço da ciência, entendendo que o texto poderá ser publicado posteriormente.

Muitas bases como a PLOS, disponibilizam dessa modalidade, de submissão e avaliação aberta, principalmente em temas novos ou inovadores, os quais carecem de publicação e visibilidade imediata, pois continua sendo a comunidade científica que julga o é pertinente na pesquisa. Esse modelo tem sido muito usado durante o estudo para o combate da pandemia do Covid-19.

A motivação para a publicação em diferentes formatos (Publicação contínua, *Preprint*, *Ahead of print, Articles in Press*), ocorre devido ao intenso fluxo de trabalho e à demora da publicação. Algumas bases de dados estão adotando esses formatos como pré-requisito de indexação, como forma de agilizar a publicação de pesquisas científicas (PADULA, 2019). E com essa imensidão de publicações, cada vez mais rápida, o meio editorial científico preciso inovar na divulgação de seus conteúdos, utilizando dos recursos da *web* como forma de difusão e disseminação do conteúdo, uma prática que passa a ser a última etapa do ciclo editorial, no modelo atual de comunicação.

A propagação desses materiais junto à aplicação de técnicas do *Marketing,* voltadas para o conteúdo científico na *web,* proporcionam extensa interação com os membros da sociedade, expandindo a visibilidade, atenção *on-line* e o impacto desses materiais nestes ambientes dos quais estão expostos (FACHIN; WERLANG; BLATTMANN, 2022).

As redes se tornaram espaços propícios para a divulgação e obtenção de conteúdos científicos, proporcionando aos usuários certa autonomia de uso de tipo de material, disponível neste meio. Souza (2014, p. 33), enfatiza que a *web* social consolida "[...] formas de autoridade geradas pelos usuários que participam em suas diferentes ferramentas — popularidade [...]; atribuição de valor por meio do uso de *tags*; avaliações (como o "curtir" do *Facebook* ou o "gostei" do *YouTube*) entre outras".

Apesar do reconhecimento dos usos feito ao conteúdo científico nas redes sociais e acadêmicas, a comunidade científica ainda não o considera como elemento impactante para a ciência e agências de fomento, no entanto, se o usuário utiliza a informação disponível na rede, mesmo que não gere citações, esse uso precisa ser considerado. Essa dicotomia da comunidade científica tem gerado várias reflexões a respeito do assunto.

A constituição da rede da *web* em si é um fenômeno, fruto da evolução social e tecnológica de forma autônima e altruísta, objeto de estudo em várias áreas de conhecimento.

Para tanto, é preciso repensar a organização dos sistemas de mensuração da publicação científica, para que com isso seja possível medir o real impacto e uso do fazer científico em distintos ambientes e usuários, e não apenas por meio das citações recebidas, que é um dos vários indicadores existentes.

2.4 SISTEMAS DE MEDIDA PARA A PUBLICAÇÃO CIENTÍFICA

Os sistemas de medida aplicados à publicação científica foram surgindo conforme as necessidades de cada momento, assim como a área e os ramos de estudo de mensuração de impacto para esse tipo de conteúdo, o qual se encontra em cenários distintos. Vanti (2002), Costa *et al.* (2012), Glänzel e Gorraiz (2015), Vanti e Sanz-Casado (2016) e Pinheiro (2020) indicam que o emprego de diferentes ramos de estudos métricos possibilita traçar uma linha histórica decorrente da evolução social e científica dos usos, aplicação de métricas e sistemas de medidas nas diversas fases da comunicação científica para distintas finalidades.

Os estudos métricos, relacionados com a comunicação científica seguem a uma ordem cronológica:

a) **Métricas de uso**: aplicadas por bibliotecários, principalmente para medir o uso e a satisfação dos usuários em unidades de informação, por meio das e-métricas; que ficou bastante popular a partir de 2002, com o surgimento das revistas científicas eletrônicas, e que mais tarde foram incorporadas nas métricas de citação.

b) **Bibliometria**: tem uma aplicação interdisciplinar, verifica a relevância da citação x produção x quantidade de autores, redes e instituições. O primeiro estudo do gênero foi utilizado em 1917 por Cole e Eales, nesse momento essa aplicação ainda não se denominava bibliometria (COSTA *et al.*, 2012). O autor Hulme, em 1923, designou os estudos de uso de acervos como Bibliografia Estatística, que visava dar visibilidade as publicações da ciência e tecnologia, por meio da contagem de documentos (PRITCHARD, 1969). Mais tarde Paul Otlet, menciona a necessidade do emprego de estudos de medidas e quantidades aplicada aos livros, pelo qual ele denominou de *Bibliometrie*, empregada a quantificação dos usos dos livros e autores de uma biblioteca (OTLET, 1934), o termo se aplica para o que se conhece hoje por *library metrics*, ou biblioteconometria. Em 1969, o pesquisador Alan Pritchard problematizou esses dois tipos de estudo na obra “Bibliografia Estatística ou Bibliometria?”, momento no qual o autor define a Bibliometria como um campo novo, de forma mais específica, como os estudos que quantificam publicações científicas por meio da “aplicação de matemática e estatística e métodos para livros e outros meios de comunicação” (PRITCHARD, 1969, p. 349). O estudo de Nicholas e Ritchie

(1978) relata que a diferença entre a bibliografia e a bibliometria está no fato em que esta tem prioritariamente o uso de método quantitativo ao invés do método discursivo, comumente usados na bibliografia. Ainda, cabe salientar que não há um consenso da comunidade científica a respeito de quem cunhou o termo bibliometria, devido a finalidade de aplicação dada por cada autor (MOMESSO; NORONHA, 2017). De fato, a bibliometria é a disciplina que aplica leis da matemática, conhecidas como: Lotka (1926) - Lei de Produtividade de Autores; Bradford (1934) - Lei de Dispersão de Periódicos; Zipf (1949) - Lei de Frequência das Palavras (PINHEIRO, 2020; ARAÚJO, 2006; VANTI, 2002).

c) **Cientometria**: tem interesses comuns com a bibliometria e a infometria. É o estudo da ciência, do crescimento, estrutura, inter-relações e produtividade; estuda os dados quantitativos e estatísticos, referentes a pesquisas científicas e da própria ciência, visa analisar em especial o impacto de uma área científica (VANTI, 2002). No entanto, Mingers e Leydesdorff (2015) mencionam que a cientometria foi definida pela primeira vez por Nalimov e Mulcjenko, em 1971. Por sua vez, Vanti (2002) indica que o termo ganhou visibilidade em 1977, com a publicação de Dobrov & Karennoi.

d) **Infometria**: aplica métodos estatísticos e matemáticos para medir a informação, palavras, documentos, independente do suporte, bases de dados, *homepage*; o termo foi empregado por Otto Nacke em 1979 (VANTI, 2002). Esse campo é mais abrangente e aborda todo e qualquer estudo de informação (MINGERS; LEYDESDORFF, 2015).

e) **Webmetria**: analisa de forma quantitativa o conteúdo, as estruturas, os *links* e *sites,* os recursos informacionais, sob a ótica dos estudos infométricos e bibliométricos (ALMIND; INGWERSEN, 1997). O termo foi cunhado em 1997 na 6ª Conferência Internacional de Cienciometria e Informetria (VANTI, 2002).

f) **Análise de citação**: começou a ser utilizada como forma de complementar às métricas de uso para auxiliar nas tomadas de decisão em bibliotecas. Esse tipo de análise foi aplicado pela primeira vez por Gross e Gross em 1927, mas o método passou a ser difundido após o surgimento do **fator de impacto**, um indicador que analisa as citações, impulsionadas pela criação do *Science Citation Index* por Eugene Garfield (1972), aplicando o fator de impacto nas publicações científicas disponíveis na *web*.

g) **Altmetria**: estuda as aplicações e a interação da publicação científica em diversos canais da *internet*, principalmente os não científicos. Conforme Vanti e Sanz-Casado (2016), as primeiras publicações a tratarem do assunto foram “Análise dos principais componentes de 39 medidas de impacto científico” de Bollen *et al.* (2009). O manifesto de Priem *et al.* (2010) e a “Coleção Altmetrics” de Priem, Groth e Taraborelli (2012), são esses os estudos que

apresentaram a altmetria como um novo indicador de análise científica nas redes sociais.

No entanto, a ideia de aplicação de métricas padronizadas surgiu na década de 50, com a reflexão da necessidade de indicadores de "qualidade do conteúdo", exclusivamente científico, para o que estava sendo produzido e publicado nos canais formais de comunicação (GARFIELD, 1972). Esses indicadores passam a ranquear os textos pela citação ou menção, auferindo um grau de relevância, dando a visão de que alguns autores são mais lidos e vistos que outros, quando esses recebem maior número de citações que outros. É um sistema de retroalimentação que os pesquisadores utilizam para alavancar seus índices de menção na publicação científica.

A comunidade científica, como já foi visto, também precisou criar padrões para estruturar a publicação científica, com esse objetivo, desenvolveram o sistema de avaliação por pares, que proporcionou e ainda proporciona maior confiabilidade e credibilidade para a publicação científica. Contudo, os autores e pesquisadores precisavam saber se as pesquisas que produziam e publicavam eram relevantes para a comunidade científica. A maneira pensada para solucionar esse problema foi a aplicação de estudos de análise e mensuração dos usos feitos das publicações, desenvolvidos por meio de vários indicadores.

Na visão de Meadows (1999), a melhor forma de avaliar a qualidade de uma publicação é verificar o nível de interesse desta pela comunidade científica, através da citação de um conteúdo publicado.

Seguindo a essa linha, o estudo de Eugene Garfield, de 1955 na *Science,* propõe um sistema bibliográfico que padronize as menções de estudos, um índice de citação, o que viria a ser a estrutura do Fator de Impacto e que mais tarde foi lançado pelo autor; a sugestão possibilitou o desenvolvimento do modelo de mensuração, aplicada com base no sistema de citação de *Shepard*, proveniente da área do Direito (GARFIELD, 1955). Garfield tinha o objetivo de organizar o cenário da publicação científica, no que diz respeito aos usos dos dados para cada texto, dessa forma, os autores e comunidade científica se beneficiariam, pois saberiam em quais campos e abordagens os seus estudos estariam sendo aplicados, por meio das menções feitas em outros trabalhos, indicando a influência deste trabalho para outros autores; seria algo como: foi lido e considerado importante, então o texto era citado (GARFIELD, 1972).

Com base nesses elementos do sistema de mensuração é que a comunidade científica passou a considerar quais textos eram relevantes ou não, aplicando alguns indicadores de avaliação da produção científica. Conforme sinaliza Costa *et al.* (2012), os indicadores são:

a) qualidade científica – apreciação dos pares na avaliação do conteúdo de publicações;

b) atividade científica – contabiliza a atividade científica, verificando quantidade de

trabalhos, produtividade de autores, colaboração na publicação de trabalhos, quantidade de referências empregadas nas publicações;

c) impacto científico – existem dois tipos: impacto de trabalho, por meio da contabilização de citação, e o impacto da fonte, por meio do fator de impacto da revista;

d) associações temáticas – por meio da análise de citação e referência, levantando tendências temáticas (COSTA *et al.,* 2012).

A avaliação da produção científica é importante para comunidade científica, por isso há a necessidade da criação de indicadores que não se restrinjam apenas ao impacto. Bem como menciona Costa *et al.* (2012), existem vários elementos de mensuração que foram criados para observar os diversos fatores que enredam a comunicação científica. Moed (2017) apresenta onze tipos de indicadores:

a) Indicadores baseados em publicações;
b) Indicadores baseados em citações;
c) Indicadores de métricas de periódicos;
d) Indicadores baseados em patentes;
e) Indicadores baseados em uso;
f) Indicadores baseados em Altmetria;
g) Indicadores baseados em Webometria;
h) Indicadores econômicos;
i) Medidas baseadas em reputação e estima;
j) Medidas de colaboração científica, migração e interdisciplinaridade; e,
k) Indicadores de infraestrutura de pesquisa.

O mesmo autor assinala que, todo tipo de indicador pode ser afetado por N fatores e sofrer graves vieses em sua formulação. “Os fatores de impacto do periódico não são bons preditores da taxa de citação de artigos individuais em um periódico. Apenas erros aleatórios tendem a se cancelar em grandes conjuntos de dados; vieses sistemáticos podem permanecer” (MOED, 2017, p. 32, tradução nossa).

Dentre tantos, o indicador que ganhou maior aderência foi o de impacto científico, por meio do sistema *Information Sciences Institute* (ISI), e o *Fator de Impacto* (FI), tornando-se mais que uma ferramenta para acompanhar os usos da produção científica, configurando-se em um sistema de mensuração em que a qualidade de uma publicação é aferida conforme a quantidade de citação que esta recebe ao longo dos anos. Porém, continua sendo exclusivamente de materiais científicos em ambientes restritos, limitados às bases de dados de sistemas tradicionais, como o caso do ISI, os quais são usados apenas por cientistas, ou seja, nesse caso a mensuração do uso feito dos materiais científicos não evoluiu com os canais de comunicação

e a dinâmica da *web.*

Uma questão interessante que Garfield (1955) apontou é que, o sistema de mensuração de impacto científico poderia dar visibilidade aos textos de periódicos "menos importantes", os que não estariam nos grandes índices e bases de dados; estes, ao serem citados, apareceriam automaticamente no índice de citação, ficando mais visíveis.

Nesse contexto surgiram várias indagações, dentre elas: uma citação realmente indica que uma pesquisa tem qualidade, ou, que é mais útil do que outra que não obteve a menção científica? O conteúdo científico só é relevante se for utilizado por cientistas? Esses questionamentos junto às tecnologias de informação e comunicação e o movimento do acesso aberto, na ciência aberta, colocaram em prova o sistema tradicional de mensuração, ou seja, a comunidade científica quer saber o que realmente impacta, e a quem esses estudos importam, para além dos sistemas tradicionais de mensuração quantificável.

O sistema bibliográfico sugerido por Garfield em 1955, que iniciou a ideia de construção de um indicador, o FI quinze anos depois, foi só o primeiro de muitos outros que vieram a seguir. Surgiram indicadores de menção de artigos, autor, instituição e, atualmente, os de usos alternativos, por meio das redes sociais, seguindo as tendências da sociedade da informação inserida nas redes da *web*. No Quadro 1 apresenta-se os diversos sistemas de mensuração existente na atualidade.

Quadro 1 - Sistemas de Mensuração

SISTEMAS DE IMPACTO DE PERIÓDICOS
ISI/JCR *Social Sciences Edition* – contabiliza o número médio de citações dos materiais recentes publicados pelo periódico.
Eigen factor and Article in Fluence – faz uma média de forma que a soma de todas as citações de um periódico seja 100. Mede a influência do periódico e dos artigos.
SJR *Scimago Journal & Country Rank* – ranqueia os periódicos com maiores indicadores de impacto científico.
Source Normalized Impact per Paper – indicador de impacto padronizado, mede o contexto de uma citação, ponderando com base no número total de citações em um campo de assunto. Uma única citação pode receber um valor maior em áreas de assuntos, em que são menos prováveis e vice-versa. Usado para verificar o potencial de citação de uma área.
Google Scholar Metrics - ranqueia os periódicos com maior número de citação, como indicador de impacto.
SISTEMA DE ACOMPANHAMENTO DE IMPACTO
Web of Science Citation Tools – disponibiliza os dados de mensuração dos materiais indexados no JCR.
Google Scholar Citations – contabiliza as citações, índice h e o i10 de autores.
PLoS Article-Level Metrics – rastreia o uso e a reutilização de resultados de pesquisa, visualizações, compartilhamento, citações e *download* de textos.

Publish or Perish – rastreia os dados em bases específicas e apresenta: quantidade de publicação por ano; média de citações por ano; quantidade artigos analisados; total de citações; total de citações por ano; soma de citações por artigo; média de citação por autor; média de artigos por autor; média de autor por artigo; h-índice; g-índice; hi-normal/ individualizado; hi anual.
INDICADOR DE IMPACTO DE AUTOR
Índice H – no qual o número de citação é igual ou maior que o número total dos textos publicados por um mesmo autor. Um autor contém 70 artigos publicado, e 20 desses têm 20 citações cada, o índice vai ser h20.
Índice h5 index – é um índice de artigos que contabiliza o número de artigos mais citados nos últimos 5 anos completos. Se em cinco anos um periódico obteve citações em 10 artigos, dos quais todos obtiveram mais de 200 citações cada um, o índice h5 do periódico será 200. A ponderação é por meio do recorte das publicações nos últimos 5 anos.
Índice i10 - quer dizer que, um número x de publicações recebeu, no mínimo, dez citações, então, 50 publicações receberam dez citações cada, o índice i10 é 50. A ponderação é mensurar 10 citações por publicação, indiferente de período ou quantitativo de publicações.
Índice G – o índice G pega um conjunto de artigos e os contabiliza, soma todas as citações desse total de artigos, testa para achar o quantitativo que ao ser elevado ao quadrado, se aproxima do total de citações. (ex,: um autor tem 8 publicações, mas apenas 5 artigos receberam citações, a soma dessas citações é = 16, o número de publicações ao ser elevado ao quadrado tem que ser menor ou igual ao total de citações, logo $4^2 = 16$, se fosse o número total de publicações, $5^2 = 25$ o valor seria maior que o total de citações (16), e se fosse $3^2 = 9$, bem a baixo do total de citações). Sendo assim, o índice G do autor, é 4, pois é igual ou menor que o total de suas citações.)

Fonte: Criado com base em: Strehl (2005), Egghe (2006), Bakerdh (2012), Marques (2013), Adams (2016), Cornell University Library (2018), Albert B. Alkek Library (2018), Publish or Perish (2018), Google Scholar Citations (2018), PLoS Article-Level Metrics (2018), Clarivate Analytics (2018), Library University of Maryland (2020), Harzing (2021).

Uma questão bastante relevante a ser mencionada é que o FI é um fator de impacto de periódicos que afere impacto por meio das citações dos artigos; o índice de citação afeta e influencia diretamente os indicadores de impacto da revista, pois, cada vez que um trabalho publicado pela revista é citado, indiretamente a revista recebe a contabilização, porque o material e a fonte estão diretamente vinculados.

Sabe-se que os periódicos que publicam textos de revisão tendem a ter mais citações dos que publicam textos inéditos; outra questão que infere no impacto são os periódicos com baixa visibilidade internacional e com a vida média de um artigo, que difere de área para área, para esses, o fator de impacto sempre vai ser baixo (NASSI-CALÒ, 2013). Os pesquisadores como: Bossy (1995), McKiernan (2004), Taraborelli (2008), Neylon e Wu (2009), Priem e Hemminger (2010), Priem (2015), Hicks *et al.* (2015), Maricato e Martins (2017), Cai *et al.* (2019), Wouters *et al*. (2019), entre outros, reconhecem que são muitas as críticas direcionadas ao FI, é que esse sistema de mensuração alavanca o movimento do produtivismo acadêmico com baixa qualidade, fortalecendo o viés da quantidade ao invés da qualidade.

Para tentar amenizar esse problema, o manifesto de Leiden para métricas de pesquisa, dos autores Hicks *et al.* (2015, p. 429-431), indicam dez princípios para orientar a avaliação de

pesquisa:

> a) A avaliação quantitativa deve apoiar a avaliação qualitativa e especializada;
>
> b) Medir o desempenho em relação às missões de pesquisa da instituição, grupo ou pesquisador;
> c) Proteger a excelência em pesquisas relevantes localmente;
> d) Mantenha a coleta de dados e os processos analíticos abertos, transparentes e simples;
> e) Permitir que os avaliados verifiquem dados e análises;
> f) Explique a variação por campo nas práticas de publicação e citação;
> g) Avaliação de base de pesquisadores individuais em um julgamento qualitativo de seu portfólio;
> h) Evite afirmações incorretas e falsa precisão;
> i) Reconhecer os efeitos sistêmicos da avaliação e indicadores;
> j) Examine regularmente os indicadores e atualize-os.

Mas, por enquanto, o sistema padrão de medidas continua com a mesma estrutura. O modelo de sistemas tradicionais de mensuração mais visa separar o 'joio do trigo', do que tornar o sistema mais igualitário, com isso, colaboram com os grandes *journals* que se fortalecem com o sistema de publicação, citação e medição de impacto científico, o qual se tornou um rentável mercado de divulgação e comercialização científica, devido aos padrões e exigências para a indexação de um periódico em um desses índices e bases de dados comerciais.

Quando surgiu o movimento do acesso aberto em 2002, uma das questões discutidas foi a dos sistemas de publicação e divulgação serem altamente onerosos e inacessíveis para muitos pesquisadores, tornando impossível desenvolver pesquisas de qualidade sem que houvesse o acesso à publicação científica de forma irrestrita, assim como para a publicação, devido a visibilidade desses canais.

Uma das soluções apontadas no evento mencionado foi de que, a comunidade científica teria que fazer um grande esforço para promover a publicação e divulgação científica de qualidade nos moldes do acesso aberto (OA). Isso exigiu muito altruísmo por parte dos adeptos ao movimento; por outro lado, surgiram periódicos híbridos que exigem taxas de processamento de artigo (APCs), para a publicação do material em acesso aberto, onerando o autor ou as instituições de ensino e pesquisa (VELTEROP, 2018). Desde então, os periódicos que aderiram ao movimento OA têm sido indexados em bases e índices criados para indexar só periódicos de acesso aberto, como forma de alavancar a difusão dessas pesquisas; no entanto, continuam à margem do forte sistema marqueteiro de divulgação científica profissional, por parte dos aglomerados de publicações científicas tradicionais e altamente rentáveis.

O movimento de OA mobilizou duas principais vias de publicação de acesso, a via verde e a dourada; a via verde representa cerca de 35% de todo conteúdo em acesso aberto no mundo. A via dourada representa cerca de 25% dos periódicos científicos de acesso aberto (NASSI-

CALÒ, 2018). Mesmo assim, o mercado comercial lucra com cerca de 65% das publicações, desses, 25% vão estar acessível para os usuários, pois o financiamento pela via dourada garante o acesso, mas não retira o custo da publicação.

Enquanto isso, o movimento do acesso aberto se preocupa com a ampliação da publicação de pesquisas acessíveis, mas os grandes periódicos investiram em ferramentas bibliográficas, sistemas de citação para bibliotecas, pesquisadores e massivamente em marketing científico, dando alta visibilidade para as suas publicações, fortalecendo ainda mais o sistema de impacto científico tradicional em seus periódicos pagos.

Um exemplo é a *Journal Citation Reports*-JCR, índice que tem mais de 11.000 periódicos indexados e um acervo composto por 250 disciplinas de 81 países, 2,2 milhões de artigos, revisões e outras fontes. Desse total, apenas 129 periódicos são brasileiros, dos quais, 103 são de acesso aberto (CLARIVATE ANALYTICS, 2018).

É por isso que, verificar a relevância de uma publicação apenas com base nas citações científicas, não atende ao propósito da ciência como um todo, pois continua sendo excludente.

No Quadro 2 são apresentados exemplos de diversos tipos de sistema de mensuração aplicadas em distintos modelos métricos para diversos usuários, materiais e ferramentas.

Quadro 2 - Mensuração da publicação científica em bases e ferramentas

	FONTES												
	Relatório de citação	**Dimensions**	**Scopus**	**Web of Science**	**Google Scholar**	**Citação do Google**	**LENS**	**Pesquisa acadêmica da**	**Mendeley**	**ImpactoStory**	**PLoS**	**Altmetrics**	**PlumAnalytics**
MÉTRICAS PARA													
Artigos		x	x	x	x	x[a]	x	x	x	x[a]	x		
Indivíduos		x	x	x		x	x	x		x[a]		x[b]	x
Instituições		x[e]	x	x			x	x	x[b]			x[b]	x
Países		x[e]	x	x			x						
Periódicos	x	x	x	x	x		x	x				x[b]	x
Tópicos		x											
MÉTRICAS TRADICIONAIS													
Citação	x	x	x	x	x	x	x	x		x	x		x
ALTMETRICS													
Visualizações/ downloads		x							x	x[c]	x		x
Leitores/ marcadores/*tags*		x							x	x	x	x	x
Comentários		x									x		
Meio de Comunicação		x							x			x	
Blogues		x								x	x	x	x
Facebook		x								x	x	x	x

Twitter		x								x	x	x	x
COBERTURA													
Transparência	x		x	x			x						
Multidisciplinar	x		x	x	x	x	x	x	x	x	x[c]	x	x
ACESSO													
Acesso livre					x	x		x	x	x[d]	x	x[d]	
Registro necessário						x			x	x			
Serviço pago	x		x	x					x[b]	x		x[b]	x
OPÇÕES AVANÇADAS													
Download/ gerenciamento de dados	x		x	x	x[c]	x[c]	x	x[c]		x[c]	x	x[b]	x[b]
Padronização/ limpeza de dados	x		x	x				x[c]					
Normalização	x		x	x						x[c]	x[c]		
Possibilidades de API	x[c]		x[c]	x[c]			x	x[c]	x	x	x	x	x

Notas:
a - Somente itens/pessoas/usuários inclusos no sistema (depende dos dados coletados/carregados pelos usuários);
b - Serviços pagos: Mendeley Institutional Edition/Altmetric Institucional Edition/Altmetric Explorer;
c - Com restrições/limitações;
d - Métricas de nível de artigo (*Mendeley, Altmetric*) e de autor (*ImpactStory*) gratuitos para visualizar;
e - Somente na versão paga.

Fonte: Traduzido e adaptado de LibGuides (2017, 2021).

Na atualização da LibGuides (2021), retiraram do quadro original, de 2018, os sistemas: Pesquisa Acadêmica da Microsoft, *ImpactoStory* e a *PloS*; e foram inserindo a Dimensions e a *LENS*. Por considerar importante para este estudo, foram mantidos os dados referentes aos dois sistemas retirados pela *LibGuides;* e ainda, foram acrescidos os dois novos, considerando importante saber o que cada um desses recursos mede, para título de comparação.

Cada uma dessas ferramentas tem seu próprio indicador, que segue a critérios definidos pela instituição mantenedora, a qual julga o que é pertinente e o que deve ser mensurado. Setti (2013, p. 2039, tradução nossa) indica que "[...] cada índice captura seus próprios dados de interesse, às vezes ignora ou tira a ênfase de outros dados e/ou tem suas próprias desvantagens". Cada indicador tem um objetivo de análise, geralmente observa apenas um aspecto da produção ou comunicação científica, seja a parametrização de citação, impacto de periódico, produção ou impacto de autor, visibilidade, uso etc.

Por isso, um único indicador não dá conta de cobrir todos os aspectos da comunicação científica, a qual tem áreas e comportamentos distintos; em alguns casos, a combinação de alguns indicadores pode amenizar esse problema, mas não resolve o problema em si, pois até o momento não há um indicador universal que possa ser aplicado unicamente em todos os possíveis cenários da comunicação científica (CAI *et al.,* 2019).

No entanto, o Quadro 2 mostra que a mensuração é mais abrangente na modalidade de

impacto alternativo, dos quais os materiais em acesso livre são mais visíveis que os que estão nos sistemas de mensuração tradicionais, em acesso restrito; por serem sistemas pagos essa limitação dificulta o acesso e a parametrização dos usos feitos da publicação científica por diferentes tipos de usuários e em distintas redes da *web.*

No Quadro 3 são apresentadas as possibilidades de interação de sete recursos digitais, todos de uso acadêmico, cada uma com suas limitações e possibilidades. *Mendeley, ResearcheGates* e *Academia.Edu* são os três recursos mais permissivos, que possibilitam baixar textos diretamente de suas bases, se o autor assim permitir.

Quadro 3 - Comparação de sites e serviços com perfis de pesquisadores

	FONTES						
	Mendeley	**Google Scholar**	**ORCID**	**ResearcherID**	**ScopusID**	**ResearchGate**	**Academia Edu**
Lista de publicações	x	x	x	x	x	x	x
Publicações vinculadas	x	x	x	x	x	(poss.)	(poss.)
Publicações métricas	x	x		x	x	x	x
Soc. links de mídia						x	x
Bio, interesses, afiliação	x	x	x	x		x	x
Contas de usuários	6 milhões (2018)	390 milhões (2020)	10 milhões (2020)			20 milhões (2021)	171 milhões (2021)
Upload de papéis	x					x	x
Adiciona dados de publicação manualmente	x	x	x			x	x
Adicionar publicações (semi) automaticamente	Vários mecanismos de pesquisa + importar RIS ou BibTeX	Google Scholar	Crossref + Scopus + RsearcherID + DataCite + PubMed Central Europe	WoS + ORCID	Scopus	PubMed + IEEE + CiteSeer + RepEc + BMC	Crossref + Microsoft AS + PubMed + ArXiv

Fonte: Traduzido e adaptado de LibGuides (2021).

Nos recursos de redes acadêmicas, representadas no Quadro 3, os textos submetidos a esses sistemas podem ter formato variado, artigo, ppts, *preprints*, livros, capítulos etc. mesmo assim, esses recursos apresentam uma boa aceitação, todos somam milhões de usuários cadastrados nesses sistemas.

Vanti e Sanz-Casado (2016) enfatizam que os padrões tradicionais já não satisfazem

todas as necessidades da comunidade científica, isso quer dizer que mudanças devem acontecer nos moldes existentes, pois não se enquadram com a realidade em uma era digital, na qual as pessoas habitam espaços digitais cada vez mais dinâmicos.

Os indicadores alternativos e as ferramentas de publicação e comunicação científica de acesso aberto, são reflexo do fazer científico caminhando para a atualização, pois a maneira de publicar e disseminar conhecimento por meio do papel, em suporte físico, não é mais a mesma que a utilizada no formato digital, devido a esta caraterística é que mudanças têm ocorrido no meio acadêmico, desde o formato de avaliação, publicação, de divulgação etc.

2.5 ALTMETRIA

Merton (1942, p. 268) fez duras críticas ao isolacionismo da comunidade científica para com a sociedade: "o cientista passou a se considerar independente da sociedade e a considerar a ciência como uma empresa autovalidadora que estava na sociedade, mas não era dela". O autor enfatiza que esse cenário levou a necessidade de reafirmar o *ethos* da ciência moderna, o qual deveria ser inclusivo e não excludente.

A ciência com suas pesquisas muda a sociedade, assim como a sociedade muda e direciona o fazer científico, uma está para a outra, olhar para o que é e como o conhecimento produzido está sendo usado, faz parte do crescer e do desenvolver científico. É preciso reconhecer que a sociedade não é apenas uma espectadora e que por conta dessa característica, é que, cada vez mais, pesquisas científicas têm sido utilizadas por diversos tipos de pessoas em diversas escalas sociais, e em diferentes canais de comunicação. É preciso lembrar que a sociedade, por meio de verba pública, financia muitas pesquisas; e que é por meio desse recurso que os governos elaboram estratégias de gestão de pesquisas e de desenvolvimento científico, como forma de suprir demandas sociais, econômicas, estratégicas e mercadológicas, esse contexto deve ser levado em consideração ao reconhecer indicadores de avaliação de pesquisas.

Portanto, o sistema de indicadores de impacto tradicional não cobre todo o panorama da comunicação científica para as necessidades atuais, principalmente ao formato da *Open Science*. Devido à essa necessidade de adequação é que surgem os indicadores alternativos, que podem mensurar de forma mais ampla os usos da publicação científica na *web,* observando todos os atores envolvidos nesse processo.

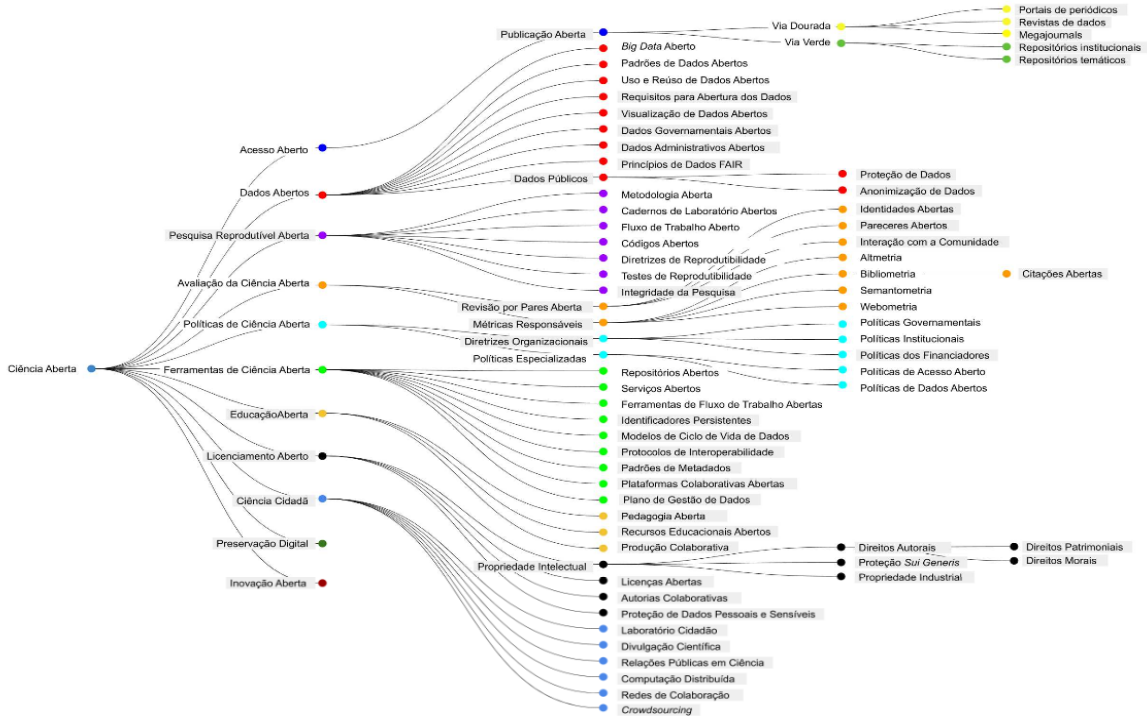
A *Open Science Taxonomy* (2021) fez a seguinte classificação: *Open Science – Open Science Evaluation – Open Metrics and Impact – Altmetrics*; a qual indica que a altmetria é "um projeto que produz métricas de nível de artigo acadêmicos a partir de informações

coletadas na *internet*, como sites de mídia social, jornais e outras fontes" (OPEN SCIENCE TAXONOMY, 2021).

O tesauro de Loterre[1] (2021) revisou a definição do termo altmetria, proposto na taxonomia da *Open Science* e o classificou na seguinte ordem: prática científica aberta – métricas e medição de impacto – métricas alternativas, o qual apresenta a sua definição como: "Medidas de impacto alternativo que avaliam a repercussão de uma publicação ou informação na *internet*, sua difusão, ações e interações em redes sociais, blogs, microblogs e imprensa." (LOTERRE, 2021, tradução nossa). Na taxonomia é enfatizado que as métricas alternativas consideram as múltiplas fontes informacionais e os diversificados produtos oriundos da comunicação científica, além da interação desses nas redes sociais.

Silveira *et al.* (2021) revisam as definições das facetas da *Open Science* e apresentaram a taxonomia em uma versão atualizada; a faceta laranja representa as interligações das métricas, que seguem a ordem: ciência aberta – avaliação da ciência aberta – métricas responsáveis – altmetria, conforme pode-se verificar na Figura 2.

Figura 2 - Taxonomia da Ciência Aberta



Fonte: Silveira *et al.* (2021, p. 14).

[1] Loterre é uma plataforma para expor e compartilhar terminologia científica multidisciplinar e multilíngue, a qual apresenta recursos de terminologia aberta vinculadas.

No cerne do *Open Access*, a altmetria surge nas discussões advindas da extensão desse movimento, o qual se propôs a olhar para o uso da ciência como um todo. O termo altmetria nasce da junção de 'métricas + alternativas', alt = alternativa e metria = métricas, atribuído por Priem *et al.* em 2010; os autores indicam que, "a Altmetria amplia nossa visão sobre o impacto causado, também do que está causando o impacto (PRIEM *et al.,* 2010, tradução nossa).

Para Vanti e Sanz-Casado (2016, p. 351), o surgimento da altmetria teve origem a partir da influência de fatores que têm atuado nas academias e redes sociais, como a:

> a) Insatisfação/insurgência com as métricas tradicionais de medir o impacto da publicação científica;
> b) O advento das ferramentas em mídias sociais na *internet*, no sentido de facilitar e ampliar a comunicação científica;
> c) E a necessidade de mudar a maneira de se selecionar o que seja relevante para a ciência;
> d) E o movimento do acesso aberto que democratizou a divulgação e ampliou o acesso ao conhecimento científico.

Devido a essas insatisfações que ocorreram mudanças na forma com que a informação é criada, compartilhada e processada na academia. Nascimento (2016) ressalta que a altmetria está atrelada à criação de indicadores para mensurar a visibilidade, o alcance e o uso das publicações científicas na *web* social, considerando qualquer usuário como parte desse ecossistema. Isso quer dizer que não é apenas considerado o cientista que cita o material, mas também o leitor, que passa a ser estimado como usuário/consumidor desse tipo de informação.

"Publicar, apenas, não é mais o suficiente, para ser lido é preciso ter visibilidade, e para isso são aplicados os filtros, lentes sobre as publicações científicas em busca do reconhecimento e evidências do impacto da publicação científica" (PRIEM; GROTH; TARABORELLI, 2012, p. e48753, tradução nossa). Os referidos autores recomendam o princípio da aplicação da altmetria como filtro para mensurar a presença *on-line* da publicação científica.

Este olhar sob a aplicação da ciência faz com que os pesquisadores reflitam sobre as demandas reais e emergenciais da avaliação científica, e quais são realmente relevantes. "A ciência está em transição, o que dá a impressão de que a ciência está em uma fase exploratória de um projeto, com o objetivo de traçar a inovação em fluxos de informação e comunicação acadêmica a partir de perspectivas evolutivas, e de rede" (KRAMER; BOSMAN, 2015, tradução nossa).

A evolução nos moldes da comunicação científica, principalmente ao que tange à aplicação altmétrica em estudos científicos, tem sido acompanhada e registrada por vários pesquisadores. Os pioneiros são: Bollen *et al.* (2005), Taraborelli (2008), Neylon e Wu (2009) e Priem e Hemminger (2010), os quais desvelaram as métricas alternativas para o mundo. No

cenário científico brasileiro, os pesquisadores que encabeçaram as primeiras pesquisas foram Gouveia (2013, 2016), Souza (2013, 2014, 2015a, 2015b), Araújo (2015a, 2015b, 2016, 2017, 2018, 2020) e Nascimento (2015, 2016). Como ainda é um campo jovem, muitos autores apresentam definições e características de: aplicação, análise, funcionamento, método, impacto, e perfil do público usuário, por isso alguns desses são apresentadas no Quadro 4.

Quadro 4 - Definições de Altmetria

AUTORES	DEFINIÇÕES
BOLLEN; SOMPEL; SMITH; LUCE (2005)	"As métricas de Structural-Author [das relações das redes] determinam o impacto de documentos, páginas da *web*, periódicos etc., com base na estrutura de uma rede de relacionamentos criados".
TARABORELLI (2008)	"As métricas baseadas no uso [...] permitem o rastreamento da popularidade métricas como o número de visualizações ou downloads por artigo e, para explorar a relação entre uso e impacto para documentos online gratuitos".
NEYLON; WU (2009)	"[As métricas não tradicionais são] uma maneira simples de medir o interesse em um artigo específico, que pode ser por meio de estatísticas de uso e download, visualização, quantos usuários demonstraram interesse [...] comparando a tendência em *downloads* e visualizações de página com a média".
ANDERSON (2009)	"[...] medição do impacto dos artigos usando o *Twitter*, blogs, vídeo e *Wikipedia"*.
PRIEM; HEMMINGER (2010)	"É a capacidade de examinar os impactos de outras formas emergentes de comunicação acadêmica. [...] métricas acadêmicas baseadas nas mídias sociais com o uso de estatísticas alternativas [...]. Avaliações de dados; eles também fornecem uma imagem mais ampla do público afetado [...] podem comparar e correlacionar os impactos das postagens e vídeos dos blogs dos pesquisadores com o impacto de seus artigos tradicionais".
PRIEM *et al.* (2010)	"Altmetrics é o estudo e uso de medidas de impacto acadêmico baseados em atividades, ferramentas e ambientes *on-line*."
PRIEM; GROTH; TARABORELLI (2012)	"o estudo e uso de métricas de impacto acadêmico baseadas na atividade em ferramentas e ambientes *on-line*. O termo também tem sido utilizado para descrever as métricas em si".
ADIE; ROE (2013)	"A criação e o estudo de novas métricas baseadas na *Web* Social para analisar e informar atividades acadêmicas".
LIU; ADIE (2013)	Altmetria é frequentemente usada para se referir a todas as medidas não tradicionais de reutilização, engajamento e impacto.
ROEMER; BORCHADT (2013)	Altmetria para filtrar ou analisar uma coleção de fontes.
GALYAVIEVA (2013)	"A criação e o estudo de novas métricas para a análise da comunicação científica (o impacto científico e o comportamento comunicativo de cientistas) fora dos canais tradicionais do sistema de comunicação científica, a saber, em redes sociais, blogs, fóruns etc.".
GOUVEIA (2013)	"O uso de dados webométricos e cibermétricos em estudos cientométricos"
HAUSTEIN *et al.* (2013)	"Índices baseados na atividade em ambientes de mídia social".
KONKIEL; SCHERE (2013)	"Métricas alternativas baseadas em atividade *on-line*".

KWOK (2013)	"Uma variedade de medidas de impacto de pesquisa que vão além das citações".
MOHAMMADI; THELWALL (2013a)	"Uma nova abordagem para medir impactos de pesquisa invisíveis e mais amplos em um ecossistema acadêmico diverso, para além das medidas clássicas".
MOUNCE (2013)	"Medidas de impacto acadêmico derivadas da atividade *on-line*".
MOHAMMADI; THELWALL, (2013b)	"Uma subdivisão da cientometria e da webometria que procura identificar novas métricas baseadas em atividades acadêmicas em plataformas *on-line* para avaliação de pesquisa".
PIWOWAR; PRIEM (2013)	"Ferramentas para medir o impacto acadêmico em um ambiente *on-line*".
RONALD; FRED (2013)	"o uso das mídias sociais, particularmente as mídias da *Web* 2.0, para avaliar a influência de pesquisadores em todos os tipos de usuários".
SUD; THELWALL (2013)	"Métricas da *web* social para publicações acadêmicas".
TORRES-SALINAS; CABEZAS-CLAVIJO (2013)	"Indicadores derivados da participação dos usuários nas ferramentas 2.0 com fins acadêmicos".
TORRES-SALINAS; CABEZAS-CLAVIJO; JIMÉNEZ- PAMPLONA (2013)	"Novos indicadores que complementam as métricas tradicionais".
WANG *et al.* (2013)	"Novas métricas baseadas na *web* social, com o propósito de obter uma análise em tempo real do impacto acadêmico de artigos".
ALPERIN (2013)	"Essas métricas se concentram, especificamente, em medir o impacto acadêmico no ambiente *on-line*".
THEL WALL *et al*. (2013)	"Medidas altmétricas derivadas da rede social são cada vez mais preconizadas e usadas como indicadores precoces de impacto e utilidade do artigo".
TAYLOR (2013)	"Altmetria é o termo coletivo para os dados de uso acadêmico que vão além da contagem de citações formais. Normalmente, os dados altmétricos vêm de plataformas especializadas e ferramentas de pesquisa, mas também podem incluir dados de aplicações gerais e plataformas técnicas. Às vezes, o termo abrange também as referências da mídia de massa, e os dados de editoras, como visualizações de páginas *web* e downloads".
GOUVEIA (2013)	"A altmetria se define como o uso de dados webométricos e cibernéticos em estudos cientométricos".
BAR-ILAN *et al.* (2014)	Altmetria como uma medida de "visibilidade".
ZAHEDI; COSTAS; WOUTERS (2014)	"Essas métricas alternativas referem-se a medida, 'não convencionais' para avaliação de Pesquisa".
SOUZA (2014)	"[...] é a criação de novas métricas destinadas a acompanhar a disseminação de produtos de pesquisa na *web* Social, as quais podem ser utilizadas como mecanismo de avaliação do impacto da ciência em complemento aos tradicionais estudos bibliométricos".
CHO (2015)	Altmetrics é um indicador de mídia social, ele só pode responder bem aos resultados de pesquisas que são acessíveis *on-line*.
GLÄNZEL; GORRAIZ (2015)	"Métricas de uso e altmetrics permitem [...] obter uma imagem mais ampla e completa de comunicação [científica]. O papel atual das mídias sociais na promoção do resultado das pesquisas deve ser analisado, e como esse comportamento afetará a própria ciência".
HASSAN; GILLANI (2015)	"[...] é basicamente a contagem de citações ou comentários em plataformas de mídia social (ou seja, *Twitter, Facebook, Mendeley* etc.) e é considerada como uma alternativa às já existentes medições científicas".

ARAÚJO (2015a)	Altmetria, como: a capacidade de verificar impactos em audiências diversas, incluindo não só pesquisadores, mas também profissionais, educadores e público em geral.
ARAÚJO (2015b)	"A altmetria se apresenta como campo emergente dos estudos métricos da informação científica nesses ambientes da *web* 2.0 [...] serve para avaliação e mensuração da circulação da informação científica na *web* social. [...] mede aspectos desconsiderados nas citações, como, onde um artigo está sendo baixado, lido, compartilhado e discutido".
VANTI; SANZ-CASADO (2015)	"se caracteriza pela criação e uso de novos indicadores que exploram as propriedades das medições baseadas em redes sociais, agindo de forma diferente do que acontece com os indicadores de impacto tradicionais".
SUGIMOTO (2015)	"métricas de atenção acadêmica ou de um objeto acadêmico".
SOUZA (2015b)	"Altmetrics ou métricas alternativas são indicadores da comunicação científica baseados na web social."
BARROS (2015)	"estudo e uso de medidas de impacto acadêmico com base na atividade de ferramentas e ambientes *on-line*"
BORBA; MARINHO; CAREGNATO (2016)	"Surge com o propósito de acompanhar, coletar e medir as atividades desenvolvidas nas mídias sociais, entendidas como um novo nicho de compartilhamento e agregação de informação".
GUMPENBERGER; GLÄNZEL; GORRAIZ (2016)	Altmetria (incluindo métricas de uso) pode ser vista como uma consequência direta da era digital, que oferece uma infinidade de informações quantificáveis na *web.*
MARICATO; MARTINS (2017)	A altmetria estaria relacionada à: criação (que indica a atividade prática), estudo (remete a uma área de estudo, o que incluiria uma carga teórica), novas métricas (que remete a produção de indicadores diferentes dos existentes), *web* social (onde se pode depreender a existência de ferramentas de mídia social, ações e interações de públicos) e, por fim, informações acadêmicas (delimita as análises no âmbito acadêmico, científico, mas deixa em aberto a multiplicidade de fontes).
ARAÚJO (2018)	A altmetria é um conjunto de indicadores.

Fonte: Produzido com base em Souza (2014), Araújo (2015a, 2015b), Borba, Marinho e Caregnato (2016) e Vanti e Sanz-Casado (2016).

As métricas alternativas, como visto nas várias definições do Quadro 4, exercem múltiplas funções, verificam a atenção, engajamento e a visibilidade da publicação científica em diversos ambientes da *web,* mas alguns autores apresentam outras aplicabilidades para esse novo sistema de medida.

De acordo com Vanti e Sanz-Casado (2015, p. 5, tradução nossa), "as métricas alternativas têm a função de despertar o interesse nos leitores em consultar e conhecer determinados trabalhos científicos ocultos, na medida em que são mencionados ou recomendados em algum tipo de rede social" Isso quer dizer que, as redes podem proporcionar ampla visibilidade para conteúdos científicos.

Zahedi, Costas e Wouters (2014) enfatizam essa questão da atenção dada a estudos disponibilizados nas mídias sociais e acadêmicas, para esses, a atenção é maior dos trabalhos que não estão nestes ambientes; as redes com suas possibilidades permitiram que houvesse

mudanças, desencadeando a produção e a publicação de materiais científicos em ambiente *on-line* acessível e gratuito, assim como, a ideia de que o fazer científico deveria estar disponível a todos.

Outro fator foi a constituição da ciência aberta (*Open Science*), que é mais recente, na qual visa que toda publicação científica deve ficar acessível de forma gratuita, e com isso, o movimento da abertura dos dados (*open data*) que possibilitou transparência, clareza e operacionalização dos dados brutos em informação relevante, principalmente os científicos, permitindo a aplicação da altmetria na análise do que se pode chamar de rastro científico disponível nas redes (FOSTER, 2018).

Pesquisadores demonstram em seus estudos que os cientistas incorporaram a *web* social no seu cotidiano, basta perceber a presença massiva dos pesquisadores nas diversas redes acadêmicas/científicas e sociais, o que contribuiu para alavancar a mensuração de indicadores alternativos e complementares.

Kramer e Bosman (2016), Matthews (2016), Padula e Williams (2015) investigaram o impacto e uso das redes acadêmicas pelos pesquisadores, eles aplicaram a altmetria na publicação científica disponíveis por meio desses ambientes. As duas primeiras pesquisas se preocuparam em investigar as três redes acadêmicas: *ResearchGate, Mendeley e Academia.edu,* analisando expressivamente o perfil dos usuários das plataformas, as áreas e instituições pertencentes e o impacto da comunicação científica nessas redes, como visualizações, *downloads*, compartilhamentos e citações desses materiais.

Assim como o *Journal Nature* (2019), indica diariamente no seu *Twitter* fragmentos de pesquisas em diversos temas, as pesquisas que são publicadas nesse ambiente passam a ser citadas nas redes sociais de alguns canais de comunicação, como *The Guardiam* (2018) e *The New York Times* (2018), culminando numa maior visibilidade e disponibilidade da pesquisa científica a todos os interessados, ultrapassando os canais científicos formais. Ambos, *The Guardiam* e *The New York Times* possuem uma seção intitulada *Science*, no qual divulgam a ciência de forma constante. As pessoas interessadas nos assuntos postados nessas páginas ou canais de comunicação passam a consumir esse tipo de informação, o que se torna cada vez mais comum na *web,* tanto na esfera social quanto acadêmica.

Para que a mensuração alternativa fosse possível, foram desenvolvidas ferramentas que utilizam todo tipo de canais de comunicação para rastrear e capturar os usos dessas publicações científicas na *web*. Contam com parcerias de plataformas particulares que fornecem dados para esse tipo de rastreio, captação e contabilização dos usos da publicação, existentes em seus sistemas de indexação de conteúdo; alguns desses recursos são pagos e outras são gratuitos.

As altmetrics, que são as mensurações alternativas e complementares às tradicionais, geram indicadores complementares que realizam a medição, avaliação dos usos feitos das publicações de cunho científico nas redes; esses indicadores direcionam o olhar para cada fenômeno que se pretende estudar, como foi visto, as interações nas redes são vastas, tanto nas redes acadêmicas quanto nas redes sociais, por isso, cada olhar é direcionado para um foco específico, gerando um indicador específico.

2.6 INDICADORES ALTERNATIVOS DE IMPACTO

Quando Merton (1942) criticou a comunidade científica, por estar fechada dentro de uma caixa, não imaginou que ao sair, toda produção científica se misturaria aos outros tipos de materiais e publicações, nos mais diversos canais de comunicação, principalmente os informais; dependendo da ótica pelo qual se olha, essa situação pode parecer caótica, pois reúne em um único lugar — *web* — uma diversidade de materiais, dificultando a análise e os usos das pesquisas científicas; por outro lado, pode ser um benefício, porque amplia a difusão da ciência nos mais diversos seguimentos da sociedade, possibilitando estar ao alcance de todos.

Não tem como padronizar a avaliação dos usos do conteúdo científico em um único sistema de avaliação por dois motivos: o primeiro é que os sistemas mudam o tempo todo, sendo assim, não dá para mensurar o perfil dos usos científicos de uma publicação com base em um formato estático; em segundo lugar, o sistema de mensuração deve ser baseado em estruturas verificáveis que podem se adaptar aos diferentes formatos e fontes, seguindo as tendências de cada época, por isso a métricas alternativas são consideradas complementares as já existentes, por atender a esse perfil dinâmico das redes.

A comunidade científica deve chegar a um consenso sobre modelos que sejam flexíveis, adaptáveis para cada área e ambiente, pois um único sistema de mensuração da comunicação científica nunca vai suprir a todas as necessidades distintas, inerentes de cada área de conhecimento, do fazer científico.

Sugimoto (2015) enfatiza que a altmetria não deve substituir qualquer outra métrica já existente, que deve ampliar as ferramentas empregadas para esse tipo de estudo, e que deve ser usada para "demonstrar a difusão da ciência". A mesma autora destaca que, "o uso responsável da altmetria exige que procuremos diligentemente entender os mecanismos subjacentes das medidas de atenção, expandir nossa capacidade de capturar a diversidade de traços de atividade acadêmica e perceber que a atenção não tem impacto" (SUGIMOTO, 2015, tradução nossa).

Nesse cenário é preciso pensar nos envolvidos nesse processo de mensuração. Moed

(2017, p. 39) sinaliza que existem três engrenagens que trabalham para o desenvolvimento da altmetria: a "política, com pesquisas de desempenho e ênfase no mérito social; a tecnológica com o desenvolvimento das tecnologias de informação e comunicação, como as redes sociais; a comunidade científica acadêmica, no movimento *Open Science*". São três engrenagens que direcionam o caminho das métricas alternativas/complementares e ambas andam juntas, pois a altmetria está intrinsicamente conectada com as tecnologias, comunicação científica e as redes da *web.*

Sendo assim, para que se possa mensurar esses usos nas redes, Vanti e Sanz-Casado (2016, p. 353), recomendam alguns indicadores alternativos, que se dividem em três medidas (repercussão social, uso das publicações científicas, qualidade ou nível das publicações), conforme seguem descritas:

> a) Medidas de repercussão social das publicações (contabilizadas pelo número de menções ou citações *on-line*);
> b) Medidas de uso das publicações científicas (calculadas por meio do número de descargas de materiais científicos da rede ou pelo número de usuários que incluíram dados de trabalhos científicos em suas listas pessoais de referências);
> c) Medidas de qualidade ou nível das publicações (computadas a partir da quantidade de citações em sítios de avaliação por pares).

Os indicadores sinalizados por Vanti e Sanz-Casado, são de viés quantitativo, já que fazem contagens de números de menções, *download*, e de avaliação por pares, eles medem o impacto das publicações nas redes.

Araújo (2015b, 2018) apresenta quatro indicadores (visibilidade, influência, engajamento, e de reputação), conforme exposto a seguir:

> a) Indicador de visibilidade: que se refere à capacidade de alcance do conteúdo exposto, sendo uma medida relacionada à audiência, tamanho do público atingido, volume e frequência (ARAÚJO, 2018, p. 9);
> b) Indicador de influência: relaciona-se com a autoridade de quem pública. Essa medida tem o objetivo de indicar "o quanto o periódico ou seus artigos, tem influência sobre o público, e mesmo o papel de determinados usuários/influenciadores na audiência e formação de opinião de um grupo" (ARAÚJO, 2015b, p. 74);

> c) Indicador de engajamento, que mede o quanto o conteúdo gerado obtém de entrosamento e interação do público e com o público. Pode ser visto como uma audiência com qualidade uma vez que indica uma 'reação' do usuário frente ao conteúdo" (ARAÚJO, 2018, p. 9).
>
> d) Indicador de reputação: construído e percebido na comunicação digital a partir da combinação dos indicadores anteriores, uma vez que a reputação é um valor atribuído na percepção combinada de impressões. Trata-se de um atributo de confiança adquirida a partir da performance associada a uma boa visibilidade, reconhecimento, capacidade de influência e de engajamento (ARAÚJO, 2018, p. 9).

Os indicadores propostos por Araújo medem o desempenho da pesquisa, são qualitativos; verificam as interações das pesquisas nas redes.

Martín-Martín, Orduña-Malea e Delgado-López-Cózar (2018, p. 8-10, tradução nossa) apresentam oito indicadores alternativos, os quais eles chamam de "Métricas no nível do autor" (visualizações, *downloads*, visualizações do perfil, seguindo, seguidores, leitores, publicações e *retweets*), como pode-se conferir a seguir:

> a) Visualizações: número total de vezes que as contribuições de um autor foram visualizadas. Posteriormente, isso foi combinado com a métrica "*Downloads*" para formar o novo indicador, o de "Leituras";
>
> b) *Downloads*: número total de vezes que as contribuições de um autor foram baixadas.
>
> c) Visualizações do perfil: número de vezes que o perfil do autor foi visitado. Este indicador não é mais público. Atualmente, os usuários só podem ver a contagem de visualizações de seu próprio perfil, mas não a de outros usuários;
>
> d) Seguindo: Número de pessoas que o autor segue (amigos);
>
> e) Seguidores: Número de pessoas que seguem o autor;
>
> f) Leitores: este número representa o número total de vezes que um usuário adicionou um documento deste autor à sua biblioteca pessoal;
>
> g) Publicações: Número de publicações que o autor carregou e classificou como "Minhas Publicações";
>
> h) *Retweets*: Número de *retweets* recebidos pelo autor.

As oito propostas de Martín-Martín, Orduña-Malea e Delgado-López-Cózar (2018) são de cunho quantitativo, pois visam a mensuração por meio de números e contagens, por isso são

indicadores característicos de impacto.

Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016, p. 489-492) exibem sete indicadores e suas aplicações; o indicador de citação não é apresentado na lista, por não se tratar de um indicador altmétrico. Os indicadores são: publicação, uso, disseminação/comentários/discussões, avaliação, conectividade social, e indicadores compostos, cujas descrições são expostas a seguir:

> a) Publicação: publicação automática; publicação manual; tipo de publicação; coautoria; triatleta de ciência aberta; postagens; *slides*, *software, tweets*, vídeos;
> b) Uso: visualização de resumo; ações/engajamento; marcadores automáticos; cliques; cliques em *URLs; downloads;* exportar/salvar; visualização de figuras; bifurcado/derivado; acervos; *link; link* externo; visualização de perfil recente; visualização de perfil total; lê/salva; tipologia de leitores; respostas; visitantes únicos; menções do usuário; visualizações/reproduções/impressões;
> c) Disseminação, comentários, discussões: (varredura limpa; comentários; menções de blog; frenesia de seguidores; contagem de tópicos de fóruns; alcance global; sul global; maior sucesso; maré de sorte; companheiros de laboratório; menções; notícias; acesso aberto/ouro; documentos de política; *retweets*; compartilhamentos automáticos; compartilhamento manual; reutilização de *softwares*; menção na *Wikipédia*;
> d) Avaliação: (leitores; descurtir automático; especialidade; favorito automático; curtida automática; curtidas manuais; revisões por pares pós-publicação; avaliações; avaliações classificadas; recomendações; recomendado por; habilidades; pontuação; votos manuais; quantitativos de votos);
> e) Conectividade social: (respostas; contatos de um autor; colaboradores de um documento; publicações seguidas; assinantes de publicações; seguidores; perguntas; assinantes; observadores);
> f) Indicadores compostos: (avaliação de comprometimento; pontuação de ferramentas).

Todos os seis indicadores de Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016), são compostos de aplicações específicas, os quais são exemplificados um a um, o que enriquece a discussão na altmetria, tornando-se um conjunto robusto de indicadores alternativos e complementares, a serem aplicados para a avaliação da comunicação científica. Cabe frisar que são de viés qualitativo, avaliam o desempenho da pesquisa. Os mesmos autores sinalizam que, “hoje tudo pode ser medido na ciência”, e que o impacto deve ser educacional, científico,

profissional e político; mas alertam para o fato de que “as medidas, indicadores e plataformas são voláteis, fugazes” (ORDUÑA-MALEA; MARTÍN-MARTÍN; DELGADO-LÓPEZ-CÓZAR, 2016, p. 495).

Como foi visto, os estudos sobre a altmetria começam a apresentar indicadores alternativos e complementares, que possibilitam múltiplas aplicações, cada um sob um olhar, um método e uma análise, de forma específica, possibilitando entender relações espcíficas. Esse trilhar caminha para um futuro em que as análises deverão ser fragmentadas para dar conta do tanto de interações que cada rede, tipo de informação, tipo de materiais e tipo de análise, que cada ferramenta ou base possa permitir aplicar.

Sendo assim, com base nos autores: Martín-Martín, Orduña-Malea e Delgado-López-Cózar (2018), Araújo (2018, 2015b), Moed (2017), Vanti e Sanz-Casado (2016), Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016), os indicadores alternativos de avaliação da comunicação científica são modelos de análise fragmentadas, pois visam mensurar algo que, ao aplicar um método de mensuração em uma amostra específica, quantitativo ou qualitativo, gera um dado de análise, que possibilita estudar um comportamento específico da comunicação científica.

Com tantas sugestões de indicadores é necessário pensar em como essa estrutura funciona. Existem métricas para tudo. A engenharia de *software* utiliza alguns modelos de análise, conforme apresentado por Gutiérrez-Pérez (2015). O autor traz a taxonomia de métricas aplicada para a análise de *software* em uma estrutura que segue quatro pilares: métricas, medição, medidas e indicadores. Esse modelo se assemelha aos quatros termos frequentes encontrados nas definições da altmetria, destacadas no Quadro 4 desta pesquisa, que são: dados, métricas, medidas, indicadores. Ao observar a descrição de aplicação de cada um dos termos, foi possível verificar que havia uma equivalência com a estrutura de Gutiérrez-Pérez (2015), entre ‘dados’ e ‘medida’, já que ‘dados’ em altmetria pode ser tanto o objeto de estudo quanto o objeto para a aplicação do estudo.

Ao refletir sobre essa estrutura exibida por Gutiérrez-Pérez (2015), juntamente com os termos encontrados nas definições da altmetria, foi possível adaptar e sistematizar um esquema para a identificação de indicadores complementares. Um exemplo desse esquema está exposto na Figura 3, com a aplicação do indicador alternativo de publicação, proposto por Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016).

Figura 3 - Infográfico da estrutura de mensuração

Fonte: adaptação da estrutura de Gutiérrez-Pérez (2015) e da classificação de Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016).

Essa estrutura pode simplificar e dar aporte para o pensar a respeito da análise e definição de atuais e novos indicadores alternativos, assim como pode servir de base para a reflexão sobre "que 'impacto' está sendo medido? Que fenômenos de socialização devem ser considerados para a medição do impacto científico? Que objetos digitais podem e devem ser mensurados?" (MARICATO; MARTINS, 2017, p. 50), e que há a necessidade de métricas e indicadores aplicados as diversas mídias sociais, como foi sugerido por Orduña-Malea, Martín-Martín e Delgado-López-Cózar (2016), abarcando uma diversidade de possibilidades de análises da comunicação científica nas redes.

O desafio à frente está em criar padrões robustos, tecnologias que atendam as todas as possíveis capturas e análises de dados altmétricos, compartilhar dados de pesquisa abertos, fortalecer as redes e estruturar políticas aplicadas à avaliação de pesquisa para a concessão de financiamento e bolsas e reconhecer indicadores alternativos como complementares aos existentes, tanto para a mensuração da pesquisa como para a constituição de políticas de avaliação de pesquisa, bolsas e periódicos.

3 METODOLOGIA

A metodologia é o caminho pelo qual o estudo é direcionado; indica a forma, método, técnicas e aplicações definidas pela ciência. Contudo, para estudar o estado da arte de um tema é preciso buscar na epistemologia a base para o método que dê conta de desvelar o problema de pesquisa, imprescindível para entender todos os ramos pertencentes a esta questão complexa.

Os paradigmas da CI foram sintetizados e apresentados por Araújo (2010, p. 103), físico, cognitivo e social, sob diversas perspectivas de estudos; uma delas diz que o paradigma físico é aquele em que se identifica as características de fontes formais e informais e a temporalidade dos produtos informacionais; o cognitivo estuda os *gatekeepers* e colégios invisíveis; e o social estuda as redes formadas na produção do conhecimento científico e as estratégias de colaboração.

Em Arboit, Bufrem e Freitas (2010, p. 22), Borko define o paradigma físico como algo relacionado à transmissão da informação. O Cognitivo envolve a interação entre a informação e o sujeito individual. O paradigma social estende os estudos da interação da informação e do sujeito para os estudos desta interação no contexto histórico e social.

Cabe salientar que um estudo completo sobre altmetria envolveria os três paradigmas: físico, devido ao uso de informação; cognitivo, pois se aplica na divulgação da informação por sujeitos e sistemas; social, por meio da interação da informação feita pela sociedade, em dado momento. No entanto, há muito para pesquisar sobre a temática a partir do prisma da Ciência da Informação, muito mais do que em outras áreas de conhecimento, tendo em vista que o objeto central do tema é a informação.

Mediante o exposto, o presente estudo se constituiu por meio da abordagem do paradigma social e cognitivo, pois objetivou mapear o debate científico em torno da altmetria, sob a perspectiva da dinâmica de uso e interação do conteúdo científico nas redes, com os diversos usuário da sociedade. De acordo com Ostermann (1996, p. 187), "uma vez percebida a semelhança e reconhecida a analogia entre dois ou mais problemas distintos, o estudante pode estabelecer relações entre os símbolos e aplicá-los à natureza segundo maneiras que já tenham demonstrado eficácia".

O emprego de um estudo com foco no paradigma social e cognitivo, com viés para o debate científico em torno do tema, requer a aplicação de uma pesquisa, quanto à natureza do objetivo, de caráter exploratória, que visa explorar o desconhecido. Para Rampazzo (2013, p. 54), enfatiza que, o estudo exploratório "trata-se de uma observação não estruturada, ou assistemática: consiste em recolher e registrar os fatos da realidade".

Lakatos e Marconi (2010) indicam que os estudos exploratórios são bastantes comuns em pesquisa de campo empírica; tem-se por objetivo formular questões de um problema, com a finalidade de desenvolver hipóteses, conhecer melhor o ambiente, fenômeno ou fato, para aporte de pesquisas futuras e elucidação de conceitos.

Também se enquadra como um estudo empírico, pois conforme Kothari (2004, p. 17), é uma pesquisa conceitual, busca conhecer e relatar ideias, teorias, desenvolve novos conceitos, verifica e observa novos experimentos, averiguando os fatos e as fontes.

Quanto à natureza dos procedimentos aplicados, trata-se de uma pesquisa bibliográfica documental. Rampazzo (2013) especifica que a técnica bibliográfica procura utilizar vários tipos de fontes de informação, livros, artigos, publicações em meio eletrônico ou impresso; já a documental utiliza fonte primária, relatórios, leis, dados estatísticos.

Esse método utiliza a literatura sobre determinado tema como fonte de dados para a investigação de um determinado elemento, de forma que seja possível a sua replicação (LIMA; MIOTO, 2007). A vantagem da pesquisa bibliográfica é que essa técnica possibilita definir previamente a estrutura de busca e limitações na aplicação da coleta dos dados (PIZZANI *et al.,* 2012).

A pesquisa bibliográfica pode ser empregada em diferentes circunstâncias, de acordo com Köche (2011, p. 122), ela pode "[...] ampliar o grau de conhecimentos em uma determinada área; dominar o conhecimento disponível e utilizá-lo como base na construção de um modelo teórico explicativo; descrever ou sistematizar o estado da arte de um tema ou problema".

Com essa aplicação, o "autor deve conceituar as inter-relações entre as propriedades do fenômeno, fato ou ambiente observado. Uma variedade de procedimentos de coleta de dados pode ser utilizada, como: entrevista, observação participante, análise de conteúdo etc." (LAKATOS; MARCONI, 2010, p. 188).

A coleta de dados visa obter informações da realidade e cenário da população, objeto deste estudo, "obtidos os dados o pesquisador terá diante de si um amontoado de respostas, que precisam ser ordenadas e organizadas para que possam ser analisadas e interpretadas" (RAMPAZZO, 2013, p. 127).

Conforme o exposto, para atender ao objetivo proposto, esta pesquisa é de aplicação básica, devido à qualidade do problema e proposta de análise; procurou ser conceitual e empírica, pois buscou nas publicações fragmentos que pudessem apontar para diversos elementos construtivos do diálogo, objeto deste estudo. Conforme enfatiza Santos (2002), uma pesquisa básica tem a finalidade de gerar conhecimento teórico com objetivo de servir de suporte para outros estudos, que pode ser de natureza básica ou aplicada, e, não

necessariamente, deverá ter uma aplicação, como no caso de pesquisa de natureza aplicada.

3.1 TRIANGULAÇÃO DE MÉTODOS

Como este estudo tem características empíricas e de pesquisa básica, o uso da triangulação de métodos possibilitou dar conta da obtenção, estruturação, classificação, tratamento e análise dos dados obtidos na amostra.

Triangulação de métodos é o emprego ou a combinação de diferentes métodos de pesquisa, prática bastante conhecida pela comunidade científica. Os autores Tashakkori e Teddlie (2010), Creswell e Plano Clark (2007), Flick (2007), Tashakkori e Creswell (2007), Cox e Hassard (2005) e Fielding e Schreier (2001) apresentam a definição e as aplicações para o uso da triangulação do método na pesquisa científica.

A triangulação é definida como um processo misto "no qual o investigador, coleta e analisa dados, integra as descobertas e faz inferências usando abordagens qualitativas e quantitativas" (TASHAKKORI; CRESWELL, 2007, p. 3, tradução nossa).

Para Flick (2007, p. 41), o conceito de triangulação significa que, "uma questão de pesquisa é considerada, ou, uma formulação construtivista é constituída, a partir de (pelo menos) dois pontos. Normalmente, a consideração de dois ou mais pontos é materializada por meio de diferentes abordagens metodológicas", o que viabiliza a aplicação de procedimentos distintos em fases distintas da pesquisa.

No entender de Cox e Hassard (2005, p. 122, tradução nossa), "[...] em vez de considerar a triangulação apenas como uma abordagem para o fechamento ou captura (do todo), ela pode ser vista como uma abertura ou angulação". Dessa forma, permite olhar por mais de um ângulo, ampliando a visão sob os aspectos da investigação.

De acordo com Fielding e Schreier (2001), a aplicação da triangulação na pesquisa não reduz o viés, assim como não aumenta a validade da pesquisa, no entanto, quando métodos de vertentes diferentes são combinados e unidos, aumenta a possibilidade de se ter um quadro mais completo, o que não quer dizer que será mais objetivo. "Rejeitar as versões absolutas da verdade e a viabilidade da objetividade absoluta não é o mesmo que rejeitar o padrão da verdade ou a tentativa de ser objetivo. Nas coisas sociais e comportamentais, nosso conhecimento é sempre parcial e intrinsecamente incompleto" (FIELDING; SCHREIER, 2001, p. 19, tradução nossa).

O uso da triangulação nesta pesquisa se deu por entender que o cenário da altmetria, na literatura científica, apresenta diversas possibilidades de reflexões. Portanto, a apresentação do panorama das publicações é exibida de forma quantitativa e a análise das discussões a respeito

do tema se dá de forma qualitativa, intercalando os dois métodos para uma análise multidirecionada, isso quer dizer, olhando de várias formas para um mesmo objeto.

3.1.1 Revisão sistemática da literatura

A revisão sistemática da literatura é um método amplamente aplicado em estudos mistos, quantitativos e qualitativos. Esse método utiliza a literatura como fonte de dados para a investigação de um determinado tema, de forma que seja possível a sua replicação (SAMPAIO; MANCINI, 2007). A vantagem da revisão sistemática da literatura é que essa técnica possibilita definir previamente a estrutura de busca e limitações na aplicação da coleta dos dados.

Revisões sistemáticas "são investigações científicas em si mesmas, com métodos pré-planejados e um conjunto de estudos originais [...], sintetizam os resultados de várias investigações primárias usando estratégias que limitam o viés e o erro aleatório" (MULROW; COOK, 1998, p. 6-7). É um método que utiliza uma estratégia de pesquisa abrangente, contendo todo material considerado relevante, avalia as características, sintetiza os dados e interpreta os resultados (MULROW; COOK, 1998), facilitando a observação de lacunas e tendências em uma temática ou área.

A revisão sistemática "permite ao pesquisador revisar e avaliar o conhecimento em áreas importantes. [...] fornece um método de pesquisa para conduzir revisões de literatura de acordo com um conjunto de procedimentos — sistematicamente — para sintetizar os resultados" (ANKEM, 2008, p. 91). Esse modelo de pesquisa possibilita desenhar um caminho válido para a aplicação científica replicável.

Os pesquisadores Grant e Booth (2009) elaboraram um estudo sobre as tipologias das revisões de literatura que eram aplicadas nos estudos científicos da área da saúde e descobriram que existem 14 tipos de estudos de revisão: Revisão crítica; Revisão da literatura; Revisão de mapeamento/Mapa sistemático; Meta-análise; Revisão de estudos mistos/Revisão de métodos mistos; Visão geral; Revisão sistemática qualitativa/Síntese de evidência qualitativa; Revisão rápida; Revisão de escopo; Revisão do estado da arte; Revisão sistemática; Pesquisa e revisão sistemáticas; Revisão sistematizada; Revisão do guarda-chuva.

Conforme o estudo de Grant e Booth (2009, p. 94), na revisão de estudos mistos, ou, revisão de métodos mistos, realiza-se uma "análise que pode caracterizar ambas as literaturas e procurar as correlações entre as características e o uso da análise de lacunas, para identificar aspectos presentes em uma literatura, mas que faltam na outra".

Para o emprego desse tipo de revisão se faz necessário utilizar um *checklist* na aplicação

de etapas, para observar quais elementos e processos são necessários à obtenção dos dados para a pesquisa.

Medeiros *et al.* (2015) apresentam uma proposta de *checklist* com dez etapas de execução: 1) determinação dos objetivos; 2) designação do descritor(es) de busca; 3) definição da base de dados; 4) testagem dos descritores; 5) aplicação de filtros e recortes para a busca; 6) uso de ferramentas e *software* para o tratamento dos dados; 7) organização da bibliografia; 8) exposição dos indicadores bibliométricos; 9) aplicação de ferramentas para a apresentação dos resultados; e 10) apresentação do relatório final da pesquisa, cujas descrições são expostas no Quadro 5.

Quadro 5 - Etapas da Revisão Sistemática

Etapa	Descrição
a) Determine seus objetivos;	O que você deseja pesquisar? Qual o tema? Como descrever seu objeto com palavras-chaves?
b) Determine um descritor de busca;	Teste os termos componentes do descritor um a um no Google Scholar antes, para checar se são pertinentes na busca. Depois dos termos, selecione operadores lógicos para integrá-los, formando assim o descritor.
c) Escolha as bases de dados pertinentes;	Selecione-as dentre aquelas disponíveis no Portal de Periódicos da CAPES.
d) Realize a busca usando o descritor;	Em todas as bases de dados escolhidas na etapa anterior.
e) Filtre a busca por critérios pré-selecionados;	Aplique filtros nas buscas feitas na etapa D. Exemplos de filtros: a) apenas artigos em periódicos com *peer review*; b) apenas publicações entre em período (ex.: 2004 e 2014); c) apenas publicações disponíveis na base da Capes.
f) Use o EndNOTE (OBS: O Zotero é uma alternativa: *Software* Livre para o EndNOTE);	Pegue todos os artigos que restaram depois do passo E, faça *download* do arquivo (csv) da base de dados em que o achou. Pegue esse arquivo (csv) contendo os dados de todos os artigos, como por exemplo: autores, data e local de publicação, resumo etc. Aplique o *Software* para a análise das classificações predefinidas: Palavras-chave; autores e coautores; língua; ano etc.
g) Sistematize a bibliografia.	Faça uma planilha mostrando os artigos que sobraram depois da etapa F. Nessa planilha, explicite o autor, ano de publicação, título, fonte etc., de cada artigo. Obs.: Destaque itens da planilha como "assuntos correlatos", "tipo de pesquisa" etc.

Fonte: Adaptado de Medeiros *et al.* (2015, p. 102).

Os autores indicam a importância de testar cada etapa da revisão sistemática e validar cada elemento, fazendo com que haja menos possibilidade de que erros aconteçam durante o processo. Cada etapa requer uma aplicação que leva a outra. É um processo de execução que ao fim possibilita escolher a forma de análise para os dados obtidos.

O modelo de Medeiros *et al.* (2015) se apresentou como viável para este estudo, já que

enfoca na categorização e análise de literatura para a aplicação em pesquisas básicas; porém, a proposta foi adequada para a realidade desta pesquisa, utilizando apenas as sete primeiras etapas de aplicação. Para a etapa final, a análise, optou-se pelo modelo de análise de conteúdo de Bardin (2011), o qual foi definido como o mais adequado para a aplicação desta pesquisa, complementando assim, as etapas da revisão sistemática da literatura.

De acordo com Grant e Booth (2009), as revisões de métodos mistos possibilitam apresentar um quadro mais completo do cenário de uma pesquisa.

3.1.2 Modelo de análise de conteúdo

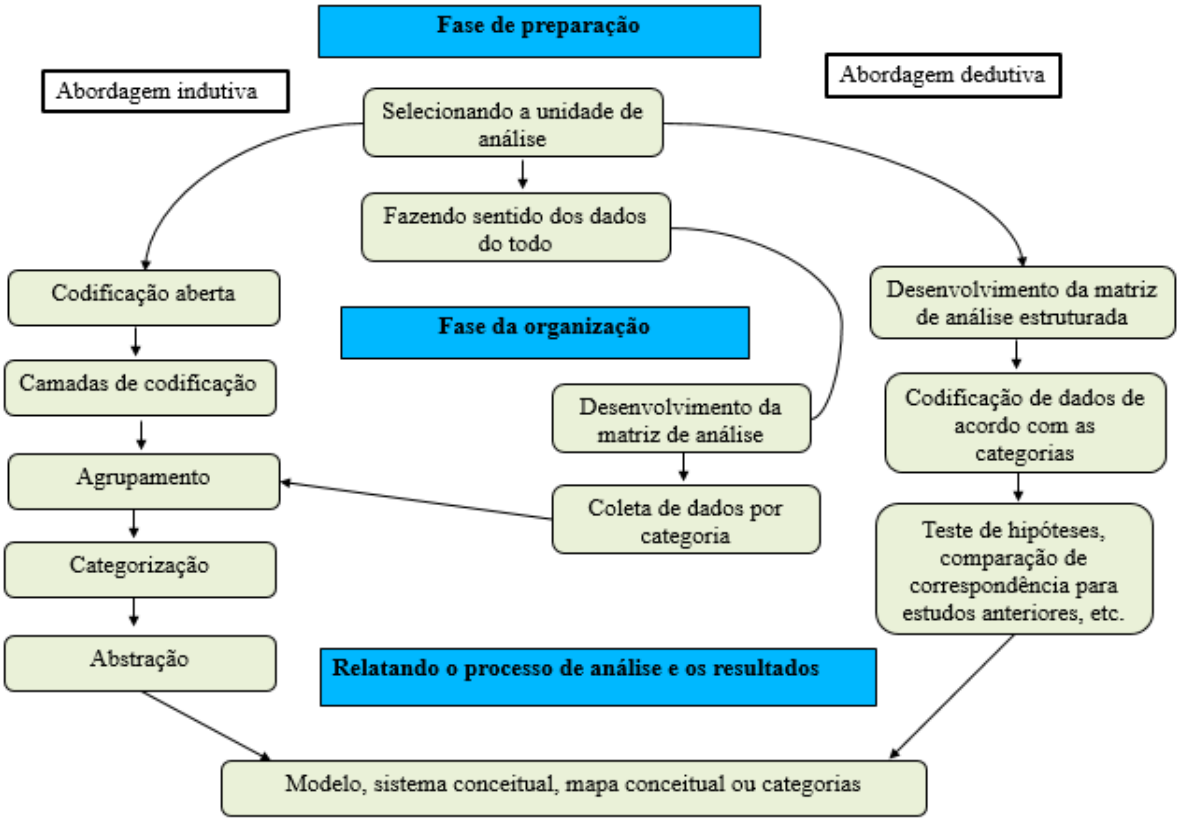
Para a análise dos dados foi definido o emprego da Análise de Conteúdo. Esse método surgiu como um instrumento de análise da comunicação, que parte de estudos empíricos; na atualidade é bastante aplicado por diversas áreas de conhecimento (PRASAD, 2008).

A análise de conteúdo se fundamentou com base na hermenêutica, a técnica de interpretar textos sagrados ou enigmáticos, que "é um conjunto de técnica de análise das comunicações" (BARDIN, 2011, p. 31). Consiste na utilização de procedimento de sistematização de um conjunto de categorias para a extração de dados que possibilitam evidenciar elementos, possibilitando realizar a descrição analítica do conteúdo, permitindo fazer inferências de conhecimentos e percepções obtidas nas mensagens identificadas nos textos.

Conforme Elo e Kyngäs (2008), existem duas abordagens da análise do conteúdo: a forma indutiva e dedutiva. A abordagem indutiva é aplicada em estudos nos quais o pesquisador não conhece suficientemente o fenômeno. Na abordagem dedutiva, o pesquisador detém de conhecimento prévio do objeto de estudo no qual pretende realizar o teste, confrontando ideias, baseia-se em uma teoria, um modelo definido, por isso parte do geral ao específico.

Em ambas as abordagens o processo de análise de conteúdo segue três etapas distintas: preparação, organização e relatório, como apresentado na Figura 4.

Figura 4 - Etapas no processo de análise de conteúdo



Fonte: Traduzido e adaptado de Elo e Kyngäs (2008, p. 110).

O método de análise também deve seguir os princípios científicos de rigorosidade e, na visão de Prasad (2008, p. 3, tradução nossa), são as características que o torna confiável:

> a) Objetividade: análise deve ser realizada com base em regras explícitas, as quais permitem aos pesquisadores aplicar o mesmo estudo e obter os mesmos resultados;
> b) Sistemática: inclusão e exclusão de conteúdo só podem ser feitas de acordo com as regras definidas para que a análise siga de forma imparcial;
> c) Generalização: os resultados obtidos devem possibilitar a aplicação em outras situações semelhantes.

A vantagem desta técnica é que ela tem uma ampla possibilidade de aplicação. Conforme Bardin (2011) existem vários campos de domínio nos quais a análise de conteúdo se aplica, sob a base de duas premissas: a primeira é o suporte, que pode ser escrito, oral, icônico, semiótico etc.; a segunda diz respeito ao agente comunicador, que pode ser uma pessoa, grupo ou comunicação de massa. No Quadro 6 são apresentados alguns exemplos.

Quadro 6 - Domínios de possíveis aplicações da Análise de Conteúdo

CÓDIGO DE SUPORTE	**NÚMERO DE PESSOAS IMPLICADAS NA COMUNICAÇÃO**			
	Uma pessoa <monólogo>	**Comunicação dual <dialógico>**	**Grupo restrito**	**Comunicação de massa**
Escrito	Agendas, maus pensamentos, congeminações, diários íntimos.	Cartas, respostas a questionários, a teste projetivos, trabalhos escolares.	Ordens de serviço em uma empresa, todas as comunicações escritas, trocadas dentro de um grupo.	Jornais, livros, anúncios publicitários, cartazes, literatura, textos jurídicos, panfletos.
Oral	Delírio do doente mental, sonhos.	Entrevistas e conversações de qualquer espécie.	Discussões, entrevistas, convenções de grupos de qualquer natureza.	Exposições, discursos, rádio, televisão, cinema, publicidade, discos.
Icônico (sinais, grafismos, imagens, fotografias, filmes etc.).	Garatujas mais ou menos automáticas, grafitos, sonhos.	Respostas aos testes projetivos, comunicação entre duas pessoas através da imagem.	Toda a comunicação icónica num pequeno grupo (ex.: símbolos icónicos numa sociedade secreta, numa casta)	Sinais de trânsito, cinema, publicidade, pintura, cartazes, televisão.
Outros códigos semióticos (tudo o que não sendo linguístico, pode ser portador de significações: música, código olfativo, objetos diversos, espaço, tempo, comportamentos, sinais patológicos etc.).	Manifestações histéricas da doença mental, (posturas, gestos, tiques, dança, coleções de objetos.	Comunicação não verbal com destino a outrem (posturas, gestos, distância espacial, sinais olfativos, manifestações emocionais, objetos cotidianos, vestuários, alojamento), comportamentos diversos, tais como os ritos e as regras de cortesia.		Meio físico e simbólico: sinalização urbana, monumentos, arte; mitos, estereótipos, instituições, elementos de cultura.

Fonte: Bardin (2011, p. 35).

Mediante as possibilidades, este estudo se caracteriza na classe de análise do suporte escrito (digital) para um grupo restrito, que utiliza linguagem especializada em sua comunicação, mas que tem potencial para a comunicação em massa estruturada, devido a possibilidade de divulgação e amplo acesso em meio eletrônico.

A análise se pauta em algumas regras de fragmentação objetiva de categorias, que neste caso, deve seguir a aplicação de categorias homogêneas, para que haja coerência na classificação para análise dos elementos. De acordo com Bardin (2011, p. 36-38), as categorias são:

a) homogêneas, as que não se misturam;
b) exaustivas, esgota a totalidade do texto;
c) exclusivas, classifica o elemento de conteúdo uma única vez;
d) objetivas, emprega codificadores diferentes que chegam a resultados iguais;
e) adequadas ou pertinentes, adaptadas ao conteúdo e objetivo.

Os objetos de análise são divididos, classificados em categorias menores, em unidades de análise, que podem ser uma palavra ou um tema, e que deve ser representativa no universo do tema (ELO; KYNGÄS, 2008, p. 109, tradução nossa). Os autores sinalizam para o cuidado que se deve ter ao fragmentar uma unidade de análise em uma única palavra, a qual pode conter várias sentenças e significados, a não ser que este seja o objeto do estudo.

Prasad (2008, p. 9, tradução nossa) salienta que "o objetivo da análise de conteúdo é converter os fenômenos "brutos" registrados em dados, tratada de maneira essencialmente científica, de modo que um conjunto de conhecimentos possa ser construído".

Pelo exposto, este estudo se caracteriza como de aplicação de análise de conteúdo, de abordagem indutiva, na qual são definidas as categorias. As categorias ainda podem ser desmembradas em subcategorias de análise, após serem testadas e verificada a necessidade de um segundo desdobramento (ELO; KYNGÄS, 2008).

Devido à característica de aplicação do método de análise de conteúdo, este foi considerado apropriado para o emprego da pesquisa, já que atende ao modelo proposto por este estudo, o qual objetivou verificar o debate científico em torno da altmetria.

3.2 PROCEDIMENTOS METODOLÓGICOS

Este estudo empregou a aplicação de procedimentos metodológicos para atender aos objetivos específicos de forma satisfatória. Os procedimentos são as etapas de planejamento e aplicação da pesquisa, que compreende o plano de coleta, indicação da população alvo, tratamento e análise dos dados. Os procedimentos metodológicos visam esclarecer os caminhos dos quais a pesquisa seguiu, assim como, indicam as escolhas e ferramentas que foram utilizadas ao longo do processo.

O planejamento e aplicação da pesquisa segue o método de revisão sistemática da literatura. No entanto, para a categorização e análise, o modelo empregado foi o de Análise de conteúdo. Ambos se complementaram de forma fluída, permitindo a execução desta pesquisa.

A aplicação das sete etapas do modelo de Medeiros *et al.* (2015) são apresentadas na sequência, indicando como se procedeu em cada uma delas.

a) Determinação dos objetivos da pesquisa

Essa etapa foi feita no início da pesquisa, antes mesmo da definição da metodologia.

a) Analisar o perfil das publicações científicas sobre altmetria;

b) Identificar os assuntos de aplicação temática da altmetria;

c) Averiguar os métodos, técnicas e aplicações nos estudos analisados;

d) Investigar os desafios e tendências da altmetria, com base na literatura.

b) Determinação dos descritores de busca

Na aplicação dessa etapa, para a escolha do descritor, alguns foram testados em português (altmetria, métricas alternativas), em espanhol (“*altmétricas”, “métricas alternativas”),* e em inglês *(“alternative metrics*” e “*altmetrics”*).

O termo *Altmetrics* em inglês foi o escolhido para ser aplicado na busca, pois demonstrou ter maior representatividade e cobertura do tema, e por ser o termo já está consagrado na área e na literatura.

Todos os descritores (em inglês, português e espanhol) foram testados no *Google Acadêmico* (https://scholar.google.com/schhp?hl=pt-BR*)* e na Base *Dimensions* (https://app.dimensions.ai/).

c) Escolha da base de dados pertinente

A base de dados definida para a coleta dos dados foi a *Dimensions*, por alguns motivos. Em primeiro lugar, ela é uma base de dados bibliográfica ou de referências, já que não indexa o material, mas sim, seus dados e endereço de acesso. Em segundo lugar, ela segue a corrente da Ciência Aberta e disponibiliza os dados do acervo, dos quais indexa, de forma aberta.

A *Dimensions* foi criada pela *Digital Science* em 2018, tem parceria com mais de 100 organizações de pesquisa, editores acadêmicos e 50.000 periódicos, agrupa cerca de 128 milhões de publicações abertas para a consulta e uso dos dados. Os dados sobre o acervo que compõem a base vêm das empresas: *ReadCube, Altmetric, Figshare, Symplectic, Digital Science Consultancy e ÜberResearch* (WILLIAMS, 2018; DIGITAL SCIENCE, 2019).

O terceiro motivo da escolha dessa base se deve ao fato de ela agrupar o acervo de várias outras bases e editoras. Como explicam Fraumann e Waltman (2019), a base utiliza os dados da *Crossref, Publishers*, *Web of Science (WoS), Scopus, SciELO, Patent Data, Altmetric,*

PubMed e *Lilacs*. Em seu sistema indica ter dados da: *PubMed, ERIH PLUS, DOAJ, arXiv, Science, PLOS, Elsevier, SpringerNature, Wiley, Ieee, Taylor & Francis, Sage, Cambridge University Press, Wolterskluwer, DeGruyter, Oxford University Press, Royal Society of Chemistry* (ORDUÑA-MALEA; DELGADO-LÓPEZ-CÓZAR, 2018).

Pelas características e benefícios apontados, a *Dimensions* foi a base de dados escolhida para a coleta dos dados, devido principalmente à sua característica centralizadora, que incorpora várias outras bases e serviços de informação, facilitando a coleta, tratamento e parametrização dos dados obtidos, gratuitamente em seu sistema. Thelwall (2018a) indica a qualidade do tratamento dos dados para a precisão da recuperação dos dados de pesquisa, o qual foi comparado entre a base *Scopus* e *Dimensions,* alcançando 97% de resultados de busca de textos iguais em ambas as bases.

O motivo pelo qual a busca não foi feita em cada uma das bases de dados mencionadas é pelo fato de que cada uma delas abrange conjuntos de dados específicos, os quais são tratados de forma diferente por cada base. No entanto, a *Dimensions* ao indexar todo esse conjunto de dados de fontes distintas, disponibiliza um conteúdo padronizado, o que facilita a utilização de dados e a análise desses sob uma única perspectiva.

d) Realizar a busca usando o descritor

Com a definição de qual base de dados utilizar e de qual termo de busca empregar foi feita a aplicação da coleta de dados, a qual tentou abranger o máximo possível de publicações sobre altmetria, dentro do recorte definido.

A busca com o termo "*Altmetrics",* feita na base da *Dimensions,* foi realizada em dois momentos, o primeiro em 29/10/2019, obtendo 4.356 textos, referente ao período de 2010-2018. No segundo momento a coleta foi feita em 12/02/2020, obtendo mais 1.107 textos, referentes as publicações do ano de 2019, somando essas duas coletas, 5.463. Os textos do pré-teste foram conferidos se estavam na amostra, constatando que 25 textos não estavam na amostra, sendo assim, esses foram incluídos, ficando com o total de 5.488 publicações. Todos os textos passaram pela 1ª etapa de análise (apresentada na seção 3.1.2 de análise do conteúdo).

e) Filtre a busca por critérios pré-selecionados

Alguns filtros foram aplicados na busca dos dados, realizada na base de dados selecionada. Um deles foi o emprego do recorte temporal (2010-2019), o qual inicia com a

publicação do manifesto de Priem *et al* (2010), considerado o marco da altmetria.

Outro critério aplicado na busca, feita na base de dados, foi a seleção da solicitação de checagem do termo de busca em qualquer parte do texto, abrindo as possibilidades de descoberta de publicações com a temática.

O uso de aspas foi empregado na busca do termo, indicando que a base deveria recuperar o termo exato, conforme a grafia apresentada, para que não houvesse confusão com termos de grafia próximas, como: *Altmetric* (empresa) e Altimetria (junção de "altitude" com "metria", método geográfico de representação), dos quais os ambos termos são difundidos na literatura.

f) Use o EndNOTE

Não caso dessa pesquisa, foi empregada outra estrutura para exportar os dados, ao invés do EndNOTE. Os dados, obtidos na busca feita na *Dimensions,* foram baixados em CSV, mas para a edição e análise qualitativa eles foram convertidos em xlsx, do *Excel* (Office 2010).

Para o objetivo "a" e "c", foram criadas as planilhas, quadros e gráficos, todos elaborados por meio do Excel. Os dados foram obtidos da planilha de dados da amostra obtida na *Dimensions*.

No objetivo "b", foi empregado o *software* livre Iramuteq, a fim de obter uma análise semântica dos dados textuais. Esses dados, da amostra da *Dimensions*, foram coletados um a um do local de origem de sua publicação, em que se obteve o título, palavras-chave e resumo em inglês, de quase todos os textos do recorte da pesquisa, pois nem todos os textos continham palavras-chave (167 ausentes), e em alguns, não constavam também os resumos (63 ausências).

Quanto ao objetivo "d", ao analisar todos os textos para as classificações, uma modalidade foi feita, a de desafios e tendências, identificando essa indicação em cada texto analisado e utilizado na pesquisa. Com essa modalidade de classificação, os 132 relatos encontrados foram agrupados em duas categorias de correlação temática, contando com 110 relatos de desafios, e 22 relatos de tendências, ambas as categorias foram reagrupadas subgrupos para cada, conforme o agrupamento de categorias, da análise de conteúdo de Bardin (2011).

g) Sistematize a bibliografia

Essa etapa segue para a apresentação qualitativa da análise do conteúdo, explanando as categorias e subcategorias de acordo com a abordagem indutiva de Elo e Kyngäs (2018),

apresentada a seguir.

3.2.1 Pré-teste

Para testar o modelo de revisão sistemática da literatura, e a categorização para a análise do conteúdo, foi feito um pré-teste na base de dados do "*AuthorMapper*", da *Springer*, em 24 de julho de 2019.

A escolha desta base se deu pela facilidade em obter dados bibliográficos, bibliométricos e cientométricos, acessíveis livremente, se assemelhando com a tipologia de dados apresentados pela *Dimnesions*. Outro motivo foi devido à base conter o periódico *Scientometrics*, que é especializado em métricas, o qual concentra publicações sobre o tema. Foram recuperados textos do tema em todos os períodos de publicação da base, que ocorreu entre 2013-2020 recuperando 522 textos, dos quais apenas 104 tratavam do assunto, conforme a categorização apresentada na sequência.

Seguindo as orientações do método de revisão sistemática da literatura, e para o emprego da análise de conteúdo, foi aplicado um pré-teste que resultou na definição de categorias e subcategorias de análise. A categorização dos textos seguiu três etapas de checagem:

a) primeira etapa: verificar se os textos tinham a altmetria como foco de suas pesquisas, por meio da análise do título, resumo, palavras-chave e referências;

b) segunda etapa: realizar a leitura técnica e composição de um breve resumo;

c) terceira etapa: categorizar e agrupar os estudos em uma das três modalidades, definidas como: Estudos Teóricos, Aplicados e Críticos.

Ao fazer a categorização dos textos, na última etapa ficou evidente que havia modalidades de estudos definidas pela característica da apresentação e abordagem, como: estudos teóricos, aplicado e crítico. Surgindo a necessidade de definir essas modalidades de classificação como:

- Estudos Teóricos: os textos focados na descrição, apresentação e revisão sobre a altmetria, não empregavam uma aplicação em uma amostra, nem apresentavam dados e análise, apenas reflexões. Geralmente empregam a revisão de literatura para refletir sobre métodos e técnicas, importantes para a análise da abordagem do tema;

- Estudos Aplicados: estudos focados em uma aplicação, seja de um método, ferramenta, amostra ou conjuntos de dados. Com vista em analisar as características, a natureza, a área, região, instituição, temas ou métodos de aplicação. Em geral, estes estudos focaram em

amostras específicas;

- Estudos Críticos: apresentaram ponderações críticas a respeito de métodos, estudos e aplicações relacionadas a altmetria;

Salienta-se que, a definição das características apontadas para a classificação dos estudos não está relacionada ao formato metodológico de aplicação em si, mas sim, a abordagem que cada um apresenta.

A aplicação do pré-teste possibilitou criar as etapas de categorização e a classificação das pesquisas, validando o modelo de revisão sistemática da literatura, proposto para este estudo, assim como possibilitou ampliar os campos de categorização dos textos. A amostra obtida na base da *Springer* foi conferida e integrada, com a que foi obtida na base da *Dimensions*.

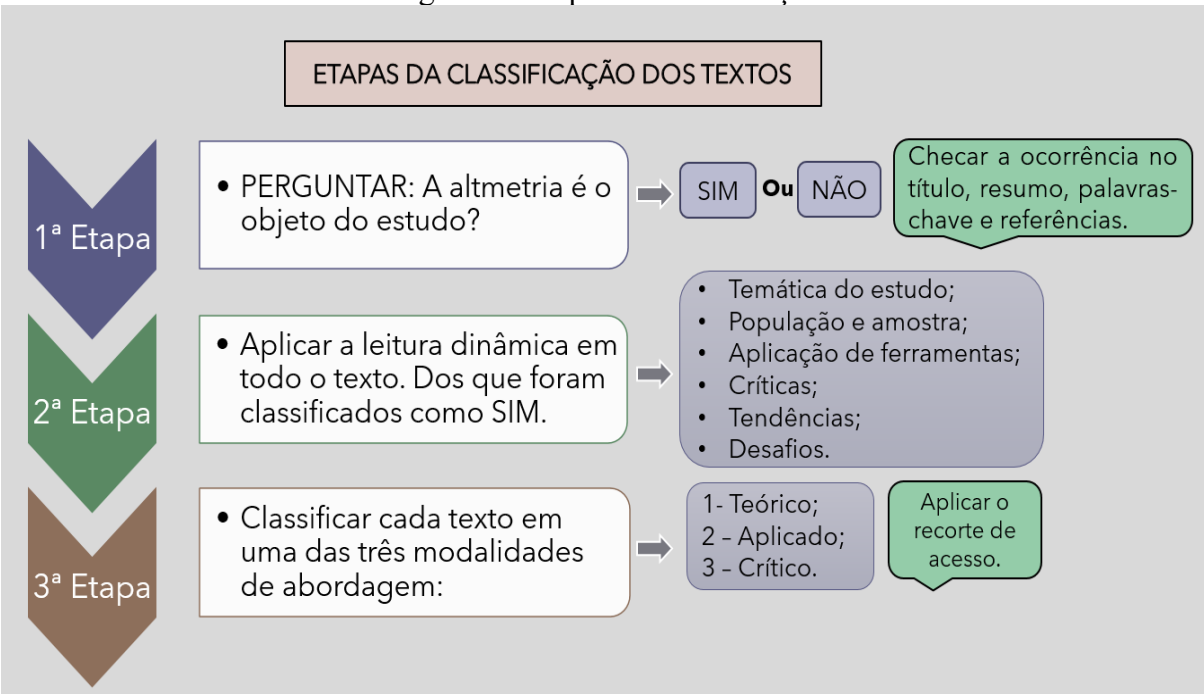
3.2.2 Etapas da classificação dos textos

Os 5.488 textos obtidos nas buscas da *Dimensions* e pré-teste, foram analisados e classificados de acordo com três etapas primárias, estabelecidas no pré-teste, a qual necessitou da aplicação de questões para ajudar e facilitar o olhar sobre a finalidade de cada um dos textos analisado. Sete questões foram aplicadas de forma descritiva, auxiliando a definir as categorias e subcategorias:

a) A altmetria é objeto de estudo do texto?
b) Qual é o foco da pesquisa?
c) Aplica uma metodologia e instrumentos de coleta e análise?
d) Apresenta uma população, ou a amostra de pesquisa?
e) O texto apresenta uma aplicação de ferramentas, *software* ou sistemas específicos?
f) O texto apresenta uma reflexão a respeito do tema?
g) Apresenta aspectos que indicam tendências ou desafios na temática?

A Figura 5 exemplifica a aplicação das sete questões, distribuídas nas três fases da execução da classificação, o que possibilitou obter como amostra 433 textos, classificados como: (149) Teóricos, (255) Aplicação, (29) Críticos.

Figura 5 - Etapas da classificação



Fonte: elaborado pela autora (2021).

A Tabela 1 exemplifica como ficou o quantitativo da classificação dos dados, obtidos nas modalidades de análise:

Tabela 1 – quantitativo por classificação

QUANTITATIVO	CLASSIFICAÇÃO	
3.711	NÃO	
827	Desclassificados	
111	Duplicados	
839	SIM	
	433 de acesso aberto	406 de acesso restrito
5.488	Total de materiais analisados	

Fonte: dados da pesquisa.

Um dos recortes aplicados foi com relação à tipologia do acesso oferecido pela base *Dimensions,* com foco nas publicações de acesso aberto, via dourada e verde. Sendo assim, do total de 5.488 analisados, 839 foram classificados como SIM, que tinham a altmetria como objeto de estudo, mas, apenas 433 textos estavam classificados na base como de acesso aberto, deixando de fora da pesquisa 406 textos que tratam da temática, porém de acesso pago e restrito.

Os textos classificados como NÃO, foram os materiais que não tinham a altmetria como objeto de estudo (3.711); Os desclassificados (827), estavam concentrados no formato (*dataset,* editoriais, expedientes de revistas, listas de sumários, resumos de livros e de anais, *banner,* poster, *ppts,* comunicações, carta ao editor, respostas, comentários e protocolo de pesquisa etc.)

e de idioma de difícil tradução (Japonês, Chinês, Árabe); Os duplicados (111), concentram os textos repetidos, na maioria os que estavam em duas versões, uma em *preprint* e outra como publicação final. Nesse caso, optou-se por manter na amostra a versão final, por entender que o texto já havia sido lapidado/ajustado para a publicação.

A pesquisa se atentou ainda para as publicações em: inglês, espanhol, português e as que foi possível a tradução. Utilizando os textos em formato de: artigo, livro, capítulo de livros, e alguns editoriais com perfil de artigo.

É importante enfatizar que a terceira etapa da classificação focou o olhar para os textos sob a ótica do tratamento da temática, como forma de agrupar as publicações semelhantes para uma análise mais direcionada, e não sob os aspectos da metodologia aplicada no estudo.

Cabe ainda salientar que a base de dados *Dimensions* oferece 32 categorias e filtros, dos quais viabilizam a aplicação de recortes nos dados da própria base, que são: Rank (classificação); ID *Dimensions*; *DOI*; PMID (identificador *Pubmed*); PMCID (identificador *Pubmed* Central); Título; Título da fonte; Título do livro (para capítulos); Termos *MeSH* (vocabulário controlado da saúde); Data de publicação; Ano de publicação; Volume; Questão; Paginação; Acesso livre; Tipo de Publicação; Autores; Coautor; Afiliações de autores; Organizações de pesquisa – padronizado; IDs GRID (identificador de pesquisa global); Organização do país de pesquisa; Financiador; Tempos de citados; Citações recentes; RCR; FCR; *Altmetric*; Fonte *Linkout* (outros links); URL da *Dimensions*; Categorias ANZSRC (Classificação de pesquisas da Austrália e Nova Zelândia). No entanto, da base *Dimensions,* optou-se por utilizar apenas o recorte de acesso, e aplicar os recortes próprios, entendendo que responderiam melhor aos objetivos propostos para o estudo. Mas para a análise temática e apresentação do perfil da amostra foram utilizados os dados da base, a respeito do título da fonte, ano, tipo de publicação, autor, organização, país e citação.

Todos os procedimentos metodológicos seguiram a metodologia proposta, empregando parte da revisão sistematizada da literatura, e do agrupamento e tipificação para a análise do conteúdo.

3.3 LIMITAÇÕES DA PESQUISA

Toda pesquisa tem limitações, até porque cada caminho leva a reflexões diferentes, com vieses diferentes. Muitas vezes a forma de abordagem requer o uso de múltiplas metodologias para que seja possível entender algum fragmento de contexto, o que não quer dizer que vá resolver o todo. Existem problemáticas que nunca são solucionadas, apenas amenizadas, pois a

sociedade é dinâmica e a ciência busca compreender acontecimentos dentro de diversos contextos que requer olhares de várias áreas do conhecimento, impossibilitando esgotar um estudo.

As limitações desta pesquisa se apresentam na construção do desenho da pesquisa e principalmente na coleta de dados.

A mineração dos dados apresentava uma problemática, pois necessitava cruzar dados de diferentes bases e do acesso a essas bases para baixar os dados. Para resolver esse problema foi escolhida a *Dimensions*, a qual unifica várias bases em um único acervo.

No entanto, para o acesso a um pacote grande de dados (5.488), era necessário solicitar uma chave API temporária, após vários e-mails de solicitação, justificativa do uso dos dados e um mês de espera não foi liberada a chave para a obtenção dos dados da pesquisa. Para obter os dados o professor Ronaldo Ferreira Araújo fez a busca com a sua chave API, exportou e mandou via e-mail. Só assim foi possível dar andamento à pesquisa, sem perder mais tempo. Em uma conta comum de usuário, pode-se exportar um pacote de até mil registros, limitando a exportação máxima para três mil registros.

Outra questão referente aos dados foi a classificação de acesso da base, a qual identifica o tipo de acesso para cada texto, mas nem todas as bases de publicação são de acesso gratuito, então, mesmo que o texto seja gratuito, a base pode não ser. Outra questão encontrada foi que, alguns dados eram de coleções, por exemplo, na publicação de uma edição de um periódico, alguns textos são disponibilizados de acesso aberto e outros não, mas não quer dizer que o acervo todo é gratuito. A mesma coisa para o acesso dos capítulos de livro, no qual o título do livro se encontra de acesso aberto, mas nem todos os seus capítulos estão livres para o acesso. Por isso, vários textos classificados pela base como de acesso aberto ou livre, precisaram ser consultados via VPN da UFSC, por meio do *DOI,* link da *Dimensions,* boton de *Open Access* e em alguns casos, via *SciHub*, pois muitos textos estavam classificados como de acesso aberto, contudo eram de acesso pago.

Uma limitação bastante impactante para esta pesquisa foi a quantidade de textos classificados como SIM (839), dos quais tratavam do tema da pesquisa como objeto do estudo, mas, (406) textos foram identificados com restrição no acesso, como de acesso pagos, inviabilizando-os para o uso na amostra.

Outra questão inerente à classificação da base é a tipologia dos textos. Muitos estavam classificados como artigo, livro e capítulo de livro, mas tinham outro formato de comunicação (poster, *dataset,* carta, resumo etc.), desclassificando (827) textos com essa característica, entre os que eram de idiomas que não possibilitava a tradução.

Foram encontrados alguns textos de *preprint*, indicados pela base como de acesso aberto, e que ao ser consultado haviam sido retirados por solicitação do autor. Outra questão sobre os *preprints* é que em vários casos o texto aparece duplicado, uma versão em *preprint* e outra publicada em periódico, obrigando desclassificar a versão mais antiga.

Ainda sobre a apresentação de duplicatas na base; nos dados recuperados vieram textos apresentados em anais e depois publicados em periódicos; outro cenário foi a questão de obra coletiva, como capítulo de livros, ora apresentados em conjunto como um todo e ora fragmentado apenas como um capítulo.

Uma questão relacionada à análise; pois estudos em línguas distintas podem apresentar limitações semânticas, o que pode dificultar uma homogeneidade no agrupamento e reflexão, como o uso da altmetria para diversas finalidades, ora como método, procedimento de recuperação, ferramenta, modelo de análise, e ainda, tiveram textos que relacionaram a altmetria como campo ou área de estudo, apresentando a complexidade do tema e dos estudos, como algo que ainda não está bem definido.

Outra limitação encontrada foi na obtenção dos resumos originais, para a análise temática via Iramuteq, pois nem todos os textos continham um resumo e palavras-chave. Constatou-se que os textos de alguns periódicos e base de *preprint* não aplicam essas modalidades de representação e indexação da pesquisa, dificultando a utilização desse recurso para esse tipo de análise.

Sobre o desenho da pesquisa, buscou-se definir o que poderia ser pesquisado e de que forma poderia contribuir para com a comunidade científica e temática. A escolha do método demandou bastante tempo, pois foi feita a checagem de vários outros métodos, assim como foi verificada a possibilidade de aplicação em cada um deles: Meta-análise, Cartografia, Autor-rede, Controvérsias, Fenomenologia, Método DELPHI, Revisão sistematizada da literatura, Análise dos dados quantitativos, Análise do domínio e, por fim, o método que foi selecionado como adequado para responder as questões de pesquisa foi proposto por meio da triangulação de dados com a Revisão sistemática da literatura e a Análise de conteúdo. Todo esse processo demandou de tempo, estudo, teste para definir o que poderia ou não ser aplicado no presente estudo.

4 APRESENTAÇÃO DOS DADOS E RESULTADOS

Os dados foram estruturados e apresentados em subseções. Cada uma das subseções possui um conjunto de dados que visa responder aos quatro objetivos específicos, propostos neste estudo. Os dados foram sistematizados, classificados e tabulados para serem exibidos de forma descritiva e analítica, separados por demanda de cada objetivo específico.

Para o objetivo a), "analisar o perfil das publicações científicas sobre altmetria", foi possível verificar questões a respeito do perfil da amostra, como: autores, área, tipologia das publicações/formato, periódicos, o acesso, ano, e a interdisciplinaridade das áreas que publicam sobre o tema.

O objetivo b) visou "identificar os assuntos de aplicação temática da altmetria", a organização dos dados possibilitou averiguar os temas que direcionaram os estudos ao longo do período de 2010 a 2019, revelando a aplicação temática desses estudos.

Para atender ao objetivo c), "averiguar os métodos, técnicas e aplicações nos estudos analisados", os dados foram classificados e agrupados, revelando aplicações, ferramentas e tendências de modelo de estudos.

Por sua vez, o objetivo d), "investigar os desafios e tendências da altmetria, com base na literatura", apresentou sua execução mais complexa, mas possibilitou verificar caminhos e lacunas sobre a temática.

Todos os dados foram apresentados, cada um dentro de uma categoria, os quais demonstram as linhas de abordagem de análise, que atentou o olhar para a altmetria, como um campo que tem multiplicidades a serem estudadas.

Apesar da altmetria ser um campo jovem e cheio de questionamentos, a temática ainda é um assunto em pleno desenvolvimento, que se constitui de forma orgânica, com base em estudos e teste de aplicação, de funcionamento etc.; o mapeamento do estudo da arte dirige o olhar para as descobertas, para os desdobramentos feitos a respeito do assunto, os caminhos que já foram trilhados, assim como, apontam as lacunas de uma disciplina ou área de conhecimento. Também serve como marco histórico, marco de partida, de revisão e reflexão sobre o que já foi discutido e o que ainda pode ser pesquisado dentro do escopo de uma temática.

4.1 PERFIL DAS PUBLICAÇÕES CIENTÍFICAS SOBRE ALTMETRIA

O primeiro grupo de dados apresentado remete ao objetivo a), "analisar o perfil das publicações científicas sobre altmetria", exibindo as fontes, tipologia, área de pesquisa e a

interdisciplinaridade dessas áreas, a relação dos autores, relação com as instituições, publicação x ano, e acesso.

A altmetria derivou sob a influência de vários fatores, entre eles o movimento do acesso aberto, o qual visa democratizar a divulgação e a ampliação do acesso ao conhecimento científico (VANTI; SANZ-CASADO, 2016). No entanto, o que se observa nos dados obtidos é que, apesar da maior parte das publicações estarem em acesso aberto 52%, ainda assim, uma grande quantia 48% = 407 textos, estão em acesso restrito, contrariando a vertente da ciência aberta, a qual desencadeou o movimento da altmetria, o que é no mínimo curioso, já que os autores que pesquisam o tema deveriam estar alinhados com a ideologia e prática da vertente a qual a temática faz parte. O que também não se configura na aplicação de algumas ferramentas altmétricas, que detém de cunho comercial.

"A ciência aberta pode ser considerada o movimento para tornar as atividades de pesquisa, os dados científicos e seus resultados acessíveis a todos" (ARAUJO, 2020, p. 39). As recentes discussões sobre ciência aberta, ciência cidadã, democrática, ciência responsável, exemplificam a necessidade de se pensar a responsabilidade que cada um tem em fomentar e praticar do acesso aberto, pois "demanda um esforço de ampliação da comunicação pública da ciência e engajamento societário, incluindo outras maneiras de se produzir ciência e de torná-la mais transparente e acessível durante o processo de pesquisa" (ARAUJO, 2020, p. 39).

Knöchelmann (2021) menciona a respeito do fenômeno de pesquisadores que estudam o movimento da ciência aberta, mas que publicam em formato fechado, que esse comportamento se dá pela super valoração dos periódicos internacionais, principalmente os periódicos e bases americanas e europeias, e que os pesquisadores estão em busca do reconhecimento como membro, parte do corpo de pesquisadores que dominam determinado conhecimento em determinada área; o autor enfatiza que essa conduta em si não é um aspecto negativo, mas que o preço que se paga (custo do acesso) talvez não valha a pena, principalmente para a sociedade que fica impedida de obter esse conhecimento que está publicado de forma restrita.

As destintas fontes que publicaram sobre o tema, demonstram que certos canais são mais visados que outros. Um aspecto curioso encontrado na amostra obtida deste estudo, foi que o *arXiv,* uma base de *preprint* das exatas e de acesso aberto, foi a fonte que mais publicou sobre o tema, outras bases de *preprint* que são de instituições comerciais, como a *F1000Research* e a *bioRxiv,* ficaram com baixa publicação, somando oito textos, as duas juntas. Esse cenário mostra que os *preprints* de acesso aberto, sobre a temática teve maior aderência que outras fontes consagradas, e que têm restrição de acesso ou para a obtenção dos textos. Na

Tabela 2 observa-se a lista das fontes que mais publicaram sobre o assunto.

Tabela 2 - Lista de fontes que publicaram a respeito do tema

FONTES	Nº. PUBL.
arXiv	44
Scientometrics	34
PLOS ONE - tem Preprint para o fluxo de avaliação	26
Journal of the Association for Information Science and Technology - JASIST	22
Journal of Informetrics	14
Canadian Journal of Emergency Medicine	9
Journal of Altmetrics	9
Bulletin of the Association for Information Science and Technology	8
Frontiers in Research Metrics and Analytics	8
SSRN Electronic Journal – tem Preprint – é comercial	6
F1000Research – tem Preprint – da base Taylor & Francis	5
BMJ Open	4
Against the Grain	4
Journal of Scientometric Research	4
Em Questão	4
Aslib Journal of Information Management	4
Nature	3
Serials The Journal for the Serials Community	3
Evidence Based Library and Information Practice	3
Learned Publishing	3
Revista ORL	3
Annals of Emergency Medicine	3
The Serials Librarian	3
bioRxiv – tem Preprint - base Cold Spring Harbor Laboratory	3

Fonte: dados da pesquisa (2021).

Tem base de periódicos que também publicam em formato de *preprint,* como o caso da *SSRN Electronic Journal,* mas nem todas disponibilizam o acesso as suas publicações, e isso reflete na amostra obtida, vários periódicos com restrição de acesso ficaram no topo da lista dos que mais publicaram sobre o assunto. Dos sete primeiros periódicos do topo da lista, três deles disponibilizam o conteúdo em acesso aberto, os demais publicam uma porcentagem do seu acervo em acesso aberto, taxa com cerca de 15 a 30% da publicação em OA. Dois dos periódicos mencionados são editados pela mesma editora comercial, a *Springer Nature.*

Knöchelmann (2021) enfatiza que as bases comerciais se utilizam da imagem do acesso aberto para parecer igualitários, no entanto, cobram muito mais para publicar um texto em OA ou em formato híbrido. Brainard (2020), Manjarrez (2021) e a Academia Joven da Argentina (2021) relatam a dificuldade em publicar em formato de acesso aberto em periódicos

internacionais, devido aos altos custos nos *APCs* (taxa de processamento de artigos) para a submissão e para a publicação, principalmente em países mais carentes de recursos. Em novembro de 2020 a editora Nature anunciou que publicaria qualquer texto em formato de acesso aberto por uma "bagatela" de € 9.500 euros, (€ 1 = 6,16 reais - 09/2021), isso soma um valor de R$ 58.520,00 reais para publicar um artigo em acesso aberto! Essa não é a única editora a adotar essa prática.

Mas a publicação em acesso aberto ganha forma nos repositórios de *preprint*, como o caso do *arXiv,* o qual consistem em um serviço de publicação, avaliação aberta e distribuição em acesso aberto de artigos acadêmicos nas áreas de: física, matemática, ciência da computação, biologia quantitativa, finanças quantitativas, estatística, engenharia elétrica, ciência de sistemas e economia (ARXIV, 2021).

O *Scientometrics,* periódico pago, ficou em segundo lugar dos que mais publicou sobre o tema, dispondo cerca de 30% de seu acervo em aceso aberto, apesar de ser interdisciplinar, publica estudos com foco quantitativo, direcionados para a área de pesquisas científicas, comunicação na ciência e política científica (SPRINGER, 2021).

Na terceira posição, o periódico *PLOS ONE,* da *Public Library of Science* (2021), é de acesso aberto, mas cobra taxas de *APCs*, publica em formato de *preprints* os textos que estão em processo de avaliação aberta, neste caso, o material fica nesse formato até concluir a revisão por pares; essa base atua na área das ciências naturais, pesquisas médicas, engenharia, ciências sociais e humanas relacionadas.

O próximo da lista é o *Journal of the Association for Information Science and Technology* (JASIST), publicação da Associação de Ciência, Tecnologia e Informação em parceria com a editora *Wiley*, é pago. Concentra as áreas da Ciência da Informação, Biblioteconomia, Ciência da Computação, Sistemas de Informação (WILEY, 2021).

Journal of Informetrics é um periódico pago, editado pela Elsevier (2021), publica estudos quantitativos da área da ciência da informação, com foco em estudos bibliométricos, cienciométricos, webométricos, patentométricos, altmétricos e avaliação de pesquisas, estudando problemas infométricos.

Canadian *Journal of Emergency Medicine*, periódico pago, da Associação Canadense de Médicos de Emergência, é publicado pela editora *Springer Nature* (2021), suas publicações são direcionadas para a área da medicina de emergência.

Journal of Altmetrics, publicado pela editora *Levy Library Press* (2021), periódico de acesso aberto, publica materiais da área de métricas alternativas. Tinha como editora (*in memoriam*) a pesquisadora Judit Bar-Ilan e o atual é Mike Thelwall, o conselho editorial é

composto por vários outros autores referência da temática.

O sétimo é o *Bulletin of the Association for Information Science and Technology* - Boletim da associação da Ciência da Informação e Tecnologia, da base Asis&t, um periódico comercial da *Wiley*. Publica na área da ciência da informação, tecnologia da informação, Biblioteca digital, ciência da computação (Asis&t, 2021).

Nessa amostra, os periódicos tiveram maior adesão do que as bases ou repositórios de *preprint,* o que pode caracterizar uma questão de cobertura dessas bases, é interessante observar que houve uma maior aderência de publicações em formato de artigo avaliados por pares, em detrimento de textos em formato pré-publicações; o formato de artigo concentrou uma porcentagem de quase 83% de todas as publicações. A Tabela 3, apresenta os formatos e seus respectivos quantitativos.

Tabela 3 - Lista de tipologia das publicações

TIPOLOGIA/FORMATO DAS PUBL.	Nº. PUBL.
Artigos de periódicos	358
Preprint	57
Anais de evento	12
Capítulos	6

Fonte: dados da pesquisa (2021).

Cabe ressaltar que o formato em *preprint* ficou em segundo lugar, concentrando 13% das publicações analisadas, ficando acima dos anais de evento e capítulos de livros, o que representa que os pesquisadores da temática têm utilizado do recurso para aprimorar suas pesquisas, pois o formato em *preprint* visa o aperfeiçoamento da pesquisa, de forma aberta, transparente, aceitando as possíveis avaliações da comunidade científica. Silveira *et al.* (2021), em sua taxonomia sugerem que o *preprint* é a modalidade do acesso aberto que democratiza a ciência, pois se propõe a estar acessível, visível e todo o processo de avaliação deve ser transparente.

Outro aspecto interessante é que, os dados apresentados e a área de concentração do tema são de áreas mais variadas possíveis. Devido a essa característica que a temática pode ser considerada como interdisciplinar, pois permeia por vários campos, integrando reflexões e aplicações em distintas áreas do conhecimento. Na Tabela 4 é apresentada a lista de áreas relacionadas às publicações da amostra analisada, que em alguns casos, um mesmo texto contempla mais de uma área de conhecimento.

Tabela 4 - Lista de áreas que publicaram a respeito do tema

ÁREA DE PESQUISA	Nº. PUBL.
Information and Computing Sciences	150
Studies in Human Society	92
Information Systems	84
Medical and Health Sciences	83
Library and Information Studies	57
Policy and Administration	50
Public Health and Health Services	41
Sociology	41
Clinical Sciences	32
Psychology and Cognitive Sciences	21
Psychology	18
Biological Sciences	17
Mathematical Sciences	16
Artificial Intelligence and Image Processing	12
Education	11
Economics	9
Applied Mathematics	9
Applied Economics	9
Biochemistry and Cell Biology	8
Language, Communication and Culture	7
History and Archaeology	7
Oncology and Carcinogenesis	7
Agricultural and Veterinary Sciences	6
Specialist Studies In Education	6
Historical Studies	6
Statistics	5

Fonte: dados da pesquisa (2021).

As áreas de conhecimento, obtida na base de dados da *Dimensions*, demonstram que a maioria das publicações são da: Ciências da Informação e da Computação, Estudos em Sociedade Humana, Sistemas de informação, Ciências Médicas e da Saúde, Biblioteca e estudos de informação, e Política e Administração. No entanto, há publicações de diversas outras áreas, que vão desde as exatas, aplicadas, sociais e humanas, demonstrando que a comunidade científica, a qual pesquisa a temática, é bem diversificada, caracterizando uma riqueza de análises e aplicações em estudos peculiares, assim como a interdisciplinaridade e a aderência do tema. Neste caso, a interdisciplinaridade se encaixa bem em uma das cinco modalidades do modelo de estudos sobre a ciência aberta, de Fecher e Friesike (2013), do qual enfatizam que a vertente pragmática é preocupada com a colaboração entre os pesquisadores, entre outros aspectos. Para a CI da informação essa não é uma novidade, já que tem como característica a relação interdisciplinar com outras áreas do conhecimento (SARACEVIC, 1996).

Assim como as áreas de conhecimento, são os autores que publicam sobre o tema das mais variadas regiões e instituições de pesquisa. Um dos autores com o maior número de publicações é Mike A. Thelwall, suas pesquisas sobre a temática datam de 2013 a 2019. Esses trabalhos contaram com a parceria de 23 coautores, sendo que cinco deles estão entre os que mais publicaram: Kayvan Kousha, Stefanie Haustein, Vincent Larivière, Cassidy R. Sugimoto, Isabella Peters. Juntos, os seis pesquisadores representam 22% dos autores e das publicações sobre o assunto, na amostra obtida, como apresentado na Tabela 5.

Tabela 5 - Lista de autores que publicaram a respeito do tema

AUTORES	INSTITUIÇÃO	PUB.	CIT.
Mike A. Thelwall	Universidade de Wolverhampton, Reino Unido	32	2.069
Stefanie Haustein	Universidade de Ottawa, Canadá	19	1.704
Lutz Bornmann	Sociedade Max Planck, Alemanha	17	612
Rodrigo Costas	Universidade de Leiden, Holanda	15	1.000
Vincent Larivière	Universidade de Montreal, Canadá	14	1.498
Isabella Peters	Universidade de Kiel, Alemanha	13	494
Cassidy R. Sugimoto	Indiana University Bloomington, Estados Unidos	12	1.104
Brent Thoma	Universidade de Saskatchewan, Canadá	11	337
Zohreh Zahedi	Universidade de Leiden, Holanda	10	683
Nicolas Robinson-Garcia	Delft University of Technology, Holanda	10	115
Robin Haunschild	Instituto Max Planck para Pesquisa de Estado Sólido, Alemanha	9	186
Timothy D. Bowman	Wayne State University, Estados Unidos	8	302
Juan Ignacio Gorraiz	Universidade de Viena, Áustria	8	179
Stacy R. Konkiel	Altmetric (Reino Unido), Reino Unido	7	70
Jason Priem	Nossa Pesquisa, Canadá	7	302
Kayvan Kousha	Universidade de Wolverhampton, Reino Unido	7	303
Ken Milne	Western University, Canadá	6	18
Chris Bond	Universidade de Calgary, Canadá	6	18
Henk F. Moed	Universidade Sapienza de Roma, Itália	6	81
Juan Pablo Alperin	Simon Fraser University, Canadá	5	21
Daniel Torres-Salinas	Universidade de Granada, Espanha	5	92
Xianwen Wang	Dalian University of Technology, China	5	136
Christian Gumpenberger	Universidade de Viena, Áustria	5	119
Rohit Mohindra	Hospital Geral Judaico, Canadá	5	73
Paul F. Wouters	Universidade de Leiden, Holanda	5	615
Michelle Lin	Universidade da Califórnia, São Francisco, Estados Unidos	5	242
Martin H. Fenner	DataCite, Alemanha	5	116

Fonte: dados da pesquisa (2021).

Vários dos autores que mais publicam sobre o tema, são os mesmos pesquisadores que desenvolveram o programa *Webometric Analyst*, um *software* para capturar, sistematizar e auxiliar pesquisas de análise webmétricas, cientométricas e alternativas, com uma metodologia

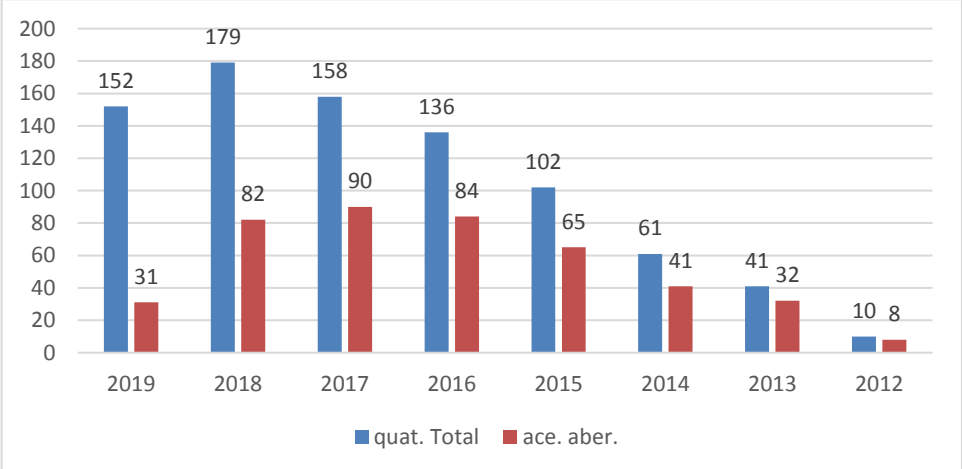
atual que possibilita, no mesmo sistema, a análise tradicional e a alternativa (WEBOMETRIC ANALYST, 2021, tradução nossa). O *Webometric Analyst* tem uma interface limpa, lembra o programa *Publish or Perish,* criado em 1997 por Anne Harzing (HARZING, 2021), porém ambos são de ideologias diferentes, devido ao foco e período que cada um foi desenvolvido, um focado nos indicadores tradicionais e o outro vai além, abarca também os indicadores recentes, os alternativos.

O *webometric Analyst* foi criado em 2012 pelo grupo de pesquisadores da *Statistical Cybermetrics*, o qual Mike A. Thelwall faz parte, é um programa gratuito, desenvolvido para a altmetria, análise de citações, análise da *web* social, *webometria* e análise de links. Utiliza os dados por meio de *APIs* ou *download* direto de dados. O programa possibilita ampla gama de opções de processamento dos dados (WEBOMETRIC ANALYST, 2021, tradução nossa).

O cenário das publicações a respeito de um assunto naturalmente acaba se concentrando em alguns autores, devido às parcerias, interesse de pesquisa e aprofundamento da temática pelos pesquisadores que são ou se tornam especialistas; pois é possível ver a evolução dos estudos de uma temática quando esses passam a ter maior adesão pela comunidade acadêmica, crescendo exponencialmente nos periódicos e bases de dados. Knöchelmann (2021) faz uma crítica quanto à concentração de pesquisas por apenas alguns pesquisadores, indicando que quanto maior for a variedade de olhares, reflexões e discussões sobre um tema, mais a ciência cresce.

Com relação à linha de tempo das publicações, é exposto no Gráfico 1, todos os materiais que foram classificados como SIM, referente aos 839 textos, que nesse caso está sem o recorte de acesso.

Gráfico 1 - Dados da linha de tempo



Fonte: dados da pesquisa (2021).

As colunas azuis representam o quantitativo das publicações que tinham a altmetria como objeto de estudo, as colunas vermelhas representam o quantitativo dos textos dentro do recorte por acesso.

Os dados obtidos mostram que as publicações sobre a temática tiveram um crescimento, com pico de publicações a partir de 2015, com maior índice em 2018 contando com 179 textos publicados no período, voltando a decair em 2019.

Tabela 6 – Recortes por acesso

Ano	**Total**	**Acesso Aberto**		**Acesso Restrito**	
2019	152	31	21%	121	79%
2018	179	82	46%	97	54%
2017	158	90	57%	68	43%
2016	136	84	62%	52	38%
2015	102	65	64%	37	36%
2014	61	41	67%	20	33%
2013	41	32	78%	9	22%
2012	10	8	80%	2	20%
839		433		406	

Fonte: dados da pesquisa (2021).

Cabe ressaltar que os 406 textos que tratavam do tema, como objeto de seus estudos, faziam parte da população da pesquisa, mas que ficaram de fora da amostra analisada por restrição do acesso; só em 2019, a perda do recorte foi de 79% das publicações para esse ano, o que é no mínimo contraditório com o movimento oriundo do tema.

Whitaker e Guest (2020) fazem alguns questionamentos a respeito da ciência aberta, falam sobre “quão aberta a 'ciência aberta' realmente é”; Olivia Guest cunhou o termo “#bropenscience”, que significa uma ciência quebrada.

Assim como as autoras mencionadas, Knöchelmann (2021), também faz sérias críticas a respeito das contradições do movimento e o quanto ainda é exclusivo e excludente, direcionado apenas para alguns; o que impacta diretamente nos menos favorecidos, e que não contribui para a democratização e para o acesso ao conhecimento, além de que, a restrição de acesso e as altas taxas de processamento dificultam a obtenção de textos e o desenvolvimento de pesquisa científica, mesmo nos moldes da ciência aberta.

As publicações sobre altmetria, analisadas na amostra do estudo, seguem a linha da interdisciplinaridade, porém, concentradas, em grande parte, em alguns pesquisadores da temática; outra questão é a mudança recente (2018, 2019), em publicar sobre o tema em acesso

restrito, o que pode caracterizar uma tendência futura, considerada prejudicial para uma área que ainda está se formando.

4.2 ASSUNTOS DE APLICAÇÃO TEMÁTICA DA ALTMETRIA

O segundo grupo de dados observados visou atender ao objetivo b), que almejou "identificar os assuntos de aplicação temática da altmetria".

Para essa etapa foi empregado o software livre Iramuteq (2018), o qual possibilita a aplicação de cinco tipos de análise: a) análise estatística (lexicográfica); b) Especificidades e análise fatorial de correspondência; c) método da classificação ou método de Reinert; d) análise de similitude; e) nuvem de palavras. A apresentação dos dados, dos temas aderidos aos textos analisados no estudo, se deu por meio de escalas, gráficos, diagramas, dendrograma e *Word Cloud*.

Para a análise dessa etapa da pesquisa foram seguidas as cinco etapas descritas no manual do Iramuteq (2018), com vistas a facilitar o entendimento do contexto e a reflexão dessa representatividade textual.

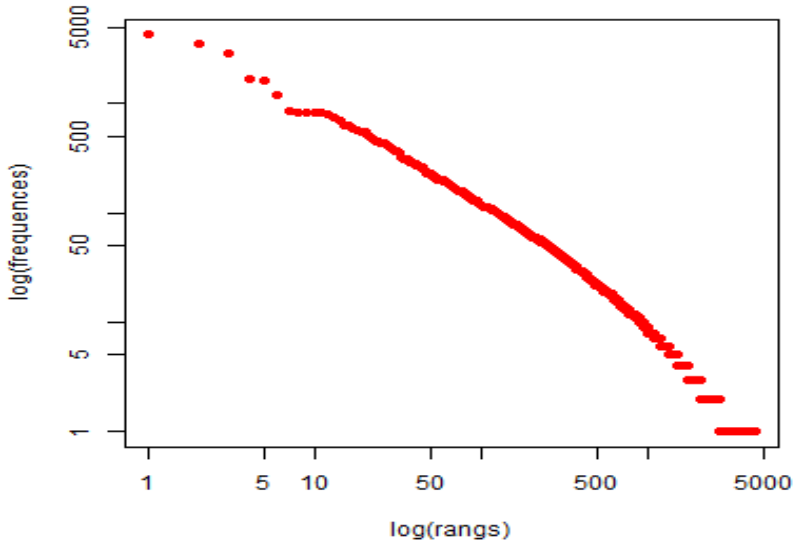
a) Análises estatísticas (lexicográfica)

A análise lexicográfica se baseia na divisão do corpus em macroestruturas ou microestruturas textuais, que serve para organizar os elementos textuais em classes e categorias (REY-DEBOVE, 1971); a lexicografia é empregada para a estruturação de dicionários, classificação temática, vocabulários e glossários, estuda o léxico.

A aplicação dos textos, no *software* Iramuteq (2018), possibilitou observar a quantidade, ocorrência e a frequência média das palavras. O sistema utiliza vocabulários para reduzir palavras por meio de sua estrutura de raiz, em que são identificadas formas que podem ser ativas ou suplementares (como advérbios, adjetivos, artigo, onomatopeia, preposição etc.). É possível verificar as ocorrências, a frequência média das palavras e a frequência de cada forma (quantitativo de cada uma), que podem ser apresentadas em planilhas ou por meio do diagrama de Zipf.

No estudo, essa análise é representada pelo Gráfico 2, do diagrama da escala de Zipf, gerado pelo sistema, o qual apresenta o comportamento da frequência das palavras ativas, o eixo vertical apresenta a frequência das palavras por ordem crescente (log frequences), e o eixo horizontal apresenta a frequência das formas em escala logarítmica (log rangs).

Gráfico 2 - Diagrama da Escala de Zipf: similaridade e agrupamento temático



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Em ambos os eixos, há uma frequência de palavras, que se aproximam a cinco mil aparições; as que estão no eixo vertical, representadas por pontos, simbolizam os termos de maior aproximação; as que se concentram no eixo horizontal, constituídas por linhas, representam menor aderência dos termos. Os pontos que formam uma linha contínua representam a aderência temática dentro de uma frequência crescente, o que infere que a classificação feita, para selecionar os textos de pesquisa, foi eficaz, já que os textos apresentaram ter relação entre si.

Um dos recortes da pesquisa era, o de obter apenas os textos que tinham a altmetria como o seu objeto de estudo, e o gráfico com o diagrama da escala de Zipf indica que os textos são representativos, no que diz respeito à temática, além de permitir a análise das similaridades.

A análise de lexicografia verificou a distribuição e concentração dos textos por meio da checagem de frequência e especificidade das palavras, que são apresentadas na sequência.

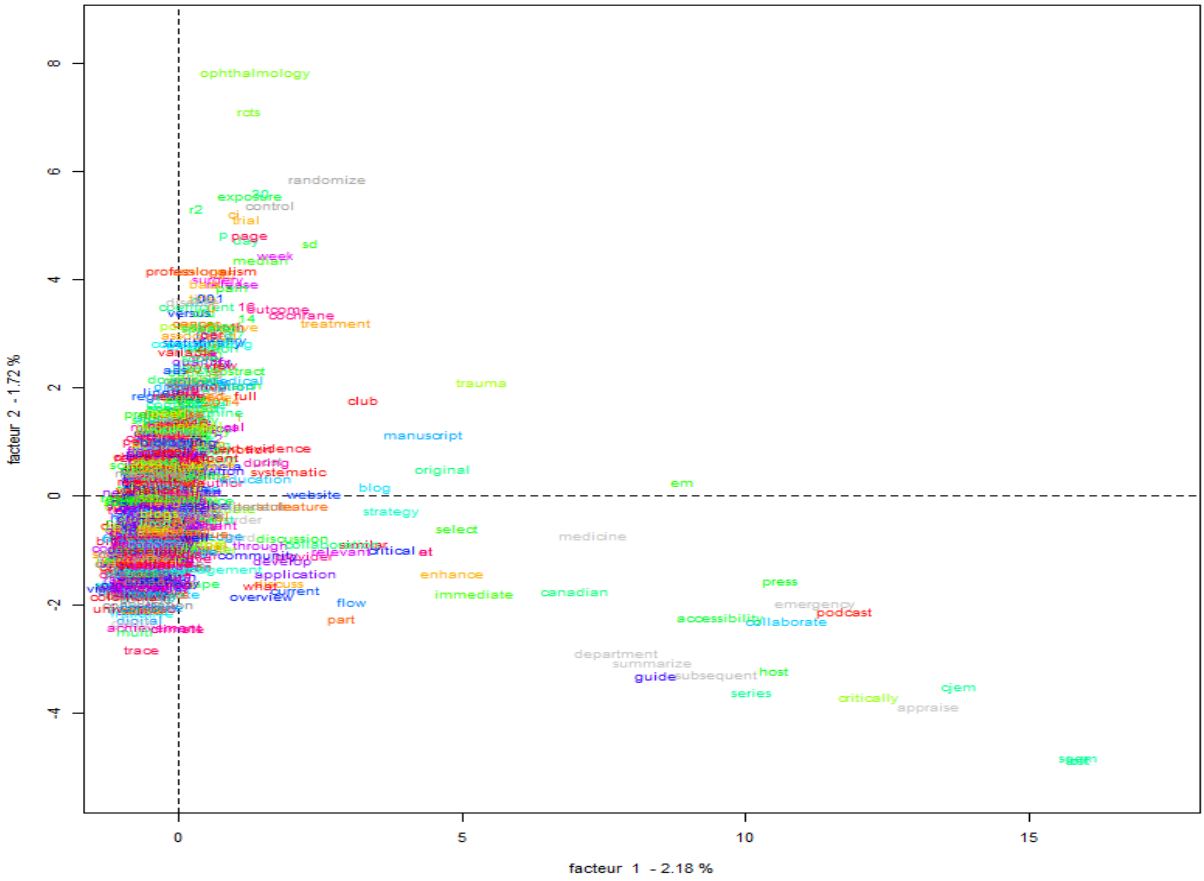
b) Especificidades e análise fatorial de correspondência

Na técnica estatística de análise fatorial de correspondência são observados o comportamento, por meio da observação de fatores; são estudadas a associação entre duas ou mais variáveis, permitindo visualizar os agrupamentos das relações entre as linhas e colunas (BATISTA; SUREDA, 1987).

Para esse tipo de análise são observadas as categorias, para que seja possível comparar

as modalidades e agrupamentos de textos por classes, o que também possibilita chegar à frequência dos termos para averiguar os que se aproximam da temática e, os quais se distanciam, como observa-se no Gráfico 3.

Gráfico 3 - Agrupamento de termos com base na escala de Zipf



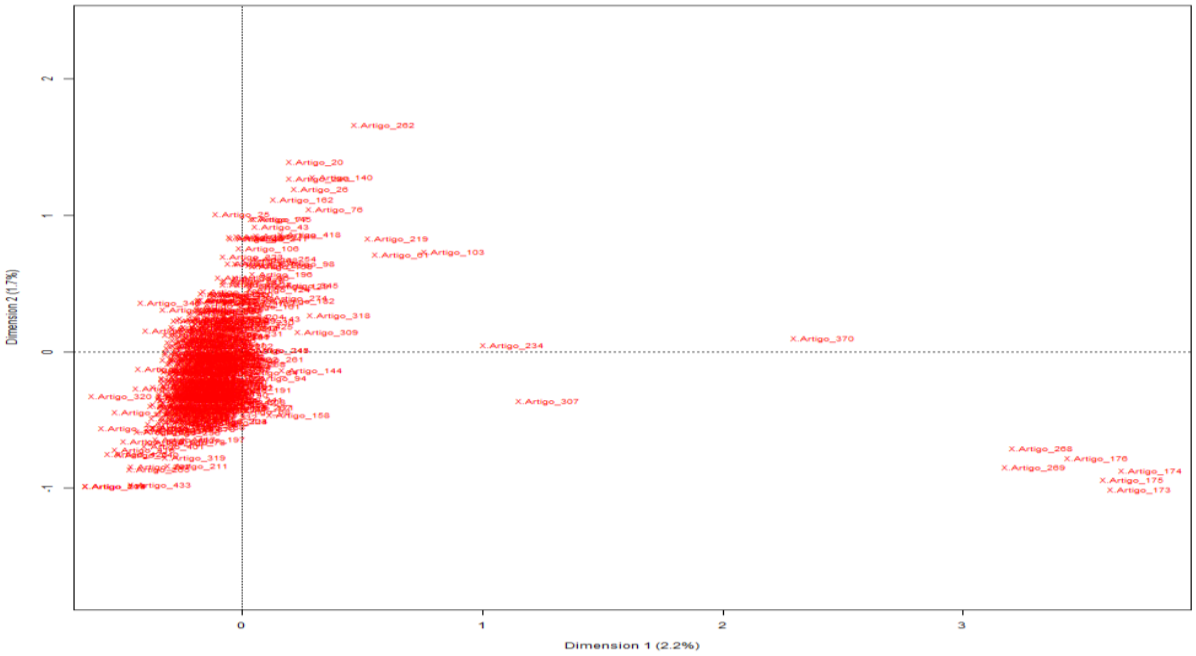
Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Quanto mais centralizados e agrupados os termos estiverem, maior é a aderência da temática, encontradas em textos distintos. Os termos que mais se distanciam são os que apresentaram menor adesão à temática; no Gráfico 3, a relação das temáticas, são representadas por cores, que no caso se misturam, devido à alta frequência e correlação dos termos.

Os Gráficos 4, 5, 6 são analisados sob a mesma ótica, porém direcionados para a especificidade e correspondência.

É possível verificar, no Gráfico 4, que o agrupamento temático está relacionado à especificidade temática, no qual há um grande grupo de textos, que se concentram no centro da simetria, enquanto alguns estão dispersos; ao todo, são 11 textos dispersos (370, 307, 269, 268, 262, 234, 219, 176, 175, 174, 173), que não apresentam estar tão alinhados com o grupo, no que diz respeito à especificidade temática. Ver os textos na lista do Apêndice A.

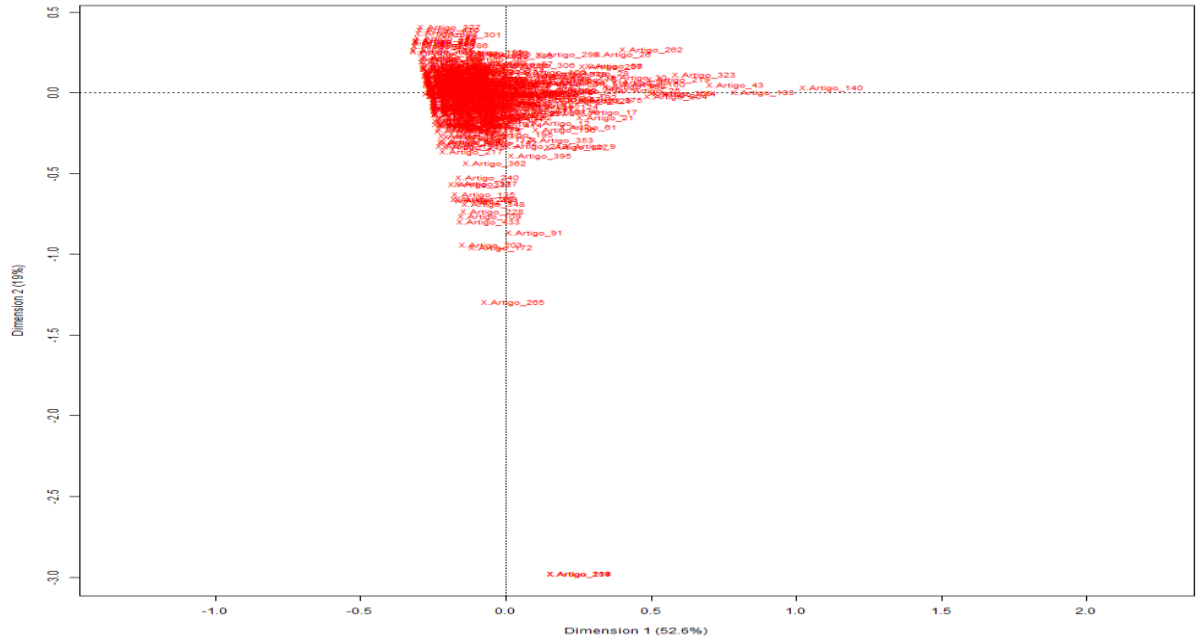
Gráfico 4 - Especificidade por agrupamento temático



Fonte: dados da pesquisa obtidos via Iramuteq (2021).

O Gráfico 5 apresenta a interrelação dos textos. Os que se concentram no topo da simetria são aqueles que têm maior relação temática entre si. Neste gráfico é possível ver que quase todos os textos se interrelacionam e apenas os textos (265, 213, 140, 091) estão distantes do núcleo central. Ver os textos na lista do Apêndice A.

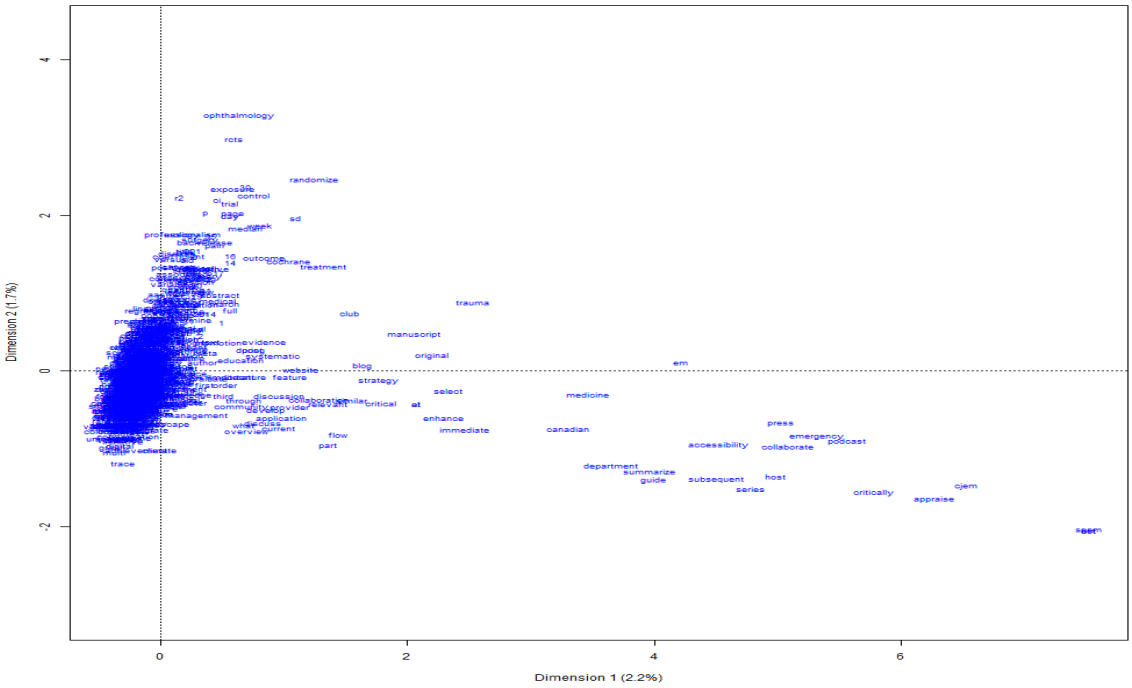
Gráfico 5 - Relação de blocos de artigos e a interrelação



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

O Gráfico 6 apresenta a concentração de termos comuns entre os textos (na maioria, são termos suplementares), considerados irrelevantes para a especificidades e análise da correspondência do tema da pesquisa. Conforme a terminologia, são os textos menos relevantes.

Gráfico 6 - Concentração de textos menos relevantes



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Visto que nesse campo de análise, os resultados apresentaram as especificidades e os fatores de correspondência das temáticas tratadas via *software*, o Iramuteq. Os textos que se agruparam na região central dos eixos foram os que ontologicamente tinham uma correlação específica de aproximação e ao contrário para os que se distanciaram. os gráficos indicam que as temáticas tratadas nos textos e a interrelação entre essas temáticas é bastante relevante, já que a maior parte da amostra se concentrou em torno do eixo dos gráficos.

c) Método da classificação ou método de Reinert

O método da Classificação Hierárquica Descendente visa classificar os termos, por meio do vocabulário empregado nos textos, a divisão dos grupos textuais é feita através da frequência e hierarquia temática empregada, a qual visa obter classes distintas (REINERT, 1990).

Ao aplicar a amostra no *software,* obteve-se a descrição da classificação dos dados para a apresentação dos gráficos e dendrogramas, conforme apresentado no Quadro 7.

Quadro 7 - Descrição dos dados para a construção dos Dendrogramas

CORPUS DA AMOSTRA DE PESQUISA	DESCRIÇÃO
Number of texts: 433	Reconhecimento do corpus a ser analisado;
Number of text segments: 2242	Divisão do corpus em segmentos;
Number of forms: 5696	Total de formas distintas, encontradas;
Number of occurrences: 77472	Número de ocorrências
Número de lemas: 4400	Frequência média de formas
Number of active forms: 3659	Formas ativas
Número de formas suplementares: 741	Formas consideradas suplementares
Número de formas ativas com a frequência >= 3: 1667	Frequência das formas ativas
Média das formas por segmento: 34.554862	Média de formas por seguimentos
Number of clusters: 4	Número de classes
2045 segments classified on 2242 (91.21%)	Retenção dos segmentos de classificação para o total do corpus.

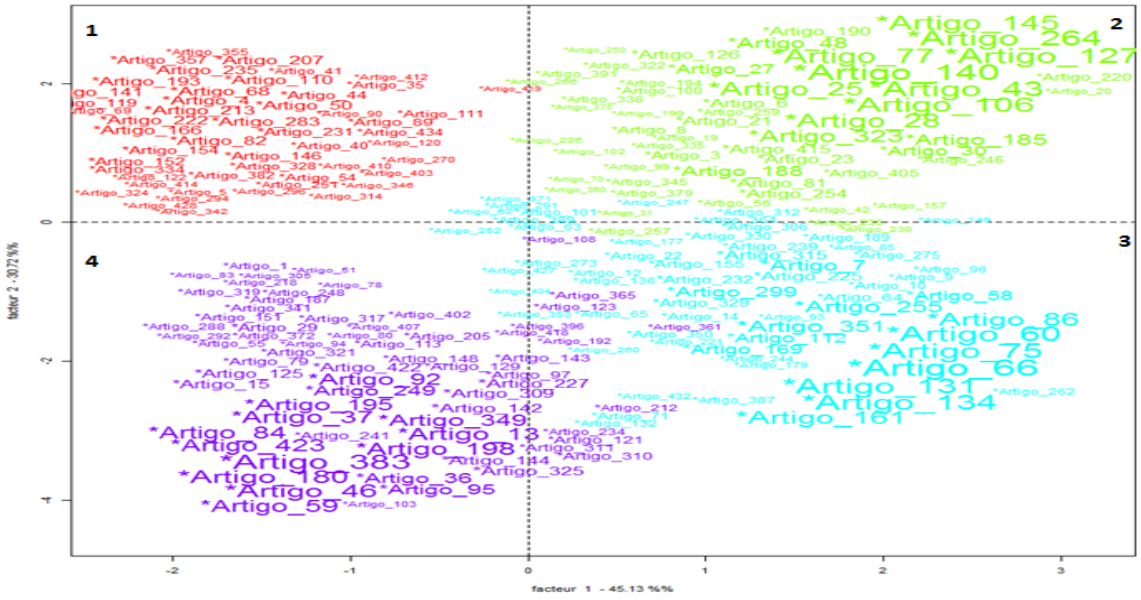
Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Conforme Camargo e Justo (2018, p. 34), nas possibilidades de análise, por meio do método da classificação ou método de Reinert (classificação hierárquica descendente – CHD), o Iramuteq apresenta as formas de análise e suas divisões, todos descritos no Quadro 7.

Essa estrutura foi usada para verificar a distribuição de classes por grupo de textos similares, exposto no gráfico 7; a distribuição de classes por termos-chave, no gráfico 8; os agrupamentos e a apresentação dos termos das categorias, no Dendrograma 9.

O Gráfico 7, apresenta como os textos estão agrupados por classes de similaridades temática, apresentando apenas as unidades de contexto. É possível ver que há uma divisão em quatro classes: 1-vermelha, 2-verde, 3-azul e a 4-roxa. Ver a lista dos textos no Apêndice A.

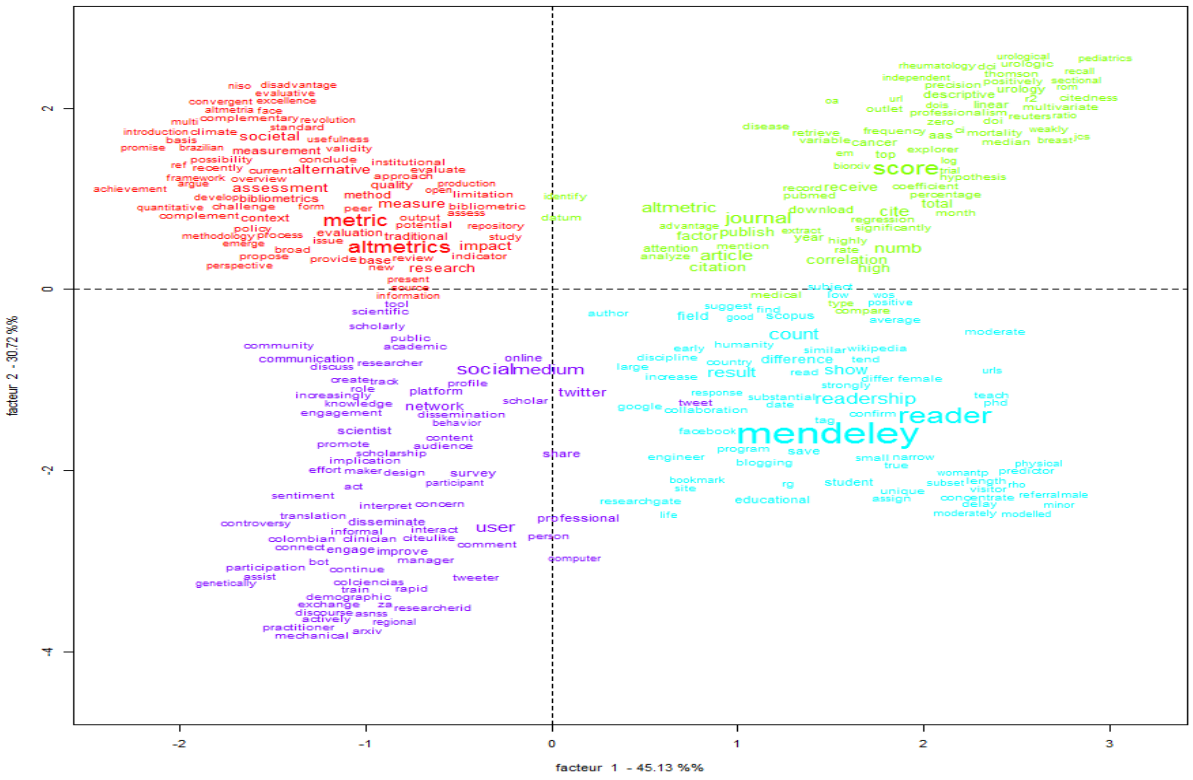
Gráfico 7 - Distribuição de classes por grupo de textos similares



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

No Gráfico 8, os textos foram agrupados pela distribuição de termos-chave, sendo divididos em quatro grupos distintos. É possível ver que há alguns termos que se interconectam uns aos outros, quer dizer que são termos comuns entre as classes, e que essas estão interligadas. Já os termos que estão com a escrita em fonte maior, foram os que apareceram mais vezes, nos textos: (*Mendeley, Reader, Score, Socialmedium, Metric, Altmetrics* etc.). Os campos superiores, em vermelho e verde, são os que concentraram a maior quantidade de palavras-chave utilizadas pelos textos.

Gráfico 8 - Divisão e distribuição de classes por termos-chave

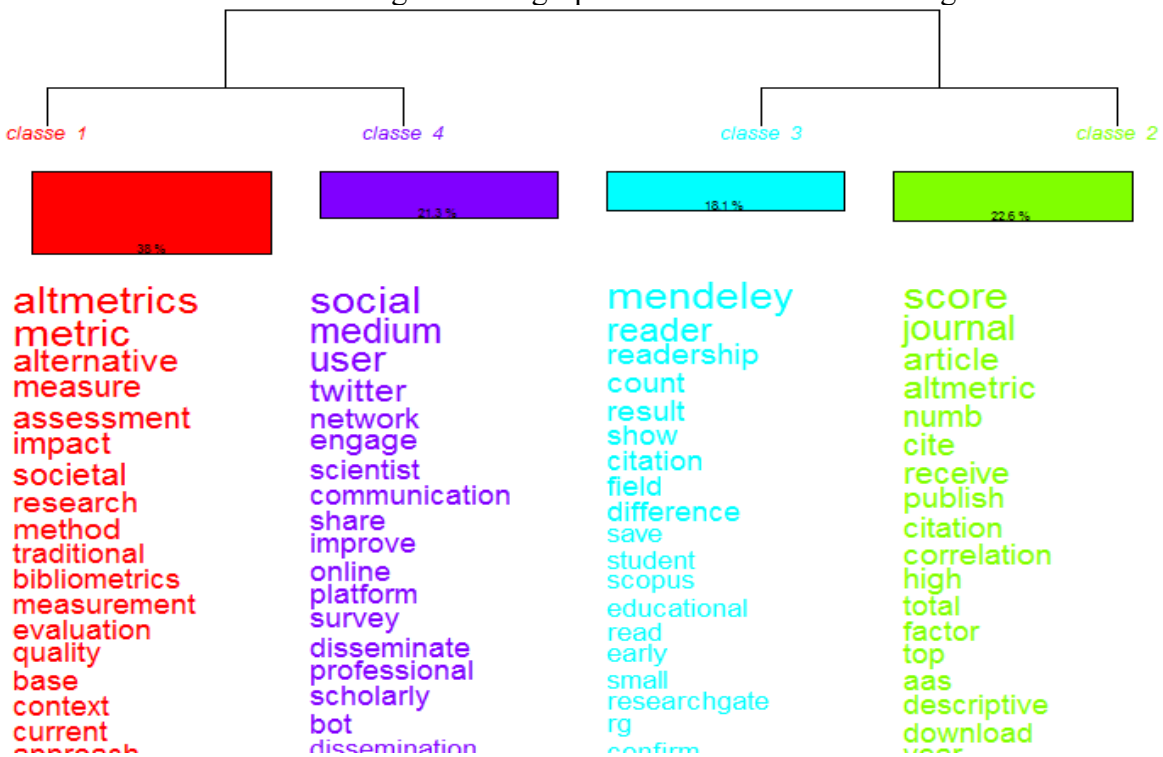


Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Retirados os termos suplementares, os demais são agrupados em quatro classes e separados por grupo, por meio de hierarquias, apresentados em dendrogramas. Dendrogramas são análises de hierarquia de termos, distribuídos por grupos — classificação do corpus.

No Gráfico 9, é apresentado o dendrograma de agrupamentos de termos das categorias, no qual é possível ver que o agrupamento dos textos, gerou quatro classe de divisão; as classes, 1-vermelha e 2-verde, concentram os dois maiores grupos, representando 60,6% dos textos analisados e classificados, contendo os termos considerados mais aplicados nos textos.

Gráfico 9 - Dendrograma de agrupamentos de termos das categorias



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

A lista de termos: Altmetrics, *metric, alternative, meansure, assessment, impact, societal, research, method,* tradicional, *bibliometrics, measurement, evaluation, quality, base, contexto, current* [...] etc.; os termos foram traduzidos e expostos na ordem, da qual se apresentam: altmetria, métrica, alternativa, média, avaliação, impacto, social, pesquisa, método, tradicional, bibliometria, medição, avaliação, qualidade, base, mídias sociais, usuários, *twitter,* comunicação científica, *mendeley,* leitores, citação, *Score,* periódico artigo, *altmetric* etc.

Todos esses termos estão intrinsicamente interrelacionados pela temática, que segundo a classificação feita pelo software, os termos têm relação com as: métricas, medidas, medição, avaliação, impacto, pesquisa, e englobam as mídias sociais, usuários e a comunicação científica; em linhas gerais, falam a respeito do processo de avaliação das publicações científicas.

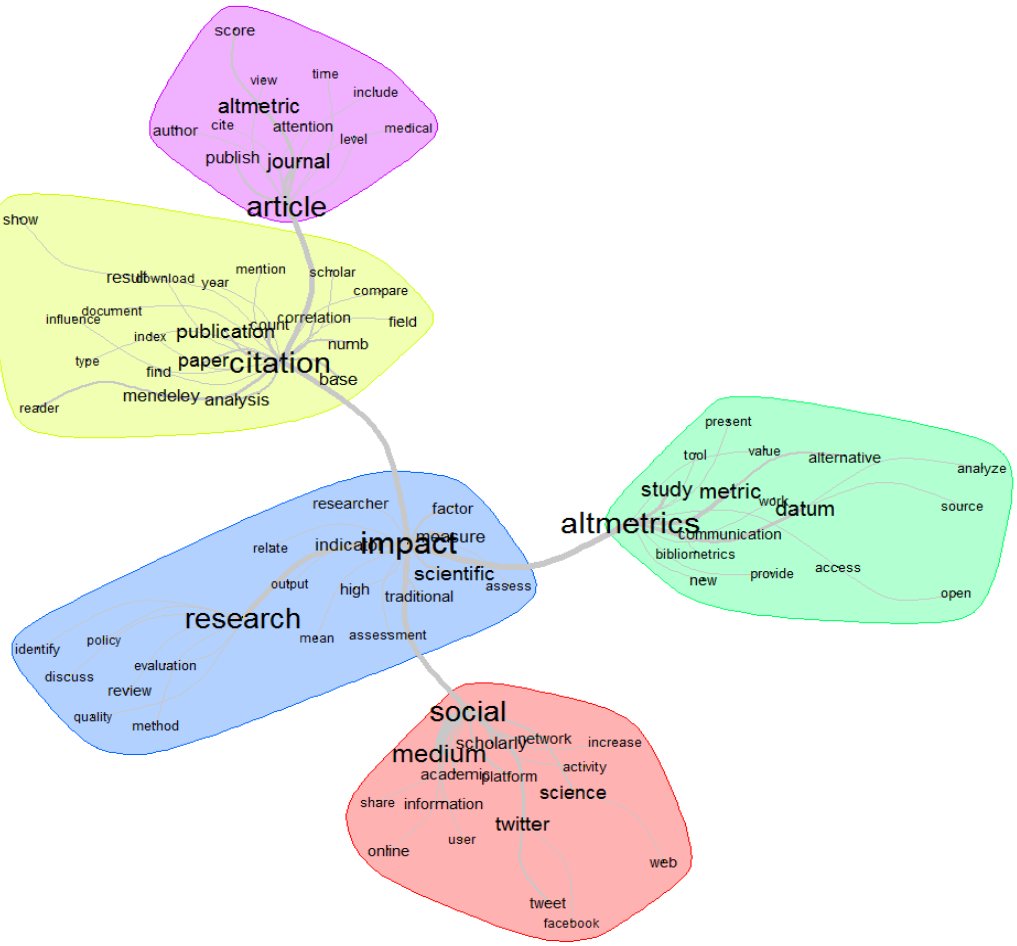
A comunidade científica ainda não chegou em um consenso a respeito dos estudos de métricas aplicados na avaliação da comunicação científica, apesar de ser um tema muito antigo, há muitas divergências de como a comunicação científica deveria ser avaliada, por quais métodos, modelos matemáticos e estatísticos, indicadores, ferramentas e até mesmo sobre as fontes de coleta para essas análises, o que reflete na ampla reflexão a respeito do uso da altmetria para esse fim.

d) Análise de similitude

A análise de similaridade apresentada por Marchand e Ratinaud (2012) consiste na técnica baseada na teoria dos grafos, que busca verificar a análise de correspondência e classificação lexicais dos textos, identificando as correlações por meio da lexicometria. Romero-Pérez, Alarcón-Vásquez e García-Jiménez (2018) enfatizam que a lexicometria é uma ferramenta aplicada para identificar expressões conceituais e categorizar temáticas por meio da análise de padrões ocultos em dados textuais.

A escala de Zipf trabalha um pouco diferente, pois visa agrupar e categorizar os textos por temáticas, verificando a frequência de uso de cada termo e distinguindo-os dos suplementares. Com isso é possível identificar as temáticas comuns e divergentes para cada uma das redes que o sistema cria. No Gráfico 10, pode-se visualizar a aplicação da análise da similaridade na escala de Zipf.

Gráfico 10 - Simetria de redes da Escala de Zipf



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

A simetria de rede da escala de Zipf mostrou que as temáticas-chave, de cada rede, são: artigo, citação, impacto/pesquisa, meio social e altmetrics, diferentes das categorias de termos apresentados do Dendrograma, no Gráfico 9.

Na simetria de Zipf, há um termo central para cada grupo, os quais se dividem em subcategorias; se apresentam como uma teia de relações temáticas; um mesmo termo pode tanto ser central como secundário, assim como o caso do termo altmetric, que aparece como central no grupo verde e secundário no grupo rosa.

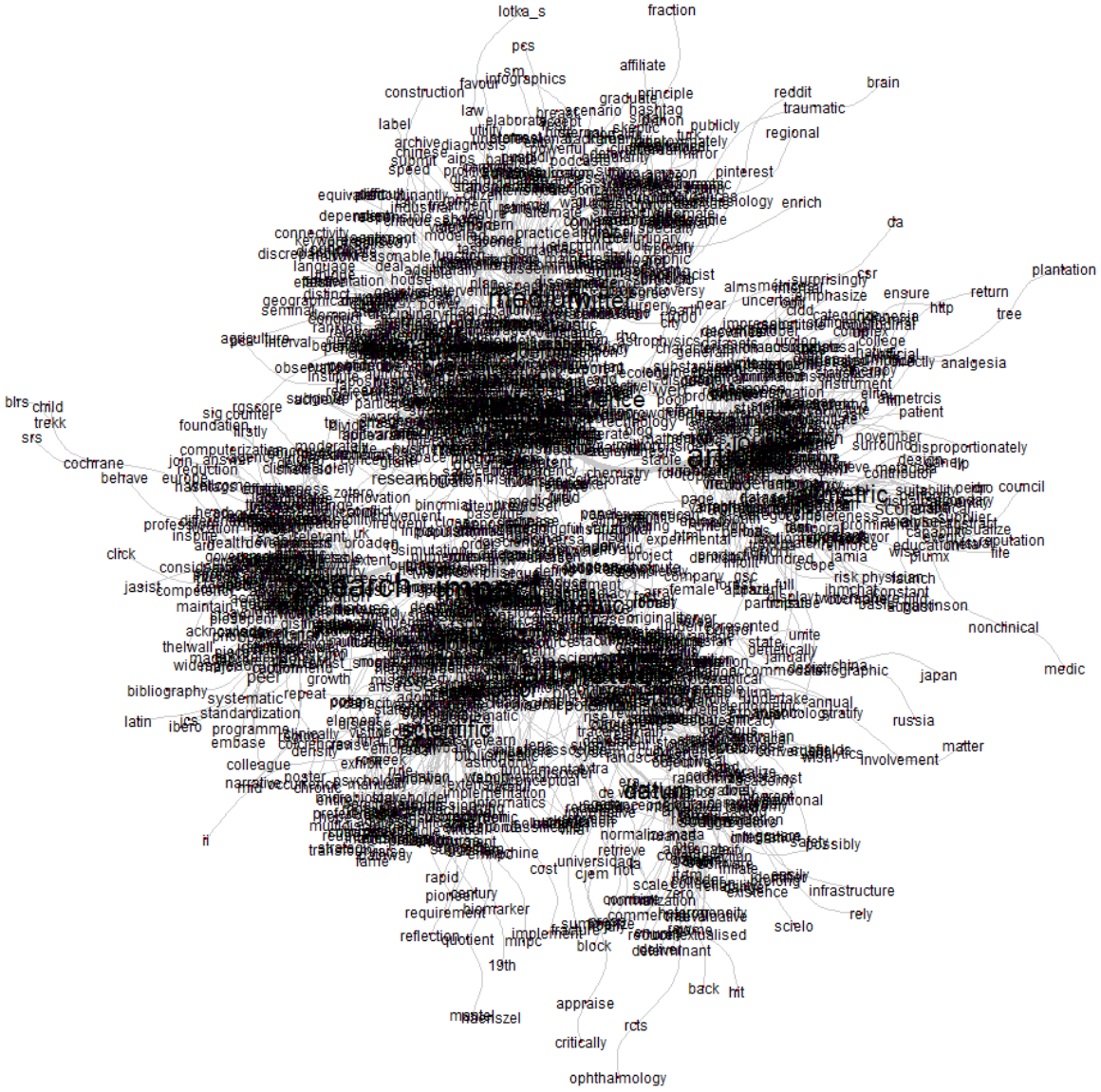
O grupo azul apresenta algo diferente dos demais, o termo central, impacto, se divide entre os secundários e um outro termo central, que é pesquisa, que por sua vez se subdivide em outros termos secundário, há duas redes em uma mesma rede.

Outra questão a observar, é que, na classificação do grupo verde, na qual a altmetria é o termo central, há um fio direto com os termos secundários: acesso aberto, que comprova a relação dessa vertente – acesso aberto - com a nova prática – altmetric - de mensuração de uso da comunicação científica, em distintos formatos e canais de comunicação.

Na simetria de rede da escala de Zipf, todas as palavras têm relação umas com as outras, pois estão conectadas na teia, por um fio central; e mesmo que exista subgrupos, as temáticas estão interconectadas entre si, indicando o ponto de relevância que cada uma têm na teia.

Se for observada a análise da simetria, apresentada no Gráfico 11, também em escala de rede, mas sem o filtro de frequência e a limpeza dos suplementares, fica difícil distinguir as relações temáticas, apenas que há cinco grupos de concentração, representados pela mancha mais escura do gráfico, e que todos estão conectados, uns aos outros.

Gráfico 191 - Simetria de rede de todos os termos



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

O que o Gráfico 11 nos mostra é a conexão das classes e subclasses em uma única teia, funciona como um grande rizoma, que não tem começo nem fim, apenas se conecta, e as intersecções são os nós, que formam os elos temáticos, os quais detém maior ligação entre si. Deleuze e Guattari (1995), utilizaram da técnica da cartografia para mapear e analisar as ligações rizomáticas entre as relações, destacando que, o que mais importa são as conexões, que no caso dos estudos dos autores, podia ser de coisas, gênero, espécie, pessoas, conhecimento etc.

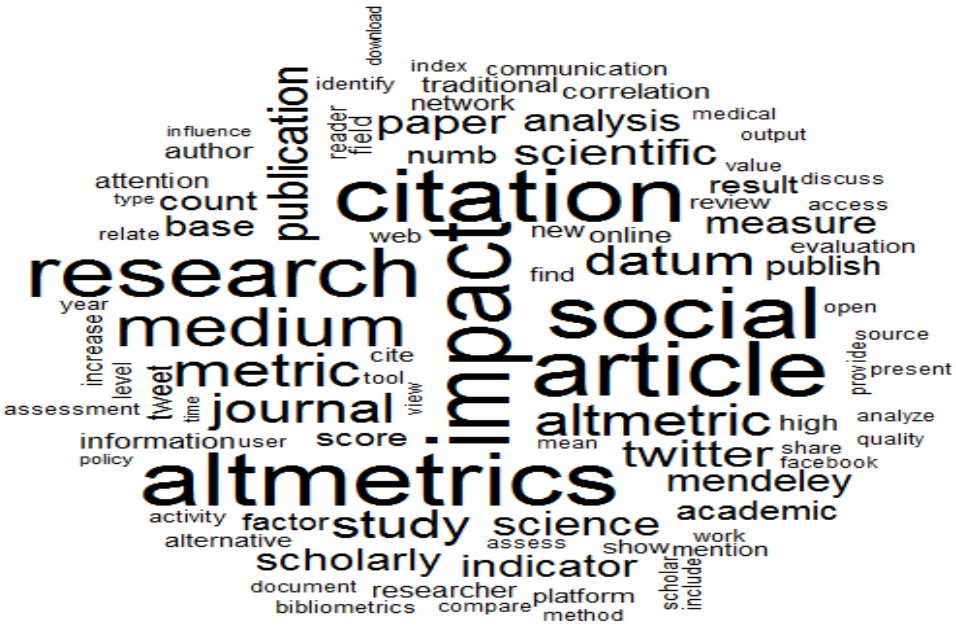
Os dados observados na análise de similitude foram representados nos Gráficos 10 e 11,

ambos em formato de rede, que se interconectam, mostrando o padrão comum dos termos, temas e subtemas dessas redes, objeto do estudo.

e) *Word Cloud*

A mesma escala de Zipf possibilitou gerar o Gráfico 12, de *Word Cloud* dos termos comuns; o diferencial é que, em função da frequência das palavras o Iramuteq viabiliza várias formas de representação gráfica, que nesse caso é demonstrado por meio da nuvem de palavras.

Gráfico 12 - Word Cloud dos termos obtidos da escala de Zipf



Fonte: Dados da pesquisa obtidos via Iramuteq (2021).

Para título de ilustração da representação dos termos em formato de nuvem de palavras, o qual, visa ser complementar ao Gráfico 10, pois se trata da mesma amostra aplicada na escala de Zipf, o que difere é a forma de apresentação; os termos, que são chave nos grupos do Gráfico 10, aparecem em fonte maior na nuvem, assim como os subtemas aparecem em fonte menores, mostrando-os de forma mais visual.

Para concluir, na análise dos assuntos da aplicação temática, a altmetria apresenta ter uma forte relação com alguns temas, dos quais os pesquisadores demonstraram ter mais preocupação, como o caso da: citação, impacto, altmetria, pesquisa e meio social, os quais fazem parte do cenário emergente e em plena discussão na ciência aberta.

Há tempos que a comunidade científica vem sinalizando a necessidade de mudança do modelo do fazer científico, principalmente da avaliação da produção científica, assim como a

mensuração de artigos e periódicos, e por consequência a avaliação dos pesquisadores. No entanto, ainda não há um concesso sobre qual é a melhor maneira de vislumbrar esses indicadores, de forma que atendam as diferentes necessidades de áreas, países, formatos de publicação e divulgação da ciência, que são recorrentes constantes na academia.

De todo modo, as terminologias identificadas nos estudos direcionam a reflexão para esses questionamentos, que possibilitou constatar que os pesquisadores estão investindo recursos em estudos sobre essas temáticas, e que essas aflições ainda são emergentes para a comunidade científica, pois a amostra é multidisciplinar e não se restringe a uma única área de conhecimento.

4.3 MÉTODOS, TÉCNICAS E APLICAÇÕES NOS ESTUDOS ANALISADOS

Conforme a proposta do objetivo c), o de "averiguar os métodos, técnicas e aplicações nos estudos analisados", os dados foram classificados e agrupados, revelando o emprego de métodos, recursos, ferramentas e modelos de estudos. Cabe salientar que a extração desses dados gerou uma lista extensa de modelos matemáticos, estatísticos e de recursos empregados nos estudos, o que demandou de um agrupamento desses dados, para possibilitar a análise e reflexão a respeito das aplicações na temática.

Para esse objetivo foi verificada a metodologia e técnica de estudo, dos 433 textos, obtendo 32 métodos e aplicações/procedimentos: análise de sentimento; análises qualitativas e estatísticas; exploratório; altmétrico; análise de conteúdo; análise temática; aplicação de entrevista; cientométrico; descritivo; entrevista semiestruturada; estatística inferencial; estatísticas descritivas; estudo bibliométrico; estudo de caso; estudo prático; estudo transversal; experimental; explicativo; levantamento bibliográfico; meta-análises; método analítico; método misto; mineração de texto; observacional; pesquisa de opiniões; qualitativo; quantitativo; reflexivo; relato de experiência; revisão de literatura; revisão narrativa; revisão sistemática.

A verificar a indicação da natureza dos 433 estudos, contatou-se que, 168 deles eram de caráter qualitativos, de cunho teórico reflexivo, outros 255 eram de caráter quantitativo, de cunho estatístico e matemático, no entanto, foi constatado que havia 10 textos que eram de abordagem mista, quali/quanti. Com isso, a inferência é de que, nessa amostra, a altmetria está um pouco mais focada na análise por meio da quantificação de dados.

A variedade de modelos metodológicos e aplicações dos estudos com foco na altmetria demonstra que realmente ainda não há um método próprio de aplicação para a temática, talvez

porque as ferramentas, modelos de análise e os ambientes/fontes mensurados, nesses estudos, tenham características distintas, o que faz com que necessite de aplicação distinta para cada objeto de análise, cenário e fonte de obtenção dos dados, assim como a visão que cada estudo espera obter.

O processo metodológico de um estudo é a forma, o caminho, o desenho que emprega regras, técnicas, instrumentos e ferramentas, a fim de atender as ações propostas pelos objetivos específicos do estudo. O método além de ser um instrumento para a aplicação de uma pesquisa, também proporciona a capacidade reprodutiva do estudo, além da checagem de aplicação e dos dados (CERVO; BERVIAN, 2002). A metodologia é o elemento que dá credibilidade para o fazer científico, porque orienta de forma sistemática como se deu o passo a passo do estudo, pois o fazer científico possui objetivo, finalidade, função e objeto, para que todos os elementos estejam conectados de forma harmoniosa.

Na checagem das abordagens metodológicas para a validação e análise dos dados foi constatado que havia várias aplicações matemáticas e estatísticas. Ao todo foram 121 modelos aplicados nos estudos, conforme indicado no Quadro 8.

Quadro 8 - abordagens metodológicas para a validação e análise dos dados

análise binomial negativa
análise bivariada
análise da área sob a curva (AUC - análise da ROC)
análise da árvore de regressão impulsionadas
análise da colinearidade
análise da correlação do assunto
análise da distribuição
análise da distribuição logarítmica
análise da função de base radial (RBF)
análise da média geométrica
análise da média geométrica de proporção
análise da pontuação Eigenfactor
análise da proporção normalizada baseada na média equalizada citada
análise da regressão binominal negativa
análise da regressão de mínimos quadrados ordinários
análise da regressão de Poisson Model
análise da regressão linear
análise da regressão linear múltipla
análise da regressão logística
análise da regressão lognormal
análise da regressão multivariada
análise da regressão não linear
análise da variance inflation factor
análise das regressões de Poisson ou binomial negativa
análise de agrupamento
análise de citação e cocitação
análise de clusters

análise de distância de levenshtein
análise de escalonamento aglomerativo hierárquico (HAC)
análise de escalonamento multidimensional (MDS)
análise de mediana do número médio geométrico
análise de medida de centralidade
análise de medida de covariância
análise de medida de similaridade de cosseno
análise de precisão e recuperação
análise de probabilidade estatística multivaridada com parâmetro não negativo e real
análise de redes
análise de redundância parcial
análise de regressão
análise de regressão binomial negativa
análise de rotação promax
análise de variação
análise de variáveis dependentes
análise do coeficiente beta - ß
análise do coeficiente de correlação de postos de Kendall
análise do coeficiente de correlação r
análise do coeficiente de determinação - R2
análise do coeficiente kappa de Cohen
análise do componente principal
análise do fator de impacto - IF
análise do fator de inflação da variância - VIF
análise do fator de pontuação
análise do índice de similaridade frasal
análise do valor de p bicaudal
análise do valor p
análise do valor RoM
análise dos efeitos marginais
análise fatorial
análise fatorial exploratória e confirmatória
análise linear
análise meta-análise
análise multidimensional
análise multifacetada
análise multifatorial
análise temática
aplicação da metodologia de impacto social em mídias sociais - SISM
aplicação da notação de espaço normatizado, vetor linear
aplicação da teoria unificada
aplicação do indicador estimador de Hodges-Lehmann
aplicação do índice - EgoMet Score
aplicação do índice de cobertura de impacto social
aplicação do índice de KATZ
aplicação do índice eletrônico - eTOC
aplicação do índice Kardashian
aplicação do índice longitudinal-retrospectivo
aplicação do índice Mean Normalized Citation Score (MNCS)
aplicação do método Best worst method (BWM)
aplicação do método de distribuição normal
aplicação do método de Levenberg-Marquardt
aplicação do método de micro-média

aplicação do método de Random Forest classifier
aplicação do método de regressão
aplicação do método de rotação de matriz de componente girado
aplicação do método log-transforming
aplicação do método Multinomial Naive Bayes
aplicação do método Multiple Factor Analysis
aplicação do método Qda (r)
aplicação do modelo binomial negativo e de regressão linear
aplicação do modelo de Bonferroni correction
aplicação do modelo de escala Likert
aplicação do modelo de Kinney
aplicação do modelo de Latent Dirichlet Allocation
aplicação do modelo de poisson - Binomial negativo inflado de zero
aplicação do modelo de procedimento de Benjamini-Hochberg
aplicação do modelo de regressão de mínimos quadrados ordinários hierárquicos
aplicação do modelo de tópico DMR - relacional
aplicação do modelo linear
aplicação do modelo linear generalizada mista
aplicação do modelo mínimos quadrados ordinários
aplicação do modelo Research Excellence Framework
aplicação do modelo term frequency–inverse document frequency
aplicação do teste ANOVA
aplicação do teste de esfericidade de Bartlett
aplicação do teste de Kolmogorov-Smirnov - teste K–S uniamostral e biamostral
aplicação do teste de Kruskal-Wallis
aplicação do teste de proporção Spearman
aplicação do teste de scree
aplicação do teste de Shapiro-Wilk
aplicação do teste Dunn’s
aplicação do teste exato de Fisher contingency tables
aplicação do teste Expectation-Maximization
aplicação do teste KAPPA
aplicação do teste Mann-Whitney-U-Test
aplicação do teste randomizado
aplicação do teste t - Student’s t-test
aplicação dos métodos C-Support Vector Machine
aplicação dos testes de legibilidade de Flesch-Kincaid
aplicação dos testes de Qui-quadrado
aplicação dos testes de soma de postos de Wilcoxon
aplicação dos testes de tendência de Cochran-Armitage
aplicação dos testes não paramétricos

Fonte: dados da pesquisa (2021)

O curioso é que os estudos estão focados em achar meios e fórmulas para quantificar o impacto do conhecimento científico, que de certa forma, corre contra a vertente do que representa o manifesto sobre a altmetria, pois deveria ser um indicador complementar dos tradicionais e com isso, trazer reflexões a respeito do “impacto” social, enquanto sociedade, e não apenas das redes/mídias sociais; olhar par o quanto um estudo pode ser benéfico para uma sociedade, que envolve todos, que vai além do campo científico e acadêmico. Talvez, nesse

sentido é preciso rever, enquanto academia, o que a altmetria representa, ou, o que deveria representar.

Por outro lado, ao analisar as abordagens metodológicas, foi constatado procedimentos com ênfase na abordagem qualitativa, como o caso da aplicação do indicador estimador de Hodges-Lehmann; aplicação do método Multinomial Naive Bayes; aplicação do modelo de escala Likert; aplicação do modelo de Latent Dirichlet Allocation; e a aplicação do teste de Kolmogorov-Smirnov — teste K–S uniamostral e biamostral; que corresponde com alguns métodos e procedimentos descritos nos estudos: análise de sentimento; análises qualitativas; análise de conteúdo; análise temática; pesquisa de opiniões; e método analítico.

Assim, das abordagens metodológicas encontradas na descrição dos procedimentos dos estudos, foram selecionados alguns recursos, os quais foram considerados aplicáveis aos modelos de estudo qualitativos: *OpenCalais; Lagotto API; TOPSY; Mimir; SocialMention; Google Ngram Viewer; Web scraping*, são recursos que viabilizam a coleta e análise de dados semânticos, alguns de aplicação *web*, outros de textos, e outros de interações nas redes. Ver a lista no Quadro 9.

A análise dos procedimentos viabilizou identificar os recursos tecnológicos que foram aplicados nos estudos, o que gerou uma lista de 108 itens, conforme indicado no Quadro 9.

Quadro 9 - recursos e ferramentas para a aplicação e análise altmétrica

RECURSOS	DESCRIÇÃO DE APLICAÇÃO
Adobe Analytics de Wolters Kluwer	permite que você mescle, combine e análise dados de qualquer lugar na jornada do cliente Adobe Analytics.
Alexa Ranks	sistema de ranqueamento global que classifica milhões de websites em ordem de popularidade.
ALiEM Social Media Widget	ferramenta para adicionar o ícone de mídia social da, base *ALiEM*, em seu site.
Altmetric Bookmarklet	programa de marcador comum, permitem que execute ações no navegador *web* com apenas um clique.
Altmetric database	Banco de dados do Altmetric.com
Altmetric Explorer	Buscador de pesquisas na base Altmetric.
Altmetric.com	Empresa que coleta, analisa e mensura a interação de conteúdos acadêmicos nas redes da *web.*
amazon.cn	empresa Amazon na China.
Andalusian Current Research Information System SICA	Sistema de biblioteca que indexa vários materiais.
API Altmetric	*Altmetric Details Page* - fornece acesso programático aos dados de métricas associados as publicações científicas, coletados pela *Altmetric.*
Batch Citation Matcher (NCBI)	ferramenta usada principalmente por editores de periódicos online.
BibSonomy	sistema de *bookmarking* social e compartilhamento de publicação.
Bing	um motor de busca para pesquisas gerais.

Buffer	software para *web* e mobile, desenvolvido para gerenciar contas em redes sociais.
Ceek.jp	motor de busca que pesquisa artigos de notícias
CINET/Netdraw	é um programa para Windows especializado na análise de dados provenientes de redes sociais.
CiteScore	mensura o número médio anual de citações de artigos recentes publicados em revistas.
CiteSeexr	motor de busca de trabalhos científicos e acadêmicos em computadores e ciência da informação.
Citeulike	serviço da *web* que permitia aos usuários salvar e compartilhar citações em trabalhos acadêmicos
Conference Navigator system	sistema social que ajuda os participantes da conferência a selecionar as palestras mais relevantes para os seus interesses
Crossref Event Data	API de eventos com informações.
D3.js	biblioteca JavaScript para produzir visualizações de dados interativos e dinâmicos em navegadores da *web*.
Emerald Insight	buscador da base de dados *Emerald* para o acervo da base.
Entrez Programming Utilities	programas para a consulta no banco de dados *Entrez - National Center for Biotechnology Information.*
Escala Grey Scale	imagem digital em cinza, ou nível de cinzento, no qual o valor de cada pixel é uma única amostra do espaço de cores.
Escala PEDro	auxilia os utilizadores da base de dados PEDro a identificar rapidamente quais dos estudos controlados aleatorizados, ou quase aleatorizados poderão ter validade interna e poderão conter suficiente informação estatística para que os seus resultados possam ser interpretados.
Essential Science Indicators	ferramenta analítica para identificar tendências e pesquisas de alto desempenho no *Web of Science Core Collection.*
EXCEL	editor de planilhas produzido pela Microsoft.
FluidSurveys	software de pesquisa, formulário e questionário on-line. Mesma função que o Monkey
Formulário Google	sistema para a criação de questionários on-line.
ForSight	empresa de tecnologia de IA da indústria de construção.
Gender API	para classificar o gênero de um nome.
Gephi	visualização e exploração para todos os tipos de gráficos e redes. Gephi é open-source e gratuito.
GetLattesData	Para baixar e ler dados Bibliométricos da Plataforma Lattes.
Google Analytics	serviço de exibição estatísticas de visitação do site/página *web.*
Google Books Ngram Viewer e Google Ngram Viewer	mecanismo de pesquisa que mapeia a frequência de palavras ou frases, delimitadas por vírgulas.
Google PageRanks	usado pelo motor de busca *Google* para ajudar a determinar a relevância ou importância de uma página.
Google Scholar Citations	mecanismos que permite que rastreie as citações de publicações ao longo do tempo.
Graph do Facebook API	é a principal forma de os aplicativos lerem e gravarem no gráfico social do Facebook.
HootSuite	gerenciador de mídias sociais.
ImpactStory	permite que o pesquisador descubra o impacto on-line de suas pesquisas.
InCites Benchmarking & Analytics	ferramenta de avaliação de pesquisa personalizada, ajuda a desenvolver estratégias de pesquisa.
JAPE	linguagem de correspondência de padrões, usado para processar texto em linguagem natural.
JCR	sistema de relatórios de citações de periódicos.

JSON	é um formato de intercâmbio de dados leve, para humanos ler e escrever, para as máquinas analisar e gerar.
Lagotto API	examina o desempenho geral e o alcance dos artigos (visto, compartilhado, discutido, citado, recomendado).
MATLAB	software que integra análise numérica, cálculo com matrizes, processamento de sinais e construção de gráficos em ambiente.
Microsoft Academic Graph	gráfico com registros de publicações científicas, citação, autores, instituições, periódicos, conferências e campos de estudo.
Mimir	estrutura de pesquisa semântica de código aberto
MongoDb	software de banco de dados para documentos de código aberto e multiplataforma, escrito na linguagem C++.
MySQL	sistema de gerenciamento de banco de dados.
NatureMetrics	dados para o monitoramento da biodiversidade, usando pesquisas de DNA ambiental, *metabarcoding.*
NodeXL	software para obter visualização simples e fácil sobre estruturas conectadas, como redes e mídia social.
OpenCalais	*Web Service*, cria automaticamente metadados semânticos para os conteúdos de (linguagem natural, aprendizado de máquina, analisa o documento etc.).
Pablo (Buffer)	criador de imagens e cards para redes sociais.
Pajek	análise e visualização de redes muito grandes
PLOS ALM	sistema de mensuração alternativa de artigos científicos
PlosOpenR	um pacote de software para a aplicação da estatística R.
PlumX	reúne métricas de pesquisa apropriadas para todos os tipos de produção de pesquisa acadêmica.
Prism GraphPad	análise e representação gráfica desenvolvida para pesquisas científicas.
Publish or Perish	sistema para obter indicadores tradicionais da comunicação científica.
PubMed Commons	para que os membros postem comentários sobre as publicações, que aparecem abaixo dos resumos no PubMed.
Python	linguagem de programação que permite trabalhar rapidamente e integrar sistemas de forma mais eficaz.
Qualtrics	empresa que avalia a gestão de experiência de clientes.
Qualtrics survey	ferramenta para construir questionários e perguntas.
R - pacote *rtwitte*	twitteR é um pacote R que fornece acesso à API do Twitter.
rAltmetric Packages	fornece uma maneira de recuperar programaticamente altmetrics de vários tipos de publicação
RapidMiner	*software* de ciência de dados, para a preparação, aprendizado de máquina, mineração de texto e análise preditiva
ResearchBlogging	sistema para coletar postagens de pesquisas revisadas por pares, em blogs, em todas as disciplinas acadêmicas.
ResearcherID	sistema para a identificação de autores científicos.
SAS version 9.4	explora dados, analisa e aprende com eles.
ScienTI - CvLAC de Colciencias	plataforma de currículo de pesquisadores da Colômbia.
Search Bios Follower Wonk de MOZ	ferramenta que pesquisa as bios do *Twitter,* compara contas, divide seguidores por localização, biografia, quem eles seguem. Combina atividades com ganhos e perdas em seguidores.
Search Bot	robôs de pesquisa.
SentiStrength	para a análise automática de sentimentos, nas redes sociais.
SnapBird - twitter	permite que pesquise nas mensagens diretas, dentro dos tweets dos seus amigos e nos favoritos de qualquer usuário.
SocialMention	pesquisa as menções em blogs, microblogs, imagens, vídeos, favoritos e comentários etc.

SocSciBot	rastreador da *web* para análise de link em sites ou coleção, texto em uma coleção de sites para ciências sociais e humanas.
Software Scikit Learn	biblioteca de aprendizado de máquina de código aberto para a linguagem de programação Python.
SolR	plataforma de pesquisa corporativa popular, de código aberto desenvolvida no Apache Lucene.
Spinn3r	fornece APIs para o acesso de conteúdos de mídia social, weblogs, notícias, vídeo, em qualquer idioma e em grandes volumes.
SPSS - Statistical Package for the Social Sciences	*Software* para análise estatística de dados.
SQL Server	banco de dados.
Stack Overflow graph	sistema de programação de computadores de *Stack Overflow* para a construção de gráficos.
Stata	pacote de software completo e integrado que fornece todas as suas necessidades de ciência de dados - manipulação de dados, visualização, estatísticas e relatórios automatizados.
Statistica version 12	software estadístico, para a análise, gestão e visualização de bases de dados e Data Mining.
Stream's Bot	para criar chats automáticos.
SurveyMonkey	sistema para a criação de questionários on-line.
SwePub	motor de busca que pesquisa artigos, textos de conferências e dissertações.
Symplur	análise de rede social para a área da saúde.
Tableau	software para visualização de dados.
TOPSY	análise social em tempo real para marketing baseado em dados framework GATE processamento de texto.
TrendMD	mecanismo de recomendação de conteúdo para editores acadêmicos.
Truthy Bot or Not	ferramenta de detecção de bot do *Twitter.*
TweetDeck	aplicativo de mídias sociais, que integra mensagens do Twitter e do Facebook.
Twitonomy	análise da interação no *Twitter*
Twitter Klout	identificador do *Twitter.*
Unpaywall	banco de textos de acesso aberto, de sistemas de biblioteca, plataformas de pesquisa e outros produtos de informação em todo o mundo.
VOSViewer	ferramenta para construção e visualização de redes bibliométricas.
Web scraping	sistema para coleta de dados estruturados da *web* de maneira automatizada.
Webometric Analyst	Para a captura e visualização de dados.
Weka	algoritmos de aprendizado de máquina para tarefas de mineração de dados.
Wiki Alfin	Wiki-Repositorio sobre Alfabetización Informacional en Iberoamérica.
WordPress	sistema para a construção de Blogs, sites e páginas *web*.
YouTube Analytics	para entender melhor o desempenho dos seus vídeos e do seu canal com as principais métricas e relatórios do *YouTube.*
ZEMANTA	tecnologia de anúncio programático desenvolvida para o engajamento pós clique.

Fonte: dados da pesquisa (2021).

O Quadro 9 permite observar que os estudos altmétricos também estavam focados no emprego de ferramentas para a coleta e análise de dados, como a maior parte dos estudos foram de cunho quantitativo, o que é coerente com o emprego desses recursos, que servem para

comparar indicadores, ferramentas, fontes de dados e sistemas de mensuração em redes acadêmicas e principalmente nas redes sociais.

É possível verificar que alguns recursos são específicos de bases, bancos de dados e empresas, como o *VOSViewer*, da empresa *Digital Science*; *ALiEM Social Media Widget* da base *ALiEM*; os serviços *Altmetric database, Altmetric Bookmarklet, rAltmetric Packages* da empresa *Altmetric*; o sistema *Crossref Event Data* da *Crossref*; a ferramenta de busca *Emerald Insight* da base *Emerald*; o sistema de consulta *Entrez Programming Utilitie*, do banco de dados da *Entrez*; a Escala *PEDro* da base *PEDro*; o *Essential Science Indicators* da base *Web of Science Core Collection*; os serviços *Google Analytics, Google Books Ngram Viewer, Google PageRanks e Google Scholar Citations* e *YouTube Analytics,* da empresa *Google;* a ferramenta *Graph do Facebook API,* do *Facebook;* a ferramenta *Microsoft Academic Graph,* da *Microsoft;* o *PubMed Commons*, da base *PubMed; pacote rtwitte* e *Twitter Klout,* do *Twitter.* Alguns desses recursos são de uso gratuito, em outros, é preciso a assinatura ou a chave de acesso para que seja possível utilizar e obter dados.

Ao classificar os recursos descritos nos estudos analisados, foram encontrados 53 serviços de dados (base de dados, repositórios, diretórios, bancos de dados, plataformas de compartilhamento etc.), que foram utilizados como fonte para a coleta de dados nos estudos analisados, descritos no Quadro 10

Quadro 10 - Lista dos serviços de dados

AHCI - Arts & Humanities Citation Index	ISI
arXiv	IraLIS
Astrophysics Data System (ADS-NASA)	Journal Citation Reports
Banco de dados de literatura educacional da FIS	Latindex
BioRxiv	LISA
Book Citation Index	LIS-TA
BRAPCI	MEDELINE
Chinese Social Sciences Citation Index	Microsoft Academic Search
CINAHL	NATURE
Cochrane Database of Systematic Reviews	OpenDOAR
CrossRef	ORCID
Current Research Information System in Norway (CRIStin)	PEDro
Data Citation Index	PLOS
Dialnet	PMID
Dimensions	Proquest
Directory of Open Access Journals	Publindex
DOI	PubMed
EBSCO	RedAlyc
E-LIS	Science Citation Index Expanded
Elsevier	SciELO Brasil
EMBASE	Scopus
Emerald	Social Science Citation Index

EurekAlert	Thomson Reuters
EXIT	Wiley
F1000Research	WoS
Figshare	Zenodo
Google Books	
Google Scholar	

Fonte: dados da pesquisa (2021).

Todos os 53 serviços informacionais são exclusivamente direcionados para a comunicação científica, alguns de acesso restrito, outros de acesso aberto, e os híbridos, com parte do acervo em acesso aberto e outra parte de acesso restrito.

Outro elemento observado foram os periódicos usados na aplicação dos estudos analisados. Foram encontrados cinco títulos: *BMJ Journals,* DataGramaZero, *Dual antiplatelet therapy (DAPT), New England Journal of Medicine, Periódico PeerJ.* É possível observar que são das áreas de ciência da informação, medicina, saúde e os interdisciplinares. Considera-se esse fator de baixa representatividade, já que não são muito os periódicos que foram usados como objeto de estudo, no grupo da amostra analisada nesta pesquisa.

Outro aspecto observado foi a aplicação de estudos sobre as redes acadêmicas, e como não é surpresa, apontam para o emprego de pesquisas nas quatro redes acadêmicas mais populares: *Mendeley, ResearchGate, Academia.edu, LinkedIn,* o que reforça o perfil dos estudos focados no comparativo de uma rede com a outra, ou, de um sistema de mensuração tradicional com um ou mais sistemas alternativos.

No entanto, ao que compete as redes sociais, blogs e *chats,* foram encontrados os relatos sobre o *Facebook, Twitter, Google+, Weibo, Wikipedia, YouTube, Skype,* todos são sistemas de interação coletiva. *Facebook, Twitter,* são os fonte de dados com maior aplicação de pesquisas, conforme à amostra. Ao longo do tempo, algumas fontes deixam de existir (*Google+, Delicious, AutorMapper* etc.), assim como blogs e redes pessoais, o que fragiliza a checagem e análise altmétricas de dados dessas redes, já que são passíveis de exclusão pelos usuários ou detentores desses sistemas.

Os estudos sobre a mensuração da comunicação científica nas redes sociais partem da proposta de que as redes também devem ser consideradas como fonte de dados e análise para a mensuração das pesquisas científicas, mas há um problema nesse tipo de enfoque, tanto as redes sociais quanto as acadêmicas, são sistemas comerciais que necessitam de investimento e uso quantitativo para a sua permanência e existência, sendo assim, os estudos que analisam as rede, seus usuários, comportamento de consumo informacional, função acadêmica e social etc., estão sujeitos a lacunas, a dificuldades de conferência, replicação do estudo, e até mesmo de acesso

e obtenção de dados para os estudos.

Os sistemas tradicionais de impacto também têm limitações de extensão de coleta de dados, janela de mensuração e a existência de mais de um modelo de cálculos para a mensuração do impacto, e a falta de alcance desses sistemas para atender a todos os materiais científicos, se limitando as publicações de suas bases.

Na amostra foram identificados 29 estudos que continham críticas, focadas na análise e uso dos sistemas de mensuração alternativo versus o tradicional, aplicadas à comunicação científica.

a) Evidenciou-se críticas a respeito da reputação acadêmica fantasma criada pelo *ResearchGate Scores*;

b) De que os indicadores de pontuação, utilizados na reputação acadêmica, não são considerados confiáveis;

c) Da aplicação de indicadores compostos, como um problema para a falta de transparência e redundância do esquema de mensuração do *ResearchGate*;

d) As políticas públicas em recompensar pesquisas que obtém citações ao mesmo tempo que ignora a existência das métricas alternativas;

e) Ao uso de citações no *Wikipédia* como indicador de impacto, correlacionando esse fenômeno com o efeito Mateus da segregação científica;

f) A ponderação sobre o uso de dados do *Twitter* para avaliação de pesquisa; crítica a incapacidade dos dados altmétricos em serem auditáveis;

g) Faz críticas as mensurações no *Twitter*, indica que são indicadores de interação e circulação do conhecimento científico e não de impacto;

h) Critica o modelo de avaliação da pesquisa, o qual visa aplicar indicadores e critérios tradicional para políticas de financiamentos de pesquisa;

i) Críticas a respeito dos desafios para analisar o engajamento no *Facebook*, o mapeamento de *urls* e *DOIs* e as análises dos variados tipos de dados;

j) Critica a qualidade dos dados em métricas de mídia social e compara a característica dos agregadores de dados altmétricos: *Altmetric.com, CrossRef Event Data, Lagotto, Plum Analytics, Mendeley*;

l) Crítica os problemas de interpretação dos traços digitais de "Altmetria";

m) Discute a respeito dos benefícios e limitações potenciais da aplicação da altmetria;

n) Analisa a relação entre as métricas e os julgamentos dos pares;

o) Descreve e crítica o potencial e as limitações das métricas acadêmicas do *Twitter*;

p) Analisa a aplicação da *Altmetric.com* como fonte de dados para a análise

bibliométrica de livros em comparação com o *PlumX*;

q) Aborda questões sobre a inadequação do uso do *Twitter* para obtenção de notícias e divulgação científica na área da saúde;

r) Discute os argumentos sobre a atenção altmétrica concentrar-se em publicações mais recentes, em comparação com estudos pioneiros;

s) Avalia a aplicação e a evolução infométrica, apresenta os vários indicadores e discute sua finalidade;

t) Critica que os resultados do *ResearchGate Scores* criam reputações acadêmicas fantasmas;

u) Discussão sobre métodos, efeitos e problemas com a medições de impacto;

v) Reflexão a respeito do uso da altmetria e seus escores para a análise de publicação científica e os usos de indicadores compostos, considerados como problemáticos;

w) Questionamento sobre a avaliação e a confiabilidade das métricas na avaliação da pesquisa no Reino Unido;

x) Analisa evidências por trás das alegações de que a altmetria permite que o impacto da pesquisa seja medido em dia, ao invés de anos, assim como a baixas correlações entre a altmetria e as citações de artigos, torna duvidoso que a altmetria possa prever com segurança citações futuras;

y) Discute a terminologia associada as métricas alternativas - sobre métricas de uso serem consideradas ou não como um subtipo da altmetria;

z) Apresenta as vantagens e desvantagens da altmetria;

aa) O uso de *bots* de contas automatizadas no *Twitter,* para a distribuição de links de arquivos em *Arxivs* e as implicações para as métricas;

bb) Apresenta que há 20 indicadores altmétricos e a distribuição desses indicadores não é normal, mas sim distorcida;

cc) Investigou a utilidade do *Twitter* no desenvolvimento e distribuição de conhecimento científico, desde o início do ciclo de vida das publicações;

dd) Critica a criação de índices adicionais de impacto de pesquisa, as altmetrias, como novas alternativas de avaliação que precisam se adequar a evolução da publicação científica.

Faz parte do fazer científico se deparar com estudos que contenham críticas e julgamentos, validações ou refutações de estudos anteriores, métodos, teorias, ferramentas etc., o que é um fator positivo para os estudos de lacuna e de área; quando bem fundamentados, esses estudos possibilitam verificar o que funciona do que não funciona, ou pelo menos, discutir a respeito de aspectos que não foram abordados naquele estudo, naquele momento, abrindo

espaço para a ampliação das discussões a respeito de uma temática.

Por fim, a análise dos modelos de aplicações, abordagens, fontes, recursos e das ferramentas aplicadas nos estudos possibilitaram o olhar sobre os aspectos por trás dessas pesquisas e seu viés quantitativo, ao mensurar dados em números, mas que também mostrou tendências de estudos e ferramentas de aplicação qualitativa, com possibilidades de análise semântica, com perspectiva à uma abordagem mais profunda.

É preciso pensar nas mensurações do fazer científico de forma individual, pois cada área se comporta de forma diferente, tende a publicar conteúdos em meios de comunicação diferente e isso não quer dizer que uma é melhor do que a outra, isso quer dizer que cada uma tem suas peculiaridades, que precisam ser levadas em consideração pelos sistemas de mensuração, e esse é o desafio da academia, encontrar uma maneira de mensurar o fazer científico de forma que seja mais justo e democrático com todos os pesquisadores, áreas, nacionalidades e instituições.

4.4 DESAFIOS E TENDÊNCIAS

O objetivo d) visou "investigar os desafios e tendências da altmetria, com base na literatura", realizado por meio da leitura de cada texto da amostra; permitindo reunir as frações dos textos por temática, de acordo com o modelo de análise de conteúdo de Bardin (2011), o qual possibilitou extrair e agrupar 110 desafios e 22 tendências, de acordo com as etapas do processo de análise de conteúdo de Elo e Kyngäs (2008), que são: agrupamento, categorização e a abstração do conteúdo.

A abstração do conteúdo permitiu realizar uma breve análise e reflexões acerca das nuances da altmetria, sinalizadas pelos autores das obras investigadas. O olhar para um todo ajuda a enxergar semelhanças e discrepâncias, observando os nós de ligação e as lacunas de uma temática ou área, principalmente as que ainda estão em construção.

4.4.1 Desafios

Considerando que o acesso livre aos textos e materiais científicos facilita a visibilidade e usos, via redes, as altmetrics têm uma vantagem sobre os demais conjuntos de indicadores, no entanto, os desafios encontrados nos textos foram agrupados em modalidades, que são: divergências, qualidade dos dados, limitações, alcance da altmetria, limitações das fontes de dados e ferramentas, representação teórica e metodológica, agentes envolvidos no processo, definição e padronização.

a) Divergências

Os 16 relatos de divergências identificados estão relacionados aos elementos que circundam a aplicação dessas métricas, como: os interesses comerciais em torno das métricas alternativas, como já é feito com o FI; a falta de padronização das altmetrics dificulta a aplicação de alguns indicadores, como o de correlação com a citação; as complicações de dados que não identificam o que é interações de pessoas e máquinas, nas redes sociais; a possibilidade de manipulação e fraude de dados altmétricos; divergências das altmetrics para avaliar a produtividade e com isso os recursos de financiamento de pesquisa; divergências sobre quais tipos de mensuração a altmetrics está preocupada, se é sob o viés: econômico, educacional ou cultural.

A divergência mais intrigante foi a respeito da escolha do nome, altmetrics/alternativas, que quer dizer que são métricas e indicadores alternativos, referente aos que se apresentam como padrão, mas, com a evolução essas métricas e indicadores podem se tornar padrão e algum dia podem deixar de ser alternativas, e essa é a problemática, de que essas métricas e indicadores por si só terão que ser redefinidos e renomeados, na medida que deixam de ser alternativos e passam a ser a regra, o padrão.

> *dados altmétricos não são mais eficazes do que as métricas tradicionais, apontando a necessidade de uma nova agenda de estudos. (JIANG; HE; NI, 2013, tradução nossa).*

> *a manipulação e fraude possíveis no uso de métricas alternativas, por outro lado, essa interação pode auxiliar em diferentes fases da pesquisa (além da disseminação), como a colaboração e avaliação prévia dos trabalhos. (DARLING; SHIFFMAN; CÔTÉ; DREW, 2013, tradução nossa).*

> *menciona a duplicação de artigos em variadas fontes e a dificuldade de rastrear as menções para estes. Desafio de lidar com o ruído e de identificar os tipos de impacto que importam. (ADIE; ROE, 2013, tradução nossa).*

> *Critica a escolha do termo altmetric como um nome ruim, como as métricas no futuro - que também serão alternativas a já utilizadas, essas, também serão chamadas de altmetria? (RONALD; FRED, 2013, tradução nossa).*

As novas métricas ainda estão na infância, "É necessário muito trabalho para desenvolver vocabulários e classificações comuns para garantir uma avaliação harmonizada. A necessidade de "ir além dos números" ou justificar solicitações de financiamento e relatar o desempenho, a necessidade de criar uma narrativa que forneça uma base contextual para ilustrar a produtividade e o impacto acadêmico. (CARPENTER; CONE; SARLI, 2014, tradução nossa).

Embora altmetria meça o impacto social, não fica claro qual o tipo de impacto: econômico, educacional, cultural esses dados produzem. (BORNMANN, 2014a, tradução nossa).

Envolvimento entre os financiadores e os desenvolvedores de plataformas altmétricas é uma problemática. (DINSMORE; ALLEN; DOLBY, 2014, tradução nossa).

Quanto mais o indicador social for usado para a avaliação, mais estará sujeito a corrupção. Pesquisas futuras devem tentar quantificar o número de contas criadas por humanos, cyborgues ou bots. (HAUSTEIN; BOWMAN; HOLMBERG, KIM; TSOU; SUGIMOTO; LARIVIÈRE, 2015, tradução nossa).

Altmetria é um indicador novo e variável, e a medição não é padronizada, tornando a escolha do indicador um desafio [...]. Não há evidências conclusivas para vincular a atividade em plataformas de mídia social a citações ou ao impacto do artigo. (CHAVDA; PATEL, 2015, tradução nossa)

distinção da análise entre twettes profissionais e pessoais. (BOWMAN, 2015, tradução nossa).

A altmetria é um recurso imperfeito para prever as citações, no seu uso para avaliação. (BARNES, 2015, tradução nossa).

Indica que o uso da altmetria como alternativa ao FI pode possibilitar uma abertura a mercantilização da publicação predatória. (LĂZĂROIU, 2016, tradução nossa).

o capital acadêmico não é igualmente distribuído, independentemente da métrica

usada. (SUGIMOTO; LARIVIÈRE, 2017, tradução nossa).

"as pontuações altmétrica como medida altmétrica do periódico, pois não contempla todos os artigos. Propõe uma nova métrica, Score Factor ou o fator de pontuação, como alternativa útil para avaliar o impacto de um periódico na mídia on-line." (VOGL; SCHERNDL; KÜHBERGER, 2018, tradução nossa).

"as tecnologias [redes sociais] destinadas a facilitar o diálogo também tornaram mais fácil ignorar pontos de vista diferentes dos nossos. Os algoritmos de software de mídia social facilitaram nossas tendências inerentes de preferir a afirmação ao desacordo, permitindo o engajamento em câmaras de eco digital que reforçam nossas visões existentes." (BAMAT; MANLEY; HARER; ROLAND, 2018, tradução nossa).

O fato é que, todas as divergências também são questionamentos que buscam por respostas, por soluções cabíveis que esclareça quaisquer dúvidas a respeito de integridade, dos dados, aplicações, intenções, ferramentas e público ao qual essas métricas se destinam, tornando-se um modelo de aplicação consolidado.

b) Qualidade dos dados

A carência de qualidade dos dados, relatado nos 13 estudos, indica a relação direta com a falta de padrão, transparência, reprodutividade, volatilidade das redes, das possibilidades de captura, de mensuração por meio de ferramentas, das quais existem na atualidade.

A interpretação dos dados deve ser feita com cautela: há diferenças associadas as disciplinas e, também, ao tempo de publicação. (KWOK, 2013, tradução nossa)

a mídia social tem grande probabilidade de manipular dados e como sua confiabilidade e validade não foram verificadas, ela deve ser usada com cuidado. (CHO, 2015, tradução nossa).

preocupações com a transparência e reprodutibilidade dos dados, levando ao desenvolvimento de padrões diferentes. (MATTHEWS, 2015, tradução nossa).

integridade dos dados. (XIA; SU; WANG; ZHANG; NING; LEE, 2016, tradução nossa).

Quanto a altmetria, a reprodutibilidade, confiabilidade e consistência dos dados é um dos desafios da área. (DARAIO; GLÄNZEL, 2016, tradução nossa).

Altmetrics também enfrenta muitos problemas de qualidade de dados e não há padrões comuns entre os diferentes agregadores altmétricos, embora o DOI Event Tracker piloto cooperativo do editor Crossref possa em breve resultar em progresso nessa frente. (ERDT; AUNG; AW; RAPPLE; THENG, 2017, tradução nossa).

A qualidade de dados foi amplamente discutida, quanto a natureza dinâmica dos eventos de mídia social e como eles podem afetar a precisão, consistência e replicabilidade de várias altmétrias, que dependem da disponibilidade do Digital Object Identifiers (DOI) [....]. "Agentes automatizados (também chamados de robôs ou bots) foram listados como uma grande preocupação em relação à validade da altmetria" (XU, 2018, tradução nossa).

"Discussão geral dos desafios de qualidade de dados em métricas de mídia social: comparação extensiva dos quatro principais agregadores de dados altmétricos". (ZAHEDI; COSTAS, 2018, tradução nossa).

"existem muitos problemas de qualidade de dados em torno da altmetria que podem resultar em erro sistemático. Precisão, consistência e replicabilidade dos dados altmétricos são citados como questões principais. A qualidade dos dados também depende da compreensão do tipo de usuário que participa da pesquisa por meio da mídia social. Certas ferramentas altmétricas diferenciam o engajamento acadêmico do público por meio da estratificação das fontes de dados." (GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa).

Os dados altmétricos são fracos e talvez não sejam tão úteis, exceto como uma ferramenta promocional. É preciso desenvolver algo que tenha um uso e propósito confiáveis, geralmente os dados mencionados são fracos ou enganosos. Há a necessidade de criar um padrão altmétrico para que se possa comparar ovos com ovos, que inclua fontes da web/mídia social, notícias e menções à mídia e menções a políticas

> *e literatura cinza, com capacidade de ver menções de fontes diferentes simultaneamente, permitindo selecionar fontes de notícias e documentos de política. (GADD; ROWLANDS, 2018, tradução nossa).*

> *"A importância de contar com dados confiáveis e válidos sempre foi um ponto de discórdia na pesquisa bibliométrica. A ocasional falta de transparência de alguns bancos de dados bibliométricos (Web of Science, Scopus, Google Scholar), juntamente com os erros e inconsistências encontrados nas citações, têm sido frequentemente destacados na literatura particularmente no que diz respeito ao seu efeito potencial na avaliação de pesquisas". (ZAHEDI; COSTAS, 2018, tradução nossa).*

> *"surgimento de bots sociais pode exacerbar ainda mais o problema da atenção indevida ao trabalho acadêmico que, de outra forma, pode não enfeitar tal atenção [...] trabalhos recentemente descobriram que muitos tweets em periódicos de odontologia eram desprovidos de pensamento original e refletiam um comportamento mecânico de bot, indicando que altmetria baseada em tweets deve ser interpretada com cautela, se usada para avaliação de pesquisa". (GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa).*

> *"O desenvolvimento de padrões de medição de dados ajudaria a melhorar os problemas de qualidade dos dados." (GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa)*

Os relatos sobre a qualidade dos dados estão focados na fragilidade desses dados, que são advindos das redes da *web.* Essa preocupação está relacionada a característica heterogênea e por serem dados considerados frágeis para a análise, por ter limitações de formato e de fonte, na falta de padrão dos dados e dos sistemas de captura e de mensuração. Todas essas características descritas têm relação direta com as limitações descritas no próximo tópico.

c) Limitações

Foram agrupados 37 relatos, que variam entre indagações quanto à natureza dos dados, aplicação e os tipos de análises que podem ser realizadas, com foco em altmetria.

Inferências sobre a amplitude das altmetrics, divergências de fontes de dados, de

ferramentas de coleta, de recursos para a análise; sobre o uso das altmetrics apenas para quantificar dados, se assemelhando ao sistema padrão bastante criticado; sobre a fragilidade dos dados oriundos de redes sociais, como a aplicação de *bots,* a possibilidade de exclusão de uma ferramenta ou postagem; a cobertura e restrição de dados em materiais audiovisuais, políticas, literatura cinzenta e outros recursos para além dos artigos com *DOI* e de ferramentas menos difundidas como as chinesas; a questão da transparência dos indicadores, dos sistemas de mensuração e da origem de cada dado; a falta de confiabilidade dos dados; a possibilidade de que os dados altmétricos possam indicar a ideia errada sobre a audiência de um material; limitações para a aplicação de análises qualitativas; o problema em torno das ferramentas e do mercado comercial desse segmento de métricas; a natureza heterogênea das fontes e dados altmétricos; os problemas técnicos associados a coleta e análise de dados.

> *"O primeiro e mais óbvio desafio que deve ser enfrentado para que a altmetria penetre no domínio mais amplo do ensino superior é o desenvolvimento de ferramentas mais sofisticadas para altmetria de nível agregado e análise institucional comparativa. O segundo grande desafio que a altmetria enfrenta para ganhar força em ambientes institucionais é a necessidade de ferramentas que abordem de forma adequada toda a variedade de acadêmicos e tipos de bolsa de estudos que existem nas disciplinas. As medidas altmétricas existentes tendem a se inclinar fortemente para as disciplinas de ciência, tecnologia, engenharia e medicina (STEM), enquanto as outras disciplinas (por exemplo, humanidades, artes e ciências sociais) têm muito menos ferramentas e métricas disponíveis". (ROEMER; BORCHADT, 2013, tradução nossa).*

> *Registra que embora a divulgação nas mídias sociais aumente o público que vê os artigos, isto não impacta nas métricas convencionais. (ALLEN; STANTON; PIETRO; MOSELEY, 2013, tradução nossa).*

> *Carência de recursos para identificar menções em áudio e vídeo; dispersão do documento (inclusive com diferentes registros de DOI, atribuídos a um mesmo artigo). (LIU; ADIE, 2013, tradução nossa).*

> *discordância entre os indicadores fornecidos pelas ferramentas altmétricas (ImpactStory e Altmetric.com); registra o problema de mapear apenas as menções associadas ao DOI. (TORRES-SALINAS; CABEZAS-CLAVIJO; JIMÉNEZ-*

PAMPLONA, 2013, tradução nossa).

Problemas técnicos associados a coleta de dados e a massa crítica em relação às análises. (HAUSTEIN; PETERS; SUGIMOTO; THELWALL; LARIVIÈRE, 2013, tradução nossa).

Uso de dados altmétricos em nível institucional. (TORRES-SALINAS; ROBINSON-GARCIA; JIMÉNEZ-PAMPLONA, 2013, tradução nossa).

A altmetria enquanto novo campo de estudo ainda não tem um significado, ainda é uma questão sem resposta. (ZAHEDI; COSTAS; WOUTERS, 2014, tradução nossa).

A comercialização, a qualidade e a manipulação dos dados. Desenvolvimento de padrões, de ferramentas para análise de dados demográficos, uso como auxiliar na tomada de decisões, oferta de financiamento e avaliação (BORNMANN, 2014b, tradução nossa).

Falta clareza sobre até que ponto a velocidade e amplitude importam. (BORNMANN; LEYDESDORFF, 2014c, tradução nossa).

Questiona a utilidade do uso de mídias sociais e necessidade de mais estudo. (TONIA, 2014, tradução nossa).

Crítica o uso de contas automatizadas no Twitter, que compartilham conteúdo por meio de bots, o que dificulta as análises e indicadores altmétricos. (HAUSTEIN; BOWMAN; HOLMBERG; TSOU; SUGIMOTO; LARIVIÈRE, 2014, tradução nossa).

Necessidade de aprimorar e aprofundar as discussões nesse tipo de mídia para no futuro distinguir o que é métrica e o que é ruído (buzz). Análises e pesquisas que abordem a diferenciação entre o público e o envolvimento. (HAUSTEIN; LARIVIÈRE; THELWALL; PETERS, 2014, tradução nossa).

"No entanto, uma vez que Altmetrics é um indicador de mídia social, ele só pode responder bem aos resultados de pesquisas que são acessíveis on-line. Portanto, existe

a possibilidade de que avaliações não relacionadas aos valores acadêmicos sejam feitas às vezes. Além disso, os resultados da medição podem diferir dependendo do país e idioma, e os resultados podem diferir entre as ferramentas de medição Altmetrics." (CHO, 2015, tradução nossa).

"a abordagem deve ser diferente, independente se o propósito da análise de Altmetric é avaliar os resultados da pesquisa ou descobrir com antecedência resultados de pesquisa pendentes que ainda não foram citados por artigos subsequentes. Com a recente ativação do acesso aberto, é altamente provável que várias versões do mesmo papel sejam distribuídas e armazenadas em vários repositórios, portanto, um modelo de agrupamento ou integração dos mesmos resultados de pesquisa deve ser apresentado. Como as tendências de uso das mídias sociais são muito diferentes de acordo com o setor e o país, é necessária uma estratégia que considere as circunstâncias e diferenças de cada setor ou país." (CHO, 2015, tradução nossa).

limitação de rastreio e cobertura de materiais sobre política, limitando-se à conteúdo dos EUA e Europa, documentos de alguns órgãos e agências, excluindo os demais. (BORNMANN; HAUNSCHILD; MAX, 2015, tradução nossa).

"É necessário formar um conceito que vai além da estrutura de avaliação de pesquisa. A altmetria encontrará valor em funções como filtragem e recomendações, em vez de índices de avaliação de pesquisa". (BANDO, 2016, tradução nossa).

Problema da dependência de redes sociais (uso e dados); menciona a limitação dos aspectos geográficos de acesso. (COSTAS, 2017, tradução nossa).

preocupação no desenvolvimento da altmetria seguindo o caminho das métricas tradicionais, com ênfase na quantificação. (ARAÚJO; OLIVEIRA; LUCAS, 2017).

"a natureza heterogênea das fontes altmétricas é um grande desafio, assim como a inconsistência e falta de normalização das altmétricas [...] pouco se sabe sobre a motivação dos usuários e as razões pelas quais eles mencionam e discutem os resultados das pesquisas nas redes sociais. Altmetria também é muito suscetível à manipulação [...]um estudo mostra que contas automatizadas de bots do Twitter

causam muito spam em artigos científicos. As estatísticas de download também são vulneráveis à manipulação e jogos. (ERDT; AUNG; AW; RAPPLE; THENG, 2017, tradução nossa).

"Cinco pontos principais de crítica são: Os indicadores podem ser tendenciosos e não medir o que deveriam medir; a maioria dos estudos adota um horizonte de tempo limitado; podem ser afetados por fatores perturbadores e sofrer graves vieses; medir o impacto social é problemático; e quando eles são usados em uma avaliação muitas vezes faltam estruturas e modelos de avaliação". (MOED, 2017, tradução nossa).

Há divergências informacional, os resultados podem ser diferentes em outras áreas e campos de conhecimento, com diferentes normas de publicação ou usando diferentes sites de compartilhamento de referência. (MAFLAHI; THELWALL, 2017, tradução nossa).

dados altmétricos são heterogêneos por natureza e não está claro de que forma eles representam engajamentos com trabalhos acadêmicos. (RAVIKUMAR, 2018, tradução nossa).

As altmetrics são consideradas como um complemento ao fator de impacto bem estabelecido, pois os dados podem ser facilmente manipulados e que a coleta e mensuração não é suficientemente rigorosa. (SEGADO-BOJ; MARTÍN-QUEVEDO; PRIETO-GUTIÉRREZ, 2018, tradução nossa).

avaliações prospectivas da realidade, comparando tweets de vários conteúdos (por exemplo, texto, imagens, vídeos), são poucas, então a melhor forma de estruturar um tweet que visa disseminar produtos de conhecimento não é bem conhecida. (GATES; FEATHERSTONE; SHAVE; SCOTT; HARTLING, 2018, tradução nossa).

inadequação da altmetria para avaliações, sendo mais indicada para promoção da visibilidade. (ISAKSSON; VESTERINEN, 2018, tradução nossa).

Um dos desafios no uso significativo de altmetria é a heterogeneidade dos atos subjacentes. Como altmetria derivada de diferentes plataformas de mídia social é

moldada por premissas significativamente diferentes, a interpretação da altmetria é um empreendimento difícil. Em muitos casos, diferentes ações em diferentes plataformas são fundamentalmente diferentes em relação à intenção do usuário e ao grau de envolvimento. Por exemplo, a motivação de marcar uma publicação em Mendeley pode ser diferente de criar um blog da mesma publicação; o nível de envolvimento também é significativamente diferente, pois os favoritos precisam de um clique, enquanto o blog exige muito mais esforço. [....] Considerando a lógica de necessidade e suficiência, não há garantia de que um único indicador possa dizer se o usuário foi de fato influenciado pelo artigo. Os significados aparentes dos rastros digitais às vezes podem ser enganosos e precisam ser interpretados com cautela. (XU, 2018, tradução nossa).

Os indicadores altmétricos apontam que um determinado artigo produziu grande atenção, além da ciência, o usuário não especialista de dados altmétricos para artigo pode concluir que o artigo é uma contribuição útil da ciência e para o público; esse é um problema com o uso de dados do Twitter, para medir o impacto ou a atenção da ciência, sem considerar o conteúdo dos tweets, uma simples contagem pode levar a conclusões erradas. (BORNMANN; HAUNSCHILD, 2018, tradução nossa).

"Um dos problemas da altmetria é a representatividade dos dados em termos de quem está usando o recurso. Estudos mostraram que os tweets para artigos científicos são criados principalmente por acadêmicos, mas também foi demonstrado que em algumas disciplinas, usuários não acadêmicos dominam a discussão" (XU, 2018, tradução nossa).

"os Altmétricos apenas garantem a medição da influência social, mas não garante a medição da qualidade de uma investigação" (SANTANA, 2018, tradução nossa).

"Mesmo na era das métricas alternativas, a maioria dos dados de pesquisa permanece sem edição e o impacto real das métricas alternativas na avaliação do impacto do artigo permanece incerto. Por outro lado, uma crítica central às métricas alternativas é que elas medem a atenção, e não necessariamente a qualidade. Os artigos compartilhados com mais frequência ou "interessantes" podem não ser os mais rigorosos cientificamente" (MURPHY et al., 2018, tradução nossa).

Os interesses de comercialização podem estar em jogo para altmetria, como acontece com a bibliometria tradicional. [...] aumentar o volume de postagens, menções e curtidas em sites de mídia social de experiências positivas é de interesse comercial inerente ao site. Da mesma forma, as empresas que fornecem altmetria têm um incentivo comercial para promover seu valor para bibliotecários, instituições e órgãos de financiamento de pesquisa. A atividade de mídia social pode ser explorada por partes com um potencial competição de interesse, como empresas farmacêuticas, grupos de defesa ou pesquisadores individuais" (GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa).

"Ao interpretar altmetria é preciso identificar a fonte de atividade on-line e classificar se há conflitos potenciais. Os agregadores de fontes de dados altmétricos precisam trabalhar com grupos acadêmicos relevantes, editores e outros para desenvolver métodos para identificar fontes de conhecimento confiáveis e baseadas em evidências, bem como fontes com um conflito de interesse real ou percebido". (GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa).

aponta os indicadores altmétricos como problemático para identificação do impacto social, potencial uso de dados altmétricos para mapear as redes de interação entre pesquisadores e partes interessadas. (ROBINSON-GARCIA; LEEUWEN; RÀFOLS, 2018, tradução nossa).

"ainda não está claro que conclusões gerais podem ser tiradas quando um artigo é frequentemente mencionado na web social. [...] As citações acadêmicas não medem se um artigo é útil em outros contextos, como comercialização, trabalho ou ensino. [...] o mais comum Altmetrics não medem o impacto, na medida em que o impacto está relacionado ao efeito da pesquisa na prática clínica ou no pensamento. [...] A pesquisa avaliada deve fazer uma "mudança" ou "diferença" no mundo (Samuel & Derrick, 2015). [...] Altmetria baseada em dados de mídia social não captura se tal pesquisa fez uma "diferença" ou "mudança" no mundo". (BORNMANN; HAUNSCHILD; ADAMS, 2019, tradução nossa).

Faz críticas sobre a falta de familiaridade e transparência dos sistemas de mensuração; a confiabilidade dos dados; a questão da comparabilidade restrita. (LEMKE;

MEHRAZAR; MAZARAKIS; PETERS, 2019, tradução nossa).

"o campo da altmetria ainda não está maduro, que é necessário o desenvolvimento de ferramentas altmétricas que inclua a todas as possíveis fontes, como as chinesas". (YU; QIYU; RONG; POOLS, 2019, tradução nossa).

Desenvolvimento de uma política específica para melhorar a auditoria. (ORTEGA, 2019, tradução nossa).

As limitações a respeito da altmetria estão estreitamente ligadas à aplicação e as circunstâncias ao em torno da temática, pois tudo ainda é muito incerto, fica claro que há várias inseguranças, o que é compreensível em uma área nova que trabalha com a ideia de indicador de mensuração da ciência.

Xu (2018, tradução nossa), sinaliza que existe uma "falta de interpretação aprofundada dos traçados digitais altmétricos [...] que falta conhecimento sólido sobre altmetria [...] que é preciso entender as motivações por trás dos atos de mídia social". Pois há uma multiplicidade que enreda a comunicação científica, o diferencial está em como a comunidade científica vai lidar com todas essas possibilidades.

d) Alcance da altmetria

Os seis relatos mencionam o baixo alcance dos estudos altmétricos, que são quase que exclusivos de análise quantitativa, negligenciando as possibilidades qualitativas de estudos, assim como os diferentes formatos e fontes dos conteúdos acerca da comunidade científica e da comunidade geral.

relação entre o volume de seguidores no Twitter e o FI. (COSCO, 2015, tradução nossa).

é preciso desenvolver estudos que mapeiem o motivo da leitura. (MOHAMMADI; THELWALL; HAUSTEIN; LARIVIÈRE, 2015, tradução nossa).

permitir que provedores de dados altmétricos sejam integrados a periódicos e

repositórios institucionais. (MADJAREVIC, 2015, tradução nossa).

O impacto pode não ser mais visto como um proxy de qualidade, mas em seu sentido original: a simples ressonância em alguns setores da sociedade. [...] No contexto de medições de impacto social, a qualidade não deve ser avaliada em um sentido acadêmico, mas no contexto de seus possíveis benefícios sociais. Em outras palavras, a pesquisa deve ser feita com precisão, mas não precisa ser excelente para ser útil em um determinado setor da sociedade. (BORNMANN; HAUNSCHILD, 2016, tradução nossa).

potencial dos dados altmétricos para medir o impacto (MOED, 2017, tradução nossa).

Menciona que não existem ferramentas específicas para a análise de sentimentos; não inclui a capacidade de analisar o conteúdo em um nível textual para verificar os sentimentos e opiniões; a mineração de sentimento e opinião de artigos científicos tem potencial para beneficiar o público. Esses métodos têm sido usados para fins comerciais e político há vários anos, com o objetivo de aumentar as vendas e prever as ações dos eleitores. No entanto, esse método ainda não foi usado para analisar o conteúdo relacionado à pesquisa científica. (HALEVI; SCHIMMING, 2018, tradução nossa)

O baixo alcance da altmetria para a análise e mensuração dos dados está relacionado à carência de ferramentas para a realização da análise qualitativa, principalmente as de sentimentos oriundos das redes sociais, que são frequentemente explorados pelo nicho comercial, mas pouco visto pela comunidade científica. Assim como a aplicação de análises altmétricas que envolvam diferentes formatos de materiais e fontes, na integração de sistemas para ampliar a capacidade de captura de dados, formatos, fontes e de análise desses conteúdos, para distintos fins.

e) Limitações das fontes de dados e ferramentas

A respeito das fontes e ferramentas, os 16 relatos encontrados sinalizam que há limitações quanto à capacidade de medir diferentes objetos; restrições de captura e mensuração de dados que são oriundos de fontes comerciais; incoerência de informações, duplicação de publicações, divergências de dados em fontes distintas; falta de padrão na apresentação dos

dados por parte de ferramentas e bases, o que geram inconsistência e a inadequação para uma análise unificada; multiplicidade de métricas, pois cada ferramenta tem a sua, e que não é clara a metodologia aplicada em seus dados, dificultando realizar comparativos e auditar esses dados; limitações das ferramentas para obter e mensurar outros formatos de conteúdo, para além dos artigos científicos; limitações das ferramentas por sua fragilidade para uma coleta e análise mais completa de dados na *web*.

> *"As plataformas onde os trabalhos são armazenados e que em última instância geram os indicadores tendem a ter ciclos de vida muito curtos e podem desaparecer (como Connotea, Yahoo ao eliminar o comando Pesquisar por site) que abalou os alicerces de toda a cibermetria. Isso implica que neste momento é difícil escolher um instrumento de referência, com garantias de continuidade a médio prazo e ainda existem muitas incertezas quanto à reprodutibilidade dos resultados e seu significado final, especialmente no que se refere à relevância da análise científica dos mesmos, o que, por sua vez, torna difícil incorporá-los à lista de ferramentas de avaliação" (TORRES SALINAS; CABEZAS CLAVIJO; JIMÉNEZ PAMPLONA, 2013, tradução nossa).*

> *A avaliação de blogs é considerada positiva no uso de métricas, pois diferente das outras altmétricas não envolve a interação (curtir, compartilhar etc.), mas um trabalho intelectual de produção de conteúdo. (JAMALI; ALIMOHAMMADI, 2015).*

> *é preciso verificar a cobertura das plataformas de mídia sociais para a difusão da ciência, e verificar quais áreas têm maior aderência e interação social, a partir daí cruzar indicadores para a construção de um sistema de mensuração mais equiparado. (MOED, 2017, tradução nossa).*

> *- novas fontes de dados e ferramentas (pouco se sabe sobre as características e interações sociais medidas pelas ferramentas altmétricas e sua capacidade de medir os diferentes objetos, ações e públicos.), medir essas novas fontes não fazia parte das preocupações dos estudos de avaliação da ciência, dificultando a construção e análise de indicadores. (MARICATO; LIMA, 2017, tradução nossa).*

> *As limitações das ferramentas (fontes) que são comerciais, como o caso do Facebook. (MOED, 2017, tradução nossa).*

o problema com dados incompletos, e o uso de métricas como ferramentas de gestão; assim como as duplicações de arquivos, no caso de publicações em acesso aberto depositadas em múltiplas plataformas. (BLAKEMAN, 2018, tradução nossa).

"a Altmetria sofre de considerável heterogeneidade entre os dados e os locais usados para medição, os quais carecem de normalização" (SANTANA, 2018, tradução nossa).

críticas a dificuldade de acesso aos dados do Facebook e a escassez de seu uso em estudos altmétricos; também menciona a diferença no mapeamento de URL e DOIs. (ENKHBAYAR; ALPERIN, 2018, tradução nossa).

dificuldade e demora na coleta de dados massivos da web, inclusive o fato de que alguns APIs têm limites de quantidade (que deve de ser observando, dividindo a coleta em lotes); e a necessidade de melhoria dos recursos de tratamento e análise dos dados, para torná-los mais precisos. (UDAYAKUMAR; SENADEERA; YAMUNARANI; CHEON, 2018, tradução nossa).

"um ponto sensível reside na volatilidade e na natureza temporal de muitos ambientes da web social". (SANTANA, 2018, tradução nossa).

Chama a atenção para o potencial impacto que a diferença entre o ano de publicação e de adesão ao Mendeley possa ter nos dados, assim como para a diferença entre áreas. (THELWALL, 2018b, tradução nossa).

"Deve-se destacar que cada plataforma estabelece suas próprias métricas, que são geradas não só a partir de um artigo científico, mas também de outros materiais valiosos de pesquisa como: teses, ensaios, conferências, relatórios técnicos, materiais didáticos, livros, patentes, entre outros" (SANTANA, 2018, tradução nossa).

Nenhuma das ferramentas fornece um quadro completo de impacto nas mídias sociais, funcionando como recursos complementares, principalmente em dados sobre livros, além dos indicadores imediatos em áreas nas quais o impacto demora mais para ser medido - janelas de citações mais longas (sociais e humanas), sendo atrativas para a

avaliação. (TORRES-SALINAS; GORRAIZ; ROBINSON-GARCIA, 2018, tradução nossa).

dúvidas sobre o uso do Twitter em altmetria, pela quantidade de bots encontradas. (DIDEGAH; THELWALL, 2018, tradução nossa).

"Aponta as limitações do uso da Dimensions para análises altmétricas (falta de afiliação, erros na atribuição de artigos, variação dos dados de acordo com o fornecedor, uso de DOI etc.)" (ORDUÑA-MALEA; DELGADO-LÓPEZ-CÓZAR, 2019, tradução nossa).

identificar as dimensões do comportamento de um usuário de mídia social, como se relaciona com a comunicação científica, baseados na atividade geral no Twitter, e que inclua as interações específicas dos usuários com objetos de pesquisa. (DÍAZ-FAES; BOWMAN; COSTAS, 2019, tradução nossa).

São várias as limitações dos dados e das ferramentas. Em ambos os casos, têm relação com a captura nas fontes e na organização desses dados para a mensuração, e na possibilidade de acesso desses dados para os estudos. A necessidade de aperfeiçoamento de ferramentas acessíveis que possam realizar uma coleta e análise mais completa desse tipo de dados, podendo obter insumos para uma análise qualitativa mais expressivas.

f) Representação teórica e metodológica

Foram seis relatos da necessidade de estudos teóricos e de modelos metodológicos que atendam de forma completa as distintas possibilidades de estudos e aplicações altmétricas, em seus divergentes cenários.

Os relatos indicam que carece de estudos teóricos para fundamentar melhor o modelo metodológico, as questões acerca da validade das fontes, aprofundar o significado e conceituar as altmetrics de forma mais precisa; assim como a necessidade de estudos a respeito da padronização dos dados e de ferramentas.

Desenvolver uma metodologia que possibilite obter dados para realizar análises globais e não apenas fragmentadas; a necessidade de discutir um método de análise mais preciso para os usos informais do compartilhamento em distintos conteúdos e fontes.

Para almejar o uso de indicadores altmétricos é necessário "deben resolverse aún muchos problemas teóricos (significado), metodológicos (validezde fuentes) y técnicos (normalización). (TORRES-SALINAS; CABEZAS-CLAVIJO; JIMÉNEZ-CONTRERAS, 2013, tradução nossa).

pesquisas ambientais e análise de conteúdo para melhorar a compreensão das bases das métricas. (PRIEM, 2014, tradução nossa).

"Os indicadores altmétricos possuem um grande potencial e carecem de mais reflexão e análises aprofundadas. Diversos estudos baseados na altmetria estão sendo desenvolvidos através de perspectivas empírica, com baixo nível de reflexão sobre os seus fundamentos. É grande o número de artigos publicados até agora que estudam, principalmente, correlações entre citações de artigos científicos com os indicadores altmétricos, mas pouco conhecimento teórico é extraído dos seus resultados. Pode-se entender que a pesquisa se encontra ainda em seu estágio exploratório, procurando definir relações de relevância que forneçam condições de induzir perspectivas teóricas e generalizações mais abrangentes. Assim, ainda há um número de problemas que devem ser resolvidos antes que seus indicadores sejam utilizados para a avaliação da pesquisa científica e para a tomada de decisão. (MARICATO; MARTINS, 2017, tradução nossa).

Análises 'universais', desprovidas de contexto. Existe uma demanda por metodologias escaláveis e universais para realização de estudos sobre o impacto social da atividade científica, com potencial de uso político. (ROBINSON-GARCIA; LEEUWEN; RAFOLS, 2017, tradução nossa).

Como rastrear com precisão o uso informal, como compartilhamento de leitura e anotação (em vez de apenas retuitar um link)? Existe um método de diferenciação entre a popularidade dos artigos em sites de redes sociais devido ao seu valor "tabloide" e aqueles que são discutidos devido ao mérito científico genuíno? Romper as barreiras para o compartilhamento de informações deve ser o objetivo coletivo da humanidade. (HOGAN; WINTER, 2017, tradução nossa).

As altmetrics são modalidades de estudos distintas, portanto, os estudos teóricos acerca das altmetrias devem focar na análise o cenário como um todo, que geralmente envolvem a comunicação científica, os modelos de publicação, os formatos de publicação, as fontes formais e informais, o comportamento dos leitores e usuários das redes, a necessidade de um modelo de avaliação que contemple os atores envolvidos no processo. Maricato e Martins (2017) sinalizam que é necessário olhar para o fazer científico de forma diferente do modelo de mensuração tradicional, focar nas diferenças e complementar as lacunas.

g) Agentes envolvidos no processo

Os relatos dos seis estudos apontam que as preocupações de pesquisas altmétricas devem envolver os agentes envolvidos no processo, que são: usuários, cientistas, profissionais, estudantes, curiosos; o olhar sob os tipos de produções, as fontes de dados; as circunstâncias acerca dos sistemas, como as interações humanas e por meio de robôs; as possibilidades de manipulação de interação e engajamento nas redes e como isso tudo impacta no processo da comunicação científica.

> *"Taylor (2013a) pouco é o conhecimento sobre as intenções, motivos e experienciais dos usuários". Estes aspectos devem ser estudados com exaustão, antes que os indicadores resultantes sejam utilizados para subsidiar decisões e avaliações das produções científicas e dos agentes envolvidos nas pesquisas" (MARICATO; MARTINS, 2017, tradução nossa).*

> *- novos atores sociais e tipos de produção (cientistas, profissionais, estudantes, curiosos e qualquer outro tipo de pessoa), tipos de produção (científicas, culturais, artísticas, literárias), distribuídas em mídias tradicionais (livros, artigos, teses e dissertações, eventos, softwares, patentes, produções culturais), naquelas que surgiram com a web (blogs, mídias sociais, redes sociais, slides, ambientes de gerenciamento de referências, ambientes de avaliação pós-publicação) (MARICATO; MARTINS, 2017, tradução nossa).*

> *"o rápido aumento de entidades editoras científicas predatórias adiciona mais ruído à atividade on-line. [...] jogos e manipulação são teoricamente possíveis pela criação de dados falsos por meio de contas falsas e automação de downloads, tweets, postagens,*

curtidas etc." (*GAMBLE; TRAYNOR; GRUZD; MAI; DORMUTH; SKETRIS, 2018, tradução nossa).*

"Vários fatores ameaçam a qualidade das informações compartilhadas. Os desafios impostos pelas "notícias falsas" na política fornecem um exemplo dos possíveis danos quando a desinformação é a intenção" (BAMAT; MANLEY; HARER; ROLAND, 2018, tradução nossa).

"O incentivo excessivo à exposição pode ter efeitos adversos. Os acadêmicos podem inadvertidamente se desviar da autopromoção necessária para a excessiva. Os financiadores e editores ansiosos para direcionar o tráfego para sites podem ser tendenciosos para o tipo de sensacionalismo que gera desconfiança" (BAMAT; MANLEY; HARER; ROLAND, 2018, tradução nossa).

Um ponto bastante relevante é sobre a necessidade de estudos das interações e experiência dos usuários das diversas redes da *web,* buscando entender as motivações por trás dessas interações; buscar entender quem são essas pessoas e porque usam esses canais e não outros. Estudar os agentes envolvidos no processo pode ser a chave para entender melhor o alcance da altmetria, no conjunto de funções da avaliação da pesquisa.

h) Definição

Foram encontrados três estudos que relataram como desafio, a necessidade de que haja uma definição, um significado para a altmetria, isso quer dizer, encaixar a altmetria dentro de uma área, disciplina, modelo ou padrão.

Necessidade de esclarecimento de vários conceitos associados ao tema, inclusive aos desafios. (HAUSTEIN, 2016, tradução nossa).

significados das ações nas mídias e redes sociais (complexidade inerente aos indicadores altmétricos é o fato de ainda não se ter clareza do significado das ações, intenções e interações nas mídias e redes sociais, bem como, dos conceitos de engajamento e citação). (MARICATO; MARTINS, 2017, tradução nossa).

> *desafio mais importante entender o significado da altmetria e o que ela mede (validade), e os motivos pelos quais alguém se envolve e outros se abstêm de participar. (BAR-ILAN, 2018, tradução nossa).*

A complexidade da altmetria está relacionada com a multiplicidade dos elementos dos quais a temática permeia, e a busca por uma definição pode representar encaixar a altmetria dentro de um campo, pôr ela dentro de uma área do conhecimento, por outro lado, definir pode dar um propósito, indicar um problema para solucionar, com isso, facilitaria a escolha de métodos que representam as possibilidades de solução para esse problema, dando-lhe um caminho para seguir.

i) Padronização

A padronização foi relatada em sete estudos, os quais indicaram que é necessário adequar as altmetrias para padronizar os dados, e que, sem a padronização se torna impossível realizar um estudo que avalie o cenário de forma universal.

> *Falta de padrão nos dados de diferentes editoras, dificultando as comparações. (WANG; MAO; XU, 2013, tradução nossa).*

> *exemplifica 20 indicadores altmétricos, sinalizando que a distribuição desses indicadores não é normal, mas sim distorcida, devido a dimensionalidade e estrutura da altmetria, devido à falta de padrão. (LIU; XU; WU; CHEN; GUO, 2013, tradução nossa).*

> *A necessidade de análises adequadas dessas métricas, de padronização das altmetrias. (BROWN, 2014, tradução nossa).*

> *Falta padronização nas menções, o que dificulta seu rastreamento, assim como é necessário concentram esforços na construção da confiabilidade dessas métricas. (FEATHERSTONE, 2014, tradução nossa).*

> *falta de uniformidade (padrão) os dados. (WANG; LIU; FANG; MAO, 2014, tradução nossa).*

> *necessidade de melhores práticas para compilação dos indicadores; uso para predizer o impacto de uma publicação, com o desenvolvimento de normas e orientações sobre a transparência dos dados. (ALONSO-ARÉVALO, 2016, tradução nossa).*

> *fornecer uma forma confiável, relevante e padronizada de medir o impacto da pesquisa. Futura atenção deve ser dada às conexões entre as atividades de citações e menções nas mídias sociais para entender melhor se a mídia social pode aumentar o impacto dos artigos ou se os artigos podem causar mais atenção nas mídias sociais. (TURK, 2017, tradução nossa).*

A padronização também é relatada como uma forma de transparência, possibilitando auditar e conferir os dados, replicar estudos e garantir a confiabilidade de uma pesquisa.

Vários questionamentos a respeito dos desafios, trajetória e futuro da altmetria são levantados, manifestando algumas indagações para a reflexão da comunidade científica. Perguntas que visam incentivar estudos em busca de respostas, checando lacunas, problemas a serem resolvidos, que no caso da altmetria, estão relacionadas às nove modalidades de desafios encontrados nos relatos dos estudos analisados, objeto desta pesquisa.

4.4.2 Tendências

Em tendência, os relatos foram classificados em nove grupos, considerados como possíveis indicadores: indicador para concessão de financiamento de pesquisas; indicador qualitativo de avaliação por pares; indicador de avaliação de produtividade acadêmica; indicador de influência; indicador de audiência e atenção *on-line;* indicador de análise de sentimentos; indicador qualitativo; indicador de análise de rede, e o grupo que relata o uso de ferramentas para captar dados para análise altmétrica.

Nessa seção os relatos são sobre a aplicabilidade de ferramentas, medidas e alcance das altmetrias para uma variedade de materiais que sofrem algum tipo de interação nas redes.

a) Indicador para concessão de financiamento de pesquisas

Dois estudos sinalizam a possibilidade do uso da altmetrias para a avaliação e concessão de financiamento de pesquisa.

"o movimento altmétrico tem o potencial de mudar a forma como as instituições e o corpo docente pensam sobre a disseminação da bolsa de estudo, mas também tem o potencial de mudar a maneira como os membros do corpo docente pensam sobre a mídia social" (OVADIA, 2013, tradução nossa).

A altmetria e seu possível uso para avaliação da concessão de financiamento de pesquisas. (WOOLSTON, 2014, tradução nossa).

Outros três estudos, verificados na modalidade de desafios, relatam a possibilidade de uso das altmetrics para a solicitação e concessão de bolsas. Na modalidade de divergências, foi relatada a necessidade de melhorias das altmétricas para que fosse possível serem usadas para justificar e solicitar financiamento de pesquisas (CARPENTER; CONE; SARLI, 2014).

Essa não é uma tendência longe de alcance, basta que as agências de financiamento aprovem o uso das altmetrics como parte dos dados para a avaliação e concessão de financiamento de pesquisa.

b) Indicador de avaliação por pares

Dois relatos apresentam a altmetrics como uma possibilidade de emprego para a avaliação por pares; no uso de indicadores qualitativos que possam mostrar o panorama das interações das pesquisas nas redes.

a fim de alinhar mais estreitamente as medições atuais (altmetrics) com o julgamento dos pares, talvez o futuro da avaliação do impacto [...] deva confiar mais fortemente na percepção, avaliação dos pares e outros julgamentos qualitativos dos pares do que na bibliometria (BARROS, 2015).

"Altmetrics podem apoiar mapas da ciência mais transparentes, avaliações mais amplas e equitativas, e melhorias para o sistema de revisão por pares. [..]. No futuro, uma maior participação e melhores sistemas para identificação de colaboradores especializados pode permitir que a revisão por pares seja realizada inteiramente a partir das altmetrics" (BARROS, 2015, p. 33).

O futuro da avaliação da pesquisa reside na combinação inteligente de indicadores e

revisão por pares. (MOED, 2017, tradução nossa).

Talvez essa tendência esteja mais aparelhada para os *preprints*, os quais são publicados e podem dispor de dados abertos, antes mesmo de receber as avaliações dos pares. Nesse caso, as altmetrics poderiam servir de indicador para a avaliação desses pares.

c) Indicador de avaliação de produtividade acadêmica

Quatro pesquisas apontam que a altmetria serve como indicador para avaliar a produtividade acadêmica, já que os demonstrativos em tempo real apresentam as interações altmétricas de toda a produção, inclusive as mais recentes.

Estudos futuros devem estudar a relação entre o conteúdo dos posts e a atuação dos pesquisadores (se eles blogam sobre seus conteúdos). (PETERS; BEUTELSPACHER; MAGHFERAT; TERLIESNER, 2012, tradução nossa).

gestão de dados informétricos, padronização de métodos e conceitos informétricos, desenvolvimento de dados baseados em ontologia e sistema de gestão direcionado para a avaliação de pesquisas. (MOED, 2017, tradução nossa).

Apesar da necessidade de melhorias, as altmétricas conseguem fornecer dados que podem ser usados como evidências sobre o nível de avaliação ou aceitação dos resultados de uma investigação em tempo real, o que constitui informação de interesse para aqueles que medem a produtividade acadêmica de pesquisadores e, portanto, de instituições. (SANTANA, 2018, tradução nossa).

"Google Livros pode servir como uma fonte promissora de dados para altmétricas, e a frequência de aparecimento de nomes de cientistas em livros pode servir como métricas alternativas, que ainda estão em grande fluxo, para capturar as contribuições intelectuais dos cientistas para um público mais amplo". (WANG; HU; LI; TANG, 2018, tradução nossa).

Os distintos formatos e fontes devem ser considerados no processo de avaliação do impacto da produção científica. A ciência aberta traz um vasto campo de possibilidades do fazer

científico e a altmetria é parte desse cenário, considerando as possibilidades, desde que estejam acessíveis e transparentes.

d) Indicador de influência

O estudo de Jäschke (2017), indica que as altmetrics ajudam a identificar a influência de um evento, por meio da análise temporais, observando os períodos e os impactos que um evento causa nas redes.

A análise do impacto de um evento é um assunto novo, no entanto, todas as áreas do conhecimento realizam eventos, porém, o registro formal é feito por meio da publicação dos anais e dos artigos que carregam as informações desse evento, sendo assim, o evento em si não é mensurado, só as publicações oriundas dele.

e) Indicador de audiência e atenção on-line

A altmetria pode ter o potencial de medir a audiência e a atenção *on-line*, verificando a visibilidade de publicações científica nas diversas redes acadêmicas e sociais.

> *"As instituições científicas também podem usar altmetria no âmbito do marketing científico: é concebível que a altmetria possa ser usada para chamar a atenção para as publicações de uma instituição amplamente discutida, compartilhada, tweetada ou usada em notícias. Isso permitiria uma melhor abordagem da interface entre ciência e sociedade" (TUNGER; CLERMONT; MEIER, 2018, tradução nossa).*

Os autores também sinalizam a relevância de estudos para "verificar se há algum benefício da altmetria na economia ou na política, além da ciência". A altmetria pode ser usada para vários fins, desde que envolva a interação de conteúdo na *web,* é claro que ainda necessita de melhores metodologias, modelos, ferramentas, mas esse contexto vai se consolidando na medida que a comunidade científica passa a usar e melhorar a forma de fazer.

f) Indicador de análise de sentimentos

Como tendência, destaca-se um relato de que as altmetrics poderiam ser aplicadas para a análise de sentimentos, verificando comentários, e o que esses comentários representam, para

além dos aspectos negativo e positivo, mas sim, o de avaliar a interação, o que está sendo discutido sobre um assunto, texto ou área.

> *“A análise de sentimento da mídia social e de notícias da pesquisa médica e biomédica ainda não existe. Plataformas que oferecem rastreamento de indicadores altmétricos para artigos ainda não oferecem análise de sentimento ou mineração de opinião do conteúdo postado por pessoas quando discutem artigos de pesquisa”. (HALEVI; SCHIMMING, 2018, tradução nossa).*

> *“A análise de sentimento pode ser uma nova maneira promissora de obter informações sobre o impacto social da produção científica”. (HALEVI; SCHIMMING, 2018, tradução nossa).*

> *“a análise de sentimento para publicações pode revelar-se mais complicada do que a análise de marcas ou indivíduos. O processo se baseia em palavras recorrentes que capturam sentimentos positivos ou negativos. No entanto, a discussão de um artigo na mídia social e de notícias pode incluir sentimentos negativos ou positivos que são mais direcionados ao tópico do que ao próprio artigo” (HALEVI; SCHIMMING, 2018, tradução nossa).*

Os poucos sistemas que realizam mensuração de sentimentos nas redes apenas classificam as reações/interações como positivas ou negativas, por isso os autores sinalizam a falta de um sistema ou infraestrutura que possa examinar de forma ontológica o que está sendo dito sobre o material/conteúdo e sob quais aspectos a interação nesses ambientes impactam no material, objeto da interação.

g) Indicador qualitativo

Os dois relatos sobre a análise qualitativa também têm relação com o olhar sobre o que está sendo dito de um texto ou um assunto.

> *"Rumo a um sistema de gerenciamento de dados informétricos baseado em ontologia [...] com uma arquitetura de três níveis, constituída por a) a ontologia; b) as fontes de dados; etc.) o mapeamento entre os dois." (MOED, 2017, p.40, tradução nossa).*

"[..] apontar particularmente para a importância da pesquisa qualitativa de traços digitais altmétricos, o que poderia ajudar a fornecer uma "lente interpretativa" para entender as motivações por trás dos atos de mídia social" (XU, 2018, tradução nossa).

Para ambos os autores, as estruturas de dados para a análise de assuntos parte do pressuposto de que, é preciso usar a inteligência artificial e sistemas de aprendizagem, pois cada língua é única e tem suas particularidades, por isso os dados brutos advindos das redes das *web,* podem ser ótimas fontes, para pesquisas desse segmento.

h) Indicador de análise de rede

Três estudos indicam que a altmetrics pode ser usada para captar e organizar os comentários, conversas a respeito de pesquisas; outros tipos de rastreios como: quem foram os usuários de um estudo, que tipo de usos foram feitos, assim como, o uso para mapear as interações e redes em torno de um tema.

"Os indicadores altmétricos, com sua capacidade de incluir menções à produção científica na mídia social e jornalística, têm nos permitido ver a natureza dos comentários e discussões de artigos científicos. No entanto, como há muitos artigos que ganham atenção massiva tanto da mídia social quanto de notícias, ler todos os artigos de notícias ou toda a seção de comentários, sem falar em organizar essas informações de uma forma perspicaz, é uma metodologia irreal. Portanto, uma ferramenta de análise de sentimento que pode rastrear o "humor" geral da conversa pode ser benéfica para quem procura informações sobre um novo estudo ou descobertas de pesquisa." (HALEVI; SCHIMMING, 2018, tradução nossa).

"É mais significativo entender quem usou um produto de pesquisa, como e por que é usado, que efeito teve, em vez de simplesmente saber quantas pessoas o visualizaram, baixaram ou mencionaram no Twitter". (XU, 2018, tradução e grifo nosso)

"O networking profissional é um motivo frequentemente citado para a adoção da mídia social na medicina acadêmica. Por exemplo, a Colaboração para Resultados em Mídias Sociais em Oncologia (COSMO) "começou a trabalhar juntos após se reunir on-line

através do Twitter, reunidos por interesses comuns". (BAMAT; MANLEY; HARER; ROLAND, 2018, tradução nossa).

Em geral, os modelos de análise de rede estão focados na contagem de curtidas, compartilhamentos, visualizações, leituras etc., preocupados com "a avaliação dos retornos sociais, culturais, ambientais e econômicos (impacto e efeitos) dos resultados (produção da pesquisa) ou produtos (resultado da pesquisa) da pesquisa com financiamento público". (BORNMANN, 2012, p. 673*, tradução nossa*).

Os estudos indicam que a temática carece de pesquisas que se atenham às manifestações em redes, dos usos dados ao texto ou tema de forma reflexiva, com aprofundamento temático, em cases específicos, possibilitando olhar para o todo.

i) Uso de ferramentas para captar dados para a análise altmétrica

O Quadro 9 apresenta a lista de ferramentas, que foram empregadas ou foram objeto dos estudos analisados, as ferramentas *Mímir, Ceek.jp* estão nessa lista; também são apresentadas como tendências de ferramentas que podem ser usadas para na aplicação de estudos altmétricos.

Mímir é uma estrutura de pesquisa semântica de código aberto para pesquisa semântica integrada sobre texto, estrutura de documento, anotações linguísticas e conhecimento semântico formal [...]. "A busca semântica de documentos visa enfrentar esses novos desafios, encontrando informações que não se baseiem apenas na presença de palavras, mas também em seus significados" (TABLAN; BONTCHEVA; ROBERTS; CUNNINGHAM, 2015, tradução nossa, grifo nosso).

Ceek.jp (Ceek.jp), motor de busca que está sendo promovido no Japão. Este serviço, que usa Altmetrics para trabalhos acadêmicos japoneses. (CHO, 2015, tradução nossa)

"a criação de ferramentas informétricas de autoavaliação [...] ao nível de autores individuais ou pequenos grupos de pesquisa." (MOED, 2017, p.41, tradução nossa)

"Hashtags são palavras, acrônimos ou strings alfanuméricas precedidas do sinal de sustenido (#). Na mídia social, as hashtags são frequentemente usadas para classificar as informações com base no conteúdo ou temas principais - rótulos que permitem que

> *as informações sejam classificadas em arquivos digitais. Aproximadamente 500 milhões de tweets são gerados a cada dia; hashtags agem como um sistema de organização informal e dinâmico para ajudar os usuários a identificar conteúdo relevante específico." (BAMAT; MANLEY; HARER; ROLAND, 2018, tradução nossa)*

As ferramentas empregadas em estudos altmétricos necessitam de aprimoramento, para que possam oferecer recursos que permitam uma coleta e análise mais adequados aos distintos cenários, assim como, uma abrangência de fontes e redes de informação. Conforme Mounce (2013), a altmetria ainda é relativamente nova, inexplorada e subdesenvolvida, e "quanto mais a *web* abre acesso a seus dados e links, veremos uma variedade maior de altmetria" (MOUNCE, 2013, p. 16, tradução nossa).

Ferramentas como o *Google* necessitam abrir espaços e criar ferramentas para a obtenção de dados altmétricos, de forma gratuita, são dados para a pesquisa, por tanto, deveriam estar acessíveis. A comunidade científica só vai conseguir criar ferramentas super eficaz se tiver apoio de empresas detentoras da informação e das redes de informação, de forma gratuita.

5 CONCLUSÃO

O estudo traz muitos dados e informações a respeito do cenário que engloba a altmetria, obtidos por meio da análise da literatura científica; suas nuances são propostas com base nos objetivos específicos, os quais, cabe retomar de forma geral e reflexiva.

No objetivo "a", alguns aspectos intrigantes foram expostos, como a predominância do formato das publicações, apresentados pela predominância dos artigos científicos publicados por periódicos, e, da limitação do acesso a esses materiais por meio de cobrança de taxas, mostrando que a altmetria por ser uma temática diretamente ligada à ciência aberta, ainda tem limitações estruturais a serem pensadas e discutidas.

Ao explanar os dados a respeito do objetivo "b", sobre as temáticas dos textos analisados, os assuntos de maior recorrência foram: citação, impacto, altmetria e pesquisa, sinalizando as preferências dos pesquisadores dessa temática, e o quanto a altmetria está relacionada com a avaliação da pesquisa, permeando quase que exclusivamente essa via, buscando mensurar a pesquisa científica quase que somente por meio de estudos quantitativos.

Quanto ao objetivo "c", os métodos que se mostraram predominantes foram os que aplicaram modelos matemáticos e estatístico; no entanto, a presença de alguns estudos qualitativos, como: análise de sentimento, análises qualitativas, análise de conteúdo, análise temática, método analítico, e de meta-análises, mostra ser um caminho viável para as análises voltadas para os usuários e usos da informação na *web*.

Ao observar as nuances expostas no objetivo "d", em desafios e tendências, é possível destacar que foram encontradas mais indicações de desafios do que de tendências, talvez porque ambas estejam interconectadas. A amostra apresenta que há vários problemas a serem sanados, indicando que os temas mais urgentes são: as divergências em torno das altmetrias, a qualidade dos dados, as limitações dos dados e ferramentas, a representação teórica e metodológica, e a padronização dos dados, todos são assuntos que carecem de aprofundamento para que a temática se desenvolva.

Ainda, quanto às indicações de tendências, os dados sinalizam que a altmetria pode ser usada de forma múltipla, apresentando alguns indicadores alternativos como emergentes: o de análise de sentimentos e de análise de rede, com viés em estudos planificados, sob o olhar das interações que ocorrem nas redes sociais, acadêmicas, e, o que cada uma dessas interações podem significar para um contexto e uma população.

No que diz respeito à análise do objetivo "d", tinha-se a ideia de que os desafios e tendências teriam uma linearidade temática e evolutiva, o que foi refutado ao analisar os dados;

pois, há temas que foram indagados no princípio dos estudos sobre a temática e que ainda são questionados na literatura atual, visto que há vários relatos sobre as limitações, problemas e desafios que a altmetria precisa enfrentar, considerando que a maioria desse problemas já haviam sidos apontados por: Taylor (2013), Gouveia e Lang (2013), Liu e Adie (2013), Sugimoto (2015), Haustein (2016), Maricato e Martins (2017), Sugimoto *et al*. (2017), Moed (2017), Tunger, Clermont e Meier (2018), Xu (2018). Os autores citados questionaram e questionam a falta de teoria, de definição, carência de um método apropriado, de ferramentas adequadas, padronização etc.

No entanto, tem a questão de que no início a comunidade científica confundia os estudos altmétricos com os estudos cientométricos, não se sabia exatamente o que a altmetria estudava, para o que deveriam olhar, então, qualquer direção era válida; esse pode ser um dos fatores que impactou no entendimento de que havia a necessidade de construção da base, da linha teórica e metodológica para essa área em desenvolvimento.

Como foi mencionado, o tema carece da base, mas segue evoluindo, na aplicação da temática, pois constatou-se que há movimentos/ondas dos estudos altmétricos; na primeira onda de pesquisas, os estudos se concentraram em olhar para as plataformas científicas e sociais, para os recursos, para as ferramentas de captura e análise de dados, oriundos das redes, muitas delas já desativadas (BAR-ILAN *et al.* 2014); a segunda onda é focada na definição da área e do seu objeto de estudo, na aplicação de estudos ontológicos, de sentimentos, relacionados com o conteúdo científico disponível nas mídias, os dois últimos se mostraram ser um tanto incipiente, porém presente na literatura; e por último, uma terceira onda se configura, na qual a demanda é para os estudos epistemológicos, interação conceitual, metodológicos e estrutural.

Tendo em vista o trilhar da altmetria, e sabendo que a mesma permeia por vários campos de conhecimento, o que a caracteriza com o viés interdisciplinar, a sua aplicação segue a um perfil indefinido; pois os dados são oriundos de várias fontes, formatos, que possibilitam o envolvimento de vários atores; o uso dos dados científicos impacta em todas as esferas da sociedade, e devido a isso, essa temática tem sido estudada por várias áreas do conhecimento; a configuração desse campo pode requerer que cada um desses múltiplos olhares necessite de um modelo específico, assim como um recorte, uma aplicação, uma ferramenta etc.

Por fim, a altmetria se constituí em um conjunto de indicadores e filtros de interação, que possibilita a mensuração da relação entre os usuários com a publicação científica, nos diversos canais e redes da *web;* esse cenário colabora com a difusão da ciência, pois uma infinidade de pessoas passou a consumir conteúdos de pesquisa científica de forma involuntária, e as redes são os novos canais de comunicação, do conteúdo científico.

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APÊNDICE A - LISTA DOS TEXTOS ANALISADOS NO SOFTWARE IRAMUTEQ

**** *Artigo_1
When You Use Social Media You Are Not Working": Barriers for the Use of Metrics in Social Sciences
The Social Sciences have long been struggling with quantitative forms of research assessment insufficient coverage in prominent citation indices and overall lower citation counts than in STM subject areas have led to a widespread weariness regarding bibliometric evaluations among social scientists. Fueled by the rise of the social web, new hope is often placed on alternative metrics that measure the attention scholarly publications receive online, in particular on social media. But almost a decade after the coining of the term altmetrics for this new group of indicators, the uptake of the concept in the Social Sciences still seems to be low. Just like with traditional bibliometric indicators, one central problem hindering the applicability of altmetrics for the Social Sciences is the low coverage of social science publications on the respective data sources—which in the case of altmetrics are the various social media platforms on which interactions with scientific outputs can be measured. Another reason is that social scientists have strong opinions about the usefulness of metrics for research evaluation which may hinder broad acceptance of altmetrics too. We conducted qualitative interviews and online surveys with researchers to identify the concerns which inhibit the use of social media and the utilization of metrics for research evaluation in the Social Sciences. By analyzing the response data from the interviews in conjunction with the response data from the surveys, we identify the key concerns that inhibit social scientists from (1) applying social media for professional purposes and (2) making use of the wide array of metrics available. Our findings show that aspects of time consumption, privacy, dealing with information overload, and prevalent styles of communication are predominant concerns inhibiting Social Science researchers from using social media platforms for their work. Regarding indicators for research impact we identify a widespread lack of knowledge about existing metrics, their methodologies and meanings as a major hindrance for their uptake through social scientists. The results have implications for future developments of scholarly online tools and show that researchers could benefit considerably from additional formal training regarding the correct application and interpretation of metrics.
Research assessment, altmetrics, bibliometrics, social media usage, concerns, interviews, online survey.

**** *Artigo_2
A 2D Evaluation of Altmetrics Influence in Citation Growth: Case Study of Indian Research Articles in PLoS Journals
The general approach of research impact evaluation is entirely based upon citations. But in the current Web2.0 era, this citation based evaluation process often do not include the generic discussions people make in social media, blogs, online scholarly discussion forums or even the online readership of the article. Altmetrics, often referred as the article level metrics is a tool that have emerged, which crowd source all the non-citation based discussions from various web2.0 platforms and tries to reflect the overhaul attention that an article gets. Since its introduction, altmetrics have been able to gather a good attention from the scientific community, and researchers are trying to evaluate if it does have scholarly value to complement the citation based impact measure process. The current study tries to evaluate altmetrics penetration in Indian research articles and the influence of altmetrics in the citation growth process. The problem was addressed taking the example of Indian research articls published in PLoS journals. Two hypotheses were set for the study and PLoS altmetrics data were taken to

run the t-test for paired sample mean to test the hypothesis. Findings from the t-test estimated a low significant p value, hence rejecting the null hypothesis and accepting the alternate hypothesis proving the positive influence of altmetrics in the citation growth process for the Indian research articles in PLoS journals. Also the presence of altmetrics data in the Indian research articles of PLoS journals is evaluated in the study.
Altmetrics, Indian research, scientometrics, t-Test

**** *Artigo_3
A comparison between traditional citation metrics and altmetrics amongst dermatology journals: An observational study. (Preprint)
Research impact has traditionally been measured using citation count and impact factor (IF). Academics have long relied heavily on this form of metric system to measure a publication's impact. A higher number of citations is viewed as an indicator of the importance of the research and a marker for the impact of the publishing journal. Recently, social media and online news sources have become important avenues for dissemination of research, resulting in the emergence of an alternative metric system known as altmetrics. Objective: We assessed the correlation between altmetric attention score (AAS) and traditional scientific impact markers, namely journal IF and article citation count, for all the dermatology journal and published articles of 2017. We identified dermatology journals and their associated IFs available in 2017 using InCites Journal Citation Reports. We entered all 64 official dermatology journals into Altmetric Explorer, a Web-based platform that enables users to browse and report on all attention data for every piece of scholarly content for which Altmetric Explorer has found attention. For the 64 dermatology journals, there was a moderate positive correlation between journal IF and journal AAS (rs=.513, P<.001). In 2017, 6323 articles were published in the 64 dermatology journals. Our data show that there was a weak positive correlation between the traditional article citation count and AAS (rs=.257, P<.001). Our data show a weak correlation between article citation count and AAS. Temporal factors may explain this weak association. Newer articles may receive increased online attention after publication, while it may take longer for scientific citation counts to accumulate. Stories that are at times deemed newsworthy and then disseminated across the media and social media platforms border on sensationalism and may not be truly academic in nature. The opposite can also be true."
dermatology, altmetrics, impact factor, citations, medical informatics

**** *Artigo_4
Information literacy and mobile technologies. A look at scientific production from the impact of altmetry. (Information Literacy and Mobile Technologies. A Look at Scientific Production from the Impact of Altmetry.)
The main focus of this paper is to provide a review of the scientific production in Information Literacy and mobile technologies (Mobile Information Literacy) between 2006 and 2017, quantifying from the altmetric perspectives. The altmetrics imply a complementary approach that can shed light on specific aspects which are not easy to be addressed by more traditional scientific approaches, neither bibliometric nor conceptual. That is why, the altmetrics include relevant features, like visualization, document downloads, quotes, recommendations and markers. These aspects can contribute to explain the impact and relevance of the scientific literature from a wider perspective. An analysis of most altmetric impact documents was carried out to manifest the main research trends in the subdomain of the Information Science. After we had carried out our altmetric review, we concluded that this perspective, applied to the IL and the mobile technologies have become a growing trend that is reaching a significant relevance, in addition to the traditional bibliometric analysis, and that covers, in a context of mobile learning and relation, which are in a unstoppable process of spiral growing, new and very

significant dimensions in the approach to the impact and significance of the scientific production.
Alfabetización informacional, altmetría, aprendizaje móvil, information literacy, altmetrics, mobile learning

**** *Artigo_5
Altmetrics: Research Developments and Applications
With the development of network era, networks as a new medium, such as Weibo and WeChat official account, provide a more convenient channel for the dissemination of academic achievements. Meanwhile, the amounts of reading or sharing reflect the social influence of academic achievements. In this context, it is neither comprehensive nor precise enough to measure the influence of academic achievements only by traditional bibliometric methods. In 2010, J. Priem, a professor of informatics from the United States, proposed a social-network-based measurement method for academic achievement evaluation, namely Altmetrics. This paper introduces the de-velopment of Altmetrics from three aspects. Firstly, we provide a history of establishment and development for Altmetrics, and discuss the difference between Altmetrics and traditional bibli-ometric methods. Secondly, we review the relevant research in domestic and foreign and sum-marize the problems and challenges in this field. Finally, we introduce the actual application of Altmetrics by taking the website of altmetric.com as an example.
Alternative metrology, bibliometrics, evaluation of academic achievement, alternative measurement indicators, Altmetrics, Authors in Evaluation of Academic Achievements, Altmetric On Indicator

**** *Artigo_6
Availability and Audit of Links in Altmetric Data Providers: Link Checking of Blogs and News in Altmetric.com, Crossref Event Data and PlumX
The aim of this paper is to compare and analyse the availability of blogs and news links from the three most important altmetric data providers (Altmetric.com, PlumX and Crossref Event Data, CED). In addition, the study explores the distribution of events by creation year in order to observe the coverage of old and new events. Researchers extracted 51,000 links from news and blogs from those providers. Those links were analysed with a link checker (Xenu's Link Sleuth), and the statuses of those links in 2019 January were at the center of the study. The results show that 35.6% of news in Altmetric.com are not accessible and 28.9% of blog mentions in PlumX point to a broken link. These worrying percentages of broken links are due, mainly, to the employment of third parties to supply news and blog events. Altmetric.com is the service that provides a better-balanced distribution of events, while PlumX and CED group their events around the last two years. The study concludes that these aggregators need to develop a specific policy to improve the audit of these data for research evaluation processes (saving a copy of the event, employing more frequently crawls, avoiding external providers, etc.).
Altmetrics data providers, blogs, news, links rot, web persistence

**** *Artigo_7
Correlation between the Articles Citations in Web of Science (WoS) and the Readership Rate in Mendeley and Research Gate (RG)
Today, the dissemination methods of scientific publications and Web access ways to them have changed. It is essential to use the new altmetric measurements to assess the impact of research products in addition to traditional indicators. Purpose: The purpose of this study was to investigate and compare the correlation between the number of citations of Iranian scholars' articles indexed in WoS and their readership rate in the two social networks of Mendeley and

RG. The quantitative methods used in this analytical-descriptive survey such as the scientometric / altmetric and correlation study. The statistical population consisted of scientific articles by the Iranian scholars in WoS. The sample of the research was 165 retrieved articles with 200 citations or more, in WoS with the address “Iran”. Data was collected from WoS, Mendeley and RG and analyzed by using Excel and SPSS software. Findings: The findings showed that the correlation between the number of citations of the articles and the degree of readership in Mendeley was 0.352 based on the Spearman’s correlation coefficient. The correlation between the number of citations of the articles and the rate of readership in RG was 0.177. The findings indicated a positive and moderate correlation with a confidence level of 99% for Mendeley and a positive, but poor correlation for RG with 95% confidence. There was a significant correlation between the readability of articles in two Mendeley and RG based on Spearman coefficient (correlation of 0.382 at 0.01 significance level) with a positive and average correlation. It was concluded that altmetric can be used as a complementary indicator beside traditional indices. Mendeley is an appropriate tool to evaluate the research work of scholars, universities, institutes, and countries. Originality/value: For the first time, correlation is measured between the articles’ citations in Web of Science (WoS) and the readership rate in Mendeley and ResearchGate (RG). The results of this research clear the value of academic social networks in the dissemination of scientific productions. These networks can increase the use of authentic scientific works. The results of this study encourage scientists to share their scientific productions on these networks.

Altmetric, Citation, Iranian scholars, Mendeley, Readership, ResearchGate (RG), scientometric, Web of science (WoS), Webometric

**** *Artigo_8

Demography of Altmetrics under the Light of Dimensions: Locations, Institutions, Journals, Disciplines and Funding Bodies in the Global Research Framework

The interconnection between the Dimensions database and Altmetric.com provides an opportunity to carry out a worldwide analysis on altmetrics coverage of scientific literature, analyzing the percentage of documents with altmetric mentions not only in general (indexed documents), but also filtered according to different units of analysis. In order to do so, the Dimensions Pro version database was directly used to retrieve 97,531,400 documents, which were subsequently filtered to obtain the top journals, countries, cities, institutions, research fields and funding bodies according to the total number of publications indexed in the database. For each entity and year of publication (from 2000 to 2017), the corresponding percentage of publications cited and the Altmetric Attention Score (% mentioned) were calculated. The main results indicate that the total number of publications with an Altmetric Attention Score (AAS) of one or over one is low (9.4% out of the total coverage), which has been highly concentratedn recent years, and higher for open access documents (18.9%), showing an open access altmetric advantage. Otherwise, English-speaking universities stand out, which determines an increase in the presence of specific cities from Anglo-Saxon countries, diminishing the presence in Japan, China, Russia or India, despite their elevated productivity. Multidisciplinary and medicine-related journals are also highlighted, which in turn influences the research disciplines with a higher AAS (% mentioned): Genetics, Immunology, Microbiology or Medical Microbiology. However, since the conducted analysis has brought out some inconsistencies in the quality of the data, results must be taken with caution.

Altmetrics, Dimensions, Bibliometrics, Scientometrics, Social media metrics, Bibliographic Databases

**** *Artigo_9

Differences between Altmetric Data Sources – A Case Study

This paper examines the data accuracy and number of altmetric counts reported by Mendeley, altmetric.com and PlumX at two points in time: June 2017 and April 2018 for the dataset of 2,728 articles and reviews published in JASIST between 2001 and 2014. The findings show growth in the number of citations and Mendeley readers over time. In addition, the results also show that there are differences in the altmetric counts reported by the two-altmetric aggregators Altmetric.com and PlumX.
Mendeley, Altmetric.com, PlumX, readers, tweets, blogs, Wikipedia

**** *Artigo_10
Disciplinary Variations in Altmetric Coverageof Scholarly Articles
The popular social media platforms are now making it possible for scholarly articles to be shared rapidly in different forms, which in turn can significantly improve the visibility and reach of articles. Many authors are now utilizing the social media platforms to disseminate their scholarly articles (often as pre- or post- prints) beyond the paywalls of journals. It is however not very well established if the level of social media coverage and attention of scholarly articles is same across all research disciplines or there exist discipline-wise variations. This paper aims to explore the disciplinary variations in coverage and altmetric attention by analyzing a significantly large amount of data from Web of Science and this http URL. Results obtained show interesting patterns. Medical Sciences and Biology are found to account for more than 50% of all instances in Altmetrics. In terms of coverage, disciplines like Biology, Medical Science and Multidisciplinary Sciences have more than 60% of their articles covered in Altmetrics, whereas disciplines like Engineering, Mathematics and Material Science have less than 25% of their articles covered in Altmetrics. The coverage percentages further vary across different altmetric platforms, with Twitter and Mendeley having much higher overall coverage than Facebook and News. Disciplinary variations in coverage are also found in different altmetric platforms, with variations as large as 7.5% for Engineering discipline to 55.7% for Multidisciplinary in Twitter. The paper also looks into the possible role of source of publication in altmetric coverage level of articles. Interestingly, some journals are found to have a higher altmetric coverage in comparison to the average altmetric coverage level of that discipline.

**** *Artigo_11
Do altmetrics work for assessing research quality?
Alternative metrics (aka altmetrics) are gaining increasing interest in the scientometrics community as they can capture both the volume and quality of attention that a research work receives online. Nevertheless, there is limited knowledge about their effectiveness as a mean for measuring the impact of research if compared to traditional citation-based indicators. This work aims at rigorously investigating if any correlation exists among indicators, either traditional (i.e. citation count and h-index) or alternative (i.e. altmetrics) and which of them may be effective for evaluating scholars. The study is based on the analysis of real data coming from the National Scientific Qualification procedure held in Italy by committees of peers on behalf of the Italian Ministry of Education, Universities and Research.
Altmetrics, Research quality, Bibliometric indicators, Correlation analysis

**** *Artigo_12
Metric study of information literacy in Latin America: from bibliometrics to altmetrics
This study identifies the presence, productivity and influence of Ibero-American authors that write about information literacy (InfoLit). Using bibliometric and altmetric indicators, it seeks to analyze the impact and subsequent use of their scholarly works on social and scientific platforms. Fifty-five authors with the highest productivity were identified, based on the results of bibliometric studies on InfoLit carried out on both an international and Ibero-American scale

in searches of major databases as well as publications collected in a Latin American wiki. Subsequently an analysis of bibliometric and altmetric indicators at the author and publication level was carried out, based on the results of searches on eight scientific platforms (Google Scholar, ResearchGate, Academia.edu, Mendeley, ORCID, IraLIS, E-LIS and EXIT), three social networks (Facebook, Twitter and LinkedIn), and data provided by a commercial supplier (Altmetric.com). Overall we found a greater presence of authors in ResearchGate (58%), Academia.edu (51%) and Google Scholar (49%) as opposed to Mendeley (25%) and ORCID (18%). Furthermore, as to social platforms, the greatest potential influence lies with Facebook, due to its high number of followers (/ top 10 authors). In addition, an analysis with the Spearman rho statistic, shows among some sources and platforms, a low correlation between the number of citations in Google Scholar and readings in Mendeley (r = 382) and low negative for mentions in blogs (r = 0,-237), Google+ (r = 0, -214) and Twitter (r = 0, -183). In conclusion, both the productivity and the impact-visibility center on specific authors writing about InfoLit, and various measurement resources show that for these authors there is a positive two-way impact from bibliometric to altmetric and vice-versa.
Information literacy, bibliometrics, altmetrics, social web, visibility, impact, open access, open science, science 2.0

**** *Artigo_13
Getting to Know Science Tweeters: A Pilot Analysis of South African Twitter Users Tweeting about Research Articles
Against the backdrop of the increasing relevance of social media in public science communication and engagement, this study aimed to expand our understanding of the relationships and interactions between social media users and scientific outputs. In order to do so, we explored the identities, characteristics and activities of South African science tweeters (or ZA science tweeters)—i.e. Twitter users in South Africa who tweet about research articles. The growing number of ZA science tweeters, both overall and in relative terms, suggests that Twitter users are increasingly using this social media platform as a tool to share and discuss scientific outputs. ZA science tweeters are actively contributing to the sharing of information about new research articles, but, in line with global trends, the bulk of science tweets amongst South African Twitter users comes from a small number of active tweeters, and only 1% of ZA science tweeters had more than 20,000 followers. About 6.6% of ZA science tweeters are scholars (or researchers) themselves. Compared to science tweeters who are not scholars, the scholar-tweeters sent out tweets about research articles more frequently, are active on Twitter over longer periods of time, publish more original tweets and use hashtags more frequently to increase their engagement on Twitter. In their Twitter bios, these scholars typically use academic terms to describe themselves, thereby presenting themselves as experts on this social media platform. Astronomy, astrophysics, ecology and the environment emerge as the research topics that are most popular amongst ZA science tweeters.
Twitter, science communication, science tweeters, science and society, social media metrics of science, altmetrics, social media studies of science

**** *Artigo_14
How much research output from India gets social media attention?
Scholarly articles are now increasingly being mentioned and discussed in social media platforms, sometimes even as pre- or post-print version uploads. Measures of social media mentions and coverage are now emerging as an alternative indicator of impact of scholarly articles. This article aims to explore how much scholarly research output from India is covered in different social media platforms, and how similar or different it is from the world average. It also analyses the discipline-wise variations in coverage and altmetric attention for Indian

research output, including a comparison with the world average. Results obtained show interesting patterns. Only 28.5% of the total research output from India is covered in social media platforms, which is about 18% less than the world average. ResearchGate and Mendeley are the most popular social media platforms in India for scholarly article coverage. In terms of discipline-wise variation, medical sciences and biological sciences have relatively higher coverage across different platforms compared to disciplines like information science and engineering.
Disciplinary variation, research output, scholarly articles, social media.

**** *Artigo_15
How much research shared on Facebook is hidden from public view? A comparison of public and private online activity around PLOS ONE papers
Despite its undisputed position as the biggest social media platform, Facebook has never entered the main stage of altmetrics research. In this study, we argue that the lack of attention by altmetrics researchers is due, in part, to the challenges in collecting Facebook data regarding activity that takes place outside of public pages and groups. We present a new method of collecting aggregate counts of shares, reactions, and comments across the platform-including users' personal timelines-and use it to gather data for all articles published between 2015 to 2017 in the journal PLOS ONE. We compare the gathered data with altmetrics collected and aggregated by Altmetric. The results show that 58.7% of papers shared on Facebook happen outside of public spaces and that, when collecting all shares, the volume of activity approximates patterns of engagement previously only observed for Twitter. Both results suggest that the role and impact of Facebook as a medium for science and scholarly communication has been underestimated. Furthermore, they emphasise the importance of openness and transparency around the collection and aggregation of altmetrics.
altmetrics, Facebook, public engagement, science communication

**** *Artigo_16
Informing the Digital Archive with Altmetrics
Altmetrics can be used to understand impact beyond citations, particularly for digitized collections. As cultural institutions look to pursue more active engagement with communities of practice, altmetrics help archivists understand the conversations happening in real time that will allow them to provide access to the most relevant materials. Through the use of case studies, we aim to demonstrate how applying altmetrics while considering the curation of digital collections can allow archivists to stay engaged with target communities outside traditional channels, demonstrating both the applicability of altmetrics to legacy scholarly work and the value of digitization as an access method.
**** *Artigo_17
Investigating the Presence of Highly Cited Articles on Chronic Diseases in Scientific Social Network: Altmetrics Study
The Clarivate Analytics Company defined the highly cited papers used to measure scientific performance. Altmetrics is a new indicator for evaluation of academic research, which evaluates the findings of research published on social networks. This study aimed at evaluating the Altmetrics indicators of highly cited articles on chronic diseases in the two social networks of ResearchGate and Mendeley. This descriptive-cross sectional study was carried out using the scientometric method. The research data were collected during October 2018 by using Excel 2013 software. HistCiteTM and VOSviewer were used as scientometric software. Data were analyzed using SPSS version 19 through non-parametric statistical tests, such as Spearman and chi-square tests. The significance level was $P < 0.05$. According to the findings, the coverage rate of highly cited articles on chronic diseases on ResearchGate is about 96.5%, which is better

than Mendeley with 92.4%. There was a significant relationship between citation with presence in social networks of research gate and Mendeley ($P < 0.05$). Each paper indexed in ResearchGate has been read on average by 318.73 individuals. In comparison with that, every paper in Mendeley has been read by 185.76 people, respectively. There was a positive correlation between the number of citations in the Web of Science and "Read" rate of the papers in ResearchGate (0.207) and Mendeley (0.343) ($P < 0.05$). Altmetric indicators evaluated activities in social media space. Increasing the presence of chronic diseases papers in social networks can actively influence dissemination of knowledge.
Bibliometrics, Non-Communicable Diseases, Chronic Diseases, Social Media, Publications

**** *Artigo_18
Meta-Research: Releasing a preprint is associated with more attention and citations for the peer-reviewed article
Preprints in biology are becoming more popular, but only a small fraction of the articles published in peer-reviewed journals have previously been released as preprints. To examine whether releasing a preprint on bioRxiv was associated with the attention and citations received by the corresponding peer-reviewed article, we assembled a dataset of 74,239 articles, 5,405 of which had a preprint, published in 39 journals. Using log-linear regression and random-effects meta-analysis, we found that articles with a preprint had, on average, a 49% higher Altmetric Attention Score and 36% more citations than articles without a preprint. These associations were independent of several other article- and author-level variables (such as scientific subfield and number of authors), and were unrelated to journal-level variables such as access model and Impact Factor. This observational study can help researchers and publishers make informed decisions about how to incorporate preprints into their work.

**** *Artigo_19
The influence of social media on international publications of indonesian scientific works in agriculture with altmetrics approach
The purpose of this study was to measure the impact of Indonesia research especially in agriculture published in international Scopus journals using Altmetrics. This research method consisted of problem identification, data collection, data preprocessing, Altmetrics approach analysis, and final analysis. The data of this study were obtained from Scopus.com citation metadata by writing the Agriculture keyword and Indonesian affiliation that the limited year from 2015-2017. Altmetrics data is obtained from Altmetric.com; Altmetrics Explorer for Librarian by extracting DOIs from each publication of scientific work. Then the data is analyzed by the Altmetrics approach, namely Facebook Coverage and Mention Rate. This study performed an analysis based on Altmetrics data share to know the popularity Indonesian research in Scopus journal and analyzed the correlation between Citation data Indonesian research in Scopus journal and Altmetrics data share of Altmetric.com. This study analyzed the impact of 4484 Indonesia research articles published by Scopus journals in the field of agriculture through Altmetrics and compared it with bibliometrics. The result showed that Coverage and Mention Rate of social media only were below 30% which was not too significant in the content discussed, view & reader and mention on social media.
Almetrics, Social media, Bibliometrics, Citation, Journal, Scopus, Indonesia

**** *Artigo_20
Randomized controlled trials in ophthalmology: a bibliometric study
Randomized controlled trials (RCTs) are situated at the top of hierarchy of evidence-based medicine, where its number and quality are important in the assessment of quality of evidence

in a medical field. In this study, we aim to assess the status of RCTs in Ophthalmology. On 15th of May 2019, we performed a PubMed search for randomized controlled trials published in the field of ophthalmology using relevant filters and search terms. We categorized the results into specific topics in ophthalmology according to Medical Subject Heading (MeSH) database classification system. We used Altmetric explorer to identify journals and articles with the highest number of RCTs and highest citations. We found a total of 540,427 publications in the field of ophthalmology, of which only 11,634 (2.15%) of them were RCTs. 'Retinal diseases' was the topic with the highest number of RCTs, followed by 'glaucoma' and 'conjunctival diseases'. The trial with highest number of citations was on retinal diseases. Only around 18% of all ophthalmology RCTs are published in the top 10 ophthalmology journals, with a maximum percentage of RCTs was (5.53%) published in Ophthalmology. RCTs in ophthalmology primarily concern the retina, glaucoma, and a few other sub-topics, with little focus on sclera, orbit, and the eyelids. Most of the high impact RCTs are published in non-ophthalmology journals.
Ophthalmology, Randomized Controlled Trials, PubMed, Retina, Journals, Bibliometrics

**** *Artigo_21
Science map of Cochrane systematic reviews receiving the most altmetric attention: network visualization and machine learning perspective
We aimed to analyze and visualize the science map of Cochrane systematic reviews (CSR) with high Altmetric attention scores (AAS). On 10 May 2019, the Altmetric data of the CSR Database were obtained from the Altmetric database (Altmetric LLP, London, UK). Bibliometric data of the top 5% of CSR were extracted from the Web of Science. Keyword co-occurrence, co-authorship, and co-citation network analysis were then employed using VOSviewer software. A Random forest model was used to analyze the citation patterns. A total of 12016 CSR with AAS were found (Total mentions: 259968) with Twitter being the most popular Altmetric resource. Consequently, the top 5% (607 articles, mean AAS: 171.2, 95% confidence level (CL): 14.4, mean citations: 42.1, 95%CL: 1.3) with the highest AAS were included in the study. Keyword co-occurrence network analysis revealed female, adult, and child as the most popular keywords. Helen V. Worthington (University of Manchester, Manchester, UK), and the University of Oxford and UK had the greatest impact on the network at the author, organization and country levels respectively. The co-citation network analysis revealed that The Lancet and CSR database had the most influence on the network. However, AAS were not correlated with citations (r=0.15) although they were correlated with policy document mentions (r=0.61). The results of random forest model confirmed the importance of policy document mentions. Despite the popularity of CSR in the Twittersphere, disappointingly, they were rarely shared and discussed within the new academic tools that are emerging, such as F1000 prime, Publons, and PubPeer.
Bibliometrics, Database, Social Media, Systematic Reviews

**** *Artigo_22
Testing for universality of Mendeley readership distributions
Altmetrics promise useful support for assessing the impact of scientific works, including beyond the scholarly community and with very limited citation windows. Unfortunately, altmetrics scores are currently available only for recent articles and cannot be used as covariates in predicting long term impact of publications. However, the study of their statistical properties is a subject of evident interest to scientometricians. Applying the same approaches used in the literature to assess the universality of citation distributions, the intention here is to test whether the universal distribution also holds for Mendeley readerships. Results of the analysis carried out on a sample of publications randomly extracted from the Web of Science confirm that

readerships seem to share similar shapes across fields and can be rescaled to a common and universal form. Such rescaling results as not particularly effective on the right tails. In other regions, rescaling causes a good collapse of field specific distributions, even for very recent publications.
Bibliometrics, Impact, Altmetrics, Mendeley, Reader Ship, CSS

**** *Artigo_23
The effect of bioRxiv preprints on citations and altmetrics
A potential motivation for scientists to deposit their scientific work as preprints is to enhance its citation or social impact, an effect which has been empirically observed for preprints in physics, astronomy and mathematics deposited to arXiv. In this study we assessed the citation and altmetric advantage of bioRxiv, a preprint server for the biological sciences. We retrieved metadata of all bioRxiv preprints deposited between November 2013 and December 2017, and matched them to articles that were subsequently published in peer-reviewed journals. Citation data from Scopus and altmetric data from Altmetric.com were used to compare citation and online sharing behaviour of bioRxiv preprints, their related journal articles, and non-deposited articles published in the same journals. We found that bioRxiv-deposited journal articles received a sizeable citation and altmetric advantage over non-deposited articles. Regression analysis reveals that this advantage is not explained by multiple explanatory variables related to the article and its authorship. bioRxiv preprints themselves are being directly cited in journal articles, regardless of whether the preprint has been subsequently published in a journal. bioRxiv preprints are also shared widely on Twitter and in blogs, but remain relatively scarce in mainstream media and Wikipedia articles, in comparison to peer-reviewed journal articles.

**** *Artigo_24
The first impression of conference papers: Does it matter in predicting future citations?
This article explores the factors influencing the future citations of conference papers. We concentrated on the explanatory power of early attention on conference papers for citations collected from Google Scholar and Scopus. The early attention data includes users' online activities in a conference support system: CN3. Bookmarks from the bibliographic management system, Citeulike, were used as a collateral source of early attention. To examine the chronological contributions of 13 factors on citations, a multiple sequential regression analysis was conducted for three timepoints of the publication cycle—paper submission, time of conferences, and months after conferences. Our results illustrate that online readers' early attention of Citeulike bookmarks were found to have the most influence on the future impact of the conference papers. The early attention records from CN3 made noteworthy improvements to explaining both the Google and Scopus citations as well. We also found that the type of papers the number of papers presented at a conference, and the best article award records were significant factors influencing future citations. However, the magnitude of the effects made by online readers' early attention from both sources appears to be larger than these three traditional factors.

**** *Artigo_25
The relationship between citations, downloads and alternative metrics in rheumatology publications: a bibliometric study.
Objective: Scientific journals and authors are frequently judged on 'impact'. Commonly used traditional metrics are the Impact Factor and H-index. However, both take several years to formulate and have many limitations. Recently, Altmetric—a metric that measures impact in a non-traditional way—has gained popularity. This project aims to describe the relationships between subject matter, citations, downloads and Altmetric within rheumatology. Data from

publications in Rheumatology were used. Articles published from 2010 to 2015 were reviewed. Data were analysed using Stata 14.2 (StataCorp, College Station, TX, USA). Correlation between citations, downloads and Altmetric were quantified using linear regression, comparing across disease topics. Relationship between downloads and months since publications were described using negative binomial regression, clustering on individual articles. A total of 1460 Basic Science and Clinical Science articles were identified, with the number of citations, downloads and Altmetric scores. There were no correlations between disease topic and downloads (R2 = 0.016, P = 0.03), citations (R2 = 0.011, P = 0.29) or Altmetric (R2 = 0.025, P = 0.02). A statistically significant positive association was seen between the number of citations and downloads (R2 = 0.29, P < 0.001). No correlations were seen between Altmetric and downloads (R2 = 0.028, P < 0.001) or citations (R2 = 0.004, P = 0.445). Disease area did not correlate with any of the metrics compared. Correlations were apparent with clear links between downloads and citations. Altmetric identified different articles as high impact compared with citation or download metrics. In tweeting about your research does not appear to influence citations.
citations, download, altmetric, twitter, research impact, rheumatology, linear regression, journal impact factor, altmetrics

**** *Artigo_26
To tweet or not to tweet, that is the question: A randomized trial of Twitter effects in medical education
Many medical education journals use Twitter to garner attention for their articles. The purpose of this study was to test the effects of tweeting on article page views and downloads.
The authors conducted a randomized trial using Academic Medicine articles published in 2015. Beginning in February through May 2018, one article per day was randomly assigned to a Twitter (case) or control group. Daily, an individual tweet was generated for each article in the Twitter group that included the title, #MedEd, and a link to the article. The link delivered users to the article's landing page, which included immediate access to the HTML full text and a PDF link. The authors extracted HTML page views and PDF downloads from the publisher. To assess differences in page views and downloads between cases and controls, a time-centered approach was used, with outcomes measured at 1, 7, and 30 days. In total, 189 articles (94 cases, 95 controls) were analyzed. After days 1 and 7, there were no statistically significant differences between cases and controls on any metric. On day 30, HTML page views exhibited a 63% increase for cases (M = 14.72, SD = 63.68) when compared to controls (M = 9.01, SD = 14.34; incident rate ratio = 1.63, p = 0.01). There were no differences between cases and controls for PDF downloads on day 30. Discussion: Contrary to the authors' hypothesis, only one statistically significant difference in page views between the Twitter and control groups was found. These findings provide preliminary evidence that after 30 days a tweet can have a small positive effect on article page views.

**** *Artigo_27
Top 100 Publications as Measured by Altmetrics in the Field of Central Nervous System Inflammatory Demyelinating Disease
Altmetrics analyze the visibility of articles in social media and estimate their impact on the general population. We performed an altmetric analysis of articles on central nervous system inflammatory demyelinating disease (CIDD) and investigated its correlation with citation analysis. Articles in the 91 journals comprising the "clinical neurology," "neuroscience," and "medicine, general, and internal" Web of Science categories were searched for their relevance to the CIDD topic. The Altmetric Explorer database was used to determine the Altmetric.com Attention Score (AAS) values of the selected articles. The papers with the top 100 AAS values

were characterized. Articles most frequently mentioned online were primarily published after 2014 and were published in journals with high impact factors. All articles except one were dealt with the issue of multiple sclerosis. Most were original articles, but editorials were also common. Novel treatments and risk factors are the most frequent topics. The AAS was weakly correlated with journal impact factors; however, no link was found between the AAS and the number of citations. We present the top 100 most frequently mentioned CIDD articles in online media using an altmetric approach. Altmetrics can rapidly offer alternative information on the impact of research based on a broader audience and can complement traditional metrics.

**** *Artigo_28
Top-cited articles in medical professionalism: a bibliometric analysis versus altmetric scores
Citation counts of articles have been used to measure scientific outcomes and assess suitability for grant applications. However, citation counts are not without limitations. With the rise of social media, altmetric scores may provide an alternative assessment tool. The aims of the study were to assess the characteristics of highly cited articles in medical professionalism and their altmetric scores. The Web of Science was searched for top-cited articles in medical professionalism, and the characteristics of each article were identified. The altmetric database was searched to identify report for each identified article. A model to assess the relationship between the number of citations and each of the key characteristics as well as altmetric scores was developed. No correlations were found between the number of citations and number of years since publication (p=0.192), number of institutes (p=0.081), number of authors (p=0.270), females in authorship (p=0.150) or number of grants (p=0.384). The altmetric scores varied from 0 to 155, total=806, median=5.0, (IQR=20). Twitter (54%) and Mendeley (62%) were the most popular altmetric resources. No correlation was found between the number of citations and the altmetric scores (p=0.661). However, a correlation was found for articles published in 2007 and after (n=17, p=0.023). To further assess these variables, a model was developed using multivariate analysis; did not show significant differences across subgroups. The topics covered were learning and teaching professionalism, curriculum issues, professional and unprofessional behaviour. Altmetric scores of articles were significantly correlated with citations counts for articles published in 2007 and after. Highly cited articles were produced mainly by the USA, Canada and the UK. The study reflects the emerging role of social media in research dissemination. Future studies should investigate the specific features of highly cited articles and factors reinforcing distribution of research data among scholars and non-scholars."

**** *Artigo_29
Towards a second generation of ‘social media metrics’: Characterizing Twitter communities of attention around science
‘Social media metrics’ are bursting into science studies as emerging new measures of impact related to scholarly activities. However, their meaning and scope as scholarly metrics is still far from being grasped. This research seeks to shift focus from the consideration of social media metrics around science as mere indicators confined to the analysis of the use and visibility of publications on social media to their consideration as metrics of interaction and circulation of scientific knowledge across different communities of attention, and particularly as metrics that can also be used to characterize these communities. Although recent research efforts have proposed tentative typologies of social media users, no study has empirically examined the full range of Twitter user’s behavior within Twitter and disclosed the latent dimensions in which activity on Twitter around science can be classified. To do so, we draw on the overall activity of social media users on Twitter interacting with research objects collected from the Altmetic.com database. Data from over 1.3 million unique users, accounting for over 14 million tweets to scientific publications, is analyzed. Based on an exploratory and confirmatory factor

analysis, four latent dimensions are identified: ‘Science Engagement’, ‘Social Media Capital’, ‘Social Media Activity’ and ‘Science Focus’. Evidence on the predominant type of users by each of the four dimensions is provided by means of VOSviewer term maps of Twitter profile descriptions. This research breaks new ground for the systematic analysis and characterization of social media users’ activity around science.

**** *Artigo_30
Twitter Mentions and Academic Citations in the Urology Literature
Objective: To quantify the relationship between the number of Twitter mentions and the number of academic citations a urologic publication receives. Materials and Two hundred and thirteen papers from 7 prominent urologic journals were examined 37 months after publication. Articles were evaluated with 2 citation based “bibliometrics” (Scopus, Google Scholar) and Twitter mentions were tracked using the Altmetric Bookmarklet. The number of article citations and Twitter mentions were compared using one-way Analysis of variance (ANOVA) and bivariate fit analysis. Seventy-three percent of articles had at least 1 Twitter mention. Forty-two percent of Twitter mentions occurred within the first week of the online publication date. Articles mentioned on Twitter had 2.0-fold more Scopus citations (P <.01), and 2.3-fold more Google Scholar citations (P <. 01) compared to articles with no Twitter mentions. Female urologic articles had the greatest number of Twitter mentions (5.7 mentions/article) while pediatric urology had the fewest mean number of Twitter mentions (0.8 mentions/article). A total of 8.9% of papers were tweeted by their authors. Author tweeted articles were associated with a 12.3 (2.0-fold) and 15.5 (1.8-fold) mean citation increase for Scopus and Google Scholar (P <. 01 and P = . 01) compared to articles not shared by their authors on Twitter. The majority of urologic publications are being shared on Twitter. The number of citations a urologic publication receives up to 3 years after release is positively associated with the number of mentions it has on Twitter. Twitter activity may be an early indicator of ultimate academic impact of an academic urologic paper.
Twitter, Altmetric, Bibliometric, Social Media, Urology

**** *Artigo_31
#MedEd: exploring the relationship between altmetrics and traditional measures of dissemination in health professions education
Researchers, funders, and institutions are interested in understanding and quantifying research dissemination and impact, particularly related to communicating with the public. Traditionally, citations have been a primary impact measure; however, citations can be slow to accrue and focus on academic use. Recently altmetrics, which track alternate dissemination forms (e. g., social media), have been suggested as a complement to citation-based metrics. This study examines the relationship between altmetrics and traditional measures: journal article citations and access counts. The researchers queried Web of Science and Altmetric Explorer for articles published in HPE journals between 2013–2015. They identified 2,486 articles with altmetrics. Data were analyzed using negative binomial and linear regression models. Blogging was associated with the greatest increase in citations (13% increase), whereas Tweets (1.2%) and Mendeley (1%) were associated with smaller increases. Journal impact factor (JIF) was associated with a 21% increase in citations. Publicly accessible articles were associated with a 19% decrease, but the interactive effect between accessible articles and JIF was associated with a 12% increase. When examining access counts, publicly accessible articles had an increase of 170 access counts whereas blogging was associated with a decrease of 87 accesses. Discussion: This study suggests that several altmetrics outlets are positively associated with citations, and that public accessibility, holding all other independent variables constant, is positively related to article access. Given the scientific community’s evolving focus on dissemination these

findings have implications for stakeholders, providing insight into the factors that may improve citations and access of articles."
Social media, Scholarly communication, Altmetrics

**** *Artigo_32
#Psychology: a bibliometric analysis of psychological literature in the online media
Online media and especially social media are becoming more and more relevant to our everyday life. Reflecting this tendency in the scientific community, alternative metrics for measuring scholarly impact on the web are increasingly proposed, extending (or even replacing) traditional metrics (e.g., citations, journal impact factor, etc.). This paper explores the relationship between traditional metrics and alternative metrics for psychological research in the years from 2010 to 2012. Traditional publication metrics (e.g., number of citations, impact factor) and alternative metrics (collected from Altmetric, a website that collects and counts references as they appear in Wikipedia, public policy documents, research blogs, mainstream media, or social networks) were extracted and compared, using a dataset of over 245,000 publications from the Web of Science. Results show positive, small to medium, correlations on the level of individual publications, and frequently medium to high correlations on the level of research fields of Psychology. The more accumulated the level of analysis, the higher the correlations. These findings are fairly robust over time and comparable to findings from research areas other than Psychology. Additionally, a new metric, the Score Factor, is proposed as a useful alternative metric to assess a journal's impact in the online media.

**** *Artigo_33
Are altmetrics-traditional systems correlations affected by the journals' social media marketing plan?: the Journal Comunicar.
This study analyses the correlations between data provided by the traditional citation systems on one hand and altmetrics on the other hand, related to the articles published in the Journal Comunicar during five years. This journal stands out among the others in its field due to its advanced social media marketing plan. First, a presentation of the most representative aspects of altmetrics is given, according to published studies. Next, a bibliographic review is carried out on the publications dealing with the subject of the correlations and that emphasize the low correlation between citations and altmetrics. With the aim of helping researchers to understand what they involved and how they are used for their own benefit, this review is followed by a cross-metric validation study of the articles that concludes that altmetrics do not measure the authors' scientific impact, but they are significant in assessing the level of attention received by their publications in different fields and indicate the interest and the importance of using social media, especially Mendeley and Twitter, to give visibility and disseminate their scientific outputs.
Scientific communication, Correlations, Social Web, altmetrics, Altmetric.com, Snowball, Mendeley, Twitter

**** *Artigo_34
A correlation comparison between Altmetric Attention Scores and citations for six PLOS journals
This study considered all articles published in six Public Library of Science (PLOS) journals in 2012 and Web of Science citations for these articles as of May 2015. A total of 2,406 articles were analyzed to examine the relationships between Altmetric Attention Scores (AAS) and Web of Science citations. The AAS for an article, provided by Altmetric aggregates activities surrounding research outputs in social media (news outlet mentions, tweets, blogs, Wikipedia etc.). Spearman correlation testing was done on all articles and articles with AAS. Further

analysis compared the stratified datasets based on percentile ranks of AAS: top 50%, top 25%, top 10%, and top 1%. Comparisons across the six journals provided additional insights. The results show significant positive correlations between AAS and citations with varied strength for all articles and articles with AAS (or social media mentions), as well as for normalized AAS in the top 50%, top 25%, top 10%, and top 1% datasets. Four of the six PLOS journals, Genetics, Pathogens, Computational Biology, and Neglected Tropical Diseases, show significant positive correlations across all datasets. However, for the two journals with high impact factors, PLOS Biology and Medicine, the results are unexpected: the Medicine articles showed no significant correlations but the Biology articles tested positive for correlations with the whole dataset and the set with AAS. Both journals published substantially fewer articles than the other four journals. Further research to validate the AAS algorithm, adjust the weighting scheme, and include appropriate social media sources is needed to understand the potential uses and meaning of AAS in different contexts and its relationship to other metrics.

**** *Artigo_35
A novel method for depicting academic disciplines through Google Scholar Citations: The case of Bibliometrics
This article describes a procedure to generate a snapshot of the structure of a specific scientific community and their outputs based on the information available in Google Scholar Citations (GSC). We call this method MADAP (Multifaceted Analysis of Disciplines through Academic Profiles). The international community of researchers working in Bibliometrics, Scientometrics, Informetrics, Webometrics, and Altmetrics was selected as a case study. The records of the top 1,000 most cited documents by these authors according to GSC were manually Processed to fill any missing information and deduplicate fields like the journal titles and book publishers. The results suggest that it is feasible to use GSC and the MADAP method to produce an accurate depiction of the community of researchers working in Bibliometrics (both specialists and occasional researchers) and their publication habits (main publication venues such as journals and book publishers). Additionally, the wide document coverage of Google Scholar (specially books and book chapters) enables more comprehensive analyses of the documents published in a specific discipline than were previously possible with other citation indexes, finally shedding light on what until now had been a blind spot in most citation analyses.
Academic profiles, Google Scholar Citations, Bibliometrics, Scientometrics, Informetrics, Webometrics, Altmetrics, Academic search engines, Scientific disciplines, MADAP method

**** *Artigo_36
Academic information on Twitter: A user survey
Although counts of tweets citing academic papers are used as an informal indicator of interest, little is known about who tweets academic papers and who uses Twitter to find scholarly information. Without knowing this, it is difficult to draw useful conclusions from a publication being frequently tweeted. This study surveyed 1,912 users that have tweeted journal articles to ask about their scholarly-related Twitter uses. Almost half of the respondents (45%) did not work in academia, despite the sample probably being biased towards academics. Twitter was used most by people with a social science or humanities background. People tend to leverage social ties on Twitter to find information rather than searching for relevant tweets. Twitter is used in academia to acquire and share real-time information and to develop connections with others. Motivations for using Twitter vary by discipline, occupation, and employment sector, but not much by gender. These factors also influence the sharing of different types of academic information. This study provides evidence that Twitter plays a significant role in the discovery of scholarly information and cross-disciplinary knowledge spreading. Most importantly, the

large numbers of non-academic users support the claims of those using tweet counts as evidence for the non-academic impacts of scholarly research.

**** *Artigo_37
Activism and scientific research: 20 years of community action by the Vancouver area network of drug users
Over the past several decades, there have been numerous peer-reviewed articles written about people who use drugs (PWUDs) from the Downtown Eastside neighborhood of Vancouver, Canada. While individual researchers have engaged and acknowledged this population as participants and community partners in their work, there has been comparatively little attention given to the role of PWUDs and drug user organizations in directing, influencing, and shaping research agendas.
In this community-driven research, we examine 20 years of peer-reviewed studies, university theses, books, and reports that have been directed, influenced, and shaped by members of the activist organization the Vancouver Area Network of Drug Users (VANDU). In this paper, we have summarized VANDU's work based on different themes from each article.
After applying the inclusion criteria to over 400 articles, 59 items containing peer-reviewed studies, books, and reports were included and three themes of topics researched or discussed were identified. Theme 1: 'health needs' of marginalized groups was found in 39% of articles, Theme 2: 'evaluation of projects' related to harm reduction in 19%, and Theme 3: 'activism' related work in 42%. Ninety-four percent of co-authors were from British Columbia and 44% of research was qualitative. Works that have been co-authored by VANDU's members or acknowledged their participations created 628 citations. Moreover, their work has been accessed more than 149,600 times.
Peer-based, democratic harm reduction organizations are important partners in facilitating groundbreaking health and social research, and through research can advocate for the improved health and wellbeing of PWUDs and other marginalized groups in their community. This article also recommends that PWUDs should be more respectfully engaged and given appropriate credit for their contributions.

**** *Artigo_38
Allegation of scientific misconduct increases Twitter attention
The web-based microblogging system Twitter is a very popular altmetrics source for measuring the broader impact of science. In this case study, we demonstrate how problematic the use of Twitter data for research evaluation can be, even though the aspiration of measurement is degraded from impact to attention measurement. We collected the Twitter data for the paper published by Yamamizu et al. (2017). An investigative committee found that the main figures in the paper are fraudulent.
Twitter, altmetrics, scientific misconduct

**** *Artigo_39
Altmetrics in Brazil: study of citation and co-citation in BRAPCI database
His paper discusses the influence of national and international authors in the Brazilian scientific literature on altmetrics, through the analysis of citation and co-citation of publications indexed in the Reference Database of Journals in Information Science (BRAPCI). Based on bibliometric indicators, the present study analyzed 14 articles with 112 references and 92 cited authors. The results suggest (1) the supremacy of American and European researchers in the network of co-authorship of the works cited and in the co-citation network of the authors cited, (2) the low presence of national researchers in the ranking of the most cited authors, (3) significant thematic proximity in the network of co-citation coming from co-authorships and

conceptual links between cited national and international authors, with emphasis on J. Priem (95% of possible co-citations). It concludes that the Brazilian research on altmetrics indexed in BRAPCI is influenced, mainly, by theoretical and methodological currents of pioneering international authors in the study of alternative metrics Scientific Communication.
Metric Studies, Citation and Co-citation Analysis, Altmetrics

**** *Artigo_40
Altmetria: complexities, challenges and new ways of measuring and understanding scientific communication on the social web
It aims to discuss some aspects of altmetria, an area commonly associated with metrics such as bibliometrics, scientometrics and webometrics, but with important differences in order to contribute to its own understanding, institutionalization and consolidation. The article is a theoretical approach on the subject altmetria, being elaborated from a set of texts selected in international databases. The selected bibliography subsidized critical and reflexive analyzes on the subject.Results.The text brought reflections on the altmetria and its theoretical foundation, seeking to discuss the definition of the area, its relation with other metric studies of information and the complexities and challenges related to the production and use of altmetric indicators. The area has great potential, but it needs more reflection, in-depth analysis and discussion about its theoretical foundations. There are uncertainties related to the institutionalization of the area and controversies about the possibilities of the indicators to measure the "impact" of academic production.
Altmetrics, Bibliometrics, Scientific Communication, Scientific Indicators, Scientometrics, Social Web

**** *Artigo_41
Altmetrics: a new lens for the metric studies of information
Based on the concept of information and information cycle proposed by Le Coadic (1994) a basis is made regarding the importance of Metrics Information Studies for the process of scientific communication. Subsequently a debate is held on the development of scientific communication and the development of the internet. Metrics Studies of Information from Bilbliometrics to an Altmetrics. Finally, the insertion of Altmetrics as a field for Metrics Information Studies and the value it presents for this area is debated
Altmetrics, Scientific Communication, Metrics Information Studies

**** *Artigo_42
Altmetric Prevalence in the Social Sciences, Arts and Humanities: Where are the Online Discussions?
The social sciences, arts and humanities all address issues of general interest that may generate broad societal impacts and public discussion. Although prior research suggests that this potential is not captured by altmetrics, it is not known whether this is true for all fields. In response, this article compares 35 social sciences, arts and humanities fields for 10 Altmetric.com scores (blogs, news, Twitter, Reddit, Facebook, Pinterest, Wikipedia, reviews, questions, Google Plus) for articles published in 2013. Excluding Twitter (maximum 41%), no field had more than 12% of its articles registering a non-zero score on any altmetric five years after publication. In some cases, fields with relatively high levels of attention were due to self-publicity or the activities of individuals rather than public discussion. There were substantial differences between fields, with Classics and Literature & Literary Theory being almost ignored and Archeology generating a relatively high level of attention on Facebook. Although journal articles are not central to many social sciences, arts and humanities fields, the apparently universally low levels of discussion about them online is surprising given their potential

audience.
altmetrics, Altmetric.com, social sciences, arts, humanities

**** *Artigo_43
Altmetric Versus Bibliometric Perspective Regarding Publication Impact and Force
Bibliometric and Altmetric analyses highlight key publications, which have been considered to be the most influential in their field. The hypothesis was that highly cited articles would correlate positively with levels of evidence and Altmetric scores (AS) and rank. Surgery as a search term was entered into Thomson Reuter's Web of Science database to identify all English-language full articles. The 100 most cited articles were analysed by topic, journal, author, year, institution, and AS. By bibliometric criteria, eligible articles numbered 286,122 and the median (range) citation number was 574 (446–5746). The most cited article (Dindo et al.) classified surgical complications by severity score (5746 citations). Annals of Surgery published most articles and received most citations (26,457). The country and year with most publications were the USA (n = 50) and 1999 (n = 11). By Altmetric criteria, the article with the highest AS was by Bigelow et al. (AS = 53, hypothermia's role in cardiac surgery); Annals of Surgery published most articles, and the country and year with most publications were USA (n = 4) and 2007 (n = 3). Level-1-evidence articles numbered 13, but no correlation was found between evidence level and citation number (SCC 0.094, p = 0.352) or AS (SCC =0.149, p = 0.244). Median AS was 0 (0–53), and in articles published after the year 2000, AS was associated with citation number (r = 0.461, p = 0.001) and citation rate index (r = 0.455, p = 0.002). AS was not associated with journal impact factor (r = 0.160, p = 0.118).
Bibliometric and Altmetric analyses provide important but different perspectives regarding article impact, which are unrelated to evidence level.

**** *Artigo_44
Altmetrics: State of the Art and a Look into the Future
The development of alternative indicators (altmetrics) can be traced back to a discussion a few years ago where the central question was: does the focus on classical bibliometric indicators still adequately reflect the scientific and social significance of scientific work in the Internet age? In the course of this discussion, the term "altmetrics" was introduced as a collective term for all those indicators that contain previously unnoticed information from the Internet—especially concerning social media. Altmetrics shed light on the reception of scientific publications in news websites as well as in scientific blogs, policy papers, and other web-based content. This chapter deals with the current state of the art of altmetrics, focusing on the present discussion about the informative value of altmetrics. Furthermore, we investigate to what extent altmetrics can be used in scientific evaluations. We conclude our chapter with an outlook on the potential prospects for success of altmetrics in different fields of application.
altmetrics, bibliometrics, informative values, cientific evaluation, social media

**** *Artigo_45
Altmetrics an Alternative Measurement for Levels of Impact and Dissemination of Scientific Publications: A Mendeley Case Study
Bibliometrics is a popular method used to perform statistical calculations of the impact of scientific article publications. The magnitude of the impact of a publication can be seen quantitatively by counting the number of other publications that cite the publication. Quoting from what the National Information Standards Organization says, even though the metrics of quotations will still be the most important component in an assessment of the quality of scientific writing, but with today's human lifestyles the metrics have not yet accommodated new forms of scientific communication such as behavior online readers, network interaction of

text (content), and social media. So to accommodate it appears a new approach to metrics are popular with the name Altmetrics.
altmetrics, scholary communication, impact factor

**** *Artigo_46
An Initiative to Track Sentiments in Altmetrics
A recent survey from Pew Research Center (NW, Washington & Inquiries 2018) found that over 44 million people receive science-related information from social media channels to which they subscribe. These include a variety of topics such as new discoveries in health sciences as well as “news you can use” information with practical tips (p. 3). Social and news media attention to scientific publications has been tracked for almost a decade by several platforms which aggregate all public mentions of and interactions with scientific publications. Since the amount of comments, shares, and discussions of scientific publications can reach an audience of thousands, understanding the overall “sentiment” towards the published research is a mammoth task and typically involves merely reading as many posts, shares, and comments as possible. This paper describes an initiative to track and provide sentiment analysis to large social and news media mentions and label them as “positive”, “negative” or “neutral”. Such labels will enable an overall understanding of the content that lies within these social and news media mentions of scientific publications.
sentiment analysis, opinion mining, scholarly output

**** *Artigo_47
Are articles labelled as “Editor's Choice” downloaded more?

**** *Artigo_48
Are methodological quality and completeness of reporting associated with citation-based measures of publication impact? A secondary analysis of a systematic review of dementia biomarker studies
To determine whether methodological and reporting quality are associated with surrogate measures of publication impact in the field of dementia biomarker studies. We assessed dementia biomarker studies included in a previous systematic review in terms of methodological and reporting quality using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) and Standards for Reporting of Diagnostic Accuracy (STARD), respectively. We extracted additional study and journalrelated data from each publication to account for factors shown to be associated with impact in previous research. We explored associations between potential determinants and measures of publication impact in univariable and stepwise multivariable linear regression analyses. Outcome measures We aimed to collect data on four measures of publication impact: two traditional measures—average number of citations per year and 5-year impact factor of the publishing journal and two alternative measures—the Altmetric Attention Score and counts of electronic downloads. The systematic review included 142 studies. Due to limited data, Altmetric Attention Scores and electronic downloads were excluded from the analysis, leaving traditional metrics as the only analysed outcome measures. We found no relationship between QUADAS and traditional metrics. Citation rates were independently associated with 5-year journal impact factor ($\beta=0.42$; $p<0.001$), journal subject area ($\beta=0.39$; $p<0.001$), number of years since publication ($\beta=-0.29$; $p<0.001$) and STARD ($\beta=0.13$; $p<0.05$). Independent determinants of 5-year journal impact factor were citation rates ($\beta=0.45$; $p<0.001$), statement on conflict of interest ($\beta=0.22$; $p<0.01$) and baseline sample size ($\beta=0.15$; $p<0.05$). Citation rates and 5-year journal impact factor appear to measure different dimensions of impact. Citation rates were weakly associated with completeness of reporting, while neither traditional metric was related to methodological

rigour. Our results suggest that hih publication usage and journal outlet is not a guarantee of quality and readers should critically appraise all papers regardless of presumed impact.

**** *Artigo_49
Assessment and support of emerging research groups
The starting point of this paper is a desktop research assessment model that does not take properly into account the complexities of research assessment, but rather bases itself on a series of highly simplifying, questionable assumptions related to the availability, validity and evaluative significance of research performance indicators, and to funding policy criteria. The paper presents a critique of this model, and proposes alternative assessment approaches, based on an explicit evaluative framework, focusing on preconditions to performance or communication effectiveness rather than on performance itself, combining metrics and expert knowledge, and using metrics primarily to set minimum standards. Giving special attention to early career scientists in emerging research groups, the paper discusses the limits of classical bibliometric indicators and altmetrics. It proposes alternative funding formula of research institutions aimed to support emerging research groups.

**** *Artigo_50
Astronomy in Chile: Assessment of scientific productivity through a bibliometric analysis
The skies of Northern Chile are considered among the best in the world for astronomy due to their geographical, climatic and atmospheric conditions. In fact, during the last several decades, a great number of astronomical observatories have been built by space research institutions devoted to space research, turning Chile into one of the countries with the greatest astronomical observation capacity in the world. Consequently, it is relevant to explore and assess the development of astronomy in Chile during the last ten years (2005-2015), carrying out a bibliometric analysis to extract traditional metrics, complemented with alternative metrics, to identify the Chilean production and scientific contribution of research in this field of knowledge. The results from traditional metrics, based on the information obtained in the Web of Science (WoS) database analyzed through InCites for the Astronomy & Astrophysics category indicate a sustained increase of the scientific production for the discipline during the last ten years. In particular, the Normalized Citation Impact of organizations and institutions conducting research in Chile is above the worldwide average. On the other hand, the alternative metrics, including for instance, the altmetrics types presented by the SCOPUS database, reflect that the Chilean research impact is much lower in the context of social networks.
Metrics in Astronomy, Local Applications

**** *Artigo_51
Attitudes toward Open Access, Open Peer Review, and Altmetrics among Contributors to Spanish Scholarly Journals
This paper aims for a better understanding of the perspectives of contributors to Spanish academic journals regarding open access, open peer review, and altmetrics. Specifically, it explores how age, gender, years of professional experience, and perception and use of social media influence authors' opinions of these developments in scholarly publishing. A sample of 295 contributors to Spanish academic journals participated in a survey about the aforementioned topics. They were found to hold a favourable opinion of open access but were more cautious about open peer review and altmetrics. The responses of younger and female scholars indicated more reluctance to accept open peer review practices. A positive attitude toward social networks did not necessarily translate into enthusiasm for emerging trends in scholarly publishing. Despite this, ResearchGate users were more aware of altmetrics.
altmetrics, open access, open peer review, scholarly communications, social media

**** *Artigo_52
Author-level metrics in the new academic profile platforms: The online behaviour of the Bibliometrics community
The new web-based academic communication platforms do not only enable researchers to better advertise their academic outputs, making them more visible than ever before, but they also provide a wide supply of metrics to help authors better understand the impact their work is making. This study has three a) to analyse the uptake of some of the most popular platforms (Google Scholar Citations, ResearcherID, ResearchGate, Mendeley and Twitter) by a specific scientific community (bibliometrics, scientometrics, informetrics, webometrics, and altmetrics); b) to compare the metrics available from each platform; and c) to determine the meaning of all these new metrics. To do this, the data available in these platforms about a sample of 811 authors (researchers in bibliometrics for whom a public profile Google Scholar Citations was foun) were extracted. A total of 31 metrics were analysed. The results show that a high number of the analysed researchers only had a profile in Google Scholar Citations (159), r only in Google Scholar Citations and ResearchGate (142). Lastly, we find two kinds of metrics of online impact. First, metrics related to connectivity (followers), and second, all metrics associated to academic impact. This second group can further be divided into usage metrics (reads, views), and citation metrics. The results suggest that Google Scholar Citations is the source that provides more comprehensive citation-related data, whereas Twitter stands out in connectivity-related metrics.
Online academic profiles, Author-level metrics, Social media metrics, Google scholar citations, Altmetrics, Citation impact

**** *Artigo_53
Bibliometric and Altmetric Analysis of Three Social Science Disciplines
This article analyses scientific publications of international prestige in three social science disciplines (communication, economics, and sociology) to identify possible production patterns. Emphasis is placed on the study of impact and visibility, both through bibliometric and altmetric indicators to determine similarities and differences and to establish possible inter-variable relationships. The use of measures such as the presence in social media for the study of the visibility of documents is discussed. A total of 112,300 papers published from 2013 to 2015 in the three disciplines analyzed was retrieved from the Social Science Citation Index (SSCI). Economics accounted for the largest number and was observed to have a “stable” and consolidated output profile. Collaboration, impact, and visibility were found to be inter-related in the three fields. The proportion of papers with mentions in the social media was high (around 50%) in communication and sociology, suggesting a relationship between the object of study and the medium for disseminating the findings. Tweets were the most common type of mentions. While the correlation between academic impact (citation/doc) and mentions in blog posts and tweets was observed to be low, the percentage of papers cited (78 to 96%) and the mean number of citations per paper were greater among those with than those without mentions in the social media (especially those mentioned in Google+, MSM, videos, and Wikipedia). The proportion of open access (OA) papers with mentions in the social media was higher than the percentage of open access papers as a whole in two of the three disciplines.
bibliometric analysis, altmetric indicators, social sciences and humanities, visibility, social media

**** *Artigo_54
Bibliometrics in a Digital Age: Help or Hindrance
Bibliometrics are a range of techniques and quantitative measures that provide an analysis of

written publications such as books and articles, and which assess the impact of research outputs. They are commonly applied to individual authors in the form of citation metrics but can also be used to assess the influence of research groups or even entire institutions. With the increased importance of social media as a means of communicating and publicising research findings, additional alternative measures of impact (altmetrics) are now being used. In addition to analysing the reach of a research output, bibliometrics can also be used as search tools to identify related and updated research, author networks and connections between institutions. This review summarises the range of tools and services that are available, their advantages and disadvantages, and some of the challenges and issues presented by the existence of multiple digital versions of research outputs.
bibliometrics, altmetrics, citation indexes, h-index, impact factors, Scopus, Web of Science, Google Scholar

**** *Artigo_55
Can We Count on Social Media Metrics?: First Insights into the Active Scholarly Use of Social Media
Measuring research impact is important for ranking publications in academic search engines and for research evaluation. Social media metrics or altmetrics measure the impact of scientific work based on social media activity. Altmetrics are complementary to traditional, citation-based metrics, e.g. allowing the assessment of new publications for which citations are not yet available. Despite the increasing importance of altmetrics, their characteristics are not well understood: Until now it has not been researched what kind of researchers are actively using which social media services and why - important questions for scientific impact prediction. Based on a survey among 3,430 scientists, we uncover previously unknown and significant differences between social media services: We identify services which attract young and experienced researchers, respectively, and detect differences in usage motivations. Our findings have direct implications for the future design of altmetrics for scientific impact prediction.
social media, digital scholarship, altmetrics, motivations

**** *Artigo_56
Challenges of capturing engagement on Facebook for Altmetrics
Previous research shows that, despite its popularity, Facebook is less frequently used to share academic content. In order to investigate this discrepancy we set out to explore engagement numbers through their Graph API by querying the Facebook API with multiple URLs for a random set of 103,539 articles from the Web of Science. We identified two major challenge areas: mapping articles to URLs and the mapping URLs to objects inside Facebook. We then explored three problem cases within our dataset: (1) identifying a landing page for any given URL, (2) instances where equivalent URLs are mapped to different Facebook objects, and (3) instances of different articles being mapped onto the same Facebook object. We found that the engagement numbers for 11.8% of all articles that have been shared on Facebook at least once are not reliable because of these problems. Moreover, we were unable to identify the URL for 11.6% of the articles in our data. Taken together, the three problem cases constitute 12.3% of the 103,539 tested articles for which engagement numbers cannot be relied upon. Given that we only tested a small number of problem cases and URL variants, our results point to large challenges facing those wishing to collect Facebook metrics programatically through the available API.
Redes Sociais e de Informação, Bibliotecas digitais

**** *Artigo_57
Co-saved, co-tweeted, and co-cited networks

Counts of tweets and Mendeley user libraries have been proposed as altmetric alternatives to citation counts for the impact assessment of articles. Although both have been investigated to discover whether they correlate with article citations, it is not known whether users tend to tweet or save (in Mendeley) the same kinds of articles that they cite. In response, this article compares pairs of articles that are tweeted, saved to a Mendeley library, or cited by the same user, but possibly a different user for each source. The study analyzes 1,131,318 articles published in 2012, with minimum tweeted (10), saved to Mendeley (100), and cited (10) thresholds. The results show surprisingly minor overall overlaps between the three phenomena. The importance of journals for Twitter and the presence of many bots at different levels of activity suggest that this site has little value for impact altmetrics. The moderate differences between patterns of saving and citation suggest that Mendeley can be used for some types of impact assessments, but sensitivity is needed for underlying differences.

**** *Artigo_58
Could scientists use Altmetric.com scores to predict longer term citation counts?
Altmetrics from Altmetric.com are widely used by publishers and researchers to give earlier evidence of attention than citation counts. This article assesses whether Altmetric.com scores are reliable early indicators of likely future impact and whether they may also reflect non-scholarly impacts. A preliminary factor analysis suggests that the main altmetric indicator of scholarly impact is Mendeley reader counts, with weaker news, informational and social network discussion/promotion dimensions in some fields. Based on a regression analysis of Altmetric.com data from November 2015 and Scopus citation counts from October 2017 for articles in 30 narrow fields, only Mendeley reader counts are consistent predictors of future citation impact. Most other Altmetric.com scores can help predict future impact in some fields. Overall, the results confirm that early Altmetric.com scores can predict later citation counts, although less well than journal impact factors, and the optimal strategy is to consider both Altmetric.com scores and journal impact factors. Altmetric.com scores can also reflect dimensions of non-scholarly impact in some fields.
Altmetrics Altmetric.com, Mendeley, Scientometrics, Journal impact factors

**** *Artigo_59
Demographics Analysis of Twitter Users who Tweeted on Psychological Articles and Tweets Analysis
This project is focused on exploring the appealing trends in the profiles of different users, with respect to different aspects of the user demographics which includes gender, whether the user is an individual or an organization, psychological and their academic background, who had discussed psychological articles on Twitter. To perform this task we retrieved the details of psychological articles, related tweets and twitter user details by web scraping using python. Then to assign suitable labels, we have used the Rapid Miner to create a model using training data. After the labeling process, we have analyzed the patterns in user profiles. Further, the tweet contents were analyzed focusing on the psychological topics more discussed by the users. This analysis will give the insight to psychological researchers, what topics are being discussed by the Twitter users and what are trending topics among Academic communities and Nonacademic Communities.
Psychology, Twitter, Python, Web scraping, Rapid Miner, Text mining, Support Vector Machine

**** *Artigo_60
Differences between journals and years in the proportions of students, researchers and faculty registering Mendeley articles

This article contains two investigations into Mendeley reader counts with the same dataset. Mendeley reader counts provide evidence of early scholarly impact for journal articles, but reflect the reading of a relatively young subset of all researchers. To investigate whether this age bias is constant or varies by narrow field and publication year, this article compares the proportions of student, researcher and faculty readers for articles published 1996–2016 in 36 large monodisciplinary journals. In these journals, undergraduates recorded the newest research and faculty the oldest, with large differences between journals. The existence of substantial differences in the composition of readers between related fields points to the need for caution when using Mendeley readers as substitutes for citations for broad fields. The second investigation shows, with the same data, that there are substantial differences between narrow fields in the time taken for Scopus citations to be as numerous as Mendeley readers. Thus, even narrow field differences can impact on the relative value of Mendeley compared to citation counts.
Mendeley, Research evaluation, Readership, Faculty, Students, Citation analysis, Altmetrics

**** *Artigo_61
Dissemination of evidence in paediatric emergency medicine: a quantitative descriptive evaluation of a 16-week social media promotion
TRanslating Emergency Knowledge for Kids (TREKK) and Cochrane Child Health collaborate to develop knowledge products on paediatric emergency medicine topics. Via a targeted social media promotion, we aimed to increase user interaction with the TREKK and Cochrane Child Health Twitter accounts and the uptake of TREKK Bottom Line Recommendations (BLRs) and Cochrane systematic reviews (SRs). Design: Quantitative descriptive evaluation.
Setting: We undertook this study and collected data via the internet. Participants: Our target users included online healthcare providers and health consumers. Intervention: For 16 weeks, we used Twitter accounts (@TREKKca and @Cochrane_Child) and the Cochrane Child Health blog to promote 6 TREKK BLRs and 16 related Cochrane SRs. We published 1 blog post and 98 image-based tweets per week. Primary and secondary outcome measures: The primary outcome was user interaction with @TREKKca and @Cochrane_Child. Secondary outcomes were visits to TREKK's website and the Cochrane Child Health blog, clicks to and views of the TREKK BLRs, and Altmetric scores and downloads of Cochrane SRs. Followers to @TREKKca and @Cochrane_Child increased by 24% and 15%, respectively. Monthly users of TREKK's website increased by 29%. Clicks to the TREKK BLRs increased by 22%. The BLRs accrued 59% more views compared with the baseline period. The 16 blog posts accrued 28% more views compared with the 8 previous months when no new posts were published. The Altmetric scores for the Cochrane SRs increased by ≥10 points each. The mean number of full text downloads for the promotion period was higher for nine and lower for seven SRs compared with the 16-week average for the previous year (mean difference (SD), +4.0 (22.0%)).
There was increased traffic to TREKK knowledge products and Cochrane SRs during the social media promotion. Quantitative evidence supports blogging and tweeting as dissemination strategies for evidence-based knowledge products.

**** *Artigo_62
Do altmetrics correlate with the quality of papers? A large-scale empirical study based on F1000Prime data
In this study, we address the question whether (and to what extent, respectively) altmetrics are related to the scientific quality of papers (as measured by peer assessments). Only a few studies have previously investigated the relationship between altmetrics and assessments by peers. In the first step, we analyse the underlying dimensions of measurement for traditional metrics (citation counts) and altmetrics–by using principal component analysis (PCA) and factor

analysis (FA). In the second step, we test the relationship between the dimensions and quality of papers (as measured by the post-publication peer-review system of F1000Prime assessments)–using regression analysis. The results of the PCA and FA show that altmetrics operate along different dimensions, whereas Mendeley counts are related to citation counts, and tweets form a separate dimension. The results of the regression analysis indicate that citation-based metrics and readership counts are significantly more related to quality, than tweets. This result on the one hand questions the use of Twitter counts for research evaluation purposes and on the other hand indicates potential use of Mendeley reader counts.

**** *Artigo_63
Do citations and readership identify seminal publications?
This work presents a new approach for analysing the ability of existing research metrics to identify research which has strongly influenced future developments. More specifically, we focus on the ability of citation counts and Mendeley reader counts to distinguish between publications regarded as seminal and publications regarded as literature reviews by field experts. The main motivation behind our research is to gain a better understanding of whether and how well the existing research metrics relate to research quality. For this experiment we have created a new dataset which we call TrueImpactDataset and which contains two types of publications, seminal papers and literature reviews. Using the dataset, we conduct a set of experiments to study how citation and reader counts perform in distinguishing these publication types, following the intuition that causing a change in a field signifies research quality. Our research shows that citation counts work better than a random baseline (by a margin of 10%) in distinguishing important seminal research papers from literature reviews while Mendeley reader counts do not work better than the baseline.
Information retrieval, Scholarly communication, Publication datasets, Data mining, Research evaluation, Bibliometrics, Altmetrics

**** *Artigo_64
Do highly cited clinicians get more citations when being present at social networking sites?
Background and Aims: The advent of social networking sites has facilitated the dissemination of scientific research. This article aims to investigate the presence of Iranian highly cited clinicians in social networking sites. Materials and This is a scientometrics study. Essential Science Indicator (ESI) was searched for Iranian highly cited papers in clinical medicine during November–December 2015. Then, the authors of the papers were checked and a list of authors was obtained. In the second phase, the authors' names were searched in the selected social networking sites (ResearchGate [RG], Academia, Mendeley, LinkedIn). The total citations and h-index in Scopus were also gathered. Fifty-five highly cited papers were retrieved. A total of 107 authors participated in writing these papers. RG was the most popular (64.5%) and LinkedIn and Academia were in 2nd and 3rd places. None of the authors of highly cited papers were subscribed to Mendeley. A positive direct relationship was observed between visibility at social networking sites with citation and h-index rate. A significant relationship was observed between the RG score, citations, reads indicators in RG, and citation numbers and there was a significant relationship between the number of document indicator in Academia and the citation numbers. It seems putting the papers in social networking sites can influence the citation rate. We recommend all scientists to be present at social networking sites to have better chance of visibility and also citation.
Academia, clinical medicine, highly cited, Iran, LinkedIn, Mendeley, ResearchGate, social networking sites

**** *Artigo_65

The traditional scientometric indicators predict social media activity on scientific knowledge? An analysis of the ecological literature

Traditional citation-based indicators and activities on Online Social Media Platforms (OnSMP; e.g. Twitter) have been used to assess the impact of scientific research. However, the association between traditional indicators (i.e., number of citations and journal impact factor) and the new OnSMP metrics still deserve further investigations. Here, we used multivariate models to evaluate the relative influence of collaboration, time since publication and traditional indicators on the interest of 2863 papers published in five ecological journals from 2013 to 2015 as given by nine OnSMP. We found that most activities were concentrated on Twitter and Mendeley and that activities in these two OnSMP are highly correlated. Our results indicate that traditional indicators explained most of the variation in OnSMP activity. Considering that OnSMP activities are high as soon as the articles are made available online, contrasting with the slow pace in which the citations are accumulated, our results support the use of activities on OnSMP as an early signal of research impact of ecological articles.

Citation rates, Altmetric, Social networks, Science evaluation, Ecology

**** *Artigo_66

Does Female-authored Research have More Educational Impact than Male-authored Research? Evidence from Mendeley

Female academics are more likely to be in teaching-related roles in some countries, including the USA. As a side effect of this, female-authored journal articles may tend to be more useful for students. This study assesses this hypothesis by investigating whether female first-authored research has more uptake in education than male first-authored research. Based on an analysis of Mendeley readers of articles from 2014 in five countries and 100 narrow Scopus subject categories, the results show that female-authored articles attract more student readers than male-authored articles in Spain, Turkey, the UK and USA but not India. They also attract fewer professorial readers in Spain, the UK and the USA, but not India and Turkey, and tend to be less popular with senior academics. Because the results are based on analysis of differences within narrow fields they cannot be accounted for by females working in more education-related disciplines. The apparent additional educational impact for female-authored research could be due to selecting more accessible micro-specialisms, however, such as health-related instruments within the instrumentation narrow field. Whatever the cause, the results suggest that citation-based research evaluations may undervalue the wider impact of female researchers.

Mendeley, Gender, Altmetrics, Scientometrics, Educational impact, Readership

**** *Artigo_67

Early Mendeley readers correlate with later citation counts

Counts of the number of readers registered in the social reference manager Mendeley have been proposed as an early impact indicator for journal articles. Although previous research has shown that Mendeley reader counts for articles tend to have a strong positive correlation with synchronous citation counts after a few years, no previous studies have compared early Mendeley reader counts with later citation counts. In response, this first diachronic analysis compares reader counts within a month of publication with citation counts after 20 months for ten fields. There are moderate or strong correlations in eight out of ten fields, with the two exceptions being the smallest categories (n = 18, 36) with wide confidence intervals. The correlations are higher than the correlations between later citations and early citations, showing that Mendeley reader counts are more useful early impact indicators than citation counts.

Mendeley, Citation analysis, Altmetrics, Alternative indicators

**** *Artigo_68
Enhancing Climate Change Research With Open Science
Climate change research aims to understand global environmental change and how it will impact nature and society. The broad scope of climate change impacts means that successful adaptation and mitigation efforts will require an unprecedented collaboration effort that unites diverse disciplines and is able to rapidly respond to evolving climate issues (IPCC, 2014). However, to achieve this aim, climate change research practices need updating: key research findings remain behind journal paywalls, and scientific progress can be impeded by low levels of reproducibility and transparency (Ellison, 2010; Morueta-Holme et al., 2018), individual data ownership (Hampton et al., 2015), and inefficient research workflows (Lowndes et al., 2017). Furthermore, the level of public interest and policy engagement on climate change issues relies on fast communication of academic research to public institutions, with the result that the societal impact of climate change studies will differ according to their public availability and exposure. Here, we argue that by adopting open science (OS) principles, scientists can advance climate change research and accelerate efforts to mitigate impacts; especially for highly vulnerable developing regions of the world where research capacity is limited. We underscore the specific benefits of OS in raising the academic and societal impact of climate change research using citation and media metrics.
interdisciplinary, science communication, open access, reproducibility, citation metrics, altmetrics

**** *Artigo_69
Evaluation of research publications and publication channels in astronomy and astrophysics
The astronomy community usually turns to the Astrophysics Data System for bibliometrics. When the context is cross-disciplinary, commercial products like Web of Science and Scopus are used along with related analytics tools instead. The results are often tainted by inherent problems in the chosen classification system. A review of the most common challenges and pitfalls is given. Commercial altmetrics products could be added to the evaluation toolbox in the near future despite the fact that they are best suited for promotion instead of evaluation. Norway, Denmark, and Finland have created journal and publisher ranking systems that are used in national funding models. Differences in how astronomy journals are weighed in these systems night be related to the volume of papers published on a national level.
Metrics in Astronomy, Measuring Impact

**** *Artigo_70
Exploring the relationship between altmetrics and traditional measures of dissemination in health professions education
Researchers, funders, and institutions are interested in understanding and quantifying research dissemination and impact, particularly related to communicating with the public. Traditionally, citations have been a primary impact measure; however, citations can be slow to accrue and focus on academic use. Recently altmetrics, which track alternate dissemination forms (e.g., social media) have been suggested as a complement to citation-based metrics. This study examines the relationship between altmetrics and traditional measures: journal article citations and access counts. The researchers queried Web of Science and Altmetric Explorer for articles published in HPE journals between 2013-2015. They identified 2,486 articles with altmetrics. Data were analyzed using negative binomial and linear regression models. Blogging was associated with the greatest increase in citations (13% increase), whereas Tweets (1.2%) and Mendeley (1%) were associated with smaller increases. Journal impact factor (JIF) was associated with a 21% increase in citations. Publicly accessible articles were associated with a 19% decrease, but the interactive effect between accessible articles and JIF was associated with

a 12% increase. When examining access counts, publicly accessible articles had an increase of 170 access counts whereas blogging was associated with a decrease of 87 accesses. This study suggests that several altmetrics outlets are positively associated with citations, and that public accessibility, holding all other independent variables constant, is positively related to article access. Given the scientific community's evolving focus on dissemination—including to the public—these findings have implications for stakeholders, providing insight into the factors that may improve citations and access of articles.
social media, scholarly communication, altmetrics

**** *Artigo_71
Exploring Topics of Interest of Mendeley Users
This paper presents a fine-grained overview of the usage behavior and topics of interest of different types of users in Mendeley. The analysis is based on 1.2 million Web of Science indexed publications published in 2012. The disciplinary differences in the reading (saving) patterns of different types of Mendeley users are identified and depicted using VOSviewer overlay visualizations. The findings show that compared to other fields, publications from Mathematics & Computer Science have the lowest coverage in Mendeley. Publications from the Social Sciences & Humanities receive on average the highest number of readers in Mendeley. The highest uptake of Mendeley is by students, but this differs across fields. Professors, students, and librarians are mainly active in the Social Sciences & Humanities, a field of science with a relatively low citation density in Web of Science. In contrast, researchers and other professionals are mainly active in fields with a relatively high citation density such as the Biomedical & Health Sciences and the Life & Earth Sciences. In addition, it seems that researchers and professionals are relatively more interested in practical, methodological, and technical oriented topics while professors and students are attracted by the more educational and theoretical oriented topics. These different usage patterns among user types possibly reflect the way in which scholarly publications are used for scientific, educational, or other professional purposes. This information could inform relevant stakeholders, such as researchers, librarians, publishers, funders, and policy makers of the scientific, educational, or professional values of publications.
Altmetrics, Fields of science, Mendeley, Publication-level classification, Readership statistics, Topics, user behaviour, Visualization, VOSviewer

**** *Artigo_72
Field- and time-normalization of data with many zeros: an empirical analysis using citation and Twitter data
Thelwall (J Informetr 11(1):128–151, 2017a. https://doi.org/10.1016/j.joi.2016.12.002; Web indicators for research evaluation: a practical guide. Morgan and Claypool, London, 2017b) proposed a new family of field- and time-normalized indicators, which is intended for sparse data. These indicators are based on units of analysis (e.g., institutions) rather than on the paper level. They compare the proportion of mentioned papers (e.g., on Twitter) of a unit with the proportion of mentioned papers in the corresponding fields and publication years. We propose a new indicator (Mantel–Haenszel quotient, MHq) for the indicator family. The MHq is rooted in the Mantel–Haenszel (MH) analysis. This analysis is an established method, which can be used to pool the data from several 2×2 cross tables based on different subgroups. We investigate using citations and assessments by peers whether the indicator family can distinguish between quality levels defined by the assessments of peers. Thus, we test the convergent validity. We find that the MHq is able to distinguish between quality levels in most cases while other indicators of the family are not. Since our study approves the MHq as a convergent valid indicator, we apply the MHq to four different Twitter groups as defined by

the company Altmetric. Our results show that there is a weak relationship between the Twitter counts of all four Twitter groups and scientific quality, much weaker than between citations and scientific quality. Therefore, our results discourage the use of Twitter counts in research evaluation.
Data with many zeros, Citation counts, Altmetrics, Twitter, Mantel–Haenszel quotient (MHq), Equalized mean-based normalized proportion cited (EMNPC), Mean-based normalized proportion cited (MNPC)

**** *Artigo_73
General discussion of data quality challenges in social media metrics: Extensive comparison of four major altmetric data aggregators
The data collection and reporting approaches of four major altmetric data aggregators are studied. The main aim of this study is to understand how differences in social media tracking and data collection methodologies can have effects on the analytical use of altmetric data. For this purpose, discrepancies in the metrics across aggregators have been studied in order to understand how the methodological choices adopted by these aggregators can explain the discrepancies found. Our results show that different forms of accessing the data from diverse social media platforms, together with different approaches of collecting, processing, summarizing, and updating social media metrics cause substantial differences in the data and metrics offered by these aggregators. These results highlight the importance that methodological choices in the tracking, collecting, and reporting of altmetric data can have in the analytical value of the data. Some recommendations for altmetric users and data aggregators are proposed and discussed.
**** *Artigo_74
How can bibliometric and altmetric suppliers improve? Messages from the end-user community

This article reports on a 2018 survey of bibliometric and altmetric practitioners – 'Three things you want your metrics supplier to know' – that was undertaken to better understand the practitioners' usage of existing tools and services and to invite them to suggest ways in which they would like to see these improve. In total, 149 suggestions were made by 42 respondents, mainly UK librarians. Responses could be categorized into four main themes: A) Improve and share your data; B) Be more responsible; C) Improve your tools; D) Improve your indicators. The findings of the survey are discussed and sample comments shared. Based on these findings, and expanding on the four themes, the article makes a number of practical recommendations to metrics suppliers for ways in which their services could better serve the need of the community for robust and responsible bibliometric and altmetric evaluation.
Bibliometrics, altmetrics, end-users, suppliers, tools, services

**** *Artigo_75
How quickly do publications get read? The evolution of mendeley reader counts for new articles

Within science, citation counts are widely used to estimate research impact but publication delays mean that they are not useful for recent research. This gap can be filled by Mendeley reader counts, which are valuable early impact indicators for academic articles because they appear before citations and correlate strongly with them. Nevertheless, it is not known how Mendeley readership counts accumulate within the year of publication, and so it is unclear how soon they can be used. In response, this paper reports a longitudinal weekly study of the Mendeley readers of articles in 6 library and information science journals from 2016. The results suggest that Mendeley readers accrue from when articles are first available online and continue to steadily build. For journals with large publication delays, articles can already have

substantial numbers of readers by their publication date. Thus, Mendeley reader counts may even be useful as early impact indicators for articles before they have been officially published in a journal issue. If field normalized indicators are needed, then these can be generated when journal issues are published using the online first date.

**** *Artigo_76
Impact of a Physician-Led Social Media Sharing Program on a Medical Journal's Web Traffic

Purpose: The use of social media by health professionals and medical journals is increasing. The aim of this study was to compare online views of articles in press (AIPs) released by Annals of Emergency Medicine before and after a nine-person social media team started actively posting links to AIPs using their personal Twitter accounts. An observational before-and-after study was conducted. Web traffic data for Annals were obtained from the publisher (Elsevier), detailing the number of page views to annemergmed.com by referring websites during the study period. The preintervention time period was defined as January 1, 2013, to June 30, 2014, and the postintervention period as July 1, 2014, to July 31, 2015. The primary outcome was page views from Twitter per AIP released each month to account for the number of articles published each month. Secondary outcomes included page views from Facebook (on which there was no article-sharing intervention) and total article views per month. The median page views from Twitter per individual AIP released each month increased from 33 in the preintervention period to 130, for an effect size of 97 (95% confidence interval, 56-111; P < .001). There was a smaller increase in median page views from Facebook per individual AIP of 21 (95% confidence interval, 10-32). There was no significant increase in these median values for total page views per AIP. Twitter sharing of AIPs increased the number of page views that came from Twitter but did not increase the overall number of page views
Social media, peer-reviewed literature, education

**** *Artigo_77
Impact of Low Back Pain Clinical Trials Measured by the Altmetric Score: Cross-Sectional Study.
There is interest from authors and publishers in sharing the results of their studies over the Internet in order to increase their readership. In this way, articles tend to be discussed and the impact of these articles tends to be increased. In order to measure this type of impact, a new score (named Altmetric) was created. Altmetric aims to understand the individual impact of each article through the attention attracted online. Objective: The primary objective of this study was to analyze potential factors related with the publishing journal and the publishing trial that could be associated with Altmetric scores on a random sample of low back pain randomized controlled trials (RCTs). The secondary objective of this study was to describe the characteristics of these trials and their Altmetric scores.
We searched for all low back pain RCTs indexed on the Physiotherapy Evidence Database (PEDro; www.pedro.org.au) published between 2010 and 2015. A total of 200 articles were randomly selected, and we extracted data related to the publishing trial, the publishing journal, methodological quality of the trials (measured by the 0-10 item PEDro scale), and total and individual scores of Altmetric mentioned and Altmetric reader. The study was a cross-sectional study, and multivariate regression models and descriptive statistics were used. A total of four variables were associated with Altmetric mentioned score: impact factor (β-coefficient=3.4 points), number of years since publication (β-coefficient=–4.9 points), number of citations divided by years since publication (β-coefficient=5.2 points), and descriptive title (β-coefficient=–29.4 points). Only one independent variable was associated with Altmetric reader score: number of citations divided by years since publication (β-coefficient=10.1 points, 95%

CI 7.74-12.46). We also found that the majority of articles were published in English, with a descriptive title, and published in open access journals endorsing the Consolidated Standards of Reporting Trials (CONSORT) statement. Researchers should preferably select high impact factor journals for submission and use declarative or interrogative titles, as these factors are likely to increase the visibility of their studies in social media.
Altmetric, social impact, clinical trials, low back pain

**** *Artigo_78
Issues in the Interpretation of "Altmetrics" Digital Traces: A Review
Researchers leave traces of their behavior during many stages of their research process. Parts of this process were formerly invisible. With scholarship moving online, we can now access various types of altmetrics digital traces such as reading, organizing, sharing, and discussing scientific papers, thus develop a more holistic story about researchers and their work. However, a lack of in-depth interpretation of altmetrics digital traces is observed. Therefore, this paper focuses on reviewing some of the existing altmetrics research, with a particular emphasis on the issues that need to be taken into consideration in the interpretation of altmetrics digital traces. Taking a preliminary step toward a guideline for more in-depth analysis of digital traces of scholarly acts, this review aims to bring attention to these issues to avoid misuse of altmetrics indicators. altmetrics, digital traces, social media, scholarly communication, impact indicator

**** *Artigo_79
Alternative metrics and their potentialities for the health professional
Currently, research processes are increasingly collaborative, and communication between academics and researchers is developed through spaces of social exchange that speeds the diffusion of scientific knowledge. In recent years, doctors and health professionals have also begun a migration to online environments, where interactions such as lectures, discussions and recommendations of scientific papers are traces that reveal the influence, attention and impact of research, which constitute new metrics that offer original and immediate information on the repercussion and scope of scientific production. This article aims to offer a brief review of the potential offered by the altmetrics or alternative metrics for the health professional academic activity, as necessary tools in the modern research career.
Bibliometrics, Biomedical research, Health personnel

**** *Artigo_80
Long live the scientists: Tracking the scientific fame of great minds in physics
This study utilizes global digitalized books and articles to examine the scientific fame of the most influential physicists. Our research reveals that the greatest minds are gone but not forgotten. Their scientific impacts on human history have persisted for centuries. We also find evidence in support of own-group fame preference, i.e., that the scientists have greater reputations in their home countries or among scholars sharing the same languages. We argue that, when applied appropriately, Google Books and Ngram Viewer can serve as promising tools for altmetrics, providing a more comprehensive picture of the impacts scholars and their achievements have made beyond academia.
Scientific fame, Own-group preference, Google corpus, Altmetrics

**** *Artigo_81
Making headlines: An analysis of US government-funded cancer research mentioned in online media
Considerable resources are devoted to producing knowledge about cancer, which in turn is disseminated to policymakers, practitioners, and the public. Online media are a key

dissemination channel for cancer research. Yet which cancer research receives media attention is not well understood. Understanding the characteristics of journal articles that receive media attention is crucial to optimize research dissemination. This cross-sectional study examines journal articles on cancer funded by the US government published in 2016, using data from PubMed and Altmetric to determine whether an article received online media attention. Frequencies and proportions were calculated to describe the cancer types and continuum stages covered in journal articles.
16.8% of articles published on US government-funded research were covered in the media. Published journal articles addressed all common cancers. Roughly one-fourth to one-fifth of journal articles within each cancer category received online media attention. Media mentions were disproportionate to actual burden of each cancer type (ie, incidence and mortality), with breast cancer articles receiving the most media mentions. Cancer prevention and control articles received less online media attention than diagnosis or therapy articles. Findings revealed a mismatch between prevalent cancers and cancers highlighted in the media. Further, journal articles on cancer control and prevention received less media attention than other cancer continuum stages. Media mentions were not proportional to actual public cancer burden nor volume of scientific publications in each cancer category. Results highlight a need for continued research on the role of media, especially online media, in research dissemination.
information storage and retrieval, journalism, medical, publishing, neoplasms

**** *Artigo_82
Measuring the impact of pharmacoepidemiologic research using altmetrics: A case study of a CNODES drug-safety article
Purpose: To provide an overview of altmetrics, including their potential benefits and limitations, how they may be obtained, and their role in assessing pharmacoepidemiologic research impact.
Our review was informed by compiling relevant literature identified through searching multiple health research databases (PubMed, Embase, and CIHNAHL) and grey literature sources (websites, blogs, and reports). We demonstrate how pharmacoepidemiologists, in particular, may use altmetrics to understand scholarly impact and knowledge translation by providing a case study of a drug-safety study conducted by the Canadian Network of Observational Drug Effect Studies. A common approach to measuring research impact is the use of citation-based metrics, such as an article's citation count or a journal's impact factor. “Alternative” metrics, or altmetrics, are increasingly supported as a complementary measure of research uptake in the age of social media. Altmetrics are nontraditional indicators that capture a diverse set of traceable, online research-related artifacts including peer- reviewed publications and other research outputs (software, datasets, blogs, videos, posters, policy documents, presentations, social media posts, wiki entries, etc). Compared with traditional citation-based metrics, altmetrics take a more holistic view of research impact, attempting to capture the activity and engagement of both scholarly and nonscholarly communities. Despite the limited theoretical underpinnings, possible commercial influence, potential for gaming and manipulation, and numerous data quality-related issues, altmetrics are promising as a supplement to more traditional citation-based metrics because they can ingest and process a larger set of data points related to the flow and reach of scholarly communication from an expanded pool of stakeholders. Unlike citation-based metrics, altmetrics are not inherently rooted in the research publication process, which includes peer review; it is unclear to what extent they should be used for research evaluation."
alternative metrics, altmetrics, bibliometrics, citation metrics, knowledge translation, pharmacoepidemiology, research evaluation, research uptake, scholarly impact

**** *Artigo_83
Medical Journals in the Age of Ubiquitous Social Media
Medical journals increasingly use social media to engage their audiences in a variety of ways, from simply broadcasting content via blogs, microblogs, and podcasts to more interactive methods such as Twitter chats and online journal clubs. Online discussion may increase readership and help improve peer review, for example, by providing postpublication peer review. Challenges remain, including the loss of nuance and context of shared work. Furthermore, uncertainty remains regarding how to assess the impact of journal social media outreach, abundant but unclear metrics, and the magnitude of benefit (if any), particularly given the substantial work required for substantive interactive engagement. Continued involvement and innovation from medical journals through social media offers potential in engaging journal audiences and improving knowledge translation.
Social media, journal publishing, knowledge translation

**** *Artigo_84
National Academies of Sciences, Engineering, and Medicine report on genetically engineered crops influences public discourse
In May 2016, the National Academies of Sciences, Engineering, and Medicine (NASEM) released the report "Genetically Engineered Crops: Experiences and Prospects," summarizing scientific consensus on genetically engineered crops and their implications. NASEM reports aim to give the public and policymakers information on socially relevant science issues. Their impact, however, is not well understood. This analysis combines national pre- and post-report survey data with a large-scale content analysis of Twitter discussion to examine the report's effect on public perceptions of genetically modified organisms (GMOs). We find that the report's release corresponded with reduced negativity in Twitter discourse and increased ambivalence in public risk and benefit perceptions of GMOs, mirroring the NASEM report's conclusions. Surprisingly, this change was most likely for individuals least trusting of scientific studies or university scientists. Our findings indicate that NASEM consensus reports can help shape public discourse, even in, or perhaps because of, the complex information landscape of traditional and social media.
Consensus reports, genetically modified organisms, genetically engineered crops, science communication, risk communication

**** *Artigo_85
Normalization of zero-inflated data: An empirical analysis of a new indicator family and its use with altmetrics data
Recently, two new indicators (Equalized Mean-based Normalized Proportion Cited, EMNPC; Mean-based Normalized Proportion Cited, MNPC) were proposed which are intended for sparse scientometrics data, e.g., alternative metrics (altmetrics). The indicators compare the proportion of mentioned papers (e.g. on Facebook) of a unit (e.g., a researcher or institution) with the proportion of mentioned papers in the corresponding fields and publication years (the expected values). In this study, we propose a third indicator (Mantel-Haenszel quotient, MHq) belonging to the same indicator family. The MHq is based on the MH analysis – an established method in statistics for the comparison of proportions. We test (using citations and assessments by peers, i.e. F1000Prime recommendations) if the three indicators can distinguish between different quality levels as defined on the basis of the assessments by peers. Thus, we test their convergent validity. We find that the indicator MHq is able to distinguish between the quality levels in most cases while MNPC and EMNPC are not. Since the MHq is shown in this study to be a valid indicator, we apply it to six types of zero-inflated altmetrics data and test whether different altmetrics sources are related to quality. The results for the various altmetrics

demonstrate that the relationship between altmetrics (Wikipedia, Facebook, blogs, and news data) and assessments by peers is not as strong as the relationship between citations and assessments by peers. Actually, the relationship between citations and peer assessments is about two to three times stronger than the association between altmetrics and assessments by peers.
Zero-inflated data, Citation counts, Altmetrics, Equalized Mean-based Normalized Proportion Cited (EMNPC), Mean-based Normalized Proportion Cited (MNPC), Mantel-Haenszel quotient (MHq)

**** *Artigo_86
On the relationships between bibliographic characteristics of scientific documents and citation and Mendeley readership counts: A large-scale analysis of Web of Science publications
In this paper we present a first large-scale analysis of the relationship between Mendeley readership and citation counts with particular documents' bibliographic characteristics. A data set of 1.3 million publications from different fields published in journals covered by the Web of Science (WoS) has been analyzed. This work reveals that document types that are often excluded from citation analysis due to their lower citation values, like editorial materials, letters, news items, or meeting abstracts, are strongly covered and saved in Mendeley, suggesting that Mendeley readership can reliably inform the analysis of these document types. Findings show that collaborative papers are frequently saved in Mendeley, which is similar to what is observed for citations. The relationship between readership and the length of titles and number of pages, however, is weaker than for the same relationship observed for citations. The analysis of different disciplines also points to different patterns in the relationship between several document characteristics, readership, and citation counts. Overall, results highlight that although disciplinary differences exist, readership counts are related to similar bibliographic characteristics as those related to citation counts, reinforcing the idea that Mendeley readership and citations capture a similar concept of impact, although they cannot be considered as equivalent indicators.
Mendeley readership, WoS citation, Bibliographic characteristics, Document types

**** *Artigo_87
Perception of the importance of chemistry research papers and comparison to citation rates
Chemistry researchers are frequently evaluated on the perceived significance of their work with the citation count as the most commonly-used metric for gauging this property. Recent studies have called for a broader evaluation of significance that includes more nuanced bibliometrics as well as altmetrics to more completely evaluate scientific research. To better understand the relationship between metrics and peer judgements of significance in chemistry, we have conducted a survey of chemists to investigate their perceptions of previously published research. Focusing on a specific issue of the Journal of the American Chemical Society published in 2003, respondents were asked to select which articles they thought best matched importance and significance given several contexts: highest number of citations, most significant (subjectively defined), most likely to share among chemists, and most likely to share with a broader audience. The answers to the survey can be summed up in several observations. The ability of respondents to predict the citation counts of established research is markedly lower than the ability of those counts to be predicted by the h-index of the corresponding author of each article. This observation is conserved even when only considering responses from chemists whose expertise falls within the subdiscipline that best describes the work performed in an article. Respondents view both cited papers and significant papers differently than papers that should be shared with chemists. We conclude from our results that peer judgements of importance and significance differ from metrics-based measurements, and that chemists should work with bibliometricians to develop metrics that better capture the nuance of opinions on the

importance of a given piece of research.

**** *Artigo_88
Prevalence of Disclosed Conflicts of Interest in Biomedical Research and Associations With Journal Impact Factors and Altmetric Scores

**** *Artigo_89
Researcher and Author Impact Metrics: Variety, Value, and Context
Numerous quantitative indicators are currently available for evaluating research productivity. No single metric is suitable for comprehensive evaluation of the author-level impact. The choice of particular metrics depends on the purpose and context of the evaluation. The aim of this article is to overview some of the widely employed author impact metrics and highlight perspectives of their optimal use. The h-index is one of the most popular metrics for research evaluation, which is easy to calculate and understandable for non-experts. It is automatically displayed on researcher and author profiles on citation databases such as Scopus and Web of Science. Its main advantage relates to the combined approach to the quantification of publication and citation counts. This index is increasingly cited globally. Being an appropriate indicator of publication and citation activity of highly productive and successfully promoted authors, the h-index has been criticized primarily for disadvantaging early career researchers and authors with a few indexed publications. Numerous variants of the index have been proposed to overcome its limitations. Alternative metrics have also emerged to highlight 'societal impact.' However, each of these traditional and alternative metrics has its own drawbacks, necessitating careful analyses of the context of social attention and value of publication and citation sets. Perspectives of the optimal use of researcher and author metrics is dependent on evaluation purposes and compounded by information sourced from various global, national, and specialist bibliographic databases.
Research Evaluation, Bibliometrics, Bibliographic Databases, h-index, Publications, Citations

**** *Artigo_90
Scholarly Twitter metrics
Twitter has arguably been the most popular among the data sources that form the basis of so-called altmetrics. Tweets to scholarly documents have been heralded as both early indicators of citations as well as measures of societal impact. This chapter provides an overview of Twitter activity as the basis for scholarly metrics from a critical point of view and equally describes the potential and limitations of scholarly Twitter metrics. By reviewing the literature on Twitter in scholarly communication and analyzing 24 million tweets linking to scholarly documents, it aims to provide a basic understanding
of what tweets can and cannot measure in the context of research evaluation. Going beyond the limited explanatory power of low correlations between tweets and citations, this chapter considers what types of scholarly documents are popular on Twitter, and how, when and by whom they are diffused in order to understand what tweets to scholarly documents measure. Although this chapter is not able to solve the problems associated with the creation of meaningful metrics from social media, it highlights particular issues and aims to provide the basis for advanced scholarly Twitter metrics.
Keywords:Social and Information Networks

**** *Artigo_91
Scientific Visibility of Colombian Universities in ResearchGate
He paper aims to compare the scientific visibility of Colombian universities based on the

ResearchGate indicator (RGScore). The article analyzes the 150 Colombian universities that have a ResearchGate profile of the 305 registered in the National Information System of Higher Education (SNIES). The top 10 universities with the best positions of RGScore are: Universidad Nacional de Colombia, Universidad de Antioquia, Universidad de Los Andes, Universidad del Valle, Pontificia Universidad Javeriana, Universidad Industrial de Santander, Universidad del Norte, Universidad de Cartagena, Universidad de la Sabana y Universidad Pontificia Bolivariana. These are institutions accredited in High Quality by the Colombian government. Additionally, there is a weak positive correlation between the number of Groups of Research, Technological Development and Innovation classified and recognized by Colciencias per regions and average RGScore of the Universities in each Colombian Department.
ResearchGate, visibility colombian universities, RGScore

**** *Artigo_92
Social impact in social media: A new method to evaluate the social impact of research
The social impact of research has usually been analysed through the scientific outcomes produced under the auspices of the research. The growth of scholarly content in social media and the use of altmetrics by researchers to track their work facilitate the advancement in evaluating the impact of research. However, there is a gap in the identification of evidence of the social impact in terms of what citizens are sharing on their social media platforms. This article applies a social impact in social media methodology (SISM) to identify quantitative and qualitative evidence of the potential or real social impact of research shared on social media, specifically on Twitter and Facebook. We define the social impact coverage ratio (SICOR) to identify the percentage of tweets and Facebook posts providing information about potential or actual social impact in relation to the total amount of social media data found related to specific research projects. We selected 10 projects in different fields of knowledge to calculate the SICOR, and the results indicate that 0.43% of the tweets and Facebook posts collected provide linkages with information about social impact. However, our analysis indicates that some projects have a high percentage (4.98%) and others have no evidence of social impact shared in social media. Examples of quantitative and qualitative evidence of social impact are provided to illustrate these results. A general finding is that novel evidences of social impact of research can be found in social media, becoming relevant platforms for scientists to spread quantitative and qualitative evidence of social impact in social media to capture the interest of citizens. Thus, social media users are showed to be intermediaries making visible and assessing evidence of social impact.

**** *Artigo_93
Social Media Attention Increases Article Visits: An Investigation on Article-Level Referral Data of PeerJ
In order to better understand the effect of social media in the dissemination of scholarly articles, employing the daily updated referral data of 110 PeerJ articles collected over a period of 345 days, we analyze the relationship between social media attention and article visitors directed by social media. Our results show that the social media presence of PeerJ articles is high. About 68.18% of the papers receive at least one tweet from Twitter accounts other than @PeerJ, the official account of the journal. Social media attention increases the dissemination of scholarly articles. Altmetrics could not only act as the complement of traditional citation measures, but also play an important role in increasing the article downloads and promoting the impacts of scholarly articles. There also exist significant correlation among the online attention from different social media platforms. Articles with more Facebook shares tend to get more tweets. The temporal trends show that social attention comes immediately following publication but does not last long, so do the social media directed article views. Altmetrics, social media,

Twitter, PeerJ, referral

**** *Artigo_94
Social media for pediatric research: what, who, why, and #?
In the age of Facebook congressional hearings and “Twitter diplomacy,” the impact of social media on society is difficult to ignore. Although social media isn’t new and its role in health care continues to grow, misconceptions of its purpose and utility in medicine are common, and some remain skeptical of its value.1 We provide a brief overview of the potential for social media to advance pediatric research and describe the use of hashtags, elaborating with an example from the neonatal clinical research community.

**** *Artigo_95
Social reference managers and their users: A survey of demographics and ideologies
Altmetric indicators are increasingly present in the research landscape. Among this ecosystem of heterogeneous indicators, social reference managers have been proposed as indicators of broader use of scholarly work. However, little work has been done to understand the data underlying this indicator. The present work uses a large-scale survey to study the users of two prominent social reference managers—Mendeley and Zotero. The survey examines demographic characteristics, usage of the platforms, as well as attitudes towards key issues in scholarly communication, such as open access, peer review, privacy, and the reward system of science. Results show strong differences between platforms: Mendeley users are younger and more gender-balanced; Zotero users are more engaged in social media and more likely to come from the social sciences and humanities. Zotero users are more likely to use the platform’s search functions and to organize their libraries, while Mendeley users are more likely to take advantage of some of the discovery and networking features—such as browsing papers and groups and connecting with other users. We discuss the implications of using metrics derived from these platforms as impact indicators.

**** *Artigo_96
Study on Most Prolific Authors’ and their Association with Citation
This paper tries to find the association between altmetric variable and citation for the articles written by most prolific authors in the field of Clinical medicine, Neuroscience, Micro and Molecular biology, 2014. A total of 713 authors had written 4886 articles in the above four subject areas. From the study it was found that five variables (Citation, Altmertric, Twitter Facebook and Mendeley) contribute more than 54% of variance among the seventeen variables. The subject wise correlation between the majority altmetric variables and citation is between 0.158 - 0.737. It was found that medical science attracts more attention in the social media compared to other science domain.
Altmetric, Attention score, Citation, New media, Prolific authors, Social media

**** *Artigo_97
Survey on opinions and usage patterns for the ResearchGate platform
Based on a survey, the following study investigates opinions and also usage patterns relating to the ResearchGate social networking site for scientists and researchers. The survey consisted of 19 questions and was conducted online with 695 scientists from the disciplines of physics, biology, medicine, and neuroscience. Amongst other issues, the research questions concerned how much time and effort the interviewees expended on ResearchGate, what added value they perceived in using the site, the extent to which social aspects influence use, how participants planned to use the platform in future, and what role ResearchGate’s own metric, the RG score, played for the scientists. In addition, we discuss which of the factors of age, sex, origin, and

scientific discipline have a decisive influence on the responses of the interviewees and which are of no statistical significance The results clearly show that the origin of the participants is frequently decisive, but that the remaining factors also have a considerable influence on the responses for more than 25% of the questions.

**** *Artigo_98
The Adoption of an Online Journal Club to Improve Research Dissemination and Social Media Engagement Among Hospitalists.
Twitter-based journal clubs are intended to connect clinicians, educators, and researchers to discuss recent research and aid in dissemination of results. The Journal of Hospital Medicine (JHM) began producing a Twitter-based journal club, #JHMChat, in 2015.
OBJECTIVE: To describe the implementation and assess the impact of a journal-sponsored, Twitter-based journal club on Twitter and journal metrics. INTERVENTION: Each #JHMChat focused on a recently published JHM article, was moderated by a social media editor, and included one study author or guest. MEASUREMENTS: The total number of participants, tweets, tweets/participant, impressions, page views, and change in the Altmetric score were assessed after each session. Thematic analysis of each article was conducted, and post-chat surveys of participating authors and participant responses to continuing medical education surveys were reviewed.
Seventeen Twitter-based chats were held: 7 (47%) focused on value, 6 (40%) targeted clinical issues, and 4 (27%) focused on education. On average, we found 2.17 (±0.583 SD) million impressions/session, 499 (±129 SD) total tweets/session, and 73 (±24 SD) participants/session. Value-based care articles had the greatest number of impressions (2.61 ± 0.55 million) and participants (90 ± 12). The mean increase in the Altmetric score was 14 points (±12), with medical education-themed articles garnering the greatest change (mean increase of 32). Page views were noted to have increased similarly to levels of electronic Table of Content releases. Authors and participants believed #JHMChat was a valuable experience and rated it highly on post-chat evaluations. Online journal clubs appear to increase awareness and uptake of journal article results and are considered a useful tool by participants.

**** *Artigo_99
The altmetric performance of publications authored by Brazilian researchers: analysis of CNPq productivity scholarship holders
The present work seeks to analyse the altmetric performance of Brazilian publications authored by researchers who are productivity scholarship holders (PQ) of the National Council of Scientific and Technological Development (CNPq). It was considered, within the scope of this research, the PQs in activity in October, 2017 (n = 14.609). The scientific production registered on Lattes was collected via GetLattesData and filtered by articles from academic journals published between 2016 and October 2017 that hold the Digital Object Identifier (n = 99064). The online attention data are analysed according to their distribution by density and variation; language of the publication and field of knowledge; and
by average performance of the type of source that has provided its altmetric values. The density evidences the long tail behavior of the variable, with most part of the articles with altmetrics score = 0, while few articles have a high index. The average of the online attention indicates a better performance of articles written in English and belonging to the Health and Biological Sciences field of knowledge. As for the sources, there was a good performance from Mendeley, followed by Twitter and a low coverage from Facebook. altmetric, online attention, productivity researchers

**** *Artigo_100

The altmetrics for measuring readers intentions towards scholarly contents in the field of information security

This study aimed to apply altmetrics tools to measure readers intentions towards the highly cited contents in the field of information security among specific types of scholarly documents and therefore investigate the correlation between the citations (Bibliometrics) readers intentions (Altmetrics) for each type of scholarly document. To achieve study objectives, the researchers used the Scopus database to find out the highest productive types of documents publishing in the field of information security in the period (2014-2015)-since this period considered as a reasonable period for the scholarly production to be available in the full text and therefore to take a right to use and cite, as well as to be used and interacted through different social media channels. Conferences papers, articles, and books chapters were the most productive types of scholarly documents. The first 20 highly cited scholarly contents from each document type were chosen to be analyzed to measure the readers' intention. The results reveal that articles were the most types of documents that gained the highest number of citations, followed by conferences papers and book chapters. As articles gained the highest number of citations, they also gained the highest number of readers intentions. This is an expected result because citations and intentions are affected by each other. The type of document affected the correlation. The statistical results reveal that the significant correlation between citations and attentions was for the articles. Articles gained the highest citations and readers intentions. The current study is an important contribution to the literature as it provides in-depth knowledge regarding citations and article publications.

Altmetrics, Information Security, Readers' intentions, Citations

**** *Artigo_101

The differential impact of scientific quality, bibliometric factors, and social media activity on the influence of systematic reviews and meta-analyses about psoriasis

Researchers are increasingly using on line social networks to promote their work. Some authors have suggested that measuring social media activity can predict the impact of a primary study (i.e., whether or not an article will be highly cited). However, the influence of variables such as scientific quality, research disclosures, and journal characteristics on systematic reviews and meta-analyses has not yet been assessed. The present study aims to describe the effect of complex interactions between bibliometric factors and social media activity on the impact of systematic reviews and meta-analyses about psoriasis (PROSPERO 2016: CRD42016053181). Methodological quality was assessed using the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) tool. Altmetrics, which consider Twitter, Facebook, and Google+ mention counts as well as Mendeley and SCOPUS readers, and corresponding article citation counts from Google Scholar were obtained for each article. Metadata and journal-related bibliometric indices were also obtained. One-hundred and sixty-four reviews with available altmetrics information were included in the final multifactorial analysis, which showed that social media and impact factor have less effect than Mendeley and SCOPUS readers on the number of cites that appear in Google Scholar. Although a journal's impact factor predicted the number of tweets (OR, 1.202; 95% CI, 1.087–1.049), the years of publication and the number of Mendeley readers predicted the number of citations in Google Scholar (OR, 1.033; 95% CI, 1.018–1.329). Finally, methodological quality was related neither with bibliometric influence nor social media activity for systematic reviews. In conclusion, there seems to be a lack of connectivity between scientific quality, social media activity, and article usage, thus predicting scientific success based on these variables may be inappropriate in the particular case of systematic reviews.

**** *Artigo_102

The Impact and Outreach of Soundscape Research
Soundscape has been growing steadily as a research field since its interdisciplinary concepts were first introduced about 50 years ago in music theory and acoustic ecology, and it currently affects a broad spectrum of disciplines ranging from social sciences to urban planning and noise control engineering. In spite of its strong research appeal, it is not clear what the actual impact and outreach of soundscape science is at a societal level; that is: how soundscape research is received by community. Using the Altmetric database, this review aims to map how and where soundscape research is "mentioned", considering the number of mentions over time, their geographical spread and effectiveness of publication outlets. Results show that mentions are growing with time, they mostly originate in the United States and the United Kingdom, and they are generated by a limited number of research items.
soundscape, sound perception, outreach, impact, altmetric

**** *Artigo_103
The impact of social media promotion with infographics and podcasts on research dissemination and readership
Objective: In 2015 and 2016, the Canadian Journal of Emergency Medicine (CJEM) Social Media (SoMe) Team collaborated with established medical websites to promote CJEM articles using podcasts and infographics while tracking dissemination and readership. CJEM publications in the "Original Research" and "State of the Art" sections were selected by the SoMe Team for podcast and infographic promotion based on their perceived interest to emergency physicians. A control group was composed retrospectively of articles from the 2015 and 2016 issues with the highest Altmetric score that received standard Facebook and Twitter promotions. Studies on SoMe topics were excluded. Dissemination was quantified by January 1, 2017 Altmetric scores. Readership was measured by abstract and full-text views over a 3-month period. The number needed to view (NNV) was calculated by dividing abstract views by full-text views. Twenty-nine of 88 articles that met inclusion were included in the podcast (6), infographic (11), and control (12) groups. Descriptive statistics (mean, 95% confidence interval) were calculated for podcast (Altmetric: 61, 42-80; 1795, 1135-2455; Full-text: 431, 0-1031), infographic (Altmetric: 31.5, 19-43; 590, 361-819; Full-text: 65, 33-98), and control (Altmetric: 12, 8-15; 257, 159-354; Full-Text: 73, 38-109) articles. The NNV was 4.2 for podcast, 9.0 for infographic, and 3.5 for control articles. Discussion: Limitations included selection bias, the influence of SoMe promotion on the Altmetric scores, and a lack of generalizability to other journals. Collaboration with established SoMe websites using podcasts and infographics was associated with increased Altmetric scores and abstract views but not full-text article views.
knowledge translation, social media, online educational resources, infographics, podcasts

**** *Artigo_104
The insoluble problems of books: what does Altmetric.com have to offer?
The purpose of this paper is to analyze the capabilities, functionalities and appropriateness of Altmetric.com as a data source for the bibliometric analysis of books in comparison to PlumX. The authors perform an exploratory analysis on the metrics the Altmetric Explorer for Institutions, platform offers for books. The authors use two distinct data sets of books. On the one hand, the authors analyze the Book Collection included in Altmetric.com. On the other hand, the authors use Clarivate's Master Book List, to analyze Altmetric.com's capabilities to download and merge data with external databases. Finally, the authors compare the findings with those obtained in a previous study performed in PlumX. Altmetric.com combines and orderly tracks a set of data sources combined by DOI identifiers to retrieve metadata from books, being Google Books its main provider. It also retrieves information from commercial

publishers and from some Open Access initiatives, including those led by university libraries, such as Harvard Library. We find issues with linkages between records and mentions or ISBN discrepancies. Furthermore, the authors find that automatic bots affect greatly Wikipedia mentions to books. The comparison with PlumX suggests that none of these tools provide a complete picture of the social attention generated by books and are rather complementary than comparable tools. This study targets different audience which can benefit from the findings. First, bibliometricians and researchers who seek for alternative sources to develop bibliometric analyses of books, with a special focus on the Social Sciences and Humanities fields. Second, librarians and research managers who are the main clients to which these tools are directed. Third, Altmetric.com itself as well as other altmetric providers who might get a better understanding of the limitations users encounter and improve this promising tool. Originality/value: This is the first study to analyze Altmetric.com's functionalities and capabilities for providing metric data for books and to compare results from this platform, with those obtained via PlumX.
Book, Altmetric, Research evaluation, Databases, Library tools

**** *Artigo_105
The Journal of Altmetrics is Launched – Editorial
Almost a decade after its introduction to the scientific community, "Altmetrics" now has its' own journal and a place in the mainstream evaluative methods of scholarly output.
Altmetrics, Journal of Altmetrics

**** *Artigo_106
Top-Cited Articles In Medical Professionalism: A Bibliometric Analysis versus Altmetric Scores
Citation counts of articles have been used by universities and funding bodies to measure scientific outcomes and assess suitability for grant applications. However, citation counts are not without limitations. With the rise of social media, altmetric scores may provide an alternative assessment tool. Objective: The aims of this study are to assess the characteristics of highly cited articles in medical professionalism and their altmetric scores. The Web of Science was searched for top-cited articles in medical professionalism, and the characteristics of each article were identified. The altmetric database was searched to identify report for each identified article. A model to assess the relationship between the number of citations and each of key characteristics as well as altmetric scores was developed.
No correlations were found between the number of citations and number of years since publication (p=0.192), number of institutes (p=0.081), number of authors (p=0.270), females in authorship (p=0.15), or number of grants (p=0.384). The altmetric scores varied from zero to 155, total= 806, median=5.0, (IQR=20). Twitter (54%) and Mendeley (62%) were the most popular altmetric resources. No correlation was found between the number of citations and the altmetric scores (p=0.661). To further assess these variables a model was developed using multivariate analysis; did not show significant differences across subgroups. The topics covered were learning and teaching professionalism, curriculum issues, professional and unprofessional behavior, defining and measuring professionalism. The articles were mainly published in Academic Medicine, Journal of the American Medical Association, Journal of General Internal Medicine, and Annals of Internal Medicine. No correlation was found between citations and any of the article parameters. Altmetric scores of articles were not significantly correlated with citations. Highly cited articles were produced mainly by the United States, Canada, and the United Kingdom. The study reflects the emerging role of altmetric and social media in the dissemination of research. Future studies should investigate the specific features of highly cited articles and factors that reinforce distribution of research data among scholars and non-scholars.

Medical professionalism, Professional behavior, Top-cited articles, Citation analysis

**** *Artigo_107
Towards the social media studies of science: social media metrics, present and future

**** *Artigo_108
Tweet success? Scientific communication correlates with increased citations in Ecology and Conservation
Science communication is seen as critical for the disciplines of ecology and conservation, where research products are often used to shape policy and decision making. Scientists are increasing their online media communication, via social media and news. Such media engagement has been thought to influence or predict traditional metrics of scholarship, such as citation rates. Here, we measure the association between citation rates and the Altmetric Attention Score—an indicator of the amount and reach of the attention an article has received—along with other forms of bibliometric performance (year published, journal impact factor, and article type). We found that Attention Score was positively correlated with citation rates. However, in recent years, we detected increasing media exposure did not relate to the equivalent citations as in earlier years; signalling a diminishing return on investment. Citations correlated with journal impact factors up to ~13, but then plateaued, demonstrating that maximizing citations does not require publishing in the highest-impact journals. We conclude that ecology and conservation researchers can increase exposure of their research through social media engagement and, simultaneously, enhance their performance under traditional measures of scholarly activity.
Altmetric, Science communication, Twitter, Social media, Enter a keyword

**** *Artigo_109
Twitter, #alternativefacts, careless whispers and Rheumatology

**** *Artigo_110
Using altmetrics for contextualised mapping of societal impact: From hits to networks
In this article, we develop a method that uses altmetric data to analyse researchers' interactions, as a way of mapping the contexts of potential societal impact. In the face of an increasing policy demand for quantitative methodologies to assess societal impact, social media data (altmetrics) have been presented as a potential method to capture broader forms of impact. However, current altmetric indicators were extrapolated from traditional citation approaches and are seen as problematic for assessing societal impact. In contrast, established qualitative methodologies for societal impact assessment are based on interaction approaches. These argue that assessment should focus on mapping the contexts in which engagement among researchers and stakeholders takes place, as a means to understand the pathways to societal impact. Following these approaches, we propose to shift the use of altmetric data towards network analysis of researchers and stakeholders. We carry out two case studies, analysing researchers' networks with Twitter data. The comparison illustrates the potential of Twitter networks to capture disparate degrees of policy engagement. We propose that this mapping method can be used as an input within broader methodologies in case studies of societal impact assessment.
societal impact, social engagement, open science, altmetrics, twitter, research evaluation

**** *Artigo_111
What Can Altmetric.com Tell Us About Policy Citations of Research? An Analysis of Altmetric.com Data for Research Articles from the University of Sheffield
There is a growing interest in using and analyzing altmetric data for quantifying the impact of

research, especially societal impact (Bornmann, 2014, Thelwall et al., 2016, Haunschild and Bornmann, 2017). This study therefore aimed to explore the usefulness of Altmetric.com data as a means of identifying and categorizing the policy impact of research articles from a single center (the University of Sheffield). Method: This study has only included published research articles from authors at the University of Sheffield and indexed in the Altmetric.com database. Altmetric data on policy impact was sourced from Altmetric.com following a data request and included citations up until February 2017. Supplementary Altmetric.com data, including news media, blogs, Mendeley saves, and Wikipedia citations, were also gathered.
Altmetric.com data did enable the identification of policy documents that cited relevant articles. In total, 1,463 pieces of published research from authors at the University of Sheffield were found to be cited by between 1 and 13 policy documents. 21 research articles (1%) were listed as being cited in five or more policy documents; 21 (1%) in four policy documents; 50 (3%) in three documents; 186 (13%) in two documents; and 1,185 (81%) in one document. Of those 1,463 outputs, 1,449 (99%) were journal articles, 13 were books, and 1 was a book chapter (less than 1%). The time lag from the publication of the research to its citation in policy documents ranged from 3 months to 31 years. Analysis of the 92 research articles cited in three or more policy documents indicated that the research topics with the greatest policy impact were medicine, dentistry, and health, followed by social science and pure science. The Altmetric.com data enabled an in-depth assessment of the 21 research articles cited in five or more policy documents. However, errors of attribution and designation were found in the Altmetric.com data. These findings might be generalizable to other institutions similar in organizational structure to The University of Sheffield. Within the limitations of the current text-mining system, Altmetric.com can offer important and highly accessible data on the policy impact of an organization's published research articles, but caution must be exercised when seeking to use this data, especially in terms of providing evidence of policy impact.
altmetrics, policy making, policy research, research impact, scholarly communication, metrics, research metrics

**** *Artigo_112
Which US and European Higher Education Institutions are visible in ResearchGate and what affects their RG score?
While ResearchGate has become the most popular academic social networking site in terms of regular users, not all institutions have joined and the scores it assigns to academics and institutions are controversial. This paper assesses the presence in ResearchGate of higher education institutions in Europe and the US in 2017, and the extent to which institutional ResearchGate Scores reflect institutional academic impact. Most of the 2258 European and 4355 US higher educational institutions included in the sample had an institutional ResearchGate profile, with near universal coverage for PhD-awarding institutions found in the Web of Science (WoS). For non-PhD awarding institutions that did not publish, size (number of staff members) was most associated with presence in ResearchGate. For PhD-awarding institutions in WoS, presence in RG was strongly related to the number of WoS publications. In conclusion, a) institutional RG scores reflect research volume more than visibility and b) this indicator is highly correlated to the number of WoS publications. Hence, the value of RG Scores for institutional comparisons is limited.
ResearchGate score, Institutional profilesHigher education institutions, Altmetrics

**** *Artigo_113
A systematic identification and analysis of scientists on Twitter
Metrics derived from Twitter and other social media—often referred to as altmetrics—are increasingly used to estimate the broader social impacts of scholarship. Such efforts, however,

may produce highly misleading results, as the entities that participate in conversations about science on these platforms are largely unknown. For instance, if altmetric activities are generated mainly by scientists, does it really capture broader social impacts of science? Here we present a systematic approach to identifying and analyzing scientists on Twitter. Our method can identify scientists across many disciplines, without relying on external bibliographic data, and be easily adapted to identify other stakeholder groups in science. We investigate the demographics, sharing behaviors, and interconnectivity of the identified scientists. We find that Twitter has been employed by scholars across the disciplinary spectrum, with an over-representation of social and computer and information scientists; under-representation of mathematical, physical, and life scientists; and a better representation of women compared to scholarly publishing. Analysis of the sharing of URLs reveals a distinct imprint of scholarly sites, yet only a small fraction of shared URLs are science-related. We find an assortative mixing with respect to disciplines in the networks between scientists, suggesting the maintenance of disciplinary walls in social media. Our work contributes to the literature both methodologically and conceptually—we provide new methods for disambiguating and identifying particular actors on social media and describing the behaviors of scientists, thus providing foundational information for the construction and use of indicators on the basis of social media metrics.

**** *Artigo_114
Altmetrics of open access brazilian journal articles in ScienceOpen: the reason for mentions
This study aims to contribute to a debate about qualitative studies in the field of altmetrics applying the analysis of mentions of Araújo and Furnival (2016) to a set of articles of open access journals present in ScienceOpen of the SciELO Brazil Collection. We identified 1,976 altmetric data from articles published between 2001 and 2015. Most of the data generated came from Twitter (68.9%), followed by Facebook (18.4%) and Mendeley (12.3%). The mentions are distributed according to their informative content (55.1%) and conversational (44.9%) aspects, with predominantly simple sharing (57.5%), followed by explanatory comments (17.4%), and of exortative narratives (15.8%). Messages that criticize or problematize articles have not been registered. We conclude that due to the few studies on the subject it is necessary to invest in proposals that consider the analysis of the mentions to understand the nuances of the circulation of scientific information in the social web and its perspectives.
altmetrics, mention analysis, open access, ScienceOpen

**** *Artigo_115
Altmetrics - A Collated Adjunct Beyond Citations for Scholarly Impact: A Systematic Review.

In emerging Figures, scholars are unifying social media tools like blogs, Twitter, and Mendeley into their professional communications. The online, open nature of these tools reveals the scholarly action to be clear and unambiguous. Metrics which is set on these activities could enlighten broader, faster measures of impact, supplementing traditional citation metrics.
Aim: The present review aims to analyse the correlation of altmetrics with the traditional citations in medical research.
Materials and The search strategy used a combination of controlled vocabulary and free text terms. The main database searched were PubMed, PubMed Central, Cochrane Review, Embase and Google Scholar from 2010 to 2016. Out of the total 78 h3s appeared seven articles fulfilled the criteria and were selected for the review.
The positive correlation between altmetrics and traditional citations indicates that the two are not entirely different from each other and are familiar with each other. Altmetrics are usually accessible earlier and enable us to evaluate the social impact of scholarly research, almost at

the actual time.
Much work is needed to develop this research which will focus on the clarity of the impact signal. Thus newer dimensions, such as altmetrics and article-level metrics are an effort to explore the influence of research across the worldwide population.
Bibliometrics, Biomedical researchers, Social media

**** *Artigo_116
Altmetrics, Legacy Scholarship, and Scholarly Legacy
When using alternative metrics (altmetrics) to investigate the impact of a scholar's work, researchers and librarians are typically cautioned that altmetrics will be less useful for older works of scholarship. This is because it is difficult to collect social media and other attention retroactively, and the numbers will be lower if the work was published before social media marketing and promotion were widely accepted in a field. In this article, we argue that altmetrics can provide useful information about older works in the form of documenting renewed attention to past scholarship as part of a scholar's legacy. Using the altmetrics profile of the late Dr. Thomas E. Starzl, often referred to as "the father of modern transplantation", we describe two cases where altmetrics provided information about renewed interest in his works: a controversy about race and genetics that shows the ongoing impact of a particular work, and posthumous remembrances by colleagues which reveal his scholarly legacy.
Altmetrics, Legacy Scholarship, Scholarly Legacy

**** *Artigo_117
Altmetrics

**** *Artigo_118
Altmetrics: Broadening Impact or Amplifying Voices?

**** *Artigo_119
An Overview on Evaluating and Predicting Scholarly Article Impact
Scholarly article impact reflects the significance of academic output recognised by academic peers, and it often plays a crucial role in assessing the scientific achievements of researchers, teams, institutions and countries. It is also used for addressing various needs in the academic and scientific arena, such as recruitment decisions, promotions, and funding allocations. This article provides a comprehensive review of recent progresses related to article impact assessment and prediction. The review starts by sharing some insight into the article impact research and outlines current research status. Some core methods and recent progress are presented to outline how article impact metrics and prediction have evolved to consider integrating multiple networks. Key techniques, including statistical analysis, machine learning, data mining and network science, are discussed. In particular, we highlight important applications of each technique in article impact research. Subsequently, we discuss the open issues and challenges of article impact research. At the same time, this review points out some important research directions, including article impact evaluation by considering Conflict of Interest, time and location information, various distributions of scholarly entities, and rising stars.
scholarly big data, article impact, machine learning, data mining

**** *Artigo_120
Term analysis of " nstitutional Repository" on Twitter: an altmetric study It presents an altmetric analysis of the term "Institutional Repository" on Twitter in the period from 2009 to 2015. The study is qualitative and quantitative, descriptive in nature, and used altmetrics to

show posts related to the term and the content analysis thereof in order to identify the relationships established between the term and associated issues. The results showed that the first publications about the Institutional Repository term in Portuguese on Twitter appeared in 2009, and the highest number of tweets on the subject took place in . It highlighted the prevalence of the category “social citations” and “Institutional Repository Disclosure”, which most often mentions the implementation of Repositories. In posts related to social citation there is mention of “Books” and “Journal article”, a reference to the repository of UFBA, which provided the largest number of books published by the Publishing House of the Institution. The most frequent hashtag was #opendoar, which is the official directory of academic open access repositories, developed by the University of Nottingham, in the UK. Finally, altmetric studies are considered a possibility of analysis of the relationship between social media and the scientific production and an alternative to disseminate and/or share such information among researchers and stakeholders.
Altmetrics, Alternative Metrics, Scientific Communication, Institutional Repository, Twitter

**** *Artigo_121
Analysing researchers’ outreach efforts and the association with publication metrics: A case study of Kudos
With the growth of scholarly collaboration networks and social communication platforms, members of the scholarly community are experimenting with their approach to disseminating research outputs, in an effort to increase their audience and outreach. However, from a researcher’s point of view, it is difficult to determine whether efforts to make work more visible are worthwhile (in terms of the association with publication metrics) and within that, difficult to assess which platform or network is most effective for sharing work and connecting to a wider audience. We undertook a case study of Kudos (https://www.growkudos.com), a web-based service that claims to help researchers increase the outreach of their publications, to examine the most effective tools for sharing publications online, and to investigate which actions are associated with improved metrics. We extracted a dataset from Kudos of 830,565 unique publications claimed by authors, for which 20,775 had actions taken to explain or share via Kudos, and for 4,867 of these full text download data from publishers was available. Findings show that researchers are most likely to share their work on Facebook, but links shared on Twitter are more likely to be clicked on. A Mann-Whitney U test revealed that a treatment group (publications having actions in Kudos) had a significantly higher median average of 149 full text downloads (23.1% more) per publication as compared to a control group (having no actions in Kudos) with a median average of 121 full text downloads per publication. These findings suggest that performing actions on publications, such as sharing, explaining, or enriching, could help to increase the number of full text downloads of a publication.

**** *Artigo_122
Applied Evaluative Informetrics: Part 1.
This manuscript is a preprint version of Part 1 (General Introduction and Synopsis) of the book Applied Evaluative Informetrics, to be published by Springer in the summer of 2017. This book presents an introduction to the field of pplied evaluative informetrics, and is written for interested scholars and students from all domains of science and scholarship. It sketches the field’s history, recent achievements, and its potential and limits. It explains the notion of multi-dimensional research performance, and discusses the pros and cons of 28 citation-, patent-, reputation- and altmetrics-based indicators. In addition, it presents quantitative research assessment as an evaluation science, and focuses on the role of extra-informetric factors in the development of indicators, and on the policy context of their application. It also discusses the

way forward, both for users and for developers of informetric tools.
Informetrics, research assessment, indicators, evaluation science, citation analysis, altmetrics, usage-based indicators, extra-informetric factors, web of science, scopus, google scholar

**** *Artigo_123
Attention Afforded Accounting Research by Policy Makers, Academics, and the General Public

Many question the value of accounting scholarship to society. We compared the attention the general public, policy makers, and academics give to academic accounting research relative to other business disciplines and other more general disciplines (economics, psychology, and other sciences). The results indicate that accounting research receives significantly less attention from the general public than all other disciplines and also performs relatively poorly in receiving policy makers' attention compared to both economics and finance. Articles in other disciplines' elite journals cite relatively little of accounting's elite-level publications, but non-elite journal articles cite accounting research in similar numbers to other disciplines. We also compared the attention subtopic areas within accounting receive. Within accounting, tax research receives more attention from the general public and policy makers than other topic areas. Finally, we rank scholars, institutions, and journals by the attention they receive. We discuss how these findings could impact accounting education.
research impact, citations, research contribution

**** *Artigo_124
Automatic identification of high impact articles in PubMed to support clinical decision making

Objectives:The practice of evidence-based medicine involves integrating the latest best available evi-dence into patient care decisions. Yet, critical barriers exist for clinicians' retrieval of evidence that is rel-evant for a particular patient from primary sources such as randomized controlled trials and meta-analyses. To help address those barriers, we investigated machine learning algorithms that find clinicalstudies with high clinical impact from PubMedÒ.Methods:Our machine learning algorithms use a variety of features including bibliometric features (e.g.,citation count), social media attention, journal impact factors, and citation metadata. The algorithmswere developed and evaluated with a gold standard composed of 502 high impact clinical studies thatare referenced in 11 clinical evidence-based guidelines on the treatment of various diseases. We testedthe following hypotheses: (1) our high impact classifier outperforms a state-of-the-art classifier basedon citation metadata and citation terms, and PubMed'sÒrelevance sort algorithm; and (2) the perfor-mance of our high impact classifier does not decrease significantly after removing proprietary featuressuch as citation count.Results:The mean top 20 precision of our high impact classifier was 34% versus 11% for the state-of-the-art classifier and 4% for PubMed'sÒrelevance sort (p = 0.009); and the performance of our high impactclassifier did not decrease significantly after removing proprietary features (mean top 20 precision = 34%vs. 36%; p = .085).Conclusion:The high impact classifier, using features such as bibliometrics, social media attention andMEDLINEÒmetadata, outperformed previous approaches and is a promising alternative to identifying high impact studies for clinical decision support.

**** *Artigo_125
Changing the Rules of the Game: How Do We Measure Success in Social Media?
Ours will be the generation proud to say we shifted the sands of educational deserts by open access and proliferation, seeding of data sharing, and watering grassroots research in resource-compromised environments. Universal "social" media is defining features of modern

professional life that provide powerful modes of knowledge acquisition/sharing to that end. Altmetric and other measurements stratify academic communications according to this alternate, online media presence (not academic penetrance). Are they meaningless, self-absorbed integers, or reliable yardsticks of scientific and educational prowess? Far beyond this trite, patronizing question from the minds of outdated, terrified technophobes, the real impact of “social” media is not narcissistic solipsism. Instant dissemination of contemporary surgical controversies on a truly global level drives improved (or at least reflective) health care for all. While a numerical assignment of value according to views, “likes,” impressions, or “retweets” may seem meaningless to cynical, established academics, the impetus for universal improvement is self-evident. Electronic data and opinion sharing may not balance the inequity between low- and high-income countries, but it keeps it in perspective. The best way to shift desert sands is to blow on them constantly.
social media, Twitter, altmetrics, Publons

**** *Artigo_126
Characteristics of the similarity index in a Korean medical journal
Journal editors have exercised their control over submitted papers having a high similarity index. Despite widespread suspicion of possible plagiarism on a high similarity index, our study focused on the real effect of the similarity index on the value of a scientific paper. This research examined the percent values of the similarity index from 978 submitted (420 published) papers in the Korean Journal of Anesthesiology since 2012. Thus, this study aimed to identify the correlation between the similarity index and the value of a paper. The value of a paper was evaluated in two distinct phases (during a peer-review process vs. after publication), and the value of a published paper was evaluated in two aspects (academic citation vs. social media appearance). Yearly mean values of the similarity index ranged from 16% to 19%. There were 254 papers cited at least once and 179 papers appearing at least once in social media. The similarity index affected the acceptance/rejection of a paper in various ways; although the influence was not linear and the cutoff measures were distinctive among the types of papers, both extremes were related to a high rate of rejection. After publication, the similarity index had no effect on academic citation or social media appearance according to the paper. The finding suggested that the similarity index no longer had an influence on academic citation or social media appearance according to the paper after publication, while the similarity index affected the acceptance/rejection of a submitted paper. Proofreading and intervention for finalizing the draft by the editors might play a role in achieving uniform quality of the publication.
Bibliometrics, Literature based discovery, Peer review, Plagiarism, Similarity index, Social media

**** *Artigo_127
Citation indices for social media articles in urology
ObjectiveTo evaluate the impact of publications on urolog icalparticipation in social media (SoMe) by virtue of citations inthe urological and non-urological literature.Materials and MethodsOn 15 March 2016, a PubMed search was undertaken usingthe names of the major SoMe platforms in current use andassociated with the field of urology. The search term ‘urolog*’was used to specifically capture articles that could beassociated with ‘urology’, ‘urologist’ or ‘urological’. Exclusioncriteria for analysis included non-English language articles,articles published for the first time online in any form after 1March 2015, articles irrelevant to the topic of SoMe, andletters of correspondence. Included articles were thensearched in Google Scholar and citations analysed todetermine if citations were from the urolog ical literature ornon-urological literature . Citations from non-urologicaljournals were

considered to be as such even if authored byurologists and on the subject of urology and SoMe. ResultsPrior to exclusions as defined in the methods, our PubM edsearch yielded 232 articles of which 17 were non-Englishlanguage and 66 had been published after 1 March 2015.Allowing for 12 months after the most recent articles werepublished, we found that the mean number of total citationsin any journal was 20.8. There were more citations injournals not specific to urology, with 8.3 citation s inurological journals, compared to 12.6 citations in non-urological journals.ConclusionUrological SoMe journal articles are hig hly ci ted, particularlyin the non-urological literature. It is likely that the magnitudeof citations has positively contributed to the impact factors ofthe almost all journals publishing these manuscripts.
social media, urology, impact factor

**** *Artigo_128
Correlation between Cancer Research Trends and the Importance of Cancers based on Mortality and Diagnosis Rates: An Analysis of Altmetric Data
Aside from the infrequent news pertaining to medical breakthroughs or dangers to the public, medical research, especially in the field of cancer, is rarely discussed in depth. The public does not know the process in which specific fields of medical research receive funding, or how this funding is used to limit issues such as cancer. This study aims to provide clarity on cancer research trends. The amount of research papers pertaining to different types of cancers is compared against mortality and diagnosis rates to determine the amount of research attention given to a type of cancer, in relation to its effects on the general population. Computational tools, such as Python, R, and Microsoft Excel, were used to analyze a dataset of research papers. Python was used to parse through JSON files and extract the abstract and Altmetric score of cancer research papers. R was used to count the appearance of each type of cancer in the abstracts, and create histograms describing Altmetric scores and file frequency. Microsoft Excel was used to find correlations between Altmetrics' data and Canadian Cancer Society data, linking the amount of research to the impacts of cancer based on deaths and new cases. The analysis from these tools revealed that breast cancer was the most researched cancer by a large margin, with nearly 1,700 papers, which is approximately four times the amount of the next leading type of cancer – prostate cancer. Although there were many research papers on the field of cancer, the Altmetric scores revealed that most of these papers did not gain significant online and media attention. Comparing these results to Canadian Cancer Society data showed that breast cancer was receiving more research attention than the mortality and diagnosis rates suggest it should. There were four times more breast cancer research papers than the secondmost researched cancer, prostate cancer. This was despite the fact that breast cancer was fourth in mortality and third in new cases among all types of cancer. Inversely, lung cancer was underrepresented, with only 401 research papers, despite being the deadliest cancer in Canada.
Cancer, Research, Treatment, Big Data, Altmetrics

**** *Artigo_129
Dissemination of 2014 dual antiplatelet therapy (DAPT) trial a systematic review of scholarly and media attention over 7 months
Objective: To explore how the results from the 2014 dual antiplatelet therapy (DAPT) trial were disseminated to the scientific community and online media.
Design: A a systematic review of scholarly and public attention surrounding the DAPT study.
Settings: Data were collected from the ISI Web of Knowledge, Google Scholar, PubMed Commons, EurekAlert, the DAPT study website (www.daptstudy.org) and the New England Journal of Medicine website (for scholarly attention) and Altmetric Explorer, Snap Bird, YouTube (for public attention) citing DAPT study results appearing from 16 November 2014 to 10 June 2015. Participants: No participants were involved in this study. Main outcome

measure: Proportion of contents highlighting the increased risk of mortality and critical to the author's interpretation of the results. We identified 425 items reported by seven sources; 164 (39%) disseminated the authors' interpretation via an electronic link or a reference, with no additional text. Among 81 items (19 %), the message favoured prolonged treatment and consequently overstated the article conclusions. Among 119 items (28 %), the text was uncertain about the benefit of prolonged treatment but was reported with no or inappropriate mention of increased risk of mortality. Only 34 items (8 %) were uncertain about the benefit of prolonged treatment and mentioned increased risk of mortality. In all, 27 items (6 %) did not favour prolonged treatment, and only 12 of these (3 %) clearly raised some concerns about the reporting of increased risk of death.
Dissemination of the DAPT study results to the scientific community and on different media sources rarely criticised the interpretation of the study results."

**** *Artigo_130
Do altmetrics correlate with the quality of papers? A large-scale empirical study based on F1000Prime data
In this study, we address the question whether (and to what extent, respectively) altmetrics are related to the scientific quality of papers (as measured by peer assessments). Only a few studies have previously investigated the relationship between altmetrics and assessments by peers. In the first step, we analyse the underlying dimensions of measurement for traditional metrics (citation counts) and altmetrics – by using principal component analysis (PCA) and factor analysis (FA). In the second step, we test the relationship between the dimensions and quality of papers (as measured by the post-publication peer-review system of F1000Prime assessments) – using regression analysis. The results of the PCA and FA show that altmetrics operate along different dimensions, whereas Mendeley counts are related to citation counts, and tweets form a separate dimension. The results of the regression analysis indicate that citation-based metrics and readership counts are significantly more related to quality, than tweets. This result on the one hand questions the use of Twitter counts for research evaluation purposes and on the other hand indicates potential use of Mendeley reader counts.
Altmetrics, Citation counts, Principal component analysis, Factor analysis, F1000Prime, Mendeley, Twitter, Altmetric attention score

**** *Artigo_131
Do Mendeley reader counts reflect the scholarly impact of conference papers? An investigation of computer science and engineering
Counts of Mendeley readers may give useful evidence about the impact of published research. Although previous studies have found significant positive correlations between counts of Mendeley readers and citation counts for journal articles, it is not known if this is equally true for conference papers. To fill this gap, Mendeley readership data and Scopus citation counts were extracted for both journal articles and conference papers published in 2011 in four fields for which conferences are important: Computer Science Applications; Computer Software; Building and Construction Engineering; and Industrial and Manufacturing Engineering. Mendeley readership counts correlated moderately with citation counts for both journal articles and conference papers in Computer Science Applications and Computer Software. The correlations were much lower between Mendeley readers and citation counts for conference papers than for journal articles in Building & Construction Engineering and Industrial and Manufacturing Engineering. Hence, there seem to be disciplinary differences in the usefulness of Mendeley readership counts as impact indicators for conference papers, even between fields for which conferences are important.
Mendeley readers, Citation counts, Journal articles, Conference papers, Correlations

**** *Artigo_132
Do ResearchGate Scores create ghost academic reputations?
The academic social network site ResearchGate (RG) has its own indicator, RG Score, for its members. The high profile nature of the site means that the RG Score may be used for recruitment, promotion and other tasks for which researchers are evaluated. In response, this study investigates whether it is reasonable to employ the RG Score as evidence of scholarly reputation. For this, three different author samples were investigated. An outlier sample includes 104 authors with high values. A Nobel sample comprises 73 Nobel winners from Medicine and Physiology, Chemistry, Physics and Economics (from 1975 to 2015). A longitudinal sample includes weekly data on 4 authors with different RG Scores. The results suggest that high RG Scores are built primarily from activity related to asking and answering questions in the site. In particular, it seems impossible to get a high RG Score solely through publications. Within RG it is possible to distinguish between (passive) academics that interact little in the site and active platform users, who can get high RG Scores through engaging with others inside the site (questions, answers, social networks with influential researchers). Thus, RG Scores should not be mistaken for academic reputation indicators.
Academic social networks, ResearchGate, Altmetrics, Research evaluation, Bibliometrics

**** *Artigo_133
Does evaluative scientometrics lose its main focus on scientific quality by the new orientation towards societal impact?
When the meaning of key terms is incompatible in competing taxonomies, a revolution might occur in the field by which the established taxonomy is replaced with another. Since the key term “impact” in scientometrics seems to undergo a taxonomic change, a revolution might be taking place at present: Impact is no longer defined as impact on science alone (measured by citations), but on all sectors of society (e.g. economics, culture, or politics). In this Short Communication, we outline that the current revolution in scientometrics does not only imply a broadening of the impact perspective, but also the devaluation of quality considerations in evaluative contexts. Impact might no longer be seen as a proxy for quality, but in its original sense: the simple resonance in some sectors of society.
Scientific revolution, Research impact, Research quality, Bibliometrics, Altmetrics, Societal impact

**** *Artigo_134
Does Mendeley provide evidence of the educational value of journal articles?
Research articles seem to have direct value for students in some subject areas, even though scholars may be their target audience. If this can be proven to be true, then subject areas with this type of educational impact could justify claims for enhanced funding. To seek evidence of disciplinary differences in the direct educational uptake of journal articles, but ignoring books, conference papers, and other scholarly outputs, this paper assesses the total number and proportions of student readers of academic articles in Mendeley across 12 different subjects. The results suggest that whilst few students read mathematics research articles, in other areas, the number of student readers is broadly proportional to the number of research readers. Although the differences in the average numbers of undergraduate readers of articles varies by up to 50 times between subjects, this could be explained by the differing levels of uptake of Mendeley rather than the differing educational value of disciplinary research. Overall, then, the results do not support the claim that journal articles in some areas have substantially more educational value than average for academia, compared with their research value.

**** *Artigo_135
Effectiveness of altmetrics in transdisciplinary research fields

**** *Artigo_136
Estudio métrico de ALFIN en Iberoamérica: de la bibliometría a las altmetrics
This study identifies the presence, productivity and influence of Ibero-American authors that write about information literacy (InfoLit). Using bibliometric and altmetric indicators, it seeks to analyze the impact and subsequent use of their scholarly works on social and scientific platforms. Fifty-five authors with the highest productivity were identified, based on the results of bibliometric studies on InfoLit carried out on both an international and Ibero-American scale in searches of major databases as well as publications collected in a Latin American wiki. Subsequently an analysis of bibliometric and altmetric indicators at the author and publication level was carried out, based on the results of searches on eight scientific platforms (Google Scholar, ResearchGate, Academia.edu, Mendeley, ORCID, IraLIS, E-LIS and EXIT), three social networks (Facebook, Twitter and LinkedIn), and data provided by a commercial supplier (Altmetric.com). Overall we found a greater presence of authors in ResearchGate (58%), Academia.edu (51%) and Google Scholar (49%) as opposed to Mendeley (25%) and ORCID (18%). Furthermore, as to social platforms, the greatest potential influence lies with Facebook, due to its high number of followers (/ top 10 authors). In addition, an analysis with the Spearman rho statistic, shows among some sources and platforms, a low correlation between the number of citations in Google Scholar and readings in Mendeley (r = 382) and low negative for mentions in blogs (r = 0,-237), Google+ (r = 0, -214) and Twitter (r = 0, -183). In conclusion, both the productivity and the impact-visibility center on specific authors writing about InfoLit, and various measurement resources show that for these authors there is a positive two-way impact from bibliometric to altmetric and vice versa.
Information literacy, bibliometrics, altmetrics, social web, visibility, impact, open access, open science, science 2.0

**** *Artigo_137
Evaluation metrics in science: current status and prospects
The evaluation of science uses a variety of bibliometric indicators mostly based on citations despite not having an unequivocal relationship between citations and scientific quality. These indicators however, encompass more than an indication of visibility, relevance and impact of the articles and may represent in a researcher’s career prestige, job opportunities, career promotion, awards, reserach grants and other rewards.

**** *Artigo_138
Examining the Scientific Productivity of Authors in Altmetrics research, A Study using Lotka’s Law
The fundamental aim of this study was, to analyze the application of Lotka’s law to the research publication, in the field of Altmetrics. The data related to alt metrics were extracted from web of science database, which is a scientific, citation and indexing service, maintained by Thomson Reuters. A total of 215 research publications were published by the researchers, in the field of Alt metrics. The study found out that, the Lotka’s inverse square law is not fit for this data. The study also analyzed the Prolific authors, Authorship pattern and the Degree of Collaboration"
Lotka’s Law, Web of Science, Degree of Colloboration

**** *Artigo_139
Exploring Features for Predicting Policy Citations
In this study we performed an initial investigation and evaluation of altmetrics and their

relationship with public policy citation of research papers. We examined methods for using altmetrics and other data to predict whether a research paper is cited in public policy and applied receiver operating characteristic curve on various feature groups in order to evaluate their potential usefulness. From the methods we tested, classifying based on tweet count provided the best results, achieving an area under the ROC curve of 0.91.
Altmetrics, Social Media, Public Policy

**** *Artigo_140
Factors associated with online media attention to research: a cohort study of articles evaluating cancer treatments
New metrics have been developed to assess the impact of research and provide an indication of online media attention and data dissemination. We aimed to describe online media attention of articles evaluating cancer treatments and identify the factors associated with high online media attention.
We systematically searched MEDLINE via PubMed on March 1, 2015 for articles published during the first 6 months of 2014 in oncology and medical journals with a diverse range of impact factors, from 3.9 to 54.4, and selected a sample of articles evaluating a cancer treatment regardless of study design. Altmetric Explorer was used to identify online media attention of selected articles. The primary outcome was media attention an article received online as measured by Altmetric score (i.e., number of mentions in online news outlets, science blogs and social media). Regression: analysis was performed to investigate the factors associated with high media attention, and regression coefficients represent the logarithm of ratio of mean (RoM) values of Altmetric score per unit change in the covariate.
Among 792 articles, 218 (27.5%) received no online media attention (Altmetric score = 0). The median [Q1–Q3] Altmetric score was 2.0 [0.0–8.0], range 0.0–428.0. On multivariate analysis, factors associated with high Altmetric score were presence of a press release (RoM = 10.14, 95%CI [4.91–20.96]), open access to the article (RoM = 1.48, 95%CI [1.02–2.16]), and journal impact factor (RoM = 1.10, 95%CI [1.07–1.12]. As compared with observational studies, systematic reviews were not associated with high Altmetric score (RoM = 1.46, 95%CI [0.74–2.86]; P = 0.27), nor were RCTs (RoM = 0.65, 95%CI [0.41–1.02]; P = 0.059) and phase I/II non-RCTs (RoM = 0.58, 95%CI [0.33–1.05]; P = 0.07). The articles with abstract conclusions favouring study treatments were not associated with high Altmetric score (RoM = 0.97, 95%CI [0.60–1.58]; P = 0.91). Most important factors associated with high online media attention were the presence of a press release and the journal impact factor. There was no evidence that study design with high level of evidence and type of abstract conclusion were associated with high online media attention.
Cancer treatment, Media attention, Altmetric score, Journal impact factor, Press release, Open access

**** *Artigo_141
Filling the citation gap: measuring the multidimensional impact of the academic book at institutional level with PlumX
More than 5 years after their emergence, altmetrics are still seen as a promise to complement traditional citation-based indicators. However, no study has focused on their potential usefulness to capture the impact of scholarly books. While recent literature shows that citation indicators cannot fully capture the impact of books, other studies have suggested alternative indicators such as usage, publishers' prestige or library holdings. In this paper, we calculate 18 indicators which range from altmetrics to library holdings, views, downloads or citations to the production of monographs of a Spanish university using the bibliometric suite PlumX from EBSCO. The objective of the study is to adopt a ultidimensional perspective on the analysis of

books and understand the level of complementarity between these different indicators. Also, we compare the overview offered by this range of indicators when applied to monographs with the traditional bibliometric perspective focused on journal articles and citation impact. We observe a low presence of altmetric indicators for monographs, even lower than for journal articles and a predominance of library holdings, confirming this indicator as the most promising one towards the analysis of the impact of books.
Books Monographs, Altmetrics, Usage metrics, Plum analytics, Citation analysis

**** *Artigo_142
Global science discussed in local altmetrics: Weibo and its comparison with Twitter
Local altmetrics is currently an integral part of the altmetrics landscape. This paper aims to investigate the characteristics of microblog altmetrics of the Chinese microblog platform, Weibo, to shed light on cultural differences and draw attention to local altmetrics in developing countries. The analysis is based on 4.4 million records provided by Altmetric.com. Data collected are from March 2014 to July 2015. It is found that Weibo users discuss global science, more actively compared with several international altmetrics sources. Statistical results show strong evidence of the immediacy advantage of metrics based on Weibo as well as Twitter and the general altmetrics over citations. Distribution of Weibo altmetrics on the article level, source level and discipline level are highly skewed. Overall, compared with Twitter, Weibo altmetrics present similar distributions, with some minor variations. To better understand how and why Weibo users discuss global scientific articles, the top weiboed articles, sources and disciplines are identified and further explored. Our content analysis shows that the common motivation of scientific weibos is to disseminate or discuss the articles because they are interesting, surprising, academically useful or practically useful. Conclusion of articles is the most frequently mentioned element in scientific weibos. In addition, different from Twitter, Weibo users have a preference for traditional prestigious journals.
Altmetrics, Weibo, Altmetrics indicators, Scholarly communication, Distribution

**** *Artigo_143
History of Social Media in Surgery
In many ways, the history of surgeons on Twitter echoes the initial resistance and ultimate mass adoption of laparoscopic surgery that led to the field of minimally invasive surgery. At its inception, social media was similarly met with skepticism and concerns of threats to professionalism. Despite these concerns, numerous surgeons and other physicians pioneered the use of social media to establish a virtual medical community and share scientific knowledge regarding a variety of topics including medical conferences, journal publications, and more. After these initial successes, surgeons' views have evolved, leading to mass adoption of social media and participation on Twitter as a means of professional networking and dissemination of science. This article chronicles that history.
social media, Twitter, history of medicine

**** *Artigo_144
How Social Media Is Changing the Practice of Regional Anesthesiology
Purpose of review This review summarizes the current applications of social media in regional anesthesiology, describes ways that specific platforms may promote growth, and briefly discusses limitations and future directions. Recent findings Although Facebook users outnumber Twitter users, the latter has been better studied in regional anesthesiology and may have the advantages of speed and expansion of reach. Highly tweeted publications are more likely to be cited in the medical literature, and twitter-enhanced journal clubs facilitate communication regarding important articles with international colleagues. In both the USA and

internationally, Twitter has been shown to enhance the anesthesiology conference experience, changing communication amongst attendees and non-attendees. YouTube and podcasts are quickly finding a niche in regional anesthesiology for just-in-time training and continuing professional development. Summary Social media use is rapidly growing in regional anesthesiology, and benefits include global interaction and knowledge translation within the specialty and with the general public.
Social media, Regional anesthesia, Anesthesiology, Medical education, Continuing education, Professional development, Twitter, Facebook, YouTube, Podcast

**** *Artigo_145
Impact of Low Back Pain Clinical Trials Measured by the Altmetric Score: Cross-Sectional Study
There is interest from authors and publishers in sharing the results of their studies over the Internet in order to increase their readership. In this way, articles tend to be discussed and the impact of these articles tends to be increased. In order to measure this type of impact, a new score (named Altmetric) was created. Altmetric aims to understand the individual impact of each article through the attention attracted online. Objective: The primary objective of this study was to analyze potential factors related with the publishing journal and the publishing trial that could be associated with Altmetric scores on a random sample of low back pain randomized controlled trials (RCTs). The secondary objective of this study was to describe the characteristics of these trials and their Altmetric scores. We searched for all low back pain RCTs indexed on the Physiotherapy Evidence Database (PEDro; www.pedro.org.au) published between 2010 and 2015. A total of 200 articles were randomly selected, and we extracted data related to the publishing trial, the publishing journal, methodological quality of the trials (measured by the 0-10 item PEDro scale), and total and individual scores of Altmetric mentioned and Altmetric reader. The study was a cross-sectional study, and multivariate regression models and descriptive statistics were used. A total of four variables were associated with Altmetric mentioned score: impact factor (Î²-coefficient=3.4 points), number of years since publication (Î²-coefficient=â€“4.9 points), number of citations divided by years since publication (Î²-coefficient=5.2 points), and descriptive title (Î²-coefficient=â€“29.4 points). Only one independent variable was associated with Altmetric reader score: number of citations divided by years since publication (Î²-coefficient=10.1 points, 95% CI 7.74-12.46). We also found that the majority of articles were published in English, with a descriptive title, and published in open access journals endorsing the Consolidated Standards of Reporting Trials (CONSORT) statement. Researchers should preferably select high impact factor journals for submission and use declarative or interrogative titles, as these factors are likely to increase the visibility of their studies in social media.
Altmetric, social impact, clinical trials, low back pain

**** *Artigo_146
Incipiency of visualization of bibliometric and altmetric indicators in Brazilian Institutional Repositories
The Institutional Repositories have significant potential as sources of information for the preparation of metrics studies aimed at understanding the dynamics of institutional scientific activity. However, Institutional Repositories have deficiencies with regard to visual externalization of their vast scientific content in the form of bibliometric and altmetric indicators. In this context, the aim of this paper was to investigate the capability of national initiatives in OpenAccess Institutional Repositories in the use of bibliometric and altmetric indicators based on information visualization concepts. The research method used was the exploratory case study and the analysis unit comprises 81 Institutional Repositories, active in

Brazilian Science and Technology Institutions, identified in the Directory of Open Access Repositories – OpenDOAR. The results achieved understood the identification and analysis of the presence in the Brazilian Institutional Repositories of bibliometric and altmetric indicators and its graphical visualization. It was observed that the bibliometric indicators showed a higher rate of occurrence in the analyzed sample than altmetric indicators and paucity of Institutional Repositories in providing the indicators using a visual representation.
It is concluded that the discussion of the results can contribute to the understanding of the issues surrounding the use of Institutional Repositories, as sources of information for the preparation and visualization of bibliometric and altmetric indicators on the dynamics of scientific activities performed by Brazilian Science and Technology Institutions.
Visualization, Bibliometric and altmetric indicators, Institutional, Repository, Scientific communication

**** *Artigo_147
Alternative indicators of the scientific activity of the Central University «Marta Abreu» of Las Villas on the Web 2.0
At present day to the use of Web 2.0 for academic purposes, have been generated alternative indicators to measure scientific output in these new platforms. At the Universidad Central "Marta Abreu" de Las Villas is identified a considerable presence of professionals that make intensive use of social and academic networks in order to share their scientific production and promote their visibility. In the center of higher education is unknown the visibility and scientific impact by the users in social networks and Web 2.0 platforms. Is presented as objective of the study to describe the scientific activity of the Universidad Central “Marta Abreu” de Las Villas in Web 2.0, using alternative indicators. To obtain results are used methods in the theoretical and empirical levels, highlighting the bibliometric method. Are identified the users who have more publications and calculate him several indicators within academic networks Research Gate, Google Scholar and comparisons are made with the results obtained on both platforms.
scientific activity, social and academic networks, altmetrics, Universidad Central “Marta Abreu” de Las Villas

**** *Artigo_148
Information exchange on an academic social networking site: A multidiscipline comparison on researchgate Q&A
The increasing popularity of academic social networking sites (ASNSs) requires studies on the usage of ASNSs among scholars and evaluations of the effectiveness of these ASNSs. However, it is unclear whether current ASNSs have fulfilled their design goal, as scholars' actual online interactions on these platforms remain unexplored. To fill the gap, this article presents a study based on data collected from ResearchGate. Adopting a mixed-method design by conducting qualitative content analysis and statistical analysis on 1,128 posts collected from ResearchGate Q&A, we examine how scholars exchange information and resources, and how their practices vary across three distinct disciplines: library and information services, history of art, and astrophysics. Our results show that the effect of a questioner's intention (i.e., seeking information or discussion) is greater than disciplinary factors in some circumstances. Across the three disciplines, responses to questions provide various resources, including experts' contact details, citations, links to Wikipedia, images, and so on. We further discuss several implications of the understanding of scholarly information exchange and the design of better academic social networking interfaces, which should stimulate scholarly interactions by minimizing confusion, improving the clarity of questions, and promoting scholarly content management.

**** *Artigo_149
Introducing altmetrics to the Journal of the Medical Library Association
The Journal of the Medical Library Association's (JMLA's) website now shows a range of article-level metrics (e.g., article views, online mentions, social media attention) for each published article. This editorial explains how "altmetrics" may be better than traditional citations in reflecting the impact of JMLA articles on the practice of health sciences librarianship and provides tips for how to increase the impact of your articles.
Publishing, Librarians

**** *Artigo_150
Is What's "Trending" What's Worth Purchasing? Insights from a National Study of Collection Development Librarians
New forms of data like altmetrics are helping librarians to make smarter decisions about their collections. A recent nationwide study administered to librarians at R1 universities shines light on exactly how these metrics are being applied in academia. This article is based on a presentation from the NASIG 31st Annual Conference. It includes survey results addressing previously unknown rates of technology and metrics uptake among collection development librarians, the most popular citation databases and altmetrics services being used to make decisions, and surprising factors that affect attitudes toward the use of metrics.
Altmetrics, bibliometrics, collection development, selection criteria, survey

**** *Artigo_151
Laboratorios sociales en universidades: Innovación e impacto en Medialab UGR
social laboratories, defined as experimental spaces for co-creation, have recently become the main centers of innovation.
Medialabs are experimental laboratories of technologies and communication media which have co-evolved along with the digital society into mediation laboratories of citizen experimentation, observing a confluence of both models. in recent years, these centers have expanded within the higher education context, generating new forms of innovation and posing the question of how to measure the impact of such open spaces. this paper analyzes the origin and development of social laboratories in spain. it first reviews their historical development from their antecedents in the 19th Century to the most recent initiatives. it focuses specifically on initiatives launched within the university context, highlighting their role as motors of innovation. then, it presents the case of Medialab ugr, a co-creation and digital culture center of social collaboration framed in the digital context. Finally, it offers a first approach towards the assessment of its social impact by using twitter and analyzes its capacity to mobilize and reach non-academic audiences. the findings show the plurality of actors involved in this type of networks as well as the difficulty and complexity of the task for the development of indicators that can comprise both, academic and social interests.
Medialab, altmetrics, digital culture, digital society, social impact, twitter, social media, innovation

**** *Artigo_152
Making the mission visible: altmetrics and nontraditional publishing
Purpose: Whereas traditional book and journal publishing remain the gold standard for many post-secondary institutions, nontraditional publishing is just as prolific at the flagship university in Maine. The university has strong land and sea grant missions that drive a broad research agenda, with an emphasis on community outreach and engagement. However, the impact of researchers' contributions outside of academe is unlikely to be accurately reflected in

promotion, tenure or review processes. Thus, the authors designed a series of altmetrics workshops aimed at seeding conversations around novel ways to track the impact of researchers' diverse scholarly and creative outputs. Design/methodology/approach: This paper presents a case study of the instructional approach taken at the University of Maine library to facilitate discussions of alternative impact assessments that reach beyond traditional publications. Findings: Evaluations revealed an increased awareness of, and interest in, impact tracking tools that capture both traditional scholarship, like journal articles, and nontraditional scholarly and creative outputs, such as videos, podcasts and newsletters. The authors learned that altmetrics provides an entry point into a broader conversation about scholarly impact, and was best received by those whose scholarly output is not always captured by traditional metrics. Practical implications: Scholars are equipped with novel methods for describing the value of their work and discovering a broader audience for their research. Future initiatives will target the needs identified through initial conversations around altmetrics. Originality/value: Altmetrics workshops provide spaces to explore the potential for new tools that capture a range of previously unconsidered measures of impact, and to discuss the implications of those measures.
Altmetrics, Impact, Instutional repository, Scholarly Communication, Library instruction and outreach, Nontraditional publishing

**** *Artigo_153
Measuring impact in research evaluations: a thorough discussion of methods for, effects of and problems with impact measurements
Impact of science is one of the most important topics in scientometrics. Recent developments show a fundamental change in impact measurements from impact on science to impact on society. Since impact measurement is currently in a state of far reaching changes, this paper describes recent developments and facing problems in this area. For that, the results of key publications (dealing with impact measurement) are discussed. The paper discusses how impact is generally measured within science and beyond, which effects impact measurements have on the science system and which problems are associated with impact measurement. The problems associated with impact measurement constitute the focus of this paper: Science is marked by inequality, random chance, anomalies, the right to make mistakes, unpredictability and a high significance of extreme events, which might distort impact measurements. Scientometricians as the producer of impact scores and decision makers as their consumers should be aware of these problems and should consider them in the generation and interpretation of bibliometric results, respectively.
Impact measurement, Citation impact, Societal impact, Altmetrics
Bibliometrics

**** *Artigo_154
Measuring scientific impact beyond academia: An assessment of existing impact metrics and proposed improvements
How does scientific research affect the world around us? Being able to answer this question is of great importance in order to appropriately channel efforts and resources in science. The impact by scientists in academia is currently measured by citation based metrics such as h-index, i-index and citation counts. These academic metrics aim to represent the dissemination of knowledge among scientists rather than the impact of the research on the wider world. In this work we are interested in measuring scientific impact beyond academia, on the economy, society, health and legislation (comprehensive impact). Indeed scientists are asked to demonstrate evidence of such comprehensive impact by authoring case studies in the context of the Research Excellence Framework (REF). We first investigate the extent to which existing

citation based metrics can be indicative of comprehensive impact. We have collected all recent REF impact case studies from 2014 and we have linked these to papers in citation networks that we constructed and derived from CiteSeerX, arXiv and PubMed Central using a number of text processing and information retrieval techniques. We have demonstrated that existing citation-based metrics for impact measurement do not correlate well with REF impact results. We also consider metrics of online attention surrounding scientific works, such as those provided by the Altmetric API. We argue that in order to be able to evaluate wider non-academic impact we need to mine information from a much wider set of resources, including social media posts, press releases, news articles and political debates stemming from academic work. We also provide our data as a free and reusable collection for further analysis, including the PubMed citation network and the correspondence between REF case studies, grant applications and the academic literature.

**** *Artigo_155
Measuring social media activity of scientific literature: an exhaustive comparison of scopus and novel altmetrics big data
This paper measures social media activities of 15 broad scientific disciplines indexed in Scopus database using Altmetric.com data. First, the presence of Altmetric.com data in Scopus database is investigated, overall and across disciplines. Second, a zerotruncated negative binomial model is used to determine the association of various factors with increasing or decreasing citations. Lastly, the effectiveness of altmetric indices to identify publications with high citation impact is comprehensively evaluated by deploying area under the curve (AUC)—an application of receiver operating characteristic. Results indicate a rapid increase in the presence of Altmetric.com data in Scopus database from 10.19% in 2011 to 20.46% in 2015. It was found that Blog count was the most important factor in the field of Health Professions and Nursing as it increased the number of citations by 38.6%, followed by Twitter count increasing the number of citations by 8% in the field of Physics and Astronomy. The results of receiver operating characteristic show that
altmetric indices can be a good indicator to discriminate highly cited publications, with an encouragingly AUC = 0.725 between highly cited publications and total altmetric count. Overall, findings suggest that altmetrics can be used to distinguish highly cited publications. The implications of this research are significant in many different directions. Firstly, they set the basis for a further investigation of altmetrics efficiency to predict publications impact and most significantly promote new insights for the measurement of research outcome dissemination over social media.
Altmetrics, Scopus, Comparative analysis, Research evaluation

**** *Artigo_156
Measuring the impact of CPJ on pharmacy practice

**** *Artigo_157
Mendeley readership as a filtering tool to identify highly cited publications
This study presents a large-scale analysis of the distribution and presence of Mendeley readership scores over time and across disciplines. We study whether Mendeley readership scores (RS) can identify highly cited publications more effectively than journal citation scores (JCS). Web of Science (WoS) publications with digital object identifiers (DOIs) published during the period 2004–2013 and across five major scientific fields were analyzed. The main result of this study shows that RS are more effective (in terms of precision/recall values) than JCS to identify highly cited publications across all fields of science and publication years. The findings also show that 86.5% of all the publications are covered by Mendeley and have at least

one reader. Also, the share of publications with Mendeley RS is increasing from 84% in 2004 to 89% in 2009, and decreasing from 88% in 2010 to 82% in 2013. However, it is noted that publications from 2010 onwards exhibit on average a higher density of readership versus citation scores. This indicates that compared to citation scores, RS are more prevalent for recent publications and hence they could work as an early indicator of research impact. These findings highlight the potential and value of Mendeley as a tool for scientometric purposes and particularly as a relevant tool to identify highly cited publications.

**** *Artigo_158
Metrics and the Scientific Literature: Deciding What to Read

**** *Artigo_159
Metrics for Medical Journals

**** *Artigo_160
Newsworthiness vs scientific impact: are the most highly cited urology papers the most widely disseminated in the media?
Objective: To assess whether a correlation exists between newsworthiness (Altmetric score) and scientific impact markers, such as citation analysis, impact factors, and levels of evidence. The top five most cited articles for the year 2014 and 2015 from the top 10 ranking urology journals (Scientific Impact Group) were identified. The top 50 articles each in 2014 and 2015 were identified from Altmetric support based on media activity (Media Impact Group). We determined the number of citations that these articles received in the scientific literature, and calculated correlations between citations with Altmetric scores. In the Scientific Impact Group, the mean number of citations per article was 37.6, and the most highly cited articles were oncology guidelines. The mean Altmetric score in these articles was 14.8. There was a weak positive correlation between citations and Altmetric score ($rs = 0.35$, 95% confidence interval 0.16–0.52, $P < 0.001$). In the Media Impact Group, the mean Altmetric score was 121.1 and most widely shared articles all related to sexual medicine. In this group, the mean number of citations was 9.7 and there was a weak negative correlation between Altmetric score and citations ($rs = 0.20$, $P = 0.046$). The top articles based on Altmetric scores were not highly cited, suggesting that publications receiving the most media attention may not be the most scientifically rigorous, or that this audience places greater value on different subjects than the scientific community.
Altmetrics, citations, urology, newsworthiness, digital media

**** *Artigo_161
On the differences between citations and altmetrics: An investigation of factors driving altmetrics vs. citations for Finnish articles
This study examines a range of factors associating with future citation and altmetric counts to a paper. The factors include journal impact factor, individual collaboration, international collaboration, institution prestige, country prestige, research funding, abstract readability, abstract length, title length, number of cited references, field size, and field type and will be modelled in association with citation counts, Mendeley readers, Twitter posts, Facebook posts, blog posts, and news posts. The results demonstrate that eight factors are important for increased citation counts, seven different factors are important for increased Mendeley readers, eight factors are important for increased Twitter posts, three factors are important for increased Facebook posts, six factors are important for increased blog posts, and five factors are important for increased news posts. Journal impact factor and international collaboration are the two factors that significantly associate with increased citation counts and with all altmetric scores.

Moreover, it seems that the factors driving Mendeley readership are similar to those driving citation counts. However, the altmetric events differ from each other in terms of a small number of factors; for instance, institution prestige and country prestige associate with increased Mendeley readers and blog and news posts, but it is an insignificant factor for Twitter and Facebook posts. The findings contribute to the continued development of theoretical models and methodological developments associated with capturing, interpreting, and understanding altmetric events.

**** *Artigo_162
Online distribution channel increases article usage on Mendeley: a randomized controlled trial

Prior research shows that article reader counts (i.e. saves) on the online reference manager, Mendeley, correlate to future citations. There are currently no evidenced-based distribution strategies that have been shown to increase article saves on Mendeley. We conducted a 4-week randomized controlled trial to examine how promotion of article links in a novel online cross-publisher distribution channel (TrendMD) affect article saves on Mendeley. Four hundred articles published in the Journal of Medical Internet Research were randomized to either the TrendMD arm (n = 200) or the control arm (n = 200) of the study. Our primary outcome compares the 4-week mean Mendeley saves of articles randomized to TrendMD versus control. Articles randomized to TrendMD showed a 77% increase in article saves on Mendeley relative to control. The difference in mean Mendeley saves for TrendMD articles versus control was 2.7, 95% CI (2.63, 2.77), and statistically significant ($p < 0.01$). There was a positive correlation between pageviews driven by TrendMD and article saves on Mendeley (Spearman's rho $r = 0.60$). This is the first randomized controlled trial to show how an online cross-publisher distribution channel (TrendMD) enhances article saves on Mendeley. While replication and further study are needed, these data suggest that cross-publisher article recommendations via TrendMD may enhance citations of scholarly articles.
Bibliometrics, Mendeley, Randomized controlled trial, Article usage, Academic journals Impact, TrendMD, Knowledge dissemination

**** *Artigo_163
Perpetuating the myth of the return of native forests
Viña et al. imply that native forests account for China's marked increase in tree cover and that tree plantations play a minimal role. All 71 tweets linked to the article reinforce the idea that China's native forests are returning, whereas a review of their methodology indicates that it is not likely accurate. Referring news articles (n = 19) were dominated by terms associated with native forests, whereas tree plantations were rarely mentioned.
reforestation, tree farms, plantations, native forest, forest, safforestation

**** *Artigo_164
Predicting citations from mainstream news, weblogs and discussion forums
The growth in the alternative digital publishing is widening the breadth of scholarly impact beyond the conventional bibliometric community. Thus, research is becoming more reachable both inside and outside of academic institutions and are found to be shared, downloaded and discussed in social media. In this study, we linked the scientific articles found in mainstream news, weblogs and Stack Overflow to the citation database of peer-reviewed literature called Scopus. We then explored how standard graph-based influence metrics can be used to measure the social impact of scientific articles. We also proposed the variant of Katz centrality metrics called EgoMet score to measure the local importance of scientific articles in its ego network. Later we evaluated these computed graph-based influence metrics by predicting absolute

citations. Our results of the prediction model describe 34% variance to predict citations from blogs and mainstream news and 44% variance to predict citations from Stack Overflow.
Graphs, Centrality, Impact, Prediction, Altmetrics

**** *Artigo_165
Predicting Research that will be Cited in Policy Documents
Scientific publications and other genres of research output are increasingly being cited in policy documents. Citations in documents of this nature could be considered a critical indicator of the significance and societal impact of the research output. In this study, we built classification models that predict whether a particular research work is likely to be cited in a public policy document based on the attention it received online, primarily on social media platforms. We evaluated the classifiers based on their accuracy, precision, and recall values. We found that Random Forest and Multinomial Naive Bayes classifiers performed better overall.
Public Policy, Policy documents, Altmetrics, Social Media

**** *Artigo_166
Quality assessment of scientific outputs using the BWM
Assessing the quality of scientific outputs (i.e. research papers, books and reports) is a challenging issue. Although in practice, the basic quality of scientific outputs is evaluated by committees/peers (peer review) who have general knowledge and competencies. However, their assessment might not comprehensively consider different dimensions of the quality of the scientific outputs. Hence, there is a requirement to evaluate scientific outputs based on some other metrics which cover more aspects of quality after publishing, which is the aim of this study. To reach this aim, first different quality metrics are identified through an extensive literature review. Then a recently developed multicriteria methodology (best worst method) is used to find the importance of each quality metric. Finally, based on the importance of each quality metric and the data which are collected from Scopus, the quality of research papers published by the members of a university faculty is measured. The proposed model in this paper provides the opportunity to measure quality of research papers not only by considering different aspects of quality, but also by considering the importance of each quality metric. The proposed model can be used for assessing other scientific outputs as well.
Research evaluation, Scientific outputs, Quality metrics, Multi-criteria decision-making, BWM

**** *Artigo_167
Repositórios institucionais de acesso aberto: adequação às novas métricas da web
Institutional open access repositories are essential in today's scholarly communication system. It´s observed significant growth of its use by public institutions of higher education in Brazil in the last fifteen years. The use of the web environment for production, storage, dissemination and access to scientific and technological information grows, impacting the entire structure of scientific communication. This new format needs new indicators for the metric studies of scientific and technological information, as webometric and altmetrics indicators. Through exploratory and descriptive research, it shows how these institutions are adapting their repositories to the new scenario. It was identified that 70% of the repositories provide statistical data on access and download of its items, 22% offer altmetric data, 83% use "identifiers resolution system" of digital objects. It shows that public higher education institutions are now adapting their repositories to the new scenario of metric information studies, and altmetrics presents incipient results.
Institutional Repositories, Open Access, Web Metrics, Scientific Communication, Indicators

**** *Artigo_168
Research Support in Australian Academic Libraries: Services, Resources, and Relationships
In the last decade Australian academic libraries have increasingly aligned their research support services with assessment criteria used in the national research evaluation exercise (Excellence for Research in Australia). The same period has seen growing interest in research impact outside of traditional measures, such as bibliometrics. Social media has provided opportunities for research dissemination and new tools, altmetrics, to measure these activities have emerged. This article reports on research into the extent and nature of research support services at Australian academic libraries, how the services are managed, and the factors that influence their development and delivery. Quantitative and qualitative research methods were used to compare the findings with an earlier study and to provide a deeper understanding of research support in Australia. Three key themes, services, staff and resourcing, and relationships, are discussed in relation to the management and challenges faced in providing research support.
Australia, academic libraries, research support, bibliometrics, altmetrics, research evaluation

**** *Artigo_169
ResearchGate articles: Age, discipline, audience size, and impact
The large multidisciplinary academic social website ResearchGate aims to help academics to connect with each other and to publicize their work. Despite its popularity, little is known about the age and discipline of the articles uploaded and viewed in the site and whether publication statistics from the site could be useful impact indicators. In response, this article assesses samples of ResearchGate articles uploaded at specific dates, comparing their views in the site to their Mendeley readers and Scopus-indexed citations. This analysis shows that ResearchGate is dominated by recent articles, which attract about three times as many views as older articles. ResearchGate has uneven coverage of scholarship, with the arts and humanities, health professions, and decision sciences poorly represented and some fields receiving twice as many views per article as others. View counts for uploaded articles have low to moderate positive correlations with both Scopus citations and Mendeley readers, which is consistent with them tending to reflect a wider audience than Scopuspublishing scholars. Hence, for articles uploaded to the site, view counts may give a genuinely new audience indicator.

**** *Artigo_170
ResearchGate versus Google Scholar: Which finds more early citations?
ResearchGate has launched its own citation index by extracting citations from documents uploaded to the site and reporting citation counts on article profile pages. Since authors may upload preprints to ResearchGate, it may use these to provide early impact evidence for new papers. This article assesses the whether the number of citations found for recent articles is comparable to other citation indexes using 2675 recently-published library and information science articles. The results show that in March 2017, ResearchGate found less citations than did Google Scholar but more than both Web of Science and Scopus. This held true for the dataset overall and for the six largest journals in it. ResearchGate correlated most strongly with Google Scholar citations, suggesting that ResearchGate is not predominantly tapping a fundamentally different source of data than Google Scholar. Nevertheless, preprint sharing in ResearchGate is substantial enough for authors to take seriously.
ResearchGate, Early impact, Citation analysis, Altmetrics, Academic social network sites

**** *Artigo_171

Scholarly use of social media and altmetrics: A review of the literature
Social media has become integrated into the fabric of the scholarly communication system in fundamental ways, principally through scholarly use of social media platforms and the promotion of new indicators on the basis of interactions with these platforms. Research and scholarship in this area has accelerated since the coining and subsequent advocacy for altmetrics—that is, research indicators based on social media activity. This review provides an extensive account of the state-of-the art in both scholarly use of social media and altmetrics. The review consists of 2 main parts: the first examines the use of social media in academia, reviewing the various functions these platforms have in the scholarly communication process and the factors that affect this use. The second part reviews empirical studies of altmetrics, discussing the various interpretations of altmetrics, data collection and methodological limitations, and differences according to platform. The review ends with a critical discussion of the implications of this transformation in the scholarly communication system.

**** *Artigo_172
Scientific competition, impact factor, Altmetrics

**** *Artigo_173
SGEM Hot Off the Press: Computer provider order entry (CPOE) and emergency department flow
As part of the Canadian Journal of Emergency Medicine (CJEM) developing social media strategy,1 we are collaborating with the Skeptics' Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency
medicine literature using evidence-based medicine principles. In the Hot Off the Press (HOP) series, we select original
research manuscripts published in CJEM to be summarized and critically appraised on the SGEM website/podcast2 and discussed by the study authors and the online EM community. A similar collaboration is underway between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article and the immediate post-publication critical appraisal from the SGEM podcast, as well as an overview of the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically relevant EM research. In this, the fourth SGEM HOP hosted collaboratively with CJEM, we discuss Gray et al.'s paper3 evaluating the impact of computerized provider order entry on patient flow through a quaternary emergency department in London, Ontario.
medical order entry systems, emergency department, efficiency

**** *Artigo_174
SGEM Hot Off the Press: Delayed complications of sternal fractures
As part of the Canadian Journal of Emergency Medicine (CJEM) developing social media strategy, 1 we are collaborating with the Skeptics' Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency medicine literature using evidence-based medicine principles. In the Hot Off the Press (HOP) series, we select original research manuscripts published in CJEM to be summarized and critically appraised on the SGEM website/podcast 2 and discussed by the study authors and the online EM community. A similar collaboration is underway between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article and the immediate post-publication critical appraisal from the SGEM podcast, as well as an overview of the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically relevant EM research. In this, the fifth

SGEM HOP hosted collaboratively with CJEM, we discuss Racine et al.'s paper describing delayed complications and functional outcomes of isolated sternal fractures after emergency department discharge
sternal fracture, trauma, thoracic trauma, chest trauma, discharge, FOAMed, EBM, evidence based medicine, social media

**** *Artigo_175
SGEM Hot Off the Press: Management of bronchiolitis in community hospitals
As part of the Canadian Journal of Emergency Medicine's (CJEM) developing social media strategy, 1 we are collaborating with the Skeptics' Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency medicine literature using evidence-based medicine principles. In the "Hot Off the Press" (HOP) series, we select original research manuscripts published in CJEM to be summarized and critically appraised on the SGEM website/podcast and discussed by the study authors and the online EM community. A similar collaboration is underway between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article and the immediate post-publication critical appraisal from the SGEM podcast, as well as an overview of the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically-relevant EM research. In the sixth SGEM HOP hosted collaboratively with CJEM, we discuss Plint and colleagues' report 2 on the treatment of bronchiolitis in Canadian community emergency departments.
Bronchiolitis, medical education, knowledge translation

**** *Artigo_176
SGEM Hot Off the Press: ultrasound during critical care simulation: a randomized crossover study
As part of the Canadian Journal of Emergency Medicine's (CJEM) developing social media strategy, 1 we are collaborating with the Skeptics' Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency medicine (EM) literature using evidence-based medicine principles. In the "Hot Off the Press" series, we select original research manuscripts published in CJEM to be featured on the SGEM website/podcast 2 and discussed by the study authors and the online EM community. A similar collaboration is underway between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article the immediate post-publication synthesis from the SGEM podcast, commentary by the first author, and the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically relevant EM research. In this, the third SGEM HOP hosted collaboratively with CJEM, we discuss Olszynski et al. 's randomized crossover study evaluating the use of ultrasound simulator devices during critical care simulation
ultrasound, education, simulation, social media

**** *Artigo_177
SlideShare presentations, citations, users, and trends: A professional site with academic and educational uses
SlideShare is a free social website that aims to help users distribute and find presentations. Owned by LinkedIn since 2012, it targets a professional audience but may give value to scholarship through creating a long-term record of the content of talks. This article tests this hypothesis by analyzing sets of general and scholarly related SlideShare documents using content and citation analysis and popularity statistics reported on the site. The results suggest that academics, students, and teachers are a minority of SlideShare uploaders, especially since

2010, with most documents not being directly related to scholarship or teaching. About two thirds of uploaded SlideShare documents are presentation slides, with the remainder often being files associated with presentations or video recordings of talks. SlideShare is therefore a presentation-centered site with a predominantly professional user base. Although a minority of the uploaded SlideShare documents are cited by, or cite, academic publications, probably too few articles are cited by SlideShare to consider extracting SlideShare citations for research evaluation. Nevertheless, scholars should consider SlideShare to be a potential source of academic and nonacademic information, particularly in library and information science, education, and business.

**** *Artigo_178
Social impact assessment of scientist from mainstream news and weblogs
Research policy makers, funding agencies, universities and government organizations evaluate research output or impact based on the traditional citation count, peer review, h-index and journal impact factors. These impact measures also known as bibliometric indicators are limited to the academic community and cannot provide the broad perspective of research impact in public, government or business. The understanding that scholarly impact outside scientific and academic sphere has given rise to an area of scientometrics called alternative metrics or "altmetrics." Moreover, researchers in this area incline to center around gauging scientific activity via social media, namely Twitter. However, these count-based measurements of impact are sensitive to gaming as they lack concrete references to the primary source. In this work, we expand a conventional citation graph to a heterogeneous graph of publications, scientists, venues, organizations based on more reliable social media sources such as mainstream news and weblogs. Our method is composed of two components: the first one is combining the bibliometric data with social media data like blogs and mainstream news. The second component investigates how standard graph-based metrics can be applied to a heterogeneous graph to predict the academic impact. Our result showed moderate correlations and positive associations between the computed graph-based metrics with academic impact and also reasonably predict the academic impact of researchers.
Altmetrics, Heterogeneous, Graph, Impact, h-index, Scientist, Prediction

**** *Artigo_179
Social Media Attention Increases Article Visits: An Investigation on Article-Level Referral Data of PeerJ
In order to better understand the effect of social media in the dissemination of scholarly articles, employing the daily updated referral data of 110 PeerJ articles collected over a period of 345 days, we analyze the relationship between social media attention and article visitors directed by social media. Our results show that social media presence of PeerJ articles is high. About 68.18% of the papers receive at least one tweet from Twitter accounts other than @PeerJ, the official account of the journal. Social media attention increases the dissemination of scholarly articles. Altmetrics could not only act as the complement of traditional citation measures but also play an important role in increasing the article downloads and promoting the impacts of scholarly articles. There also exists a significant correlation among the online attention from different social media platforms. Articles with more Facebook shares tend to get more tweets. The temporal trends show that social attention comes immediately following publication but does not last long, so do the social media directed article views.
altmetrics, social media, Twitter, PeerJ, referral

**** *Artigo_180
The case of #arseniclife: Blogs and Twitter in informal peer review

Using the “#arseniclife” controversy as a case study, we examine the roles of blogs and Twitter in post-publication review. The controversy was initiated by a scientific article about bacteria able to substitute arsenic for phosphorus in its genetic material. We present the debate chronologically, using prominent online media to reconstruct the events. Using tweets that discussed the controversy, we conducted quantitative sentiment analysis to examine skeptical and non-skeptical tones on Twitter. Critiques of and studies refuting the arsenic life hypothesis were publicized on blogs before formal publication in traditional academic spaces and were shared on Twitter, influencing issue salience among a range of audiences. This case exemplifies the role of new media in informal post-publication peer review, which can complement traditional peer review processes. The implications drawn from this case study for future conduct and transparency of both formal and informal peer review are discussed.
blogs, informal post-publication peer review, new media, sentiment analysis, Twitter

**** *Artigo_181
The impact of open access on the medical literature: a review of current literature
the aim of the article is to conduct an overview of the impact of OA on the medical articles based on 3-part categorization.
Data were identified by a search strategy with eight combinations of keywords (open access, citation impact, citation advantage, citation count, article download, article usage, social media attention, altmetrics) and searched in three different databases. the analysis was conducted on 107 studies dealing with citations, downloads and social impact. Sixty-seven of them simply employed the counting citations to OA and non-OA articles; nineteen articles compared the downloads and citations counts; and twenty-one articles investigated the social impact of OA articles. Twenty-five articles investigated the citations, download counts, and social impact of medical articles. The studies investigating the citation impact mostly showed citation advantages. Those that employed citation and download counts of medical articles using randomized controlled trials showed that OA articles were downloaded significantly more frequently, but found no evidence of a citation advantage for open access articles. The citation advantage from open access might be caused by other factors. Results of the studies comparing the social media attention and citations/downloads of the medical articles are often diametrically opposed.
open access, citation impact, citation advantage, citation count, article download, article usage, article level metrics, altmetrics, social media attention

**** *Artigo_182
The Journal and Social Media

**** *Artigo_183
The Journal Impact Factor: Moving Toward an Alternative and Combined Scientometric Approach
The Journal Impact Factor (JIF) is a single citation metric, which is widely employed for ranking journals and choosing target journals, but is also misused as the proxy of the quality of individual articles and academic achievements of authors. This article analyzes Scopus-based publication activity on the JIF and overviews some of the numerous misuses of the JIF, global initiatives to overcome the ‘obsession’ with impact factors, and emerging strategies to revise the concept of the scholarly impact. The growing number of articles on the JIF, most of which are in English, reflects interest of experts in journal editing and scientometrics toward its uses, misuses, and options to overcome related problems. Solely displaying values of the JIFs on the journal websites is criticized by experts as these average metrics do not reflect skewness of citation distribution of individual articles. Emerging strategies suggest to complement the JIFs

with citation plots and alternative metrics, reflecting uses of individual articles in terms of downloads and distribution of related information through social media and networking platforms. It is also proposed to revise the original formula of the JIF calculation and embrace the concept of the impact and importance of individual articles. The latter is largely dependent on ethical soundness of the journal instructions, proper editing and structuring of articles, efforts to promote related information through social media, and endorsements of professional societies.
Journal Impact Factor, Periodicals as Topic, Editorial Policies, Publishing, Publication Ethics, Science Communication

**** *Artigo_184
The new alchemy: Online networking, data sharing and research activity distribution tools for scientists
There is an abundance of free online tools accessible to scientists and others that can be used for online networking, data sharing and measuring research impact. Despite this, few scientists know how these tools can be used or fail to take advantage of using them as an integrated pipeline to raise awareness of their research outputs. In this article, the authors describe their experiences with these tools and how they can make best use of them to make their scientific research generally more accessible, extending its reach beyond their own direct networks, and communicating their ideas to new audiences. These efforts have the potential to drive science by sparking new collaborations and interdisciplinary research projects that may lead to future publications, funding and commercial opportunities. The intent of this article is to: describe some of these freely accessible networking tools and affiliated products; demonstrate from our own experiences how they can be utilized effectively; and, inspire their adoption by new users for the benefit of science.
Online networking, Social networking, Research data sharing, altmetrics, Alternative metrics

**** *Artigo_185
The relationship between altmetric score with received citations in Iranian pediatrics articles
Today, in addition to citations and with the expansion of social media, the use of altmetrics has gained attention as a tool necessary for evaluating the effects of scientific publications. The present study intended to monitor Iranian pediatrics articles, as one of the leading areas of scientific publications in Iran, between the years 2010-2016 using altmetrics and citation-metrics, and then evaluate the relationship between the altmetric score and number of received citations. This is a practical study of the analytical descriptive type and the research methodology is scientometrics. This research included 1332 research articles, review articles and conference articles in the field of pediatrics from Iran during 2010-2016, published in the Web of Science. Authors, year, journal and social media was determined in these articles. Data analysis was carried out using SPSS21 software and descriptive and inferential statistics (Kolmogorov-Smirnov test and Spearman correlation). A total of 1138 articles have citations and 256 articles had altmetric activity. The results indicate a significant correlation among the articles' altmetric scores and number of received citations. Among the data sources of altmetric score, mentions of articles in Mendeley, Twitter, and Facebook had the highest ranking. The number of times an article was read in Mendeley had a significant correlation with the number of citations. It seems that altmetrics better represent the impact of newer articles, while older articles had received more citations. In addition, a high number of reads in Mendeley correlates with received citations. However, Mendeley reads do not involve altmetric score calculation algorithms, and this should be implemented in the future.
Pediatrics, Articles, Scientometrcis, Altmetric, Citation, Iran

**** *Artigo_186
The role of open access in a changing academy: reflections on a new publishing paradigm

**** *Artigo_187
The unbearable emptiness of tweeting—About journal articles
Enthusiasm for using Twitter as a source of data in the social sciences extends to measuring the impact of research with Twitter data being a key component in the new altmetrics approach. In this paper, we examine tweets containing links to research articles in the field of dentistry to assess the extent to which tweeting about scientific papers signifies engagement with, attention to, or consumption of scientific literature. The main goal is to better comprehend the role Twitter plays in scholarly communication and the potential value of tweet counts as traces of broader engagement with scientific literature. In particular, the pattern of tweeting to the top ten most tweeted scientific dental articles and of tweeting by accounts is examined. The ideal that tweeting about scholarly articles represents curating and informing about state-of-the-art appears not to be realized in practice. We see much presumably human tweeting almost entirely mechanical and devoid of original thought, no evidence of conversation, tweets generated by monomania, duplicate tweeting from many accounts under centralized professional management and tweets generated by bots. Some accounts exemplify the ideal, but they represent less than 10% of tweets. Therefore, any conclusions drawn from twitter data is swamped by the mechanical nature of the bulk of tweeting behavior. In light of these results, we discuss the compatibility of Twitter with the research enterprise as well as some of the financial incentives behind these patterns.

**** *Artigo_188
The Use of Twitter by Trauma and Orthopaedic Surgery Journals: Twitter Activity, Impact Factor, and Alternative Metrics
Aim: Social media (SoMe) platforms have become leading methods of communication and dissemination of scientific information in the medical community. They allow for immediate discussion and widespread engagement around important topics. It has been hypothesized that the activity on Twitter positively correlates with highly cited articles. The purpose of this study was to analyze the prevalence and activity of Trauma and Orthopaedic Surgery journals on Twitter, with the hypothesis that impact factor is positively associated with Twitter usage. The top 50 Trauma and Orthopaedic Surgery journals, ranked by 2016 Impact Factor were analyzed. The Twitter profiles of each journal or affiliated society were identified. Other SoMe platforms used were also recorded. Twitonomy software (Digonomy Pty Ltd, New South Wales, Australia) was used to analyze the Twitter profiles over a one-year period. Twitter Klout Scores were recorded for each journal to approximate the SoMe influence. Altmetric Scores (the total number of mentions via alternative metrics) were also recorded. Statistical analysis was carried out to identify correlations between journal Impact Factors, SoMe activity, Twitter Klout Scores and Altmetric Scores. Twenty-two journals (44%) had dedicated Twitter profiles. Fourteen journals (28%) were associated with societies that had profiles and 14 journals (28%) had no Twitter presence. The mean Impact Factor overall was 2.16 +/- 0.14 (range, 1.07-5.16). The journals with dedicated Twitter profiles had higher Impact Factors than those without (mean 2.41 vs. 1.61; P=0.005). A greater number of Twitter followers were associated with higher Impact Factors (R2 0.317, P=0.03). Journals with higher Twitter Klout Scores had higher Impact Factors (R2 0.357, P=0.016). Altmetric Score was positively associated with Impact Factor (R2 0.310, P=0.015). Journals with higher numbers of retweets (virtual citations in the Twittersphere) had higher Altmetric Scores (R2 0.463, P=0.015). Trauma and Orthopaedic Surgery journals with dedicated Twitter profiles have higher Impact Factors than those without.

Altmetrics is likely to play a significant role in the literature evaluation going forward along with the traditional metrics. The engagement with Twitter by Trauma and Orthopaedic surgeons should be encouraged.
twitter, social media, klout score, altmetric, alternative metrics, impact factor, orthopaedic journals, trauma and orthopaedics, trauma and orthopaedics, influence

**** *Artigo_189
Three practical field normalised alternative indicator formulae for research evaluation
Although altmetrics and other web-based alternative indicators are now commonplace in publishers' websites, they can be difficult for research evaluators to use because of the time or expense of the data, the need to benchmark in order to assess their values, the high proportion of zeros in some alternative indicators, and the time taken to calculate multiple complex indicators. These problems are addressed here by (a) a field normalisation formula, the Mean Normalised Log-transformed Citation Score (MNLCS) that allows simple confidence limits to be calculated and is similar to a proposal of Lundberg, (b) field normalisation formulae for the proportion of cited articles in a set, the Equalised Mean-based Normalised Proportion Cited (EMNPC) and the Mean-based Normalised Proportion Cited (MNPC), to deal with mostly uncited data sets, (c) a sampling strategy to minimise data collection costs, and (d) free unified software to gather the raw data, implement the sampling strategy, and calculate the indicator formulae and confidence limits. The approach is demonstrated (but not fully tested) by comparing the Scopus citations, Mendeley readers and Wikipedia mentions of research funded by Wellcome, NIH, and MRC in three large fields for 2013–2016. Within the results, statistically significant differences in both citation counts and Mendeley reader counts were found even for sets of articles that were less than six months old. Mendeley reader counts were more precise than Scopus citations for the most recent articles and all three funders could be demonstrated to have an impact in Wikipedia that was significantly above the world average.

**** *Artigo_190
Top Altmetric Scores in the Parkinson's Disease Literature
A new class of social web-based metrics for scholarly publications (altmetrics) has surfaced as a complement to traditional citation-based metrics. Our aim was to study and characterize those recent papers in the field of Parkinson's disease which had received the highest Altmetric Attention Scores and to compare this attention measure to the traditional metrics. The top 20 papers in our analysis covered a variety of topics, mainly new disease mechanisms, treatment options and risk factors for the development of PD. The main media sources for these high attention papers were news items and Twitter. The papers were published predominantly in high impact journals, suggesting a correlation between altmetrics and conventional metrics. One paper published in a relatively modest journal received a significant amount of attention, reflecting that public attention does not always parallel the traditional metrics. None of the most influential papers in PD, as reviewed by Ponce and Lozano (2011) made it to our list, suggesting that recent publications receive higher attention scores, and that altmetrics may omit older, seminal work in the field.
Altmetric, impact factor, Parkinson's disease, social media

**** *Artigo_191
Tweeting about journal articles: Engagement, marketing or just gibberish?
This paper presents preliminary results on the analysis of tweets to journal articles in the field of Dentistry. We present two case studies in which we critically examine the contents and context that motivate the tweeting of journal articles. We then focus on a specific aspect, the

role played by journals on self-promoting their contents and the effect this has on the total number of tweets their papers produce. In a context where many are pushing to the use of altmetrics as an alternative or complement to traditional bibliometric indicators. We find a lack of evidence (and interest) on critically examining the many claims that are being made as to their capability to trace evidences of 'broader forms of impact'. Our first results are not promising and question current approaches being made in the field of altmetrics.

**** *Artigo_192
Tweeting birds: online mentions predict future citations in ornithology
The rapid growth of online tools to communicate scientific research raises the important question of whether online attention is associated with citations in the scholarly literature. The Altmetric Attention Score (AAS) quantifies the attention received by a scientific publication on various online platforms including news, blogs and social media. It has been advanced as a rapid way of gauging the impact of a piece of research, both in terms of potential future scholarly citations and wider online engagement. Here, we explore variation in the AAS of 2677 research articles published in 10 ornithological journals between 2012 and 2016. On average, AAS increased sevenfold in just five years, primarily due to increased activity on Twitter which contributed 75% of the total score. For a subset of 878 articles published in 2014, including an additional 323 ornithology articles from non-specialist journals, an increase in AAS from 1 to 20 resulted in a predicted 112% increase in citation count from 2.6 to 5.5 citations per article. This effect interacted with journal impact factor, with weaker effects of AAS in higher impact factor journals. Our results suggest that altmetrics (or the online activity they measure), as well as complementing traditional measures of scholarly impact in ornithology such as citations, may also anticipate or even drive them.
altmetrics, ornithology, Twitter, impact, citations, social media

**** *Artigo_193
Using Altmetrics for Contextualised Mapping of Societal Impact: From Hits to Networks
In this article, we develop a method that uses altmetric data to analyse researchers' interactions, as a way of mapping the contexts of potential societal impact. In the face of an increasing policy demand for quantitative methodologies to assess societal impact, social media data (altmetrics) has been presented as a potential method to capture broader forms of impact. However, current altmetric indicators were extrapolated from traditional citation approaches and are seen as problematic for assessing societal impact. In contrast, established qualitative methodologies for societal impact assessment are based on interaction approaches. These argue that assessment should focus on mapping the contexts in which engagement among researchers and stakeholders takes place, as a means to understand the pathways to societal impact. Following these interaction approaches, we propose to shift the use of altmetric data towards network analysis of researchers and stakeholders. We carry out two case studies, analysing researchers' networks with Twitter data. The comparison illustrates the potential of Twitter networks to capture disparate degrees of policy engagement. We propose that this mapping method can be used as an input within broader methodologies in case studies of societal impact assessment.
Societal impact, social engagement, open science, altmetrics, twitter, research evaluation

**** *Artigo_194
Open Access Citation Advantage in selected Information Science journals: an extended analysis to altmetrics indicators
Open access refers to scientific literature available free of charge and free of copyright restrictions and licensing for its reuse. An increase in the total number of citations received by

articles available in open access in relation to those of restricted, pay-walled access is expected, according to the Open Access Citation Advantage hypothesis. Objective: Assess the possible citation advantages and mentions on the social web that open access can offer to the Information Science area.
Methodology: Bibliometric and altmetric indicators were analyzed in two journals: Journal of the American Society for Information Science and Scientometrics. Data collection was conducted in the Web of Science, Google Scholar, Altmetric.com and Mendeley. The results indicated that for both journals, open access offers an advantage in the number of citations received by articles. It was also demonstrated that the advantage is maintained over time. This research confirmed the hypothesis of an Open Access Citation Advantage for the journals analyzed in the area of Information Science. This pattern was also observed for the altmetric data
Open Access, Journals, Information Science, Bibliometrics, Altmetrics

**** *Artigo_195
Visibility of Colombian Researchers on Google Scholar and ResearchGate Depending on their Indicators. Differences and Similarities with the Official Classification of the National Science System - COLCIENCIAS
The aim of this study is to contextualize the results obtai-ned regarding the classification of researchers who work in Colombian institutions according to their public Google Scholar - GSC citation profiles (1390 with an H index equal or higher than 5). To this end, the study compares its findings with the data obtained from the collection of Colombian au-thors on a social network named ResearchGate - RG and the local information provided by Colciencias, which is the Colombian agency that publishes researcher classification from a platform named ScienTI. Findings revealed signifi-cant discrepancies between GSC and RG findings regarding the four classification categories Colciencias provided. This suggests that Colciencias must reconsider its assessment cri-teria including new sources and indicators. Considering that the two sources (GSC, RG) and the (h index, RG-Index) indicators behave differently regarding disciplines, Col-ciencias must also be careful with disciplinary assignments adopting International classifications and developing disci-pline related indicators. Colombian academic and research organizations should become more active in recognizing the potential and importance of Internet platforms to visibilize their research work and increase its impact (Ciencia 2.0).
Researchers, Colombia, visibility, altmetrics, Google Scholar, Research Gate, Colciencias, ScienTI, science 2.0, open science.

**** *Artigo_196
What can altmetrics tell us about interest in dental clinical trials?

**** *Artigo_197
What do altmetrics measure? Maybe the broader impact of research on society

**** *Artigo_198
What do computer scientists tweet? Analyzing the link-sharing practice on Twitter
Twitter communication has permeated every sphere of society. To highlight and share small pieces of information with possibly vast audiences or small circles of the interested has some value in almost any aspect of social life. But what is the value exactly for a scientific field? We perform a comprehensive study of computer scientists using Twitter and their tweeting behavior concerning the sharing of web links. Discerning the domains, hosts and individual web pages being tweeted and the differences between computer scientists and a Twitter sample enables us

to look in depth at the Twitter-based information sharing practices of a scientific community. Additionally, we aim at providing a deeper understanding of the role and impact of altmetrics in computer science and give a glance at the publications mentioned on Twitter that are most relevant for the computer science community. Our results show a link sharing culture that concentrates more heavily on public and professional quality information than the Twitter sample does. The results also show a broad variety in linked sources and especially in linked publications with some publications clearly related to community-specific interests of computer scientists, while others with a strong relation to attention mechanisms in social media. This refers to the observation that Twitter is a hybrid form of social media between an information service and a social network service. Overall the computer scientists' style of usage seems to be more on the information-oriented side and to some degree also on professional usage. Therefore, altmetrics are of considerable use in analyzing computer science.

**** *Artigo_199
What is the impact of a research publication?
An increasing number of metrics are used to measure the impact of research papers. Despite being the most commonly used, the 2-year impact factor is limited by a lack of generalisability and comparability, in part due to substantial variation within and between fields. Similar limitations apply to metrics such as citations per paper. New approaches compare a paper's citation count to others in the research area, while others measure social and traditional media impact. However, none of these measures take into account an individual author's contribution to the paper or the number of authors, which we argue are key limitations. The UK's 2014 Research Exercise Framework included a detailed bibliometric analysis comparing 15 selected metrics to a 'gold standard' evaluation of almost 150 000 papers by expert panels. We outline the main correlations between the most highly regarded papers by the expert panel in the Psychiatry, Clinical Psychology and Neurology unit and these metrics, most of which were weak to moderate. The strongest correlation was with the SCImago Journal Rank, a variant of the journal impact factor, while the amount of Twitter activity showed no correlation. We suggest that an aggregate measure combining journal metrics, field-standardised citation data and alternative metrics, including weighting or colour-coding of individual papers to account for author contribution, could provide more clarity.

**** *Artigo_200
What makes papers visible on social media? An analysis of various document characteristics
In this study we have investigated the relationship between different document characteristics and the number of Mendeley readership counts, tweets, Facebook posts, mentions in blogs and mainstream media for 1.3 million papers published in journals covered by the Web of Science (WoS). It aims to demonstrate that how factors affecting various social media-based indicators differ from those influencing citations and which document types are more popular across different platforms. Our results highlight the heterogeneous nature of altmetrics, which encompasses different types of uses and user groups engaging with research on social media.

**** *Artigo_201
Zenodo in the Spotlight of Traditional and New Metrics
In this case study, we aim to explore the characteristics and the reception of files uploaded to Zenodo, and the role the repository plays itself in generating usage. To this end, we first apply descriptive statistics on Zenodo's full set of data record metadata with digital object identifiers (DOIs) until and including January 2017 (n = 141,777 records). Second, we estimate the

coverage of Zenodo datasets in the Data Citation Index as well as of Zenodo journal articles in the Science Citation Index, Social Science Citation Index, and Arts and Humanities Citation Index, Zenodo books and book chapters in the Book Citation Index, and Zenodo conference papers in the Proceedings Citation Index, and analyze their citedness according to the different data record types in Zenodo (e.g., journal article, dataset, book, or conference paper). Third, we provide a bibliometric analysis of Zenodo records by using different metrics for citedness, including citation, usage, and altmetrics. Altmetrics data are gathered from two of the most popular tools for altmetric analyses, PlumX and Altmetric.com, and we compare the results. Moreover, we study how open access and DOIs provided by Zenodo influence the impact of Zenodo data records and we find a tendency toward a positive relationship between permissive access rights and altmetrics in certain data records.
Zenodo, data citation, citation analysis, altmetrics, repository, bibliometrics

**** *Artigo_202
Status of altmetrics granting of articles published in Japanese academic societies
In this study, we analyzed 1,080,840 papers published in the journals of Japanese academic societies from 2006 to 2015 based on the data obtained from major altmetrics measurement services in Japan and the UK. Report. Of the papers published in the journals of Japanese academic societies, only about 1 to 2% were mentioned by social media. The relationship between field, language, year of publication and altmetrics tends to differ depending on the data source used, but it is common that many humanities and social treatises are referred to by social media. Also, even when targeting the same treatise, the range of references on social media collected by the data sources was different.
altmetrics, bibliometrics, research evaluation, scholarly communication, social media

**** *Artigo_203
A altmetria e a interface entre a ciência e a sociedade

**** *Artigo_204
A scientometric analysis of selected GIScience journals
A set of 12,436 papers published in 20 GIScience journals in the period 2000–2014 were analysed to extract publication patterns and trends. This comprehensive scientometric study focuses on multiple aspects: output volume, citations, national output and efficiency (output adjusted with econometric indicators), collaboration, altmetrics (Altmetric score, Twitter mentions, and Mendeley bookmarking), authorship, and length. Examples of notable observations are that 5% countries account for 76% of global GIScience output; a paper published 15 years ago received a median of 12 citations; and the share of international collaborations in GIScience has more than tripled since 2000 (31% papers had authors from multiple countries in 2014, an increase from 10% in 2000).
Scientometrics, GIScience, bibliometrics, altmetrics, social media

**** *Artigo_205
A Systematic Identification and Analysis of Scientists on Twitter
Metrics derived from Twitter and other social media—often referred to as altmetrics—are increasingly used to estimate the broader social impacts of scholarship. Such efforts, however, may produce highly misleading results, as the entities that participate in conversations about science on these platforms are largely unknown. For instance, if altmetric activities are generated mainly by scientists, does it really capture broader social impacts of science? Here we present a systematic approach to identifying and analyzing scientists on Twitter. Our method can identify scientists across many disciplines, without relying on external bibliographic data,

and be easily adapted to identify other stakeholder groups in science. We investigate the demographics, sharing behaviors, and interconnectivity of the identified scientists. We find that Twitter has been employed by scholars across the disciplinary spectrum, with an over-representation
of social and computer and information scientists; under-representation of mathematical, physical, and life scientists; and a better representation of women compared to scholarly publishing. Analysis of the sharing of URLs reveals a distinct imprint of scholarly sites, yet only a small fraction of shared URLs are science-related. We find an assortative mixing with respect to disciplines in the networks between scientists, suggesting the maintenance of disciplinary walls in social media. Our work contributes to the literature both methodologically and conceptually—we provide new methods for disambiguating and identifying particular actors on social media and describing the behaviors of scientists, thus providing foundational information for the construction and use of indicators on the basis of social media metrics.

**** *Artigo_206
Academic Librarians' Knowledge of Bibliometrics and Altmetrics
Objective – To measure the knowledge and opinions that academic librarians have of established and emerging research metrics. Methods – An online survey was distributed to all academic librarians in Oklahoma during Summer 2015. Results – Librarians were less familiar with altmetrics than with bibliometrics, but they viewed altmetrics as effective and were interested in receiving training to learn more about them. Librarians who had been in the profession for over five years knew more about both bibliometrics and altmetrics than newer librarians. Conclusions – Technological advances and changes in the ways that research products are shared have led to the possibility of and need for new ways of measuring research impact. Altmetrics have emerged to fill this need, but academic librarians need more familiarity and training to be able to fulfill a role as providers of these metrics.

**** *Artigo_207
Alternative metric indicators for funding scheme evaluations
Purpose: The purpose of this paper is to investigate the potential of altmetric and webometric indicators to aid with funding agencies' evaluations of their funding schemes. Design/methodology/approach: This paper analyses a range of altmetric and webometric indicators in terms of suitability for funding scheme evaluations, compares them to traditional indicators and reports some statistics derived from a pilot study with Wellcome Trust-associated publications. Findings: Some alternative indicators have advantages to usefully complement scientometric data by reflecting a different type of impact or through being available before citation data. Research limitations/implications: The empirical part of the results is based on a single case study and does not give statistical evidence for the added value of any of the indicators. Practical implications: A few selected alternative indicators can be used by funding agencies as part of their funding scheme evaluations if they are processed in ways that enable comparisons between data sets. Their evidence value is only weak, however. Originality/value: This is the first analysis of altmetrics or webometrics from a funding scheme evaluation perspective.
Altmetrics, Research evaluation, Funding programme, Funding scheme, Funding stream, Webometrics

**** *Artigo_208
Altmetria: a métrica social a serviço de uma ciência mais democrática
Theoretical review of the methods to measure scientific production impact in the area of Metric Studies of Information, focusing on Altmetrics, a more recent approach. The objective of this

study is to demonstrate the rise of altmetrics with the emergence of Web 2.0 and social media, examining the impact and influence of academic activities in these new online platforms. This study addresses altmetrics' origin, concepts, applications, indicators, data sources, tools, and ways to retrieve information from social media platforms, as well as previous or traditional research metrics. It discusses reasons to use alternative indicators and metrics to measure academic research impact and presents the future perspectives that these metrics are opening. It was concluded that Altmetrics can be considered as alternative complementary metrics to traditional metrics because they can give a fair reflection of citations count or global scholarly impact, resulting in a more democratic science.
Altmetrics, Cybermetrics, Bibliometric studies, Social Networks, Scientific production
**** *Artigo_209
Altmetrics

**** *Artigo_210
Altmetrics and Books: Bookmetrix and Other Implementations

**** *Artigo_211
Altmetrics as Traces of the Computerization of the Research Process

**** *Artigo_212
Altmetrics of ""altmetrics"" using Google Scholar, Twitter, Mendeley, Facebook, Google-plus, CiteULike, Blogs and Wiki
We measure the impact of “altmetrics” field by deploying altmetrics indicators using the data from Google Scholar, Twitter, Mendeley, Facebook, Googleplus, CiteULike, Blogs and Wiki during 2010- 2014. To capture the social impact of scientific publications, we propose an index called alt-index, analogues to h-index.
Across the deployed indices, our results have shown high correlation among the indicators that capture social impact. While we observe medium Pearson’s correlation (ρ= .247) among the alt-index and h-index, a relatively high correlation is observed between social citations and scholarly citations (ρ= .646). Interestingly, we find high turnover of social citations in the field compared with the traditional scholarly citations, i.e. social citations are 42.2% more than traditional citations. The social mediums such as Twitter and Mendeley appear to be the most effective channels of social impact followed by Facebook and Google-plus. Overall, altmetrics appears to be working well in the field of “altmetrics”.
Altmetrics, Social Media, Usage Indicators, Alt-index

**** *Artigo_213
Altmetrics can not remain a alternative for a long time
Introduction and objective: The emergence of the Internet and social media is having a powerful influence on the ways in which researchers discover, access, process and communicate information. The methods used by systems measuring the impact of a scientific paper used during the last forty years, and questioned, are demonstrating more clearly insufficient in this new context, they do not provide information of all interactions that occur in the new social media. Altmetrics emerges as a complementary resource and does not exclude traditional metrics to provide a richer view of the influence of an investigation. Method: Narrative review. This article presents an analysis of the implications of altmetrics, advantages, disadvantages, and achievements made. It is considered that altmetrics provides a broader view of the social implications of research beyond the purely academic. Discussion: While it is not easy to disentangle what is the meaning of altmetrics and what kind of impact accurately measures. altmetrics although it is not yet considered by the agencies of scientific accreditation, is already

being used by some of the most important publishers, as it provides an immediate picture of the impact of an investigation, and ultimately may be a mechanism to predict the future academic impact of research, there are still many aspects to consider as all related to standardization of sources and methods of compilation of the results, but we can say that has altmetrics come and will have to be taken into account in the immediate future by lso accreditation bodies and research funding.
altmetrics, research, evaluation, impact, social networking, research 2.0

**** *Artigo_214
Altmetrics, huh?

**** *Artigo_215
Altmetrics: diversifying the understanding of influential scholarship
The increase in the availability of data about how research is discussed, used, rated, recommend, saved and read online has allowed researchers to reconsider the mechanisms by which scholarship is evaluated. It is now possible to better track the influence of research beyond academia, though the measures by which we can do so are not yet mature enough to stand on their own. In this article, we examine a new class of data (commonly called “altmetrics”) and describe its benefits, limitations and recommendations for its use and interpretation in the context of research assessment. This article is published as part of a collection on the future of research assessment.

**** *Artigo_216
Altmetrics: Documenting the Story of Research

**** *Artigo_217
Altmetrics: Just measuring the “buzz”?

**** *Artigo_218
Altmetrics: medición de la influencia de los medios en el impacto social de la investigación
Social media is changing the way we interact, present ideas and information and judgethe quality of content and contributions. In recent years there have been hundreds ofplatforms to freely share all kinds of information and connect across networks. Thesenew tools generate activity statistics and interactions among users such as mentions,retweets, conversations, comments on blogs or Facebook; managers references showingpopularity ratings of more references shared by other researchers or repositories thatgenerate statistics of visits or downloads of articles. This paper analyzes that havemeaning and implications altmetrics, what are its advantages and critical platforms(Almetric.com, ImpactStory, Plos altmetrics, PlumX), reports progress and benefits forauthors, publishers and librarians. It concluded that the value of alternative metrics as acomplementary tool citation analysis is evident, although it is suggested that you shoulddig deeper into this issue to unravel the meaning and the potential value of theseindicators to assess their potential.
Altmetrics, impact, Evaluation, Quality, Research, Social Networks, bibliometry

**** *Artigo_219
An Analysis of Altmetrics in Emergency Medicine
Alternative-level metrics (Altmetrics) are a new method to assess the sharing and spread of scientific knowledge. The primary objective of this study was to describe the traditional metrics and Altmetric scores of the 50 most frequently cited articles published in emergency medicine (EM) journals. Since many articles related to EM are published in other journals, the secondary

aim of this study was to describe the Altmetric scores of the most frequently cited articles relevant to EM in other biomedical journals. A structured search of the Institute for Scientific Information Web of Science version of the Science Citation Index Expanded was conducted. The 200 most frequently cited articles in the top 10 EM journals (2011 Journal Citation Report) were identified. The 200 most frequently cited articles from the rest of the medical literature, matching a predefined list of keywords relevant to the specialty of EM, were identified. Two authors reviewed the lists of citations for relevance to EM and a consensus approach was used to arrive at the final lists of the top 50 cited articles. The Altmetric scores for the top 50 cited articles in EM and other journals were determined. Descriptive statistics and Spearman correlation were performed. The highest Altmetric score for EM articles was 25.0; the mean (≠SD) was 1.9 (≠5.0). The EM journal with the highest mean article Altmetric score was Resuscitation. The main clinical areas shared for articles from EM articles were trauma (mean ≠ SD = 11.0 ≠ 15.6, median = 11.0) and cardiac arrest (mean ≠ SD = 2.7 ≠ 5.8, median = 0). The highest Altmetric score for other journals was 176.0 (mean ≠ SD = 23.3 ≠ 40.8). The other journal with the highest mean article Altmetric score was the New England Journal of Medicine. The main clinical areas shared for articles were critical care (mean ≠ SD score = 36.5 ≠ 47.4, median = 36.5), sepsis (mean ≠ SD = 24.6 ≠ 48.8, median = 12.0), cardiology (mean ≠ SD = 19.2 ≠ 35.6, median = 7.0), and infectious diseases (mean ≠ SD = 17.0 12.7, median = 17.0). Spearman correlation demonstrated weakly positive correlation between citation counts and Altmetric scores for EM articles and other journals. This study is the first analysis of Altmetric scores for the top cited articles in EM. We demonstrated that there is a mild correlation between citation counts and Altmetric scores for the top papers in EM and other biomedical journals. We also demonstrated that there is a gap between the sharing of the top articles in EM journals and those related to EM in other biomedical journals. Future research to explore this relationship and its temporal trends will benefit the understanding of the reach and dissemination of EM research within the scientific community and society in general"

**** *Artigo_220
Are citations from clinical trials evidence of higher impact research? An analysis of ClinicalTrials.gov
An important way in which medical research can translate into improved health outcomes is by motivating or influencing clinical trials that eventually lead to changes in clinical practice. Citations from clinical trials records to academic research may therefore serve as an early warning of the likely future influence of the cited articles. This paper partially assesses this hypothesis by testing whether prior articles referenced in ClinicalTrials.gov records are more highly cited than average for the publishing journal. The results from four high profile general medical journals support the hypothesis, although there may not be a cause-and effect relationship. Nevertheless, it is reasonable for researchers to use citations to their work from clinical trials records as evidence of the possible long-term impact of their research.
Citation analysis, Altmetrics, Alternative metrics, Clinical trials, Medical research

**** *Artigo_221
Bibliographic Analysis of Nature Based on Twitter and Facebook Altmetrics Data
This paper presents a bibliographic analysis of Nature articles based on altmetrics. We assess the concern degree of social users on the Nature articles through the coverage analysis of Twitter and Facebook by publication year and discipline. The social media impact of a Nature article is examined by evaluating the mention rates on Twitter and on Facebook. Moreover, the correlation between tweets and citations is analyzed by publication year, discipline and Twitter user type to explore factors affecting the correlation. The results show that Twitter users have a higher concern degree on Nature articles than Facebook users, and Nature articles have higher

and faster-growing impact on Twitter than on Facebook. The results also show that tweets and citations are somewhat related, and they mostly measure different types of impact. In addition, the correlation between tweets and citations highly depends on publication year, discipline and Twitter user type.

**** *Artigo_222
Bibliometrics: tracking research impact by selecting the appropriate metrics
Traditionally, the success of a researcher is assessed by the number of publications he or she publishes in peer-reviewed, indexed, high impact journals. This essential yardstick, often referred to as the impact of a specific researcher, is assessed through the use of various metrics. While researchers may be acquainted with such matrices, many do not know how to use them to enhance their careers. In addition to these metrics, a number of other factors should be taken into consideration to objectively evaluate a scientist's profile as a researcher and academician. Moreover, each metric has its own limitations that need to be considered when selecting an appropriate metric for evaluation. This paper provides a broad overview of the wide array of metrics currently in use in academia and research. Popular metrics are discussed and defined, including traditional metrics and article-level metrics, some of which are applied to researchers for a greater understanding of a particular concept, including varicocele that is the thematic area of this Special Issue of Asian Journal of Andrology. We recommend the combined use of quantitative and qualitative evaluation using judiciously selected metrics for a more objective assessment of scholarly output and research impact.
article-level metrics, bibliometrics, citation counts, h-index, impact factor, research databases, research impact, research productivity, traditional metrics

**** *Artigo_223
Bibliometry in libraries
The analysis of demand (for documents, information), traditional for libraries, was previously carried out mainly by questioning readers. COUNTER is quite convenient for work - statistics of the use of licensed electronic documents. Currently, in the process of library services, large amounts of data are accumulated in the electronic catalog. This data contains useful information. The arrays of log files of the library's tele-access system servers and the library's website look even more impressive. All this makes it possible to organize a new channel for obtaining bibliometric information - additional to the existing channels of bibliometrics and altmetrics.
bibliometrics, library statistics, electronic catalog, tele-access servers, website of the Russian National Public Library for Science and Technology Library

**** *Artigo_224
By the Numbers: Bibliometrics and Altmetrics as Measures of Faculty Impact in the Field of Religion
Citation analysis is a staple in the sciences for measuring the impact of faculty members' output, but heavy reliance on monographs as a vehicle of scholarly communication diminished the value of bibliometrics in theological disciplines. The digital revolution, however, created a seismic shift for citation analysis and has given rise to altmetrics. Overviews of altmetrics and bibliometrics are provided and a series of questions posed to encourage ongoing discussions about the value of these tools in theological contexts.
**** *Artigo_225
Can alternative indicators overcome language biases in citation counts? A comparison of Spanish and UK research
This study compares Spanish and UK research in eight subject fields using a range of

bibliometric and social media indicators. For each field, lists of Spanish and UK journal articles published in the year 2012 and their citation counts were extracted from Scopus. The software Webometric Analyst was then used to extract a range of altmetrics for these articles, including patent citations, online presentation mentions, online course syllabus mentions, Wikipedia mentions and Mendeley reader counts and Altmetric.com was used to extract Twitter mentions. Results show that Mendeley is the altmetric source with the highest coverage, with 80 % of sampled articles having one or more Mendeley readers, followed by Twitter (34 %). The coverage of the remaining sources was lower than 3 %. All of the indicators checked either have too little data or increase the overall difference between Spain and the UK and so none can be suggested as alternatives to reduce the bias against Spain in traditional citation indexes.

Altmetrics, Social media metrics, Alternative indicators, Country comparison, Language bias, Research production

**** *Artigo_226
Can we use altmetrics at the institutional level? A case study analysing the coverage by research areas of four Spanish universities
Social media based indicators or altmetrics have been under scrutiny for the last seven years. Their promise as alternative metrics for measuring scholarly impact is still far from becoming a reality. Up to now, most studies have focused on the understanding of the nature and relation of altmetric indicators with citation data. Few papers have analysed research profiles based on altmetric data. Most of these have related to researcher profiles and the expansion of these tools among researchers. This paper aims at exploring the coverage of the this http URL database and its potential use in order to show universities' research profiles in relationship with other databases. We analyse a sample of four different Spanish universities.First, we observe a low coverage of altmetric indicators with only 36 percent of all documents retrieved from the Web of Science having an 'altmetric' score. Second, we observe that for the four universities analysed, the area of Science shows higher 'altmetric' scores that the rest of the research areas. Finally, considering the low coverage of altmetric data at the institutional level, it could be interesting for research policy makers to consider the development of guidelines and best practices guides to ensure that researchers disseminate adequately their research findings through social media.

**** *Artigo_227
Scientific communication and online attention: in search of virtual colleges underpinning altmetrics data
Informational exchanges around scientific communication activity have become increasingly dynamic in cyberspace, changing the practice of scientists and expanding the reach of research results that attain an increasingly significant online attention among different groups. Aim: To analyze whether altmetric data regarding online attention point to the existence of ""virtual colleges"" - composed of people from inside and outside the scientific community - around the scientific topic being discussed and shared in social media. Methodology: An exploratory pilot study, with analysis focused on the impact of the open access article with the highest altmetric indicator for the year 2015, as disclosed by Altmetric.com in its ranking ""Top 100"". The qualification of online attention is described by the most expressive media (Twitter and Facebook) in a random sample (n= 10%) on which content analysis was carried out and categorization of the types of interaction and characterization of social groups that interacted around the article. The most common form of dissemination observed was retweeting on Twitter (62%) and sharing on Facebook (45%), followed by ""conclusive"" (16% and 25%) and “argumentative” (15% and 9.6%) categories. The profile of the users responsible for the

circulation of and discussion about the article indicates the prevalence of members from the general public. Altmetrics permit the tracking of the potentially more social and democratic impact assessment of scientific research, which becomes particularly evident for the case of articles featuring scientific research deemed to epitomise scientific controversies, the dimensions of which are played out in these “virtual colleges”.
Scientific communication, Altmetrics, Online attention

**** *Artigo_228
Data Science Altmetrics

**** *Artigo_229
Developing Standards for Emerging Forms of Assessment: The NISO Altmetrics Initiative
New types of calculation methodologies, called altmetrics, which is short for alternative metrics, are increasingly being used to measure and analyze the scholarly communication networks of researchers, librarians, publishers, and funding organizations. By applying altmetrics to emergent online forums like Twitter, Academia.edu, Mendeley, and ResearchGate, studies have shown that early measures of social attention to a work or body of work can be correlated with later usage and citation statistics to predict the diffusion and impact of research output. However, standards for altmetrics are needed to build confidence and trust among the information community.
altmetrics, NISO, scholarly communications, social networks, assessment metrics

**** *Artigo_230
Does a Graphical Abstract Bring More Visibility to Your Paper?
A graphical abstract (GA) represents a piece of artwork that is intended to summarize the main findings of an article for readers at a single glance. Many publishers currently encourage authors to supplement their articles with GAs, in the hope that such a convenient visual summary will facilitate readers with a clearer outline of papers that are of interest and will result in improved overall visibility of the respective publication. To test this assumption, we statistically compared publications with or without GA published in Molecules between March 2014 and March 2015 with regard to several output parameters reflecting visibility. Contrary to our expectations, manuscripts published without GA performed significantly better in terms of PDF downloads, abstract views, and total citations than manuscripts with GA. To the best of our knowledge, this is the first empirical study on the effectiveness of GA for attracting attention to scientific publications.
graphical abstract, article views, citations, pdf downloads, scientific writing, science communication, research visibility, online attention, social media shares, Altmetric score
**** *Artigo_231
Does a research group increase impact on the scientific community or general public discussion? Alternative metric-based evaluation
In this study, we investigated the impact of scientific publications of the Italian SIMPAR (Study In Multidisciplinary PAin Research) group by using altmetrics, defined as nontraditional metrics constituting an alternative to more traditional citation-impact metrics, such as impact factor and H-index. By correlating traditional and alternative metrics, we attempted to verify whether publications by the SIMPAR group collectively had more impact than those performed by its individual members, either in solo publications or in publications coauthored by non-SIMPAR group investigators (which for the purpose of this study we will refer to as “individual publications”). For all the 12 members of the group analyzed (pain therapists, biologists, and pharmacologists), we created Open Researcher and Contributor ID and Impact Story accounts, and synchronized these data. Manually, we calculated the level metrics for each article by

dividing the data obtained from the research community by those obtained from the public community. We analyzed 759 articles, 18 of which were published by the SIMPAR group. Altmetrics demonstrated that SIMPAR group publications were more likely to be saved (77.8% vs 45.9%), discussed (61.1% vs 1.1%, P<0.0001), and publicly viewed (11.1% vs 1.3%, P=0.05) than individual publications. These results support the importance of multidisciplinary research groups in the impact of scientific literature; the interaction and synergy among the research participants allowed the obtainment of high impact-literature in the field of personalized pain medicine. Finally, our findings demonstrate the potential of altmetrics in estimating the value of the research products of a group.
altmetrics, SIMPAR group, pain-research impact

**** *Artigo_232
Evaluation of Scientific Outputs of Kashan University of Medical Sciences in Scopus Citation Database based on Scopus, ResearchGate, and Mendeley Scientometric Measures
It is essential to evaluate the impact of scientific publications through citation analysis in citation indexes. In addition, scientometric measures of social media also should be assessed. These measures include how many times the publications were read, viewed, and downloaded. The present study aimed to assess the scientific output of scholars at Kashan University of Medical Sciences by the end of March 2014 based on scientometric measures of Scopus, ResearchGate, and Mendeley. A survey method was used to study the articles published in Scopus journals by scholars at Kashan University of Medical Sciences by the end of March 2014. The required data were collected from Scopus, ResearchGate, and Mendeley. The data were analyzed with descriptive statistics. Also, the Spearman correlation was used between the number of views of articles in ResearchGate with citation number of the articles in Scopus and reading frequency of the articles in Mendeley with citation number in Scopus were examined using the Spearman correlation in SPSS 16. Five-hundred and thirty-three articles were indexed in the Scopus Citation Database by the end of March 2014. Collectively, those articles were cited 1,315 times. The articles were covered by ResearchGate (74%) more than Mendeley (44%). In addition, 98% of the articles indexed in ResearchGate and 92% of the articles indexed in Mendeley were viewed at least once. The results showed that there was a positive correlation between the number of views of the articles in ResearchGate and Mendeley and the number of citations of the articles in Scopus. Coverage and the number of visitors were higher in ResearchGate than in Mendeley. The increase in the number of views of articles in ResearchGate and Mendeley also increased the number of citations of the papers. Social networks, such as ResearchGate and Mendeley, also can be used as tools for the evaluation of academics and scholars based on the scientific research they have conducted.
ResearchGate, Mendeley, Scopus, social media, publications, research, scientometric

**** *Artigo_233
Examining Characteristics of Traditional and Twitter Citation
Social media has attracted the attention of the academic community as an emerging communication channel. This channel opens a new opportunity to measure the impact of social use of scholarly publications in social media (altmetrics) that supplements our understanding on the scholarly impact of publications (bibliometrics). Two different channels, social media and journal, are known to establish various citation patterns statistically. However, thematic difference between altmetrics and bibliometrics structurally and contextually is unknown. Therefore, we perform document co-citation network analysis for structural comparison and topic modeling for contextual comparison. We also suggest Spearman's correlation for statistical comparison. A case study is done for the publications from Journal of the Association for Information Science and Technology and the tweets mentioning the publications. We

identified a weak correlation between scholarly impact and social use of these publications. We also found the structures of the traditional citations and Twitter citations share common but high interest in information retrieval system and impact analysis, while Twitter citations have diverse interest in data mining, network analysis, and information behavior as well. In addition, from content analysis, we found the two citation patterns to have both common and distinct characteristics. Specifically, the topics covered by both citation patterns show intersections and exclusive contexts. In conclusion, the traditional citation patterns and the Twitter citation patterns in Information Science are different statistically, structurally, and contextually. We suspect that intentional and unintentional citing behaviors are the main factor for the thematic difference and will be examined on the future.
altmetrics, Twitter citation, text mining, document co-citation analysis, topic modeling

**** *Artigo_234
Global Emergency Medicine Journal Club: A Social Media Discussion About the Lack of Association Between Press Ganey Scores and Emergency Department Analgesia
Annals of Emergency Medicine collaborated with an educational Web site, Academic Life in Emergency Medicine (ALiEM), to host a public discussion featuring the 2014 Annals article on the association between Press Ganey scores and emergency department (ED) analgesia by Schwartz et al. The objective was to curate a 14-day (December 1 through 14, 2014) worldwide academic dialogue among clinicians in regard to preselected questions about the article. Five online facilitators hosted the multimodal discussion on the ALiEM Web site, Twitter, and Google Hangout. Comments across the social media platforms were curated for this report, as framed by the 4 preselected questions. Engagement was tracked through Web analytic tools and analysis of tweets. Blog comments, tweets, and video expert commentary involving the featured article are summarized and reported. The dialogue resulted in 978 page views from 342 cities in 33 countries on the ALiEM Web site, 464,345 Twitter impressions, and 83 views of the video interview with experts. Of the unique 169 identified tweets, discussion (53.3%) and learning points (32.5%) were the most common category of tweets identified. Common themes that arose in the open-access multimedia discussions included Press Ganey data validity and the utility of patient satisfaction in determining pain treatment efficacy. This educational approach using social media technologies demonstrates a free, asynchronous means to engage a worldwide scholarly discourse.

**** *Artigo_235
Grand challenges in altmetrics: heterogeneity, data quality and dependencies
With increasing uptake among researchers, social media are finding their way into scholarly communication and, under the umbrella term altmetrics, are starting to be utilized in research evaluation. Fueled by technological possibilities and an increasing demand to demonstrate impact beyond the scientific community, altmetrics have received great attention as potential democratizers of the scientific reward system and indicators of societal impact. This paper focuses on the current challenges for altmetrics. Heterogeneity, data quality and particular dependencies are identified as the three major issues and discussed in detail with an emphasis on past developments in bibliometrics. The heterogeneity of altmetrics reflects the diversity of the acts and online events, most of which take place on social media platforms. This heterogeneity has made it difficult to establish a common definition or conceptual framework. Data quality issues become apparent in the lack of accuracy, consistency and replicability of various altmetrics, which is largely affected by the dynamic nature of social media events. Furthermore altmetrics are shaped by technical possibilities and are particularly dependent on the availability of APIs and DOIs, strongly dependent on data providers and aggregators, and potentially influenced by the technical affordances of underlying platforms.

Big data, Data integration, Research and innovation policy, Data quality, Comparability, Standardization, Concordance tables, Modularization, Interoperability, Research assessment

**** *Artigo_236
Grand challenges in data integration—state of the art and future perspectives: an introduction

**** *Artigo_237
How many scientific papers are mentioned in policy-related documents? An empirical investigation using Web of Science and Altmetric data
In this short communication, we provide an overview of a relatively newly provided source of altmetrics data which could possibly be used for societal impact measurements in scientometrics. Recently, Altmetric – a start-up providing publication level metrics – started to make data for publications available which have been mentioned in policy-related documents. Using data from Altmetric, we study how many papers indexed in the Web of Science (WoS) are mentioned in policy-related documents. We find that less than 0.5% of the papers published in different subject categories are mentioned at least once in policy-related documents. Based on our results, we recommend that the analysis of (WoS) publications with at least one policy-related mention is repeated regularly (annually). Mentions in policy-related documents should not be used for impact measurement until new policy-related sites are tracked.
Bibliometrics, altmetrics, policy documents, policy-related mentions, societal impact

**** *Artigo_238
How social are ornithologists?

**** *Artigo_239
How to normalize Twitter counts? A first attempt based on journals in the Twitter Index
One possible way of measuring the broad impact of research (societal impact) quantitatively is the use of alternative metrics (altmetrics). An important source of altmetrics is Twitter, which is a popular microblogging service. In bibliometrics, it is standard to normalize citations for cross-field comparisons. This study deals with the normalization of Twitter counts (TC). The problem with Twitter data is that many papers receive zero tweets or only one tweet. In order to restrict the impact analysis on only those journals producing a considerable Twitter impact, we defined the Twitter Index (TI) containing journals with at least 80 % of the papers with at least 1 tweet each. For all papers in each TI journal, we calculated normalized Twitter percentiles (TP) which range from 0 (no impact) to 100 (highest impact). Thus, the highest impact accounts for the paper with the most tweets compared to the other papers in the journal. TP are proposed to be used for cross-field comparisons. We studied the field-independency of TP in comparison with TC. The results point out that the TP can validly be used particularly in biomedical and health sciences, life and earth sciences, mathematics and computer science, as well as physical sciences and engineering. In a first application of TP, we calculated percentiles for countries. The results show that Denmark, Finland, and Norway are the countries with the most tweeted papers (measured by TP).
Twitter counts, Twitter percentiles, Twitter Index, Altmetrics

**** *Artigo_240
Hyde Park Debate, Resolved: Altmetrics Are Overrated

**** *Artigo_241
If I tweet will you cite? The effect of social media exposure of articles on downloads and citations

We sought to investigate whether exposing scientific papers to social media (SM) has an effect on article downloads and citations. We randomized all International Journal of Public Health (IJPH) original articles published between December 2012 and December 2014 to SM exposure (blog post, Twitter and Facebook) or no exposure at three different time points after first online publication. 130 papers (SM exposure = 65, control = 65) were randomized. The number of downloads did not differ significantly between groups (p = 0.60) nor did the number of citations (p = 0.88). Adjusting for length of observation and paper's geographical origin did not change these results. There was no difference in the number of downloads and citations between the SM exposure and control group when we stratified for open access status. The number of downloads and number of citations were significantly correlated in both groups. SM exposure did not have a significant effect on traditional impact metrics, such as downloads and citations. However, other metrics may measure the added value that social media might offer to a scientific journal, such as wider dissemination.

**** *Artigo_242
Increasing our understanding of Altmetrics: Identifying factors that are driving both citation and Altmetric counts This study examines a range of factors associating with eventual citation and altmetric counts to a paper. The factors include research collaboration, institution impact, journal impact, journal open accessibility, and field type that will be modelled in association with citation counts, Twitter posts, Facebook posts and Mendeley readers. The results show that the factors driving increased citations are different from those driving increased altmetric events. The altmetric events differ from each other in terms of a few factors. The findings from this study can contribute to the continued development of theoretical models and methodological developments associated with capturing, interpreting, and understanding altmetric events. This work can also aid research policy makers with identifying important factors driving altmetric events.
Altmetrics factors, citation factors, advanced statistical modelling

**** *Artigo_243
Interpreting 'Altmetrics': Viewing Acts on Social Media through the Lens of Citation and Social Theories

**** *Artigo_244
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This study examines a range of factors associating with eventual citation and altmetric counts to a paper. The factors include research collaboration, institution impact, journal impact, journal open accessibility, and field type that will be modelled in association with citation counts, Twitter posts, Facebook posts and Mendeley readers. The results show that the factors driving increased citations are different from those driving increased altmetric events. The altmetric events differ from each other in terms of a few factors. The findings from this study can contribute to the continued development of theoretical models and methodological developments associated with capturing, interpreting, and understanding altmetric events. This work can also aid research policy makers with identifying important factors driving altmetric events.
Altmetrics factors, citation factors, advanced statistical modelling

**** *Artigo_245
Interpreting 'Altmetrics': Viewing Acts on Social Media through the Lens of Citation and Social Theories

**** *Artigo_246
Interpreting correlations between citation counts and other indicators
Altmetrics or other indicators for the impact of academic outputs are often correlated with citation counts in order to help assess their value. Nevertheless, there are no guidelines about how to assess the strengths of the correlations found. This is a problem because the correlation strength affects the conclusions that should be drawn. In response, this article uses experimental simulations to assess the correlation strengths to be expected under various different conditions. The results show that the correlation strength reflects not only the underlying degree of association but also the average magnitude of the numbers involved. Overall, the results suggest that due to the number of assumptions that must be made, in practice it will rarely be possible to make a realistic interpretation of the strength of a correlation coefficient.
Citation analysis, Correlation, Altmetrics, Indicators, Discretised lognormal, Simulation

**** *Artigo_247
Investigating singapore's altmetric landscape
Altmetrics is an emerging measure for academic impact and it is gaining in global importance. In this paper, we analyse the altmetric landscape of Singapore, a young nation with a fast growing international research sector. We aim to find out if the coverage of altmetrics across the different disciplines is increasing along with the fast increase in the amount of research publications in recent years. We also look into how altmetrics relate to traditional citation counts as a measure of research impact. From our results, we see that there is overall an 18% coverage of altmetrics of Singapore publications from 2009 to 2013. The number of publications with available altmetric data has also been increasing over the years for most disciplines. Correlation results between citation counts and altmetrics show medium to low correlations with distinct differences amongst the various disciplines. A high coverage of altmetrics however does not seem to lead to larger correlations with citation counts. Singapore thus remains an intriguing case study to watch in the coming years.
Altmetrics, Singapore, research, impact

**** *Artigo_248
Journal of the Association for Information Science and Technology
Social media are becoming increasingly popular in scientific communication. A range of platforms, such as academic social networking sites (SNS), are geared specifically towards the academic community. Proponents of the altmetrics approach have pointed out that new media allow for new avenues of scientific impact assessment. Traditional impact measures based on bibliographic analysis have long been criticized for overlooking the relational dynamics of scientific impact. We therefore propose an application of social network analysis to researchers' interactions on an academic social networking site to generate potential new metrics of scientific impact. Based on a case study conducted among a sample of Swiss management scholars, we analyze how centrality measures derived from the participants' interactions on the academic SNS ResearchGate relate to traditional, offline impact indicators. We find that platform engagement, seniority, and publication impact contribute to members' indegree and eigenvector centrality on the platform, but less so to closeness or betweenness centrality. We conclude that a relational approach based on social network analyses of academic SNS, while subject to platform-specific dynamics, may add richness and differentiation to scientific impact assessment.

**** *Artigo_249
Laying the Groundwork for a New Library Service: Scholar-Practitioner & Graduate Student

Attitudes Toward Altmetrics and the Curation of Online Profiles
Objective – In order to inform a library service related to creating and maintaining online scholarly profiles, we sought to assess the knowledge base and needs of our academic communities. Participants were queried about use, issues, and attitudes toward scholarly profile and altmetric tools, as well as the role librarians could play in assisting with the curation of online reputation. Methods – Semi-structured interviews with 18 scholar-practitioners and 5 graduate students from two mid-sized universities. Results – While all participants had Googled themselves, few were strategic about their online scholarly identity. Participants affirmed the perception that altmetrics can be of value in helping to craft a story of the value of their research and its diverse outputs. When participants had prior knowledge of altmetrics tools, it tended to be very narrow and deep, and perhaps field-specific. Participants identified time as the major barrier to use of scholarly profile and altmetrics tools. Conclusions – Librarians are well-placed to assist scholar-practitioners who wish to curate an online profile or use altmetrics tools. Areas of assistance include: personalized support, establishment of goals, orientation to specific tools, orientation to altmetrics and scholarly promotion landscape, preparing users for potential difficulties, discussing copyright implications, Open Access education, and guidance with packaging content for different venues and audiences.

**** *Artigo_250
Making sense of altmetrics
Altmetrics have arisen as a result of the requirement, by employers andfunders, to measure individual researchers' productivity and impact. Beforethe advent of social media, the impact of a paper was measured solely bythe number of times it was cited by others (citation index). Altmetrics(alternative metrics) is a term that first emerged in 2010 to describe a lessformal approach to measuring the impact of a paper [1]. This editorialdescribes how assessment of an individual researcher's outputs is evolvingand aims to demystify altmetrics

**** *Artigo_251
Measuring book impact based on the multi-granularity online review mining
As with articles and journals, the customary methods for measuring books' academic impact mainly involve citations, which is easy but limited to interrogating traditional citation databases and scholarly book reviews. Researchers have attempted to use other metrics, such as Google Books, libcitation, and publisher prestige. However, these approaches lack content-level information and cannot determine the citation intentions of users. Meanwhile, the abundant online review resources concerning academic books can be used to mine deeper information and content utilizing altmetric perspectives. In this study, we measure the impacts of academic books by multi-granularity mining online reviews, and we identify factors that affect a book's impact. First, online reviews of a sample of academic books on Amazon.cn are crawled and processed. Then, multi-granularity review mining is conducted to identify review sentiment polarities and aspects' sentiment values. Lastly, the numbers of positive reviews and negative reviews, aspect sentiment values, star values, and information regarding helpfulness are integrated via the entropy method, and lead to the calculation of the final book impact scores. The results of a correlation analysis of book impact scores obtained via our method versus traditional book citations show that, although there are substantial differences between subject areas, online book reviews tend to reflect the academic impact. Thus, we infer that online reviews represent a promising source for mining book impact within the altmetric perspective and at the multi-granularity content level. Moreover, our proposed method might also be a means by which to measure other books besides academic publications.
Online book reviews, Sentiment analysis, Book citation, Information content, Altmetrics

**** *Artigo_252
Measuring field-normalized impact of papers on specific societal groups: An altmetrics study based on Mendeley data
Bibliometrics is successful in measuring impact, because the target is clearly defined: the publishing scientist who is still active and working. Thus, citations are a target-oriented metric which measures impact on science. In contrast, societal impact measurements based on altmetrics are as a rule intended to measure impact in a broad sense on all areas of society (e.g. science, culture, politics, and economics). This tendency is especially reflected in the efforts to design composite indicators (e.g. the Altmetric attention score). We deem appropriate that not only the impact measurement using citations is target-oriented (citations measure the impact of papers on scientists), but also the measurement of impact using altmetrics. Impact measurements only make sense, if the target group – the recipient of academic papers – is clearly defined. Thus, we extend in this study the field-normalized reader impact indicator proposed by us in an earlier study, which is based on Mendeley data (the mean normalized reader score, MNRS), to a target-oriented field-normalized impact indicator (e.g., MNRSED measures reader impact on the sector of educational donation, i.e., teaching). This indicator can show – as demonstrated in empirical examples – the ability of journals, countries, and academic institutions to publish papers which are below or above the average impact of papers on a specific sector in society (e.g., the educational or teaching sector). For example, the method allows to measure the impact of scientific papers on students – controlling for the field in which the papers have been published and their publication year.
altmetrics, field-normalization, Mendeley, target-oriented impact measurement, MNRS, broader impact

**** *Artigo_253
Measuring research impact: bibliometrics, social media, altmetrics, and the BJGP

**** *Artigo_254
Media Reporting of Practice-Changing Clinical Trials in Oncology: A North American Perspective
Media reporting of clinical trials impacts patient-oncologist interactions. We sought to characterize the accuracy of media and Internet reporting of practice-changing clinical trials in oncology. Materials and The first media articles referencing 17 practice-changing clinical trials were collected from 4 media outlets: newspapers, cable news, cancer websites, and industry websites. Measured outcomes were media reporting score, social media score, and academic citation score. The media reporting score was a measure of completeness of information detailed in media articles as scored by a 15-point scoring instrument. The social media score represented the ubiquity of social media presence referencing 17 practice-changing clinical trials in cancer as determined by the American Society of Clinical Oncology in its annual report, entitled Clinical Cancer Advances 2012; social media score was calculated from Twitter, Facebook, and Google searches. The academic citation score comprised total citations from Google Scholar plus the Scopus database, which represented the academic impact per clinical cancer advance. From 170 media articles, 107 (63%) had sufficient data for analysis. Cohen's κ coefficient demonstrated reliability of the media reporting score instrument with a coefficient of determination of 94%. Per the media reporting score, information was most complete from industry, followed by cancer websites, newspapers, and cable news. The most commonly omitted items, in descending order, were study limitations, exclusion criteria, conflict of interest, and other. The social media score was weakly correlated with academic citation score. Media outlets appear to have set a low bar for coverage of many practice-changing advances in oncology, with reports of scientific breakthroughs often omitting basic study facts and cautions,

which may mislead the public. The media should be encouraged to use a standardized reporting template and provide accessible references to original source information whenever feasible.

**** *Artigo_255
Mendeley readership altmetrics for medical articles: An analysis of 45 fields
Medical research is highly funded and often expensive and so is particularly important to evaluate effectively. Nevertheless, citation counts may accrue too slowly for use in some formal and informal evaluations. It is therefore important to investigate whether alternative metrics could be used as substitutes. This article assesses whether one such altmetric, Mendeley readership counts, correlates strongly with citation counts across all medical fields, whether the relationship is stronger if student readers are excluded, and whether they are distributed similarly to citation counts. Based on a sample of 332,975 articles from 2009 in 45 medical fields in Scopus, citation counts correlated strongly (about 0.7; 78% of articles had at least one reader) with Mendeley readership counts (from the new version 1 applications programming interface [API]) in almost all fields, with one minor exception, and the correlations tended to decrease slightly when student readers were excluded. Readership followed either a lognormal or a hooked power law distribution, whereas citations always followed a hooked power law, showing that the two may have underlying differences.

**** *Artigo_256
Mendeley readership counts: An investigation of temporal and disciplinary differences
Scientists and managers using citation-based indicators to help evaluate research cannot evaluate recent articles because of the time needed for citations to accrue. Reading occurs before citing, however, and so it makes sense to count readers rather than citations for recent publications. To assess this, Mendeley readers and citations were obtained for articles from 2004 to late 2014 in five broad categories (agriculture, business, decision science, pharmacy, and the social sciences) and 50 subcategories. In these areas, citation counts tended to increase with every extra year since publication, and readership counts tended to increase faster initially but then stabilize after about 5 years. The correlation between citations and readers was also higher for longer time periods, stabilizing after about 5 years. Although there were substantial differences between broad fields and smaller differences between subfields, the results confirm the value of Mendeley reader counts as early scientific impact indicators.

**** *Artigo_257
MP020: Do real-time Twitter metrics correlate with traditional emergency medicine post-conference speaker evaluations?
Traditional post-conference speaker evaluations are inconsistently completed; meanwhile, real time social media tools such as Twitter are increasingly used in conferences. We sought to determine whether a correlation exists between traditional conference evaluation for a speaker and the number of real-time tweets it generated using data from a CAEP conference. This study utilized a retrospective design. The hashtag #CAEP14 was prospectively registered with Symplur, an online Twitter management tool, so that all tweets related to CAEP conference 2014 were stored. A tweet was associated with a session if it mentioned the speaker name, or if the tweet content and timing closely matched that of the session in the schedule. A tweet classification system was developed to differentiate original tweets from retweets, and quotes from comments generating further discussion. Two authors assessed and coded the first 200 tweets together to ensure a uniform approach to coding, and then independently coded the remaining tweets. Discrepancies were resolved by consensus. One author reviewed post-conference speaker evaluation, and abstracted the value corresponding to the question “The

speaker was an effective communicator". We present descriptive statistics and correlation analyses. A total of 3,804 tweets were collected, with 2,218 (58.3%) associated with a session. Forty-eight (48%) (131 out of 274) of sessions receiving at least one tweet, with a mean of 11.7 tweets per session (95% CI of 0 to 57.5). In comparison, only 31% (85 out of 274) of sessions received a formal post conference speaker evaluation ($p<0.005$). For sessions that received at least one traditional post-conference evaluation, there was no significant correlation between the number of tweets and evaluation scores ($R=0.087$). This can be attributed to the fact that there was minimal variation between evaluation scores (median = 3.6 out of 5, IQR of 3.4 to 3.7). There was no correlation between the number of real-time tweets and traditional post-conference speaker evaluation. However, many sessions which received no formal speaker evaluation generated tweets, and the number of tweets was highly variable between sessions. Thus, Twitter metrics might be useful for conference organizers to supplement formal speaker evaluations.
social media, altmetrics, program evaluation

**** *Artigo_258
Not all international collaboration is beneficial: The Mendeley readership and citation impact of biochemical research collaboration
Biochemistry is a highly funded research area that is typified by large research teams and is important for many areas of the life sciences. This article investigates the citation impact and Mendeley readership impact of biochemistry research from 2011 in the Web of Science according to the type of collaboration involved. Negative binomial regression models are used that incorporate, for the first time, the inclusion of specific countries within a team. The results show that, holding other factors constant, larger teams robustly associate with higher impact research, but including additional departments has no effect and adding extra institutions tends to reduce the impact of research. Although international collaboration is apparently not advantageous in general, collaboration with the United States, and perhaps also with some other countries, seems to increase impact. In contrast, collaborations with some other nations seems to decrease impact, although both findings could be due to factors such as differing national proportions of excellent researchers. As a methodological implication, simpler statistical models would find international collaboration to be generally beneficial and so it is important to take into account specific countries when examining collaboration.

**** *Artigo_259
Thematic orientation and correlation coefficient for comparison between altmetric data and citations: an analysis of the journal Datagramazero
The paper intends to verify the relationship between altmetrics and citation analysis using thematic orientation as a trace identifier for the works analysed, as well as Pearson's correlation coefficient. Therefore 441 articles from the journal DataGramaZero were categorized by a taxonomy featuring ten Information Science research themes. The category ""Theoretical and general aspects of information science"" was highlighted with more articles cited and a greater attention online. It was perceived that the two variables tend to behave similarly in relation to the time of publication, however, a low correlation between the number of mention and the number of citations for each article was noted. When the coefficients of the two variables weighted averages were calculated for thematic orientations, the correlation became moderate (P = 0,65). The results were similar to previous findings in the literature, reinforcing the potential of the Pearson's correlation coefficient for metric studies in information science.
Altmetrics, Citation, Correlation Coefficient

**** *Artigo_260

Posted, visited, exported: Altmetrics in the social tagging system BibSonomy
In social tagging systems, like Mendeley, CiteULike, and BibSonomy, users can post, tag, visit, or export scholarly publications. In this paper, we compare citations with metrics derived from users' activities (altmetrics) in the popular social bookmarking system BibSonomy. Our analysis, using a corpus of more than 250,000 publications published before 2010, reveals that overall, citations and altmetrics in BibSonomy are mildly correlated. Furthermore, grouping publications by user-generated tags results in topic-homogeneous subsets that exhibit higher correlations with citations than the full corpus. We find that posts, exports, and visits of publications are correlated with citations and even bear predictive power over future impact. Machine learning classifiers predict whether the number of citations that a publication receives in a year exceeds the median number of citations in that year, based on the usage counts of the preceding year. In that setup, a Random Forest predictor outperforms the baseline on average by seven percentage points.
Altmetrics, Scholarly impact, Social bookmarking, Collaborative tagging

**** *Artigo_261
Publication rate of presentation abstracts presented at the Canadian Health Libraries Association (CHLA/ABSC) annual meetings from 2004-2009
The purpose of this paper is to determine the publication rate of Canadian health sciences librarians, post-conference presentation. Discover barriers that prevent librarians from taking conference presentation to full publication. Assess the metrics available to librarians for scholarly output measurement by examining metrics, traditional and altmetrics, of articles resulting from conference presentation. A survey using FluidSurveys was distributed via e-mail to authors of poster and papers presentation presented at Canadian Health Libraries Association/Association des bibliothèques de la santé du Canada conferences from 2004 to 2009. A literature search for articles matching presentations in National Library of Medicine's PubMed, Cumulative Index of Nursing and Allied Health Literature and Library, Information Science & Technology Abstracts was conducted to determine publication rate. Metrics of retrieved articles were gathered and analyzed to gage scholarly output of Canadian health sciences librarians. A publication rate of 31.5 percent was determined by literature search. Time restriction was the most common reported reason for not publishing. The altmetric analysis included 71 articles, of which 52 percent had at least one value in various metrics, with Mendeley counts being the most common value represented. Not all survey respondents may be library science professionals, so that survey findings may not be generalizable to the Canadian health librarian profession. While every effort was made to find and confirm publications related to conference presentations, the reported publication rate may be either an over estimate or under estimate of the true rate. Current altmetric science is very dynamic and evolving. Originality/value: This study provides a baseline publication rate, identifies barriers librarians face to publication and provides a glimpse into the state of metrics available to Canadian librarians for evaluation of their scholarly output.
Librarianship, Publishing, Bibliometrics, Publication rate, Scholary output

**** *Artigo_262
Randomized Controlled Trial of Social Media: Effect of Increased Intensity of the Intervention

A prior randomized controlled trial of social media exposure at Circulation determined that social media did not increase 30-day page views. Whether insufficient social media intensity contributed to these results is uncertain.
Methods and Original article manuscripts were randomized to social media exposure compared with no social media exposure (control) at Circulation beginning in January 2015. Social media

exposure consisted of Facebook and Twitter posts on the journal's accounts. To increase social media intensity, a larger base of followers was built using advertising and organic growth, and posts were presented in triplicate and boosted on Facebook and retweeted on Twitter. The primary outcome was 30-day page views. Stopping rules were established at the point that 50% of the manuscripts were randomized and had 30-day follow-up to compare groups on 30-day page views. The trial was stopped for futility on September 26, 2015. Overall, 74 manuscripts were randomized to receive social media exposure, and 78 manuscripts were randomized to the control arm. The intervention and control arms were similar based on article type (P=0.85), geographic location of the corresponding author (P=0.33), and whether the manuscript had an editorial (P=0.80). Median number of 30-day page views was 499.5 in the social media arm and 450.5 in the control arm; there was no evidence of a treatment effect (P=0.38). There were no statistically significant interactions of treatment by manuscript type (P=0.86), by corresponding author (P=0.35), by trimester of publication date (P=0.34), or by editorial status (P=0.79).
A more intensive social media strategy did not result in increased 30-day page views of original research.
social media, randomized control trial, altmetrics

**** *Artigo_263
Recognising influence: helping authors of non-traditional research outputs evidence the reach and potential impacts of their work
New technologies and the underlying scholarly structure mean that it is now easier than ever to track and report on the online activity surrounding scholarly articles. But how can these methods and tools be adapted to provide similar benefits for scholars who do not consider the journal article their primary form of output, and what challenges are associated with that? This poster will present some of the early developments in this area, and detail how the data might bring future benefits for researchers in a variety of disciplines.

**** *Artigo_264
Research data explored: an extended analysis of citations and altmetrics
In this study, we explore the citedness of research data, its distribution over time and its relation to the availability of a digital object identifier (DOI) in the Thomson Reuters database Data Citation Index (DCI). We investigate if cited research data “impacts” the (social) web, reflected by altmetrics scores, and if there is any relationship between the number of citations and the sum of altmetrics scores from various social media platforms. Three tools are used to collect altmetrics scores, namely PlumX, ImpactStory, and Altmetric.com, and the corresponding results are compared. We found that out of the three altmetrics tools, PlumX has the best coverage. Our experiments revealed that research data remain mostly uncited (about 85 %), although there has been an increase in citing data sets published since 2008. The percentage of the number of cited research data with a DOI in DCI has decreased in the last years. Only nine repositories are responsible for research data with DOIs and two or more citations. The number of cited research data with altmetrics “foot-prints” is even lower (4–9 %) but shows a higher coverage of research data from the last decade. In our study, we also found no correlation between the number of citations and the total number of altmetrics scores. Yet, certain data types (i.e. survey, aggregate data, and sequence data) are more often cited and also receive higher altmetrics scores. Additionally, we performed citation and altmetric analyses of all research data published between 2011 and 2013 in four different disciplines covered by the DCI. In general, these results correspond very well with the ones obtained for research data cited at least twice and also show low numbers in citations and in altmetrics. Finally, we observed that there are disciplinary differences in the availability and extent of altmetrics scores.

Altmetrics, Citation analysis, Co-citation analysis, Citedness, Research data, Data Citation Index

**** *Artigo_265
Research Altmetrics

**** *Artigo_266
Revisiting an open access monograph experiment: measuring citations and tweets 5 years later

An experiment run in 2009 could not assess whether making monographs available in open access enhanced scholarly impact. This paper revisits the experiment, drawing on additional citation data and tweets. It attempts to answer the following research question: does open access have a positive influence on the number of citations and tweets a monograph receives, taking into account the influence of scholarly field and language? The correlation between monograph citations and tweets is also investigated. The number of citations and tweets measured in 2014 reveal a slight open access advantage, but the influence of language or subject should also be taken into account. However, Twitter usage and citation behaviour hardly overlap.
Open access, Monographs, Citations, Altmetrics, Tweets

**** *Artigo_267
Scholarly use of social media and altmetrics: a review of the literature
Social media has become integrated into the fabric of the scholarly communication system in fundamental ways: principally through scholarly use of social media platforms and the promotion of new indicators on the basis of interactions with these platforms. Research and scholarship in this area has accelerated since
the coining and subsequent advocacy for altmetrics—that is, research indicators based on social media activity. This review provides an extensive account of the state-of-the art in both scholarly use of social media and altmetrics. The review consists of two main parts: the first examines the use of social media in
academia, examining the various functions these platforms have in the scholarly communication process and the factors that affect this use. The second part reviews empirical studies of altmetrics, discussing the various interpretations of altmetrics, data collection and methodological limitations, and differences
according to platform. The review ends with a critical discussion of the implications of this transformation in the scholarly communication system."

**** *Artigo_268
SGEM Hot Off the Press: hypertonic saline in severe traumatic brain injury: a systematic review and meta-analysis of randomized controlled trials
As part of the Canadian Journal of Emergency Medicine’s (CJEM) developing social media strategy, 1 we are collaborating with the Skeptics’ Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency medicine (EM) literature using evidence-based medicine principles. In the “Hot Off the Press” series, we select original research manuscripts published in CJEM to be featured on the SGEM website/podcast and discussed by the study authors and the online EM community. A similar collaboration is under way between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article, the immediate post-publication synthesis from the SGEM podcast, commentary by the first author, and the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically relevant EM research. In this, the second SGEM HOP hosted

collaboratively with CJEM, we discuss a systematic review evaluating the use of hypertonic saline in the treatment of severe traumatic brain injury.
traumatic brain injury, social media, twitter, mannitol

**** *Artigo_269
SGEM Hot Off the Press: Regional Nerve Blocks for Hip and Femoral Neck Fractures: A Systematic Review
As part of the Canadian Journal of Emergency Medicine's (CJEM) developing social media strategy, 1 we are collaborating with the Skeptics' Guide to Emergency Medicine (SGEM) to summarize and critically appraise the current emergency medicine literature using evidence-based medicine principles. For this new "Hot Off the Press" series, we will select original research manuscripts published in CJEM to be featured on the SGEM site and discussed by study authors and the online EM community of medical students, residents, and practicing physicians. A similar collaboration is underway between the SGEM and Academic Emergency Medicine. What follows is a summary of the selected article, the immediate post-publication synthesis from the SGEM podcast, commentary by the first author, and the subsequent discussion from the SGEM blog and other social media. Through this series, we hope to enhance the value, accessibility, and application of important, clinically-relevant EM research. In this, the first SGEM HOP hosted collaboratively with CJEM, a systematic review evaluating the efficacy and safety of regional blocks for analgesia in hip and femur fractures is discussed
regional anaesthesia, nerve blocks, analgesia, femur fracture

**** *Artigo_270
We Are Visible and We Have Impact. Open Access Data Analysis, Almetrics and Others of the Revista Interamericana de Bibliotecología
This is a study based on the OJS of the Inter-Ameri-can Science Journal -(in Spanish, RIB), interrelated with other sources of information (E-LIS, Google Scholar, RedAlyc, SciELO, Web of Science-SciELO Citation Index and Scopus). This study allowed the identification of the visibility and the interna-tional and national impact the journal has had ba-sed on these sources and on an analysis of biblio-metric data and altmetrics, generally speaking. At the same time, a new indicator proposal (D/T Me-trics) is implemented and proposes the possibility for journals of similar realities and contexts to use the methodology that this study completed, to be able to identify the journals visibility and impact and make decisions regarding quality processes and editorial management as well as scientific mar-keting.
altmetrics, open access, OJS, D/T Me-trics, journals, visibility, impact

**** *Artigo_271
The counting house: measuring those who count. Presence of Bibliometrics, Scientometrics, Informetrics, Webometrics and Altmetrics in the Google Scholar Citations, ResearcherID, ResearchGate, Mendeley & Twitter
Following in the footsteps of the model of scientific communication, which has recently gone through a metamorphosis (from the Gutenberg galaxy to the Web galaxy), a change in the model and methods of scientific evaluation is also taking place. A set of new scientific tools are now providing a variety of indicators which measure all actions and interactions among scientists in the digital space, making new aspects of scientific communication emerge. In this work we present a method for ―capturing‖ the structure of an entire scientific community (the Bibliometrics, Scientometrics, Informetrics, Webometrics, and Altmetrics community) and the main agents that are part of it (scientists, documents, and sources) through the lens of Google Scholar Citations (GSC). Additionally, we compare these author ―portraits to the ones offered by other profile or social platforms currently used by academics (ResearcherID, ResearchGate,

Mendeley, and Twitter), in order to test their degree of use, completeness, reliability, and the validity of the information they provide. A sample of 814 authors (researchers in Bibliometrics with a public profile created in GSC) was subsequently searched in the other platforms, collecting the main indicators computed by each of them. The data collection was carried out on September, 2015. The Spearman correlation (α= 0.05) was applied to these indicators (a total of 31), and a Principal Component Analysis was carried out in order to reveal the relationships among metrics and platforms as well as the possible existence of metric clusters. We found that it is feasible to depict an accurate representation of the current state of the Bibliometrics community using data from GSC (the most influential authors, documents, journals, and publishers). Regarding the number of authors found in each platform, GSC takes the first place (814 authors), followed at a distance by ResearchGate (543), which is currently growing at a vertiginous speed. The number of Mendeley profiles is high, although 17.1% of them are basically empty. ResearcherID is also affected by this issue (34.45% of the profiles are empty), as is Twitter (47% of the Twitter accounts have published less than 100 tweets). Only 11% of our sample (93 authors) have created a profile in all the platforms analyzed in this study. From the PCA, we found two kinds of impact on the Web: first, all metrics related to academic impact. This first group can further be divided into usage metrics (views and downloads) and citation metrics. Second, all metrics related to connectivity and popularity (followers). ResearchGate indicators, as well as Mendeley readers, present a high correlation to all the indicators from GSC, but only a moderate correlation to the indicators in ResearcherID. Twitter indicators achieve only low correlations to the rest of the indicators, the highest of these being to GSC (0.42-0.46), and to Mendeley (0.41-0.46). Lastly, we present a taxonomy of all the errors that may affect the reliability of the data contained in each of these platforms, with a special emphasis in GSC, since it has been our main source of data. These errors alert us to the danger of blindly using any of these platforms for the assessment of individuals, without verifying the veracity and exhaustiveness of the data. In addition to this working paper, we also have made available a website where all the data obtained for each author and the results of the analysis of the most cited documents can be found: Scholar Mirrors.
Google Scholar, Social media metrics, Bibliometrics, Altmetrics, Mendeley, ResearchGate, ResearcherID, Twitter, Academic profiles

**** *Artigo_272
The ecstasy and the agony of the altmetric score
Altmetrics have gained momentum and are meant to overcome the shortcomings of citation-based metrics. In this regard some light is shed on the dangers associated with the new “all-in-one” indicator altmetric score.
Altmetrics, Altmetric score, “All-in-one” indicator

**** *Artigo_273
The Poor Altmetric Performance of Publications Authored by Researchers in Mainland China
China’s scientific output has risen precipitously over the past decade; it is now the world’s second-largest producer of scientific papers, behind only the United States. The quality of China’s research is also on the rise (Van Noorden, 2016). The online visibility and impact of China’s research are also important issues worth exploring. In this study, we investigate the altmetric performance of publications in the field of Biotechnology and Applied Microbiology and published by authors from Chinese affiliations. We find that papers published by those authors from Chinese affiliations have much lower visibility on the social web than articles from other countries, when there is no significant difference for the citations. Fewer of China’s publications get tweeted, and those tweeted publications attract less social attention. A geographical analysis of tweeters shows that scholarly articles get most of their social attention

from the authors' home countries, a finding that is also confirmed by correlation and regression analysis. This situation, which is unfavorable for researchers from Chinese affiliations, is caused, in part, by the inaccessibility of mainstream social networking platforms in mainland China.
altmetrics, social media, open access, China, twitter

**** *Artigo_274
The social journal

**** *Artigo_275
Three practical field normalised alternative indicator formulae for research evaluation
Although altmetrics and other web-based alternative indicators are now commonplace in publishers' websites, they can be difficult for research evaluators to use because of the time or expense of the data, the need to benchmark in order to assess their values, the high proportion of zeros in some alternative indicators, and the time taken to calculate multiple complex indicators. These problems are addressed here by (a) a field normalisation formula, the Mean Normalised Log-transformed Citation Score (MNLCS) that allows simple confidence limits to be calculated and is similar to a proposal of Lundberg, (b) field normalisation formulae for the proportion of cited articles in a set, the Equalised Meanbased Normalised Proportion Cited (EMNPC) and the Mean-based Normalised Proportion Cited (MNPC), to deal with mostly uncited data sets, (c) a sampling strategy to minimise data collection costs, and (d) free unified software to gather the raw data, implement the sampling strategy, and calculate the indicator formulae and confidence limits. The approach is demonstrated (but not fully tested) by comparing the Scopus citations, Mendeley readers and Wikipedia mentions of research funded by Wellcome, NIH, and MRC in three large fields for 2013-2016. Within the results, statistically significant differences in both citation counts and Mendeley reader counts were found even for sets of articles that were less than six
months old. Mendeley reader counts were more precise than Scopus citations for the most recent articles and all three funders could be demonstrated to have an impact in Wikipedia that was significantly above the world average.

**** *Artigo_276
Towards Predicting Academic Impact from Mainstream News and Weblogs: A Heterogeneous Graph Based Approach
The realization that scholarly publications are discussed and have influence on discourse outside scientific and academic domains has given rise to area of scientometrics called alternative metrics or "altmetrics". Furthermore, researchers in this field tend to focus primarily on measuring scientific activity on social media platforms such as Twitter, however these count-based metrics are vulnerable to gaming because they tend to lack concrete justification or reference to the primary source. In this collaboration with Elsevier, we extend the conventional citation graph to a heterogeneous graph of publications, scientists, venues, organizations and more authoritative media sources such as mainstream news and weblogs. Our approach consists of two parts: one is integrating the bibliometric data with the social data such as blogs, mainstream news. The other involves understanding how standard graph-based metrics can be used to predict the academic impact. Our result showed the computed graph-based metrics can reasonably predict the academic impact of early stage researchers.
Blogs, Social network services, Measurement, Bibliometrics, Data models, Data mining, Organizations

**** *Artigo_277

Tracking the digital footprints to scholarly articles from social media
Scholarly articles are discussed and shared on social media, which generates altmetrics. On the opposite side, what is the impact of social media on the dissemination of scholarly articles and how to measure it? What are the visiting patterns? Investigating these issues, the purpose of this study is to seek a solution to fill the research gap, specifically, to explore the dynamic visiting patterns directed by social media, and examine the effects of social buzz on the article visits. Using the unique real referral data of 110 scholarly articles, which are daily updated in a 90-day period, this paper proposes a novel method to make analysis. We find that visits from social media are fast to accumulate but decay rapidly. Twitter and Facebook are the two most important social referrals that directing people to scholarly articles, the two are about the same and account for over 95 % of the total social referral directed visits. There is synchronism between tweets and tweets resulted visits. Social media and open access are playing important roles in disseminating scholarly articles and promoting public understanding science, which are confirmed quantitatively for the first time with real data in this study.
Altmetrics, Social media, Twitter, Facebook, PeerJ, Public understanding science

**** *Artigo_278
Tweets as Impact Indicators: Examining the Implications of Automated “bot” Accounts on Twitter
This brief communication presents preliminary findings on automated Twitter accounts distributing links to scientific articles deposited on the preprint repository arXiv. It discusses the implication of the presence of such bots from the perspective of social media metrics (altmetrics), where mentions of scholarly documents on Twitter have been suggested as a means of measuring impact that is both broader and timelier than citations. Our results show that automated Twitter accounts create a considerable amount of tweets to scientific articles and that they behave differently than common social bots, which has critical implications for the use of raw tweet counts in research evaluation and assessment. We discuss some definitions of Twitter cyborgs and bots in scholarly communication and propose distinguishing between different levels of engagement—that is, differentiating between tweeting only bibliographic information to discussing or commenting on the content of a scientific work.

**** *Artigo_279
Twitter Article Mentions and Citations: An Exploratory Analysis of Publications in the American Journal of Psychiatry

**** *Artigo_280
Twitter Predicts Citation Rates of Ecological Research
The relationship between traditional metrics of research impact (e.g., number of citations) and alternative metrics (altmetrics) such as Twitter activity are of great interest, but remain imprecisely quantified. We used generalized linear mixed modeling to estimate the relative effects of Twitter activity, journal impact factor, and time since publication on Web of Science citation rates of 1,599 primary research articles from 20 ecology journals published from 2012–2014. We found a strong positive relationship between Twitter activity (i.e., the number of unique tweets about an article) and number of citations. Twitter activity was a more important predictor of citation rates than 5-year journal impact factor. Moreover, Twitter activity was not driven by journal impact factor; the ‘highest-impact’ journals were not necessarily the most discussed online. The effect of Twitter activity was only about a fifth as strong as time since publication; accounting for this confounding factor was critical for estimating the true effects of Twitter use. Articles in impactful journals can become heavily cited, but articles in journals with lower impact factors can generate considerable Twitter activity and also become heavily

cited. Authors may benefit from establishing a strong social media presence, but should not expect research to become highly cited solely through social media promotion. Our research demonstrates that altmetrics and traditional metrics can be closely related, but not identical. We suggest that both altmetrics and traditional citation rates can be useful metrics of research impact.

**** *Artigo_281
One metric does not tell the whole story of scientific production. I. Visibility
There are different strategies for scientific publication that can be addressed from the perspective of visibility, contemplating the uniformity of the firm and author profiles. Method: Narrative review recommendations for the implementation of the author's signature and description of each of the profiles existing in both traditional resources as altmetrics author. scientific researchers must know the visibility strategies described in this article in order to improve recovery of its publications, increase the impact of its production and achieve greater visibility and connection with other researchers through the author profiles.
information management, scientific publication, web visbility, scientific impact, metric

**** *Artigo_282
One metric does not tell the whole story of scientific production. III. Management and conclusions
There are different strategies for scientific publication that can be addressed from the perspective of management, ahead of the assessment by national agencies. Rising of alternative metrics, services and suppliers. Method: Narrative review. the characteristic features of the evaluation criteria of scientific publications by Spanish agencies evaluation are presented and described altmetrics services. The need for national evaluation systems of scientific production to avoid the current bias and ignorance of the publishing sector which suffer WoS and Scopus arises. And also the need for other altmetric systems, complementary to traditional, to expand the type of scientific products and evaluate the scientific social impact.
information management, scientific publication, web visbility, scientific impact, metric, quality

**** *Artigo_283
Using almetrics for contextualised mapping of societal impact: From hits to networks
In this article, we develop a method that uses altmetric data to analyse researchers' interactions, as a way of mapping the contexts of potential societal impact. In the face of an increasing policy demand for quantitative methodologies to assess societal impact, social media data (altmetrics) has been presented as a potential method to capture broader forms of impact. However, current altmetric indicators were extrapolated from traditional citation approaches and are seen as problematic for assessing societal impact. In contrast, established qualitative methodologies for societal impact assessment are based on interaction approaches. These argue that assessment should focus on mapping the contexts in which engagement among researchers and stakeholders take place, as a means to understand the pathways to societal impact. Following these approaches, we propose to shift the use of altmetric data towards network analysis of researchers and stakeholders. We carry out two case studies, analysing researchers' networks with Twitter data. The comparison illustrates the potential of Twitter networks to capture disparate degrees of policy engagement. We propose that this mapping method can be used as an input within broader methodologies in case studies of societal impact assessment
Societal impact, social engagement, open science, altmetrics, twitter, research evaluation

**** *Artigo_284
Using Altmetrics as an Engineering Faculty Outreach Tool

Engineering faculty members are increasingly looking at the pros and cons of the number of research communication tools that are available but are overwhelmed by the variety and lack of evidence that the tools will have a positive influence on research impact, promotion, and tenure. Engineering faculty are drawn to altmetrics for a more complete picture of real world impact while simultaneously dubious of the validity of these emerging measures. This paper reviews the literature on altmetric tools, identifies the existing tools, as well as pros and cons of using those tools. The author investigates how the tools can be used to create an outreach service for faculty members in engineering that supports early career faculty to strategically design an online presence for research impact.

**** *Artigo_285
Vector-valued impact measures and generation of specific indexes for research assessment
A mathematical structure for defining multi-valued bibliometric indices is provided with the aim of measuring the impact of general sources of information others than articles and journals—for example, repositories of datasets. The aim of the model is to use several scalar indices at the same time for giving a measure of the impact of a given source of information, that is, we construct vector valued indices. We use the properties of these vector valued indices in order to give a global answer to the problem of finding the optimal scalar index for measuring a particular aspect of the impact of an information source, depending on the criterion we want to fix for the evaluation of this impact. The main restrictions of our model are (1) it uses finite sets of scalar impact indices (altmetrics), and (2) these indices are assumed to be additive. The optimization procedure for finding the best tool for a fixed criterion is also presented. In particular, we show how to create an impact measure completely adapted to the policy of a specific research institution.
Impact factor, Vector valued, Model, Mathematics, Altmetrics

**** *Artigo_286
When Are Readers as Good as Citers for Bibliometrics? Scopus vs. Mendeley for LIS Journals

In theory, articles can attract readers on the social reference sharing site Mendeley before they can attract citations, so Mendeley altmetrics could provide early indications of article impact. This article investigates the influence of time on the number of Mendeley readers of an article through a theoretical discussion and an investigation into the relationship between counts of readers of, and citations to, 4 general library and information science (LIS) journals. For this discipline, it takes about 7 years for articles to attract as many Scopus citations as Mendeley readers, and after this the Spearman correlation between readers and citers is stable at about 0.6 for all years. This suggests that Mendeley readership counts may be useful impact indicators for both newer and older articles. The lack of dates for individual Mendeley article readers and an unknown bias toward more recent articles mean that readership data should be normalized individually by year, however, before making any comparisons between articles published in different years.
**** *Artigo_287
Why Altmetric scores should never be used to measure the merit of scientific publications (or 'how to tweet your way to honour and glory')

**** *Artigo_288
WHAT ROLE DO LIBRARIANS PLAY IN ALTMETRICS?
Our aim is to identify the steps that librarians can take concerning altmetrics within the framework of the research support services. The current bibliography on altmetrics has been reviewed. A survey has also been carried out of librarians of Spanish universities to find out

their degree of involvement in the matter and the setting up of relevant initiatives. Likewise, a thorough study which would enable librarians to find out about the use which their researchers make of social networks and the interest that they may have in altmetrics is needed. This research offers a user guide for librarians as an orientation in their activities and initiatives related to altmetrics, as well as a list of arguments which justify the reasons why librarians should undertake these initiatives. We contribute a view of altmetrics from the perspective of librarians as a strategic element of dissemination and training in altmetrics.
Altmetrics, librarians, academic library, researchers, scientific production metrics, research evaluation

**** *Artigo_289
A comparison of downloads, readership and citations data for the Journal of Medical Hypotheses and Ideas
This article reflects the comparison of downloads, readership and citation data for the Journal of Medical Hypotheses and Ideas. A brief analysis of the journal's recent performance indicates that the journal articles appear to have a high rate of downloads around the world. Its published articles are from a variety of countries and the odds of accepted articles for publication is surprisingly even across regions. However, the rate of received citations to the published articles indicated a lack of considerable impact in scholarly publications. This approach has double value as it shows the overall impact of the journal in social web as well as scholarly publications and also provides future directions for the journal's editorial boards. Altmetrics was also proposed as an alternative to the widely used citation and usage indicators in tracking the impact of individual articles.
Downloads, Journal usage indicators, Altmetrics, Readership, Journal of Medical Hypotheses and Ideas

**** *Artigo_290
A Randomized Trial of Social Media From Circulation
Medical journals use social media to distribute the findings of published articles. Whether social media exposure to original articles improves article impact metrics is uncertain. Methods and Articles were randomized to receive targeted social media exposure from Circulation, including postings on the journal's Facebook and Twitter feeds. The primary end point was 30-day article page views. We conducted an intention-to-treat analysis comparing article page views by the Wilcoxon Rank sum test between articles randomized to social media as compared with those in the control group, which received no social media from Circulation. Prespecified subgroups included article type (population/clinical/basic), US versus non-US corresponding author, and whether the article received an editorial. Overall, 243 articles were randomized: 121 in the social media arm and 122 in the control arm. There was no difference in median 30-day page views (409 [social media] versus 392 [control], P=0.80). No differences were observed by article type (clinical, population, or basic science; P=0.19), whether an article had an editorial (P=0.87), or whether the corresponding author was from the United States (P=0.73). A social media strategy for a cardiovascular journal did not increase the number of times an article was viewed. Further research is necessary to understand and quantify the ways in which social media can increase the impact of published cardiovascular research.
randomized controlled trials, social media

**** *Artigo_291
A Study about Scholarly Impact Measurement through Altmetrics
Altmetrics is a technique to measure the social impact that could not be found in the existing method by collecting the influence of various research results from social media, media reports,

and reference management tools and analyzing them in a multidimensional manner. Recently, as academic communication methods have been diversified, and OA repositories that can store and distribute papers in various fields have been activated by the open access culture, concerns about a new evaluation system that can measure the influence of each article in multiple ways and complexes have begun. is becoming This study examines the background, application status, and strengths and weaknesses of Altmetrcis, and examines the impact of papers on digital libraries published in Korea, China, and Japan published in international academic journals using ImpactStory, an actual open-source-based Altmetrcis measurement tool, and any correlation with citations. was analyzed to see if As a result of Altmetrcis measurement, the cases of 'saved' in the reference management tool were found to be higher than those of 'discussed' by social media or 'cited' by follow-up studies, 'saved' and 'cited'. It was found that there was a positive correlation (r = 0.718) between ' and On the other hand, as a result of comparing and analyzing the difference in influence by dividing the analysis target papers into Korea, China and Japan, it was found that the frequency of 'saved' in Korea is higher than that of Japan and China.
Altmetrics, Research Impact, Citation Count, ImpactStory, Mendeley

**** *Artigo_292
Adapting sentiment analysis for tweets linking to scientific papers
In the context of altmetrics, tweets have been discussed as potential indicators of immediate and broader societal impact of scientific documents. However, it is not yet clear to what extent Twitter captures actual research impact. A small case study (Thelwall et al., 2013b) suggests that tweets to journal articles neither comment on nor express any sentiments towards the publication, which suggests that tweets merely disseminate bibliographic information, often even automatically. This study analyses the sentiments of tweets for a large representative set of scientific papers by specifically adapting different methods to academic articles distributed on Twitter. Results will help to improve the understanding of Twitter's role in scholarly communication and the meaning of tweets as impact metrics.

**** *Artigo_293
Altmetrics or alternative metrics:concepts and key features
This interview presents the concepts and characteristics of the alternative metrics (or altmetria, in portuguese), emphasising their relationship to the traditional metrics and the potential for hazards, mainly artificial data manipulation. Discusses the challenges for such metrics and the tools available.
Altmetrics, Social networks, Bibliometrics, Infometrics

**** *Artigo_294
Altmetrics – a complement to conventional metrics
Emerging metrics based on article-level does not exclude traditional metrics based on citations to the journal, but complements them. Both can be employed in conjunction to offer a richer picture of an article use from immediate to long terms. Article-level metrics (ALM) is the result of the aggregation of different data sources and the collection of content from multiple social network services. Sources used for the aggregation can be broken down into five categories: usage, captures, mentions, social media and citations. Data sources depend on the tool, but they include classic metrics indicators based on citations, academic social networks (Mendeley, CiteULike, Delicious) and social media (Facebook, Twitter, blogs, or Youtube, among others). Altmetrics is not synonymous with alternative metrics. Altmetrics are normally early available and allow to assess the social impact of scholarly outputs, almost at the real time. This paper overviews briefly the meaning of altmetrics and describes some of the existing tools used to

apply this new metrics: Public Library of Science - Article-Level Metrics, Altmetric, Impactstory and Plum.
altmetrics, article-level metrics, citation, social media

**** *Artigo_295
Altmetrics (Chapter from Beyond Bibliometrics: Harnessing Multidimensional Indicators of Scholarly Impact)
This chapter discusses altmetrics (short for "alternative metrics"), an approach to uncovering previously-invisible traces of scholarly impact by observing activity in online tools and systems. I argue that citations, while useful, miss many important kinds of impacts, and that the increasing scholarly use of online tools like Mendeley, Twitter, and blogs may allow us to measure these hidden impacts. Next, I define altmetrics and discuss research on altmetric sources--both research mapping the growth of these sources, and scientometric research measuring activity on them. Following a discussion of the potential uses of altmetrics, I consider the limitations of altmetrics and recommend areas ripe for future research.

**** *Artigo_296
Altmetrics as traces of the computerization of the research process
I propose a broad, multi-dimensional conception of altmetrics, namely as traces of the computerization of the research process. Computerization should be conceived in its broadest sense, including all recent developments in ICT and software, taking place in society as a whole. I distinguish four aspects of the research process: the collection of research data and development of research methods; scientific information processing; communication and organization; and, last but not least, research assessment. I will argue that in each aspect, computerization plays a key role, and metrics are being developed to describe this process. I propose to label the total collection of such metrics as Altmetrics. I seek to provide a theoretical foundation of altmetrics, based on notions developed by Michael Nielsen in his monograph Reinventing Discovery: The New Era of Networked Science. Altmetrics can be conceived as tools for the practical realization of the ethos of science and scholarship in a computerized or digital age.

**** *Artigo_297
Altmetrics: A new emerging issue for dental research scientists

**** *Artigo_298
Altmetrics: alternative metrics of scientific impact based on social media
Alternative metrics or "altmetrics" can be defined as the study and use of academic impact measures based on the activity of online tools and environments. Altmetrics aim to measure the different forms and patterns of meaning and use of scientific products, looking not only for publishing in traditional media, but also the broader process of dissemination in emerging environments. Its goal is to update the scientific concept of influence in a century characterized by the rapid spread of information and adoption of social media on a global scale. This paper presents the altmetrics and analyses its application to assess academic impact.
Altmetrics, Webometrics, Bibliometrics, Impact Factor, Social Media

**** *Artigo_299
Are scholarly articles disproportionately read in their own country? An analysis of mendeley readers
International collaboration tends to result in more highly cited research and, partly as a result of this, many research funding schemes are specifically international in scope. Nevertheless, it

is not clear whether this citation advantage is the result of higher quality research or due to other factors, such as a larger audience for the publications. To test whether the apparent advantage of internationally collaborative research may be due to additional interest in articles from the countries of the authors, this article assesses the extent to which the national affiliations of the authors of articles affect the national affiliations of their Mendeley readers. Based on English-language Web of Science articles in 10 fields from science, medicine, social science, and the humanities, the results of statistical models comparing author and reader affiliations suggest that, in most fields, Mendeley users are disproportionately readers of articles authored from within their own country. In addition, there are several cases in which Mendeley users from certain countries tend to ignore articles from specific other countries, although it is not clear whether this reflects national biases or different national specialisms within a field. In conclusion, research funders should not incentivize international collaboration on the basis that it is, in general, higher quality because its higher impact may be primarily due to its larger audience. Moreover, authors should guard against national biases in their reading to select only the best and most relevant publications to inform their research.

**** *Artigo_300
Article level metrics: a look beyond the journal impact factor

**** *Artigo_301
Biology Open: evaluating impact

**** *Artigo_302
Blog Citations as Indicators of the Societal Impact of Research: Content Analysis of Social Sciences Blogs
This article analyzes motivations behind social sciences blog posts citing journal articles in order to find out whether blog citations are good indicators for the societal impact or benefits of research. A random sample of 300 social sciences blog posts (out of 1,233 blog posts) from ResearchBlogging.org published between 01/01/2012 to 18/06/2014 were subjected to content analysis. The 300 blog posts had 472 references including 424 journal articles from 269 different journals. Sixty-one (22.68%) of all cited journals were from the social sciences and most of the journals with high frequency were highly cited general science journals such as PNAS and Science. Seventy-five percent of all journals were referenced only once. The average age of articles cited at the time of citation was 5.8 years. Discussion and criticism were the two main categories of motivations. Overall, the study shows the potential of blog citations as an altmetric measure and as a proxy for assessing the research impact. A considerable number of citation motivations in blogs such as disputing a belief, suggesting policies, providing a solution to a problem, reacting to media, criticism and the like seemed to support gaining societal benefits. Societal benefits are considered as helping stimulate new approaches to social issues, or informing public debate and policy-making. Lower self-citation (compared to some other altmetric measures such as tweets) and the fact that blogging involves generating content (i.e. an intellectual process) give them an advantage for altmetrics. However, limitations and contextual issues such as disciplinary differences and low uptake of altmetrics, in general, in scholarly communication should not be ignored when using blogs as a data source for altmetrics.
Blog Citations, Altmetrics, Research, Societal Impact, Weblogs, Social Sciences

**** *Artigo_303
By the Numbers: Bibliometrics and Altmetrics as Measures of Faculty Impact in the Field of

Religion.
Citation analysis is a staple in the sciences for measuring the impact of faculty members' output, but heavy reliance on monographs as a vehicle of scholarly communication diminished the value of bibliometrics in theological disciplines. The digital revolution, however, created a seismic shift for citation analysis and has given rise to altmetrics. Overviews of altmetrics and bibliometrics are provided and a series of questions posed to encourage ongoing discussions about the value of these tools in theological contexts.

**** *Artigo_304
Can you measure the impact of your research?

**** *Artigo_305
Challenges in publishing: producing, assuring and communicating quality
This paper is based on a session “How to make forest science available for all? Publishers’, editors’, and authors’ challenges” at the IUFRO XXIV world conference, organized by Pekka Nygren and Eeva Korpilahti from the Finnish Society of Forest Science. The presenters dealt with the topical problems of publishing scientific knowledge from different perspectives. The talks covered the development of journals, publications and submissions, benefits and drawbacks of open access
publishing as well as electronic and traditional publishing, and possibilities to promote interesting papers either from the journal’s or from the author’s perspective, and the problems of disseminating the scientific results to the end users. In this paper, a few prevalent viewpoints, inspired by the session, are raised and discussed with some suggestions included.
peer review, open access, altmetrics, citation index

**** *Artigo_306
Characterizing Social Media Metrics of Scholarly Papers: The Effect of Document Properties and Collaboration Patterns
A number of new metrics based on social media platforms—grouped under the term “altmetrics”—have recently been introduced as potential indicators of research impact. Despite their current popularity, there is a lack of information regarding the determinants of these metrics. Using publication and citation data from 1.3 million papers published in 2012 and covered in Thomson Reuters’Web of Science as well as social media counts from Altmetric.com, this paper analyses the main patterns of five social media metrics as a function of document characteristics (i.e., discipline, document type, title length, number of pages and references) and collaborative practices and compares them to patterns known for citations. Results show that the presence of papers on social media is low, with 21.5% of papers receiving at least one tweet, 4.7% being shared on Facebook, 1.9% mentioned on blogs, 0.8% found on Google+ and 0.7% discussed in mainstream media. By contrast, 66.8% of papers have received at least one citation. Our findings show that both citations and social media metrics increase with the extent of collaboration and the length of the references list. On the other hand, while editorials and news items are seldom cited, it is these types of document that are the most popular on Twitter. Similarly, while longer papers typically attract more citations, an opposite trend is seen on social media platforms. Finally, contrary to what is observed for citations, it is papers in the Social Sciences and humanities that are the most often found on social media platforms. On the whole, these findings suggest that factors driving social media and citations are different. Therefore, social media metrics cannot actually be seen as alternatives to citations; at most, they may function as complements to other type of indicators.

**** *Artigo_307

CJEM and the changing landscape of medical education and knowledge translation
Social Media, Altmetrics, Knowledge translation

**** *Artigo_308
Connecting Altmetric: Integrating with Institutional Publications Systems
This paper discusses Altmetric tools for institutions and how they are supported by accurate, up-to-date and re-usable research information. We examine the importance of standardised metadata formats across research information management systems in enabling altmetric providers to deliver data in robust, reliable and meaningful ways. We share our experience of collaborating with a range of institutions to report and analyse the attention to their collection of research outputs and surfacing altmetrics data at the author, department and institutional level. This includes working with institutions to ensure we can harvest from or integrate with existing technical infrastructure in order to match outputs with the corresponding altmetrics data in the Altmetric database. We discuss integrations with institutional repositories and publications systems including Symplectic Elements, VIVO and DSpace. Finally, we study motivations for incorporating metrics into workflows and systems across institutions, and how altmetrics can be integrated with existing research support and bibliometrics services.
Altmetric, Metadata, Article Metrics

**** *Artigo_309
Creating, Curating, and Sharing Online Faculty Development Resources
Problem: It is difficult to engage clinicians in continuing medical education that does not focus on clinical expertise. Evolving online technologies (e.g., massive open online courses [MOOCs]) are disrupting and transforming medical education, but few online nonclinical professional development resources exist. Approach In August 2013, the Academic Life in Emergency Medicine Web site launched the Medical Education in Cases (MEdIC) series to engage clinicians in an online professional development exercise. Each month, a complex, realistic scenario featuring a nonclinical medical education dilemma is published with accompanying discussion questions. A weeklong discussion is moderated on Twitter and the Web site. This discussion is curated to create a community commentary, which is published alongside presolicited expert responses. Case resources are available for download. Outcomes The first six MEdIC cases (published August 2013–January 2014) emphasized different CanMEDS and/or Accreditation Council on Graduate Medical Education competencies. Median reader engagement metrics (interquartile range 25%–75%) in the first week following publication were 861 (634–1,114) pageviews, 767 (518–953) unique visitors from 326 (218–405) cities in 45 (32–50) countries, 30 (24–39) comments, 52 (40–56) tweets, 17 (13–30) Facebook Likes, and 5 (5–7) Google Plus +1s. Next Steps The MEdIC series is proof of concept that online activities can engage clinicians in nonclinical professional development. The early experience suggests the connectivist nature of MEdIC allows for crowdsourcing solutions to ill-defined problems via the wisdom of readers. This methodology may also be effective for other nonclinical and medical education topics.

**** *Artigo_310
Differences in personal and professional tweets of scholars
Purpose – The purpose of this paper is to show that there were differences in the use of Twitter by professors at AAU schools. Affordance use differed between the personal and professional tweets of professors as categorized by turkers. Framing behaviors were described that could impact the interpretation of tweets by audience members. Design/methodology/approach – A three phase research design was used that included surveys of professors, categorization of tweets by workers in Amazon’s Mechanical

Turk, and categorization of tweets by active professors on Twitter. Findings – There were significant differences found between professors that reported having a Twitter account, significant differences found between types of Twitter accounts (personal, professional, or both), and significant differences in the affordances used in personal and professional tweets. Framing behaviors were described that may assist altmetric researchers in distinguishing between personal and professional tweets. Research limitations/implications – The study is limited by the sample population, survey instrument, low survey response rate, and low Cohen's κ. Practical implications – An overview of various affordances found in Twitter is provided and a novel use of Amazon's Mechanical Turk for the categorization of tweets is described that can be applied to future altmetric studies. Originality/value – This work utilizes a socio---technical framework integrating social and psychological theories to interpret results from the tweeting behavior of professors and the interpretation of tweets by workers in Amazon's Mechanical Turk.
Social media, Affordance, Impression management, Altmetrics, Twitter, Frame analysis

**** *Artigo_311
Digital Presence of Norwegian Scholars on Academic Network Sites—Where and Who Are They?
The use of academic profiling sites is becoming more common, and emerging technologies boost researchers'visibility and exchange of ideas. In our study we compared profiles at five different profiling sites. These five sites are ResearchGate, Academia.edu, Google Scholar Citations, ResearcherID and ORCID. The data set is enriched by demographic information including age, gender, position and affiliation, which are provided by the national CRIS-system in Norway. We find that approximately 37% of researchers at the University of Bergen have at least one profile, the prevalence being highest (>40%) for members at the Faculty of Psychology and the Faculty of Social Sciences. Across all disciplines, Research-Gate is the most widely used platform. However, within Faculty of Humanities, Academia.
edu is the preferred one. Researchers are reluctant to maintain multiple profiles, and there is little overlap between different services. Age turns out to be a poor indicator for presence in the investigated profiling sites, women are underrepresented and professors together with PhD students are the most likely profile holders. We next investigated the correlation between bibliometric measures, such as publications and citations, and user activities, such as downloads and followers. We find different bibliometric indicators to correlate strongly within individual platforms and across platforms. There is however less agreement between the traditional bibliometric and social activity indicators.

**** *Artigo_312
Do "altmetrics" correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective
An extensive analysis of the presence of different altmetric indicators provided by Altmetric.com across scientific fields is
presented, particularly focusing on their relationship with citations. Our results confirm that the presence and density of social media altmetric counts are still very low and not very frequent among scientific publications, with 15%-24% of the publications presenting some altmetric activity and concentrating in the most recent publications, although their presence is increasing over time. Publications from the social sciences, humanities and the medical and life sciences show the highest presence of altmetrics, indicating their potential value and interest for these fields. The analysis of the relationships between altmetrics and citations confirms previous claims of positive correlations but relatively weak, thus supporting the idea that

altmetrics do not reflect the same concept of impact as citations. Also, altmetric counts do not always present a better filtering of highly cited publications than journal citation scores. Altmetrics scores (particularly mentions in blogs) are able to identify highly cited publications with higher levels of precision than journal citation scores (JCS), but they have a lower level of recall. The value of altmetrics as a complementary tool of citation analysis is highlighted, although more research is suggested to disentangle the potential meaning and value of altmetric indicators for research evaluation.
Scientometrics Indicators, criticism and new developments, Scientometrics Studies, Webometrics

**** *Artigo_313
F1000Prime: an analysis of discipline-specific reader data from Mendeley
We have used the F1000Prime recommended paper set (n= 114,582 biomedical papers) to inquire the number of Mendeley readers per (sub-) discipline via the Mendeley Application Programming Interface (API). Although the (sub-) discipline of Mendeley readers is self-assigned and not mandatory, we find that a large share (99.9%) of readers at Mendeley does share their (sub-) discipline. As expected, we find most readers of F1000Prime recommended papers work in the disciplines of biology and medicine. A network analysis reveals strong connections between the disciplines of engineering, chemistry, physics, biology, and medicine.

F1000Prime, Altmetrics, Mendeley, paper, evaluation

**** *Artigo_314
How well developed are Altmetrics? Cross-disciplinary analysis of the presence of alternative metrics in scientific publications?" "In this paper an analysis of the presence and possibilities of altmetrics for bibliometric and performance analysis is carried out. Using the web based tool Impact Story, we have collected metrics for 20,000 random publications from the Web of Science. We studied the presence and frequency of altmetrics in the set of publications, across fields, document types and also through the years. The main result of the study is that less than 50% of the publications have some kind of altmetrics. The source that provides most metrics is Mendeley, with metrics on readerships for around 37% of all the publications studied. Other sources only provide marginal information. Possibilities and limitations of these indicators are discussed and future research lines are outlined. We also assessed the accuracy of the data retrieved through Impact Story by focusing on the analysis of the accuracy of data from Mendeley; in a follow up study, the accuracy and validity of other data sources not included here will be assessed.

**** *Artigo_315
I Like, I Cite? Do Facebook Likes Predict the Impact of Scientific Work?
Due to the increasing amount of scientific work and the typical delays in publication, promptly assessing the impact of scholarly work is a huge challenge. To meet this challenge, one solution may be to create and discover innovative indicators. The goal of this paper is to investigate whether Facebook likes for unpublished manuscripts that are uploaded to the Internet could be used as an early indicator of the future impact of the scientific work. To address our research question, we compared Facebook likes for manuscripts uploaded to the Harvard Business School website (Study 1) and the bioRxiv website (Study 2) with traditional impact indicators (journal article citations, Impact Factor, Immediacy Index) for those manuscripts that have been published as a journal article. Although based on our full sample of Study 1 (N = 170), Facebook likes do not predict traditional impact indicators, for manuscripts with one or more Facebook likes (n = 95), our results indicate that the more Facebook likes a manuscript receives,

the more journal article citations the manuscript receives. In additional analyses (for which we categorized the manuscripts as psychological and non-psychological manuscripts), we found that the significant prediction of citations stems from the psychological and not the non-psychological manuscripts. In Study 2, we observed that Facebook likes (N = 270) and non-zero Facebook likes (n = 84) do not predict traditional impact indicators. Taken together, our findings indicate an interdisciplinary difference in the predictive value of Facebook likes, according to which Facebook likes only predict citations in the psychological area but not in the non-psychological area of business or in the field of life sciences. Our paper contributes to understanding the possibilities and limits of the use of social media indicators as potential early indicators of the impact of scientific work."

**** *Artigo_316
Influence of study type on Twitter activity for medical research papers
Twitter has been identified as one of the most popular and promising altmetrics data sources, as it possibly reflects a broader use of research articles by the general public. Several factors, such as document age, scientific discipline, number of authors and document type, have been shown to affect the number of tweets received by scientific documents. The particular meaning of tweets mentioning scholarly papers is, however, not entirely understood and their validity as impact indicators debatable. This study contributes to the understanding of factors influencing Twitter popularity of medical papers investigating differences between medical study types. 162,830 documents indexed in Embase to a medical study type have been analysed for the study type specific tweet frequency. Meta-analyses, systematic reviews and clinical trials were found to be tweeted substantially more frequently than other study types, while all basic research received less attention than the average. The findings correspond well with clinical evidence hierarchies. It is suggested that interest from laymen and patients may be a factor in the observed effects.
Altmetrics, (ISSI) Conference

**** *Artigo_317
Interpreting ""altmetrics"": viewing acts on social media through the lens of citation and social theories
More than 30 years after Cronin's seminal paper on "the need for a theory of citing" (Cronin, 1981), the metrics community is once again in need of a new theory, this time one for so-called "altmetrics". Altmetrics, short for alternative (to citation) metrics - and as such a misnomer - refers to a new group of metrics based (largely) on social media events relating to scholarly communication. As current definitions of altmetrics are shaped and limited by active platforms, technical possibilities, and business models of aggregators such as this http URL, ImpactStory, PLOS, and Plum Analytics, and as such constantly changing, this work refrains from defining an umbrella term for these very heterogeneous new metrics. Instead a framework is presented that describes acts leading to (online) events on which the metrics are based. These activities occur in the context of social media, such as discussing on Twitter or saving to Mendeley, as well as downloading and citing. The framework groups various types of acts into three categories -- accessing, appraising, and applying -- and provides examples of actions that lead to visibility and traceability online. To improve the understanding of the acts, which result in online events from which metrics are collected, select citation and social theories are used to interpret the phenomena being measured. Citation theories are used because the new metrics based on these events are supposed to replace or complement citations as indicators of impact. Social theories, on the other hand, are discussed because there is an inherent social aspect to the measurements.

**** *Artigo_318
Journal Club via social media: authors take note of the impact of #BlueJC

**** *Artigo_319
Knowledge Service Pattern of New Digital Library Combining Altmetrics
Starting from the influence of online scientific research era on digital library knowledge service, the paper expounds the new requirements of digital library users, which needs individualized service integrating relevant resources and combining swarm intelligence, and the academic achievements of academic social network relationship. The paper points out that digital library should obey new idea which means to provide academic social network service, knowledge service based on big data and resource filtering mechanism based on swarm intelligence. Based on analyzing the positioning of digital library in altmetricecosystem, the paper proposes novel knowledge service pattern of digital library. The pattern improves knowledge service capability from the perspective of user retrieval and personal push. Lastly, compared with the traditional digital library knowledge service pattern, the new knowledge service pattern has the characteristics of automation, dynamic, networked and transiting towards knowledge communicator, which is inherent with the concept of digital library.
Digital library, Altmetrics, knowledge service, Information retrieval, Scientific communication, Academic social network

**** *Artigo_320
Making data count

**** *Artigo_321
Marketing científico digital e métricas alternativas para periódicos: da visibilidade ao engajamento
The paper reflects about the scientific digital marketing role to raise the visibility of scholarly journals as well as the monitoring and evaluation of their social impact by altmetrics. For the application of this kind of marketing the publishers should build and maintain an online presence; provide appropriate content to environments that act, and; establish a responsive performance. The main indicators of scientific digital marketing is discussed and the altmetrics is considered as a method for collecting and analyzing such indicators. Before opting for the altmetrics service to be used cost and the required standard of journals should be observed.
Scientific digital marketing, Altmetrics, Journal, Visibility, Scientific communication

**** *Artigo_322
Measuring Metrics - A forty year longitudinal cross-validation of citations, downloads, and peer review in Astrophysics
Citation measures, and newer altmetric measures such as downloads are now commonly used to inform personnel decisions. How well do or can these measures measure or predict the past, current of future scholarly performance of an individual? Using data from the Smithsonian/NASA Astrophysics Data System we analyze the publication, citation, download, and distinction histories of a cohort of 922 individuals who received a U.S. PhD in astronomy in the period 1972-1976. By examining the same and different measures at the same and different times for the same individuals we are able to show the capabilities and limitations of each measure. Because the distributions are lognormal measurement uncertainties are multiplicative; we show that in order to state with 95% confidence that one person's citations and/or downloads are significantly higher than another person's, the log difference in the ratio

of counts must be at least 0.3 dex, which corresponds to a multiplicative factor of two.

**** *Artigo_323
Medical journals, impact and social media: an ecological study of the Twittersphere
Twitter is an increasingly popular means of research dissemination. I sought to examine the relation between scientific merit and mainstream popularity of general medical journals. I extracted impact factors and citations for 2014 for all general medical journals listed in the Thomson Reuters InCites Journal Citation Reports. I collected Twitter statistics (number of followers, number following, num-ber of tweets) between July 25 and 27, 2015 from the Twitter profiles of journals that had Twitter accounts. I calculated the ratio of observed to expected Twitter followers accord-ing to citations via the Kardashian Index. I cre-ated the (Fifty Shades of) Grey Scale to calculate the analogous ratio according to impact factor. Only 28% (43/153) of journals had Twitter profiles. The scientific and social media impact of journals were correlated: in adjusted models, Twitter followers increased by 0.78% (95% confidence interval [CI] 0.38%–1.18%) for every 1% increase in impact factor and by 0.62% (95% CI 0.34%–0.90%) for every 1% increase in citations. ardashian I n d e x scores above the 9 9 % C I w e r e obsverved in 16% (7/43) of journals, including 6 of the 7 highest ranked journals by impact factor, whereas 58% (25/43) had scores below this interval. For the Grey Scale, 12% (5/43) of journals had scores above and 35% (15/43) had scores below the 99% CI. The size of a general medical journal's Twitter following is strongly linked to its impact factor and citations, suggesting that higher quality research received more main-stream attention. Many journals have not capi-talized on this dissemination method, although others have used it to their advantage.

**** *Artigo_324
Metrics and Assessment
An important and timely plenary session at the 2015 UKSG Conference and Exhibition focused on the role of metrics in research assessment. The two excellent speakers had slightly divergent views. Todd Carpenter from the National Information Standards Organization (NISO) argued that altmetrics are not alt(ernative) any more and that downloads and other forms of digital interaction, including social media reference, reference tracking, personal library saving and secondary linking activity now provide mainstream approaches to the assessment of scholarly impact. James Wilsdon is Professor of Science & Democracy in the Science Policy Research Unit (SPRU) at the University of Sussex and is Chair of the Independent Review of the Role of Metrics in Research Assessment commissioned by the Higher Education Funding Council for England (HEFCE). The outcome of this review will inform the work of HEFCE and the other UK higher education funding bodies as they prepare for the future of the Research Excellence Framework (REF). He is more circumspect, arguing that metrics cannot and should not be used as a substitute for informed judgement. This article provides a summary of both presentations.

metrics, altmetrics, social media, research assessment, REF, NISO

**** *Artigo_325
Metropolises in the Twittersphere: An Informetric Investigation of Informational Flows and Networks
Information flows on social media platforms are able to show trends and user interests as well as connections between users. In this paper, we present a method how to analyze city related networks on the social media platform Twitter based on the user content.
Forty million tweets have been downloaded via Twitter's REST API (application programming

interface) and Twitter's Streaming API. The investigation focuses on two aspects: firstly, trend detection has been done to analyze 31 informational world cities, according the user activity, popularity of shared websites and topics defined by hashtags. Secondly, a hint of how connected informational cities are to each other is given by creating a clustered network based on the number of connections between different city pairs. Tokyo, New York City, London and Paris clearly lead the ranking of the most active cities if compared by the total number of tweets. The investigation shows that Twitter is very frequently used to share content from other services like Instagram or YouTube. The most popular topics in tweets reveal great differences between the cities. In conclusion, the investigation shows that social media services like Twitter also can be a mirror of the society they are used in and bring to light information flows of connected cities in a global network. The presented method can be applied in further research to analyze information flows regarding specific topics and/or geographical locations.
social media, microblogging, Twitter, informational city, big data, network analysis

**** *Artigo_326
Social media and scientific communication: an altmetric analysis of information science journals
This study elaborates on the relationship between social media and communication science, setting the emerging field of altmetris for the analysis of this relationship. The study presents the results of a research project that aimed to analyse alternative metrics to 125 articles of Brazilian Information Science journals.
Through Altmetric.com, 45 of the 125 items returned altmetrics data. The journal Ciência da Informação obtained better results than the others, with 21 articles and 297 altmetrics data. In regards to social media, around 92,43% of the data collected
was taken from Mendeley's library, while 7,57% of the mentions were from Twitter, and no data was recovered from Facebook. We consider that the lack of standardization for magazines can be a factor in the reduced quantity of articles found, and the parameterization of Application Programming Interface of social media such as Facebook and Twitter can be the answer to overcome this low number for the recovered data. The altmetric data indicates the attention that the articles receive on socialweb shortly after their publication and may be a suggestion of future citations.
Social media, Scientific communication, Altmetrics

**** *Artigo_327
Moving Beyond Counting Publications to Assess Impact

**** *Artigo_328
Multidimensional assessment of scholarly research impact
This article introduces the Multidimensional Research Assessment Matrix of scientific output. Its base notion holds that the choice of metrics to be applied in a research assessment process depends on the unit of assessment, the research dimension to be assessed, and the purposes and policy context of the assessment. An indicator may by highly useful within one assessment process, but less so in another. For instance, publication counts are useful tools to help discriminate between those staff members who are research active, and those who are not, but are of little value if active scientists are to be compared with one another according to their research performance. This paper gives a systematic account of the potential usefulness and limitations of a set of 10 important metrics, including altmetrics, applied at the level of individual articles, individual researchers, research groups, and institutions. It presents a typology of research impact dimensions and indicates which metrics are the most appropriate

to measure each dimension. It introduces the concept of a “meta-analysis” of the units under assessment in which metrics are not used as tools to evaluate individual units, but to reach policy inferences regarding the objectives and general setup of an assessment process.

**** *Artigo_329
National research impact indicators from Mendeley readers
National research impact indicators derived from citation counts are used by governments to help assess their national research performance and to identify the effect of funding or policy changes. Citation counts lag research by several years, however, and so their information is somewhat out of date. Some of this lag can be avoided by using readership counts from the social reference sharing site Mendeley because these accumulate more quickly than citations. This article introduces a method to calculate national research impact indicators from Mendeley, using citation counts from older time periods to partially compensate for international biases in Mendeley readership. A refinement to accommodate recent national changes in Mendeley uptake makes little difference, despite being theoretically more accurate. The Mendeley patterns using the methods broadly reflect the results from similar calculations with citations and seem to reflect impact trends about a year earlier. Nevertheless, the reasons for the differences between the indicators from the two data sources are unclear.
Scientometrics, Citation analysis, Research evaluation

**** *Artigo_330
Networks of reader and country status: an analysis of Mendeley reader statistics
The number of papers published in journals indexed by the Web of Science core collection is steadily increasing. In recent years, nearly two million new papers were published each year; somewhat more than one million papers when primary research papers are considered only (articles and reviews are the document types where primary research is usually reported or reviewed). However, who reads these papers? More precisely, which groups of researchers from which (self-assigned) scientific disciplines and countries are reading these papers? Is it possible to visualize readership patterns for certain countries, scientific disciplines, or academic status groups? One popular method to answer these questions is a network analysis. In this study, we analyze Mendeley readership data of a set of 1,133,224 articles and 64,960 reviews with publication year 2012 to generate three different networks: (1) The network based on disciplinary affiliations of Mendeley readers contains four groups: (i) biology, (ii) social sciences and humanities (including relevant computer sciences), (iii) bio-medical sciences, and (iv) natural sciences and engineering. In all four groups, the category with the addition “miscellaneous” prevails. (2) The network of co-readers in terms of professional status shows that a common interest in papers is mainly shared among PhD students, Master’s students, and postdocs. (3) The country network focusses on global readership patterns: a group of 53 nations is identified as core to the scientific enterprise, including Russia and China as well as two thirds of the OECD (Organisation for Economic Co-operation and Development) countries.
Mendeley, network, Pajek, VOSviewer, bibliometrics, altmetrics

**** *Artigo_331
On Developing Extraction Rules for Mining Informal Scientific References from Altmetric Data Sources
Altmetrics measure scientific impact outside of traditional scientific literature. We identify mentions of scientific research or entities like researchers, academic or research organizations in a corpus containing blogs, articles, news items etc. We first manually analyse the corpus for patterns of such informal mentions and then apply text mining techniques by developing extraction rules for mining informal mentions. We apply them to our development corpus and

present our results. This work takes us closer to developing concrete altmetrics for determining research impact on news and public discourse ultimately leading to measuring impact of scientific research on government policies.
Text mining, Altmetrics, Informal scientific references

**** *Artigo_332
Online metrics show who's saying what about scientists' research
Journal websites are now highlighting their articles' likes, shares, and tweets, but information scientists still aren't sure what the numbers really mean.
Arxiv, Careers and professions, Books, News and evente, Libraries, Physicists, Funding, Social networks, Educational assessment, Journal

**** *Artigo_333
PLOS, Please publish our articles on Wednesdays: A look at altmetrics by day of publication
altmetrics, data analysis, PLOS

**** *Artigo_334
Policy documents as sources for measuring societal impact: How often is climate change research mentioned in policy-related documents?
In the current UK Research Excellence Framework (REF) and the Excellence in Research for Australia (ERA) societal impact measurements are inherent parts of the national evaluation systems. In this study, we deal with a relatively new form of societal impact measurements. Recently, Altmetric – a start-up providing publication level metrics – started to make data for publications available which have been mentioned in policy documents. We regard this data source as an interesting possibility to specifically measure the (societal) impact of research. Using a comprehensive dataset with publications on climate change as an example, we study the usefulness of the new data source for impact measurement. Only 1.2% (n=2,341) out of 191,276 publications on climate change in the dataset have at least one policy mention. We further reveal that papers published in Nature and Science as well as from the areas "Earth and related environmental sciences" and "Social and economic geography" are especially relevant in the policy context. Given the low coverage of the climate change literature in policy documents, this study can be only a first attempt to study this new source of altmetric data. Further empirical studies are necessary in upcoming years, because mentions in policy documents are of special interest in the use of altmetric data for measuring target-oriented the broader impact of research.
Climate change, Policy documents, altmetrics

**** *Artigo_335
Ranking Journals Using Altmetrics
The rank of a journal based on simple citation information is a popular measure. The simplicity and availability of rankings such as Impact Factor, Eigenfactor and SciMago Journal Rank based on trusted commercial sources ensures their widespread use for many important tasks despite the well-known limitations of such rankings. In this paper we look at an alternative approach based on information on papers from social and mainstream media sources. Our data comes from altmetric.com who identify mentions of individual academic papers in sources such as Twitter, Facebook, blogs and news outlets. We consider several different methods to produce a ranking of journals from such data. We show that most (but
not all) schemes produce results, which are roughly similar, suggesting that there is a basic consistency between social media based approaches and traditional citation based methods. Most ranking schemes applied to one data set produce relatively little variation and we

suggest this provides a measure of the uncertainty in any journal rating. The differences we find between data sources also shows they are capturing different aspects of journal impact. We conclude a small number of such ratings will provide the best information on journal impact.

**** *Artigo_336
Regression for citation data: An evaluation of different methods
Citations are increasingly used for research evaluations. It is therefore important to identify factors affecting citation scores that are unrelated to scholarly quality or usefulness so that these can be taken into account. Regression is the most powerful statistical technique to identify these factors and hence it is important to identify the best regression strategy for citation data. Citation counts tend to follow a discrete lognormal distribution and, in the absence of alternatives, have been investigated with negative binomial regression. Using simulated discrete lognormal data (continuous lognormal data rounded to the nearest integer) this article shows that a better strategy is to add one to the citations, take their log and then use the general linear (ordinary least squares) model for regression (e.g., multiple linear regression, ANOVA), or to use the generalised linear model without the log. Reasonable results can also be obtained if all the zero citations are discarded, the log is taken of the remaining citation counts and then the general linear model is used, or if the generalised linear model is used with the continuous lognormal distribution. Similar approaches are recommended for altmetric data, if it proves to be lognormally distributed.
scientometrics, informetrics, altmetrics, citation distributions, lognormal, powerlaw, regression

**** *Artigo_337
Relationships Between Traditional Metrics and Altmerics: A Case Analysis of PLoS
The possibility of creating and easily distributing something via a digital platform creates an enormous material volume. With the increase of scientific publications it becomes harder for scholars to choose the most related and significant resources from the others (Henning & Gunn, 2012). bibliometrics measures the impact of scholars between each other, but the impact of articles across the entire web is not limited by this. On the other hand, altmetrics measures the impact of articles from the web, alongside bibliometric data. the aim of this study is to investigate the probable relationships between traditional metrics and altmetrics by analysing the PloS Article-level Metric (AlM) dataset.
bibliometrics, altmetrics, Article level Metric (AlM)

**** *Artigo_338
Research Data Explored II: the Anatomy and Reception of figshare
This is the second paper in a series of bibliometric studies of research data. In this paper, we present an analysis of figshare, one of the largest multidisciplinary repositories for research materials to date. We analysed the structure of items archived in figshare, their usage, and their reception in two altmetrics sources (PlumX and ImpactStory). We found that figshare acts (1) as a personal repository for yet unpublished materials, (2) as a platform for newly published research materials, and (3) as an archive for PLOS. Depending on the function, we found different bibliometric characteristics. Items archived from PLOS tend to be coming from the natural sciences and are often unviewed and non-downloaded. Self-archived items, however, come from a variety of disciplines and exhibit some patterns of higher usage. In the altmetrics analysis, we found that Twitter was the social media service where research data gained most attention; generally, research data published in 2014 were most popular across social media services. PlumX detects considerably more items in social media and also finds higher altmetric

scores than ImpactStory.

**** *Artigo_339
Research Data Explored: Citations versus Altmetrics
The study explores the citedness of research data, its distribution over time and how it is related to the availability of a DOI (Digital Object Identifier) in Thomson Reuters' DCI (Data Citation Index). We investigate if cited research data "impact" the (social) web, reflected by altmetrics scores, and if there is any relationship between the number of citations and the sum of altmetrics scores from various social media-platforms. Three tools are used to collect and compare altmetrics scores, i.e. PlumX, ImpactStory, and this http URL. In terms of coverage, PlumX is the most helpful altmetrics tool. While research data remain mostly uncited (about 85%), there has been a growing trend in citing data sets published since 2007. Surprisingly, the percentage of the number of cited research data with a DOI in DCI has decreased in the last years. Only nine repositories account for research data with DOIs and two or more citations. The number of cited research data with altmetrics scores is even lower (4 to 9%) but shows a higher coverage of research data from the last decade. However, no correlation between the number of citations and the total number of altmetrics scores is observable. Certain data types (i.e. survey, aggregate data, and sequence data) are more often cited and receive higher altmetrics scores.
Altmetrics, Citation, Co-citation Analysis

**** *Artigo_340
ResearchGate: Disseminating, communicating, and measuring Scholarship?
ResearchGate is a social network site for academics to create their own profiles, list their publications, and interact with each other. Like
Academia.edu, it provides a new way for scholars to disseminate their work and hence potentially changes the dynamics of informal scholarly communication. This article assesses whether ResearchGate usage and publication data broadly reflect existing academic hierarchies and whether individual countries are set to benefit or lose out from the site. The results show that rankings based on ResearchGate statistics correlate moderately well with other rankings of academic institutions, suggesting that ResearchGate use broadly reflects the traditional distribution of academic capital. Moreover, while Brazil, India, and some other countries seem to be disproportionately taking advantage of ResearchGate, academics in China, South Korea, and Russia may be missing opportunities to use ResearchGate to maximize the academic impact of their publications.

**** *Artigo_341
Scholarly social media profiles and libraries: A review
This article aims to point out emerging roles and responsibilities for academic librarians with the potential of better integrating the library in the research process. In order to find out how to enhance the online reputation and discoverability of individual faculty members as well as their affiliated institutions, the authors worked side-by-side with researchers in the United States and Europe to explore, create, revise, and disambiguate scholarly profiles in various software applications. In an attempt to understand and organize scholarly social media, including new, alternative metrics, the authors reviewed and classified the major academic profile platforms, highlighting the overlapping elements, benefits, and drawbacks inherent in each. The consensus is that it would be time-consuming to keep one’s profile current and accurate on all of these platforms, given the plethora of underlying problems, also discussed in detail in the article. However, it came as a startling discovery that reluctance to engage with scholarly social media may cause a misrepresentation of a researcher’s academic achievements and may come with unforeseen consequences. The authors claim that current skills and competencies can secure an

essential role for academic librarians in the research workflow by means of monitoring and navigating researcher profiles in scholarly social media in order to best represent the scholarship of their host institutions.
altmetric, discoverability, researcher profile, scholarly selfie, scholarly social media

**** *Artigo_342
Social media in scholarly communication
Social media metrics - commonly coined as "altmetrics" - have been heralded as great democratizers of science, providing broader and timelier indicators of impact than citations. These metrics come from a range of sources, including Twitter, blogs, social reference managers, post-publication peer review, and other social media platforms. Social media metrics have begun to be used as indicators of scientific impact, yet the theoretical foundation, empirical validity, and extent of use of platforms underlying these metrics lack thorough treatment in the literature. This editorial provides an overview of terminology and definitions of altmetrics and summarizes current research regarding social media use in academia, social media metrics as well as data reliability and validity. The papers of the special issue are introduced.

**** *Artigo_343
The Altmetric Score: A New Measure for Article-Level Dissemination and Impact

**** *Artigo_344
The open access advantage considering citation, article usage and social media attention
In this study, we compare the difference in the impact between open access (OA) and non-open access (non-OA) articles. 1761 Nature Communications articles published from 1 Jan. 2012 to 31 Aug. 2013 are selected as our research objects, including 587 OA articles and 1174 non-OA articles. Citation data and daily updated article-level metrics data are harvested directly from the platform of nature.com. Data is analyzed from the static versus temporal-dynamic perspectives. The OA citation advantage is confirmed, and the OA advantage is also applicable when extending the comparing from citation to article views and social media attention. More important, we find that OA papers not only have the great advantage of total downloads, but also have the feature of keeping sustained and steady downloads for a long time. For article downloads, non-OA papers
only have a short period of attention, when the advantage of OA papers exists for a much longer time.
Article-level metrics, usage metrics, Altmetrics, open access, social media attention, open access advantage

**** *Artigo_345
The Social Media Index: Measuring the Impact of Emergency Medicine and Critical Care Websites
The number of educational resources created for emergency medicine and critical care (EMCC) that incorporate social media has increased dramatically. With no way to assess their impact or quality, it is challenging for educators to receive scholarly credit and for learners to identify respected resources. The Social Media index (SMi) was developed to help address this. We used data from social media platforms (Google PageRanks, Alexa Ranks, Facebook Likes, Twitter Followers, and Google+ Followers) for EMCC blogs and podcasts to derive three normalized (ordinal, logarithmic, and raw) formulas. The most statistically robust formula was assessed for 1) temporal stability using repeated measures and website age, and 2) correlation with impact by applying it to EMCC journals and measuring the correlation with known journal

impact metrics. The logarithmic version of the SMi containing four metrics was the most statistically robust.
It correlated significantly with website age (Spearman r=0.372; p<0.001) and repeated measures through seven months (r=0.929; p<0.001). When applied to EMCC journals, it correlated significantly with all impact metrics except number of articles published. The strongest correlations were seen with the Immediacy Index (r=0.609; p<0.001) and Article Influence Score (r=0.608; p<0.001). The SMi's temporal stability and correlation with journal impact factors suggests that it may be a stable indicator of impact for medical education websites. Further study is needed to determine whether impact correlates with quality and how learners and educators can best utilize this tool.

**** *Artigo_346
The Use of Altmetrics as a Tool for Measuring Research Impact
This article provides an introduction to the use of altmetrics as a tool to assess research impact. In particular, it looks at the evidence behind claims that altmetrics allow the impact of research to be measured in days rather than years. Low correlations between altmetrics and article citations make it doubtful that altmetrics can reliably predict future citations. In addition, there are good reasons to qualify statements that altmetrics measure the wider impact of research on society. Librarians should be careful not to overstate the value of altmetrics when recommending their use as a complement to more traditional measures of research quality.
altmetrics, bibliometrics, F1000Prime, Internet social networks, Mendeley, research impact, social web, scientific communication, Twitter

**** *Artigo_347
Understanding the impact of research on policy using Altmetric data
Usage, sharing, and, discussion data sourced from the scholarly and social web (altmetrics) are being increasingly recognized as tools for understanding the diverse impacts that research can have on the world. One important impact is the downstream effect that research-backed policy can have on the lives of the average citizen. For that reason, we have developed text-mining techniques to discover mentions of research outputs in policy documents created by diverse groups like the International Monetary Fund, World Health Organization, and Intergovernmental Panel on Climate Change. By automatically identifying references to scholarly content in policy documents, we aim to help researchers and institutions to better understand the "real world" uses of their work.In this poster, we explain our current process for sourcing, scraping, validating, and sharing these important data. We also include case studies that illustrate how policy data mined by Altmetric are being used.

**** *Artigo_348
Usage metrics versus altmetrics: confusing terminology?

**** *Artigo_349
User participation in an academic social networking service: A survey of open group users on Mendeley
Although there are a number of social networking services that specifically target scholars, little has been published about the actual practices and the usage of these so-called academic social networking services (ASNSs). To fill this gap, we explore the populations of academics who engage in social activities using an ASNS; as an indicator of further engagement, we also determine their various motivations for joining a group in ASNSs. Using groups and their members in Mendeley as the platform for our case study, we obtained 146 participant responses from our online survey about users' common activities, usage habits,

and motivations for joining groups. Our results show that 1) participants did not engage with social-based features as frequently and actively as they engaged with research-based features, and 2) users who joined more groups seemed to have a stronger motivation to increase their professional visibility and to contribute the research articles they had read to the group reading list. Our results generate interesting insights into Mendeley's user populations, their activities, and their motivations relative to the social features of Mendeley. We also argue that further design of ASNSs is needed to take greater account of disciplinary differences in scholarly communication and to establish incentive mechanisms for encouraging user participation.
Academic social networking, Mendeley, digital scholarship, online communities, research networks

**** *Artigo_350
Visualization of co-readership patterns from an online reference management system
In this paper, we analyze the adequacy and applicability of readership statistics recorded in social reference management systems for creating knowledge domain visualizations. First, we investigate the distribution of subject areas in user libraries of educational technology researchers on Mendeley. The results show that around 69% of the publications in an average user library can be attributed to a single subject area. Then, we use co-readership patterns to map the field of educational technology. The resulting visualization prototype, based on the most read publications in this field on Mendeley, reveals 13 topic areas of educational technology research. The visualization is a recent representation of the field: 80% of the publications included were published within ten years of data collection. The characteristics of the readers, however, introduce certain biases to the visualization. Knowledge domain visualizations based on reader-ship statistics are therefore multifaceted and timely, but it is important that the characteristics of the underlying sample are made transparent.
relational scientometrics, topical distribution, knowledge domain visualization, mapping, altmetrics, readership statistics

**** *Artigo_351
Who reads research articles? An altmetrics analysis of Mendeley user categories
Little detailed information is known about who reads research articles and the contexts in which research articles are read. Using data about people who register in Mendeley as readers of articles, this article explores different types of users of Clinical Medicine, Engineering and Technology, Social Science, Physics, and Chemistry articles inside and outside academia. The majority of readers for all disciplines were PhD students, postgraduates, and postdocs but other types of academics were also represented. In addition, many Clinical Medicine articles were read by medical professionals. The highest correlations between citations and Mendeley readership counts were found for types of users who often authored academic articles, except for associate professors in some sub-disciplines. This suggests that Mendeley readership can reflect usage similar to traditional citation impact if the data are restricted to readers who are also authors without the delay of impact measured by citation counts. At the same time, Mendeley statistics can also reveal the hidden impact of some research articles, such as educational value for nonauthor users inside academia or the impact of research articles on practice for readers outside academia.

**** *Artigo_352
A look at altmetrics and its growing importance for research libraries
More people are now involved in scientific communication than ever before. In addition, the possibility of transmitting and disseminating data in digital form makes it possible to take into

account quantitative indicators of the influence of various materials on the development of science. Altmetrics - indicators based on data from social networks make it possible to track changes in scientific connections more quickly and to reconsider in general the question of how exactly we measure the impact of scientists' work on the scientific environment as a whole. This report summarizes the major trends, opportunities and challenges in altmetrics that researchers and research libraries are facing, and identifies ways in which research libraries can participate fully in the use and development of alternative methods for evaluating research. Besides, This article presents the results of a joint study by the University of Pittsburgh and Plum Analytics that demonstrates several ways to plan library work in this area. Original publication: Rodgers, EP and S. Barbrow. A look at altmetrics and its growing significance to research libraries.
altmetrics, research, scientific communication, reuse

**** *Artigo_353
Alternative metrics in scientometrics: A meta-analysis of research into three altmetrics
Alternative metrics are currently one of the most popular research topics in scientometric research. This paper provides an overview of research into three of the most important altmetrics: microblogging (Twitter), online reference managers (Mendeley and CiteULike) and blogging. The literature is discussed in relation to the possible use of altmetrics in research evaluation. Since the research was particularly interested in the correlation between altmetrics counts and citation counts, this overview focuses particularly on this correlation. For each altmetric, a meta-analysis is calculated for its correlation with traditional citation counts. As the results of the meta-analyses show, the correlation with traditional citations for micro-blogging counts is negligible (pooled r=0.003), for blog counts it is small (pooled r=0.12) and for bookmark counts from online reference managers, medium to large (CiteULike pooled r=0.23; Mendeley pooled r=0.51).
Altmetrics, Twitter, microblogging, online reference managers, Mendeley, blogging; meta-analysis

**** *Artigo_354
Alternative Perspectives on Impact: The Potential of ALMs and Altmetrics to Inform Funders about Research Impact

**** *Artigo_355
Altmetrics and Other Novel Measures for Scientific Impact
Impact assessment is one of the major drivers in scholarly communication, in particular since the number of available faculty positions and grants has far exceeded the number of applications. Peer review still plays a critical role in evaluating science, but citation-based bibliometric indicators are becoming increasingly important. This chapter looks at a novel set of indicators that can complement both citation analysis and peer review. Altmetrics use indicators gathered in the real-time Social Web to provide immediate feedback about scholarly works. We describe the most important altmetrics and provide a critical assessment of their value and limitations.
Article-level Metrics, Scholarly Content, ImpactStory, CiteULike, Post-publication Peer Review

**** *Artigo_356
Altmetrics as a means of assessing scholarly output
Career progression for scientists involves an assessment of their contribution to their field and a prediction of their future potential. Traditional measures, such as the impact factor of the journal that a researcher publishes in, may not be an appropriate or accurate means of assessing

the overall output of an individual. The development of altmetrics offers the potential for fuller assessments of a researcher's output based on both their traditional and non-traditional scholarly outputs. New tools should make it easier to include non-traditional outputs such as data, software and contributions to peer review in the evaluation of early- and mid-career researchers.

**** *Artigo_357
Altmetrics: What Good are They to Academic Libraries?
New knowledge is built on existing knowledge and academic libraries are the primary repositories of existing knowledge for the scholars whose work they support. In these times of belt tightening and budget reductions, it behooves academic libraries to think about how to demonstrate to administrators the value being returned on investments in the library, and to provide scholars with tools to do the same. Traditional means of measuring the quality of new knowledge like the impact factor and h-index are being made richer and more meaningful through the addition of new, social media based alternative metrics. Altmetrics also provide scholars communicating in non-traditional venues like the blogosphere and the Twitterverse with meaningful measures of the impact of their work. In this presentation I will introduce altmetrics, discuss their advantages and disadvantages relative to more traditional metrics, and propose some specific uses to which academic libraries may put altmetrics in support of the transitions now occurring in scholarly communication and thus in academic libraries.
altmetrics, social media, scholarly communication

**** *Artigo_358
Analyze This: Altmetrics and Your Collection

**** *Artigo_359
Article-level metrics – it's not just about citations

**** *Artigo_360
Astrophysicists on Twitter: An in-depth analysis of tweeting and scientific publication behavior

This paper analyzes the tweeting behavior of 37 astrophysicists on Twitter and compares their tweeting behavior with their publication behavior and citation impact to show whether they tweet research-related topics or not. Astrophysicists on Twitter are selected to compare their tweets with their publications from Web of Science. Different user groups are identified based on tweeting and publication frequency. A moderate negative correlation (ρ=-0.390*) is found between the number of publications and tweets per day, while retweet and citation rates do not correlate. The similarity between tweets and abstracts is very low (cos=0.081). User groups show different tweeting behavior such as retweeting and including hashtags, usernames and URLs. Research limitations/implications – he study is limited in terms of the small set of astrophysicists. Results are not necessarily representative of the entire astrophysicist community on witter and they most certainly do not apply to scientists in general. Future research should apply the methods to a larger set of researchers and other scientific disciplines. To a certain extent, this study helps to understand how researchers use Twitter. The results hint at the fact that impact on Twitter can neither be equated with nor replace traditional research impact metrics. However, tweets and other so-called altmetrics might be able to reflect other impact of scientists such as public outreach and science communication. To the best of our knowledge, this is the first in-depth study comparing researchers' tweeting activity and behavior with scientific publication output in terms of quantity, content and impact.

Twitter, altmetrics, social media, micro-blogging, citation analysis, bibliometrics, content analysis, comparison of tweets and citations

**** *Artigo_361
Astrophysicists' Conversational Connections on Twitter
Because Twitter and other social media are increasingly used for analyses based on altmetrics, this research sought to understand what contexts, affordance use, and social activities influence the tweeting behavior of astrophysicists. Thus, the presented study has been guided by three research questions that consider the influence of astrophysicists' activities (i.e., publishing and tweeting frequency) and of their tweet construction and affordance use (i.e. use of hashtags, language, and emotions) on the conversational connections they have on Twitter. We found that astrophysicists communicate with a variety of user types (e.g. colleagues, science communicators, other researchers, and educators) and that in the ego networks of the astrophysicists clear groups consisting of users with different professional roles can be distinguished. Interestingly, the analysis of noun phrases and hashtags showed that when the astrophysicists address the different groups of very different professional composition they use very similar terminology, but that they do not talk to each other (i.e. mentioning other user names in tweets). The results also showed that in those areas of the ego networks that tweeted more the sentiment of the tweets tended to be closer to neutral, connecting frequent tweeting with information sharing activities rather than conversations or expressing opinions.

**** *Artigo_362
ATG Special Report: New Platform Released: Altmetric for Institutions

**** *Artigo_363
Comparing digital apples to digital apples: Background on NISO's effort to build an infrastructure for new forms of scholarly assessment
Citation metrics and the journal impact factor have been the traditional forms for decades of assessing scholarly impact. These metrics are being challenged in today's digital content environment as no longer being the best methods for research assessment due to issues such as currency and granularity. New alternative metrics – altmetrics – have sprung up, but they are not without their own issues, in particular lack of standardization. The National Information Standards Organization (NISO) launched a project in 2013 to explore, identify, and advance standards and best practices for alternative metrics. A draft white paper summarizing recommendations of the first phase has been issued and will be followed by the second phase of developing one or more of the proposed standards and recommended practices.
Altmetrics, information standards, scientific impact, NISO, data citation, impact factor, research outputs, data discovery, research evaluation, data quality and gaming

**** *Artigo_364
Do altmetrics correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective
An extensive analysis of the presence of different altmetric indicators provided by Altmetric.com across scientific fields is presented, particularly focusing on their relationship with citations. Our results confirm that the presence and density of social media altmetric counts are still very low and not very frequent among scientific publications, with 15%-24% of the publications presenting some altmetric activity and concentrating in the most recent publications, although their presence is increasing over time. Publications from the social sciences, humanities and the medical and life sciences show the highest presence of

altmetrics, indicating their potential value and interest for these fields. The analysis of the relationships between altmetrics and citations confirms previous claims of positive correlations but relatively weak, thus supporting the idea that altmetrics do not reflect the same concept of impact as citations. Also, altmetric counts do not always present a better filtering of highly cited publications than journal citation scores. Altmetrics scores (particularly mentions in blogs) are able to identify highly cited publications with higher levels of precision than journal citation scores (JCS), but they have a lower level of recall. The value of altmetrics as a complementary tool of citation analysis is highlighted, although more research is suggested to disentangle the potential meaning and value of altmetric indicators for research evaluation.

**** *Artigo_365
Do Altmetrics Follow the Crowd or Does the Crowd Follow Altmetrics?
Changes are occurring in scholarly communication as scientific discourse and research activities spread across various social media platforms. In this paper, we study altmetrics on the article and journal levels, investigating whether the online attention received by research articles is related to scholarly impact or may be due to other factors. We define a new metric, Journal Social Impact (JSI), based on eleven data sources: CiteULike, Mendeley, F1000, blogs, Twitter, Facebook, mainstream news outlets, Google Plus, Pinterest, Reddit, and sites running Stack Exchange (Q&A). We compare JSI against diverse citation-based metrics, and find that JSI significantly correlates with a number of them. These findings indicate that online attention of scholarly articles is related to traditional journal rankings and favors journals with a longer history of scholarly impact. We also find that journal-level altmetrics have strong significant correlations among themselves, compared with the weak correlations among article-level altmetrics. Another finding is that Mendeley and Twitter have the highest usage and coverage of scholarly activities. Among individual altmetrics, we find that the readership of academic social networks have the highest correlations with citation-based metrics. Our findings deepen the overall understanding of altmetrics and can assist in validating them.
Social Media, Altmetrics, Research Impact, Research Evaluation, Journal Ranking, Journal Impact Factor, Twitter, Facebook, Mendeley, CiteULike, F1000, Online Reference Managers

**** *Artigo_366
Do altmetrics point to the broader impact of research? An overview of benefits and disadvantages of altmetrics
Today, it is not clear how the impact of research on other areas of society than science should be measured. While peer review and bibliometrics have become standard methods for measuring the impact of research in science, there is not yet an accepted framework within which to measure societal impact. Alternative metrics (called altmetrics to distinguish them from bibliometrics) are considered an interesting option for assessing the societal impact of research, as they offer new ways to measure (public) engagement with research output. Altmetrics is a term to describe web-based metrics for the impact of publications and other scholarly material by using data from social media platforms (e.g. Twitter or Mendeley). This overview of studies explores the potential of altmetrics for measuring societal impact. It deals with the definition and classification of altmetrics. Furthermore, their benefits and disadvantages for measuring impact are discussed.
Societal impact, Broader impact, Altmetrics, Scientometrics

**** *Artigo_367
From Attention to Citation, What and How Does Altmetrics Work?
Scholarly and social impacts of scientific publications could be measured by various

metrics. In this study, the relationship between various metrics of 63,805 PLOS research articles are studied. Generally, article views correlate well with citation, however, different types of article view have different levels of correlation with citation, when pdf download correlates the citation most significantly. It's necessary for publishers and journals to provide detailed and comprehensive article metrics. Although the low correlation between social attention and citation is confirmed by this study and previous studies, more than ever, we find that social attention is highly correlated with article view, especially the browser html view. Social attention is the important source that bringing network traffic to browser html view and may lead to citation subsequently. High altmetric score has the potential role in promoting the long-term academic impact of articles, when a conceptual model is proposed to interpret the conversion from social attention to article view, and to citation finally.
Altmetrics, Article view, Article-level metrics, Citation, Social attention

**** *Artigo_368
Funders drawn to alternative metrics

**** *Artigo_369
Genesis of altmetrics or article-level metrics for measuring efficacy of scholarly communications: Current perspectives
The article-level metrics (ALMs) or altmetrics becomes a new trendsetter in recent times for measuring the impact of scientific publications and their social outreach to intended audiences. The popular social networks such as Facebook, Twitter, and Linkedin and social bookmarks such as Mendeley and CiteULike are nowadays widely used for communicating research to larger transnational audiences. In 2012, the San Francisco Declaration on Research Assessment got signed by the scientific and researchers communities across the world. This declaration has given preference to the ALM or altmetrics over traditional but faulty journal impact factor (JIF)-based assessment of career scientists. JIF does not consider impact or influence beyond citations count as this count reflected only through Thomson Reuters' Web of Science® database. Furthermore, JIF provides indicator related to the journal, but not related to a published paper. Thus, altmetrics now becomes an alternative metrics for performance assessment of individual scientists and their contributed scholarly publications. This paper provides a glimpse of genesis of altmetrics in measuring efficacy of scholarly communications and highlights available altmetric tools and social platforms linking altmetric tools, which are widely used in deriving altmetric scores of scholarly publications. The paper thus argues for institutions and policy makers to pay more attention to altmetrics based indicators for evaluation purpose but cautions that proper safeguards and validations are needed before their adoption.
Altmetrics, article-level metrics, citation database, research assessment, research communication, science communication

**** *Artigo_370
Global Emergency Medicine Journal Club: Social Media Responses to the March 2014 Annals of Emergency Medicine Journal Club on Targeted Temperature Management∗

**** *Artigo_371
How well developed are altmetrics? A cross-disciplinary analysis of the presence of 'alternative metrics' in scientific publications
In this paper an analysis of the presence and possibilities of altmetrics for bibliometric and performance analysis is carried out. Using the web based tool Impact Story, we collected metrics for 20,000 random publications from the Web of Science. We studied both the presence

and distribution of altmetrics in the set of publications, across fields, document types and over publication years, as well as the extent to which altmetrics correlate with citation indicators. The main result of the study is that the altmetrics source that provides the most metrics is Mendeley, with metrics on readerships for 62.6% of all the publications studied, other sources only provide marginal information. In terms of relation with citations, a moderate spearman correlation (r=0.49) has been found between Mendeley readership counts and citation indicators. Other possibilities and limitations of these indicators are discussed and future research lines are outlined.
Altmetrics, Impact Story, Citation indicators, Research evaluation

**** *Artigo_372
Impact Factor 2.0: Applying Social Network Analysis to Scientific Impact Assessment
Social media are becoming increasingly popular in scientific communication. A range of platforms are geared specifically towards the academic community. Proponents of the altmetrics approach point out that these new media allow for new avenues of scientific impact assessment. Traditional impact measures based on bibliographic analysis have long been criticized for overlooking the relational dynamic of scientific impact. We therefore propose an application of social network analysis to researchers' interactions on an academic social networking site in order to generate new metrics of scientific impact. Based on a case study conducted among a sample of Swiss management scholars, we analyze how these new relational metrics relate to traditional, offline impact indicators as well as online communication activity and publication resonance. We conclude that a relational approach based on social network analysis may add richness and differentiation to scientific impact assessment.
Altmetrics, Scientometrics, Social Media, Social Network Analysis, Scientific Communication, ResearchGate, Impact Factor, Scientometrics 2.0

**** *Artigo_373
Is Almetrics an Acceptable Replacement for Citation Counts and the Impact Factor?
The research community is continually trying to find the quickest method for evaluating the quality of a scholarly article. Today's technological advancements and growing communication outlets complicate the meaning of a quality article. Altmetrics attempts to take the place of impact factor and citation counting by predicting the outcome of an article based on the previous behavior of statistics. Perhaps, the best way to evaluate the quality of an article is to look at all of the Altmetrics methods and their relationship to each other. Context explains every Altmetric and is more significant than an article's popularity. Librarians should guide patrons and researchers alike through these statistics' advantages and disadvantages.
Altmetrics, research, quality, impact factor, citation count, scholarly communication

**** *Artigo_374
Mendeley readership altmetrics for the social sciences and humanities: Research evaluation and knowledge flows
Although there is evidence that counting the readers of an article in the social reference site, Mendeley, may help to capture its research impact, the extent to which this is true for different scientific fields is unknown. In this study, we compare Mendeley readership counts with citations for different social sciences and humanities disciplines. The overall correlation between Mendeley readership counts and citations for the social sciences was higher than for the humanities. Low and medium correlations between Mendeley bookmarks and citation counts in all the investigated disciplines suggest that these measures reflect different aspects of research impact. Mendeley data were also used to discover patterns of information flow between scientific fields. Comparing information flows based on Mendeley bookmarking data

and cross-disciplinary citation analysis for the disciplines revealed substantial similarities and some differences. Thus, the evidence from this study suggests that Mendeley readership data could be used to help capture knowledge transfer across scientific disciplines, especially for people that read but do not author articles, as well as giving impact evidence at an earlier stage than is possible with citation counts.

**** *Artigo_375
New data, new possibilities: Exploring the insides of Altmetric.com
This paper analyzes Altmetric.com, one of the most important altmetric data providers currently used. We have analyzed a set of publications with DOI number indexed in the Web of Science during the period 2011-2013 and collected their data with the Altmetric API. 19% of the original set of papers was retrieved from Altmetric.com including some altmetric data. We identified 16 different social media sources from which Altmetric.com retrieves data. However five of them cover 95.5% of the total set. Twitter (87.1%) and Mendeley (64.8%) have the highest coverage. We conclude that Altmetric.com is a transparent, rich and accurate tool for altmetric data. Nevertheless, there are still potential limitations on its exhaustiveness as well as on the selection of social media sources that need further research.
Altmetric.com, Twitter, Mendeley, altmetrics, social impact, coverage, Web 2.0

**** *Artigo_376
Novel Research Impact Indicators
Citation counts and more recently usage statistics provide valuable information about the attention and research impact associated with scholarly publications. The open access publisher Public Library of Science (PLOS) has pioneered the concept of article-level metrics, where these metrics are collected on a per article and not a per journal basis and are complemented by real-time data from the social web or altmetrics: blog posts, social bookmarks, social media and other.
Article-level metrics, altmetrics, research impact

**** *Artigo_377
Scholarly Tweets: Measuring Research Impact via Altmetrics

**** *Artigo_378
Scientometrics in a changing research landscape
Bibliometrics has become an integral component of quality assessment for science and funding decisions. The next challenge for scientometrics is to develop similarly reliable indicators for the social impact of research.

**** *Artigo_379
Social Media and Online Attention as an Early Measure of the Impact of Research in Solid Organ Transplantation
Traditional measures of the impact of published research, such as citation counts, are limited to measuring academic impact. The use of social media and other online tools as alternative measures of research impact is gaining popularity and used by leading medical journals. MEDLINE was searched for articles published with subject headings relating to solid organ transplantation between August 1, 2011, and July 31, 2012. Citation data were retrieved from SCOPUS, and statistics regarding mentions in social media, social bookmarking sites, news outlets, and expert recommendation sites were retrieved from the data at www.altmetric.com. Data were analyzed for associations between alternative metric data and citation rates. The

search retrieved 6,981 publications. Sixty-six percent of the articles had at least one citation. Mentions in social media were 19.3%, 13.1% had social bookmarks, 0.9% had expert recommendations, and online news outlets picked up eight articles. Significantly higher citation rates were associated with mention in social media, expert recommendation, social bookmarking, and for articles identified as meta-analyses, multicenter studies, randomized controlled trials, and reviews (all P<0.001). The odds of an article being highly cited were significantly increased by a mention in social media (odds ratio, 2.58; P<0.001). Qualitative analysis suggests that article topics discussed on social media are more likely to relate to the more controversial and emotive areas of transplantation. DISCUSSION: Social media and online attention act as early predictors of the impact of transplant research as measured by later citation rate. Blogging and expert recommendation, in particular, are associated with higher citation rates.
Social media, Transplantation, Impact, Internet, Altmetrics

**** *Artigo_380
Social media in public health: is it used and is it useful? Social media, Public health, Twitter, Altmetrics, Facebook, Blogs

**** *Artigo_381
The Imperative for Open Altmetrics
If scholarly communication is broken, how will we fix it? At Impactstory—a non-profit devoted to helping scholars gather and share evidence of their research impact by tracking online usage of scholarship via blogs, Wikipedia, Mendeley, and more—we believe that incentivizing web-native research via altmetrics is the place to start. In this article, we describe the current state of the art in altmetrics and its effects on publishing, we share Impactstory's plan to build an open infrastructure for altmetrics, and describe our company's ethos and actions

**** *Artigo_382
The Multidimensional Assessment of Scholarly Research Impact
This article introduces the Multidimensional Research Assessment Matrix of scientific output. Its base notion holds that the choice of metrics to be applied in a research assessment process depends upon the unit of assessment, the research dimension to be assessed, and the purposes and policy context of the assessment. An indicator may by highly useful within one assessment process, but less so in another. For instance, publication counts are useful tools to help discriminating between those staff members who are research active, and those who are not, but are of little value if active scientists are to be compared one another according to their research performance. This paper gives a systematic account of the potential usefulness and limitations of a set of 10 important metrics including altmetrics, applied at the level of individual articles, individual researchers, research groups and institutions. It presents a typology of research impact dimensions, and indicates which metrics are the most appropriate to measure each dimension. It introduces the concept of a "meta-analysis" of the units under assessment in which metrics are not used as tools to evaluate individual units, but to reach policy inferences regarding the objectives and general set-up of an assessment process.
**** *Artigo_383
To Crowdfund Research, Scientists Must Build an Audience for Their Work
As rates of traditional sources of scientific funding decline, scientists have become increasingly interested in crowdfunding as a means of bringing in new money for research. In fields where crowdfunding has become a major venue for fundraising such as the arts and technology, building an audience for one's work is key for successful crowdfunding. For science, to what extent does audience building, via engagement and outreach, increase a scientist's abilities to

bring in money via crowdfunding? Here we report on an analysis of the #SciFund Challenge, a crowdfunding experiment in which 159 scientists attempted to crowdfund their research. Using data gathered from a survey of participants, internet metrics, and logs of project donations, we find that public engagement is the key to crowdfunding
success. Building an audience or ‘‘fanbase’’ and actively engaging with that audience as well as seeking to broaden the reach of one’s audience indirectly increases levels of funding. Audience size and effort interact to bring in more people to view a scientist’s project proposal, leading to funding. We discuss how projects capable of raising levels of funds commensurate with traditional funding agencies will need to incorporate direct involvement of the public with science. We suggest that if scientists and research institutions wish to tap this new source of funds, they will need to encourage and reward activities that allow scientists to engage with the public.

**** *Artigo_384
Traditional and alternative metrics: The full story of impact

**** *Artigo_385
Tweeting biomedicine: An analysis of tweets and citations in the biomedical literature
Data collected by social media platforms have been introduced as new sources for indicators to help measure the impact of scholarly research in ways that are complementary to traditional citation analysis. Data generated from social media activities can be used to reflect broad types of impact. This article aims to provide systematic evidence about how often Twitter is used to disseminate information about journal articles in the biomedical sciences. The analysis is based on 1.4 million documents covered by both PubMed and Web of Science and published between 2010 and 2012. The number of tweets containing links to these documents was analyzed and compared to citations to evaluate the degree to which certain journals, disciplines, and specialties were represented on Twitter and how far tweets correlate with citation impact. With less than 10% of PubMed articles mentioned on Twitter, its uptake is low in general but differs between journals and specialties. Correlations between tweets and citations are low, implying that impact metrics based on tweets are different from those based on citations. A framework using the coverage of articles and the correlation between Twitter mentions and citations is proposed to facilitate the evaluation of novel social-media-based metrics.

**** *Artigo_386
Tweets as impact indicators: Examining the implications of automated bot accounts on Twitter

This brief communication presents preliminary findings on automated Twitter accounts distributing links to scientific papers deposited on the preprint repository arXiv. It discusses the implication of the presence of such bots from the perspective of social media metrics (altmetrics), where mentions of scholarly documents on Twitter have been suggested as a means of measuring impact that is both broader and timelier than citations. We present preliminary findings that automated Twitter accounts create a considerable amount of tweets to scientific papers and that they behave differently than common social bots, which has critical implications for the use of raw tweet counts in research evaluation and assessment. We discuss some definitions of Twitter cyborgs and bots in scholarly communication and propose differentiating between different levels of engagement from tweeting only bibliographic information to discussing or commenting on the content of a paper.

**** *Artigo_387
Tweets vs. Mendeley readers: How do these two social media metrics differ?

A set of 1.4 million biomedical papers was analyzed with regards to how often articles are mentioned on Twitter or saved by users on Mendeley. While Twitter is a microblogging platform used by a general audience to distribute information, Mendeley is a reference manager targeted at an academic user group to organize scholarly literature. Both platforms are used as sources for so-called “altmetrics” to measure a new kind of research impact. This analysis shows in how far they differ and compare to traditional citation impact metrics based on a large set of PubMed papers. Altmetrics, social media, Twitter, Mendeley, citation analysis, scholarly communication

**** *Artigo_388
Usage history of scientific literature: Nature metrics and metrics of Nature publications
In this study, we analyze the dynamic usage history of Nature publications over time using Naturemetrics data. We conduct analysis from two perspectives. On the one hand, we examine how long it takes before the articles’ downloads reach 50 %/80 % of the total; on the other hand, we compare the percentage of total downloads in 7, 30, and 100 days after publication. In general, papers are downloaded most frequently within a short time period right after their publication. And we find that compared with non-Open Access papers, readers’ attention on Open Access publications are more enduring. Based on the usage data of a newly published paper, regression analysis could predict the future expected total usage counts.
altmetrics, article-level metrics, download, Nature metrics, page view, usage data

**** *Artigo_389
Usefulness of altmetrics for measuring the broader impact of research: A case study using data from PLOS (altmetrics) and F1000Prime (paper tags)
Purpose: Whereas citation counts allow the measurement of the impact of research on research itself, an important role in the measurement of the impact of research on other parts of society is ascribed to altmetrics. The present case study investigates the usefulness of altmetrics for measuring the broader impact of research. This case study is essentially based on a dataset with papers obtained from F1000. The dataset was augmented with altmetrics (such as Twitter counts) which were provided by PLOS (the Public Library of Science). In total, the case study covers a total of 1,082 papers. Findings: The F1000 dataset contains tags on papers which were assigned intellectually by experts and which can characterise a paper. The most interesting tag for altmetric research is ""good for teaching"". This tag is assigned to papers which could be of interest to a wider circle of readers than the peers in a specialist area. Particularly on Facebook and Twitter, one could expect papers with this tag to be mentioned more often than those without this tag. With respect to the ""good for teaching"" tag, the results from regression models were able to confirm these expectations: Papers with this tag show significantly higher Facebook and Twitter counts than papers without this tag. This association could not be seen with Mendeley or Figshare counts (that is with counts from platforms which are chiefly of interest in a scientific context). The results of the current study indicate that Facebook and Twitter, but not Figshare or Mendeley, can provide indications of papers which are of interest to a broader circle of readers (and not only for the peers in a specialist area), and seem therefore be useful for societal impact measurement.
altmetrics, F1000, Twitter, Mendeley, Figshare, Facebook, societal impact

**** *Artigo_390
Using Altmetrics and Social Media to Supplement Impact Factor: Maximizing Your Article’s Academic and Societal Impact

**** *Artigo_391

Using altmetrics for assessing research impact in the humanities
The prospects of altmetrics are especially encouraging for research fields in the humanities that currently are difficult to study using established bibliometric methods. Yet, little is known about the altmetric impact of research fields in the humanities. Consequently, this paper analyses the altmetric coverage and impact of humanities-oriented articles and books published by Swedish universities during 2012. Some of the most common altmetric sources are examined using a sample of 310 journal articles and 54 books. Mendeley has the highest coverage of journal articles (61 %) followed by Twitter (21 %) while very few of the publications are mentioned in blogs or on Facebook. Books, on the other hand, are quite often tweeted while both Mendeley's and the novel data source Library Thing's coverage is low. Many of the problems of applying bibliometrics to the humanities are also relevant for altmetric approaches; the importance of non-journal publications, the reliance on print as well the limited coverage of non-English language publications. However, the continuing development and diversification of methods suggests that altmetrics could evolve into a valuable tool for assessing research in the humanities.
Altmetrics, Bibliometrics, Humanities, Mendeley, Twitter, Library Thing

**** *Artigo_392
Using Publication Metrics to Highlight Academic Productivity and Research Impact
This article provides a broad overview of widely available measures of academic productivity and impact using publication data and highlights uses of these metrics for various purposes. Metrics based on publication data include measures such as number of publications, number of citations, the journal impact factor score, and the h-index, as well as emerging metrics based on document-level metrics. Publication metrics can be used for a variety of purposes for tenure and promotion, grant applications and renewal reports, benchmarking, recruiting efforts, and administrative purposes for departmental or university performance reports. The authors also highlight practical applications of measuring and reporting academic productivity and impact to emphasize and promote individual investigators, grant applications, or department output.

**** *Artigo_393
Validity of altmetrics data for measuring societal impact: A study using data from Altmetric and F1000Prime
Can altmetric data be validly used for the measurement of societal impact? The current study seeks to answer this question with a comprehensive dataset (about 100,000 records) from very disparate sources (F1000, Altmetric, and an in-house database based on Web of Science). In the F1000 peer review system, experts attach particular tags to scientific papers which indicate whether a paper could be of interest for science or rather for other segments of society. The results show that papers with the tag "good for teaching" do achieve higher altmetric counts than papers without this tag – if the quality of the papers is controlled. At the same time, a higher citation count is shown especially by papers with a tag that is specifically scientifically oriented ("new finding"). The findings indicate that papers tailored for a readership outside the area of research should lead to societal impact.If altmetric data is to be used for the measurement of societal impact, the question arises of its normalization. In bibliometrics, citations are normalized for the papers' subject area and publication year. This study has taken a second analytic step involving a possible normalization of altmetric data. As the results show there are particular scientific topics which are of especial interest for a wide audience. Since these more or less interesting topics are not completely reflected in Thomson Reuters' journal sets, a normalization of altmetric data should not be based on the level of subject categories, but on the level of topics.
Altmetrics, Bibliometrics, F1000, Twitter, Societal impact

**** *Artigo_394
A multi-metric approach for research evaluation
Background information is provided about the Web 2.0 related term altmetrics. This term is placed in the context of the broader field of informetrics. The term influmetrics is proposed as a better term for altmetrics. The importance of considering research products and not just scientific publications is highlighted. Issues related to peer review and making funding decisions within a multi-metric approach are discussed and brought in relation with the new metrics field.
altmetrics, influmetrics, multi-metric approach, informetrics, research evaluation

**** *Artigo_395
Altmetria: métricas de produção científica para além das citações
Altmetrics: scientific production metrics beyond citations. Citations based metrics have historically been used to evaluate scientific production. However, before the revolution of Web 2.0 arises Scientometrics 2.0, which seeks to expedite the perception of the impact of scientific publications, as well as strategic and emerging fields. In this context fall within studies with alternative metrics (altmetrics) that has the potential to enhance the understanding of the citation dynamics, taking into account the context and the scholarly role of different publications. This article presents a discussion on the field of "altmetrics" proposing its definition as webometrics and cybermetrics data usage in scientometric studies.
Altmetrics, Cybermetrics, Webometrics, Scientometrics, Bibliometrics

**** *Artigo_396
Altmetric: enriching scholarly content with article-level discussion and metrics
Scholarly content is increasingly being discussed, shared, and bookmarked online by researchers. Altmetric is a start-up that focuses on tracking, collecting, and measuring this activity on behalf of publishers; here we describe our approach and general philosophy. Over the past year we have seen sharing and discussion activity around approximately 750,000 articles. The average number of articles shared each day grows by 5–10% a month. We look at examples of how people are interacting with papers online and at how publishers can collect and present the resulting data to deliver real value to their authors and readers.

**** *Artigo_397
Altmetrics, PIRUS and Usage Factor
Scholars have moved their publications onto the web, and the ongoing conversation around the outputs of research increasingly takes place there. Beyond the research community itself, scholarly information has an impact on other professionals, as well as on the general public. Traditional measures do not reflect these wider impacts. The mission of COUNTER is to set and monitor global standards for the measurement of online usage of content. Usage is an important measure of the impact and value of publications, and as such has a role in altmetrics. Usage can be reported at the individual item and individual researcher level and aggregated to the journal or institution level. PIRUS and Usage Factor are two COUNTER-lead initiatives that are based on this approach, with the potential to provide useful altmetrics.

**** *Artigo_398
Altmetrics: nuevos indicadores para la comunicación científica en la Web 2.0
This paper presents a review of altmetrics or alternative metrics. This concept is defined as the creation and study of new indicators for analysing scientific and academic research activity

based on Web 2.0. The underlying premise is that variables such as mentions in blogs, number of tweets or saves of an article by researchers in reference management systems, may be a valid measure of the use and impact of scientific publications. In this respect, these measures are becoming particularly relevant, being at the centre of debate within the bibliometric community. Firstly, an explanation is given of the main platforms and indicators for this type of measurement. Subsequently, a study is undertaken of a selection of papers from the field of communication, comparing the number of citations received with their 2.0 indicators. The results show that the most cited articles within recent years also have significantly higher altmetric indicators. Next follows a review of the principal empirical studies undertaken, centering on the correlations between bibliometric and alternative indicators. To conclude, the main limitations of altmetrics are highlighted, alongside a reflective consideration of the role altmetrics may play in capturing the impact of research in Web 2.0 platforms.
Science, scientific communication, information, communication, Internet, social networks, quantitative methods, Social Web; Web 2.0

**** *Artigo_399
Are alternative metrics still alternative?
Since the 1960s citation counts have been the standard for judging scholarly contributions and status, but growing awareness of the strategy's limitations should lead to acceptance of alternative metrics. Citation analysis drawbacks include lack of timeliness, self citation and citations that are superfluous, negative and incomplete, and traditional counts reflect only a small fraction of actual usage. A better categorization of scholarly impact would cover usage, captures, mentions and social media in addition to citations. Metrics should include mentions in blogs and other nontraditional formats, open review forums, electronic book downloads, library circulation counts, bookmarks, tweets and more. Such alternative metrics provide a more complete view of peer response to scholarly writings and better demonstrate the relative position of a research grant applicant and potential for influential work. Altmetrics are readily available, and their value for evaluating scholarly work should be recognized.
altmetrics, scholarly publishing, citation analysis, social web, impact of scholarly output, evaluation

**** *Artigo_400
Ask not what altmetrics can do for you, but what altmetrics can do for developing countries
Traditional citation counting for evaluating scholarly impact unfairly benefits those in North America and Europe and shortchanges the alternative scholars of the developing world. Alternative metrics more accurately measure the impact of scholarly writings, better serve all scholars and can foster a research culture that supports national development goals. The current system favors dominant journals and topics of interest to the prevailing scientific community, captured by
the leading bibliographic databases. Yet publishing on platforms more open to underrepresented journals and scholars in developing nations would promote a greater range of ideas and scholarly exchange. With facilitating international development in mind, scholarly communication should encourage research on topics of local and national relevance and be presented through globally accessible channels, disseminated by social media. Publishing technology barriers to participation must be lowered. The value of altmetrics will be evident, providing advantages to alternative scholars, serving public needs and revealing scientific contributions long underrepresented in the standard literature.
altmetrics, cultural values, impact of scholarly output, scholarly publishing, developing countries, citation indexes, international aspects, social web

**** *Artigo_401
Beyond the paper

**** *Artigo_402
Can Social Reference Management Systems Predict a Ranking of Scholarly Venues?
New scholarly venues (e.g., conferences and journals) are emerging as
research fields expand. Ranking these new venues is imperative to assist researchers, librarians, and research institutions. However, rankings based on traditional citation-based metrics have limitations and are no longer the only or the best choice to determine the impact of scholarly venues. Here, we propose a venue-ranking approach based on scholarly references from academic social media sites, and we compare a number of citation-based rankings with social-based rankings. Our preliminary results show a statistically significant correlation between the two approaches in a number of general rankings, research areas, and subdisciplines. Furthermore, we found that social-based rankings favor open-access venues over venues that require a subscription.
Scholarly Venues, Ranking, Digital Libraries, Bibliometrics, Altmetrics, Impact Factor, Readership, Social Reference Management, Citation Analysis, Google Scholar Metrics

**** *Artigo_403
Correlation and interaction visualization of altmetric indicators extracted from scholarly social network activities: dimensions and structure.
Citation counts for peer-reviewed articles and the impact factor of journals have long been indicators of article importance or quality. In the Web 2.0 era, growing numbers of scholars are using scholarly social network tools to communicate scientific ideas with colleagues, thereby making traditional indicators less sufficient, immediate, and comprehensive. In these new situations, the altmetric indicators offer alternative measures that reflect the multidimensional nature of scholarly impact in an immediate, open, and individualized way. In this direction of research, some studies have demonstrated the
correlation between altmetrics and traditional metrics with different samples. However, up to now, there has been relatively little research done on the dimension and interaction structure of altmetrics.OBJECTIVE: Our goal was to reveal the number of dimensions that altmetric indicators should be divided into and the structure in which altmetric indicators interact with each other. Because an article-level metrics dataset is collected from scholarly social media and open access platforms, it is one of the most robust samples available to study altmetric indicators. Therefore, we downloaded a large dataset containing activity data in 20 types of metrics present in 33,128 academic articles from the application programming interface website. First, we analyzed the correlation among altmetric indicators using Spearman rank correlation. Second, we visualized the multiple correlation coefficient matrixes with graduated colors. Third, inputting the correlation matrix, we drew an MDS diagram to demonstrate the dimension for altmetric indicators. For correlation structure, we used a social network map to represent the social relationships and the strength of relations. We found that the distribution of altmetric indicators is significantly non-normal and positively skewed. The distribution of downloads and page views follows the Pareto law. Moreover, we found that the Spearman coefficients from 91.58% of the pairs of variables indicate statistical significance at the .01 level. The non-metric MDS map divided the 20 altmetric indicators into three clusters: traditional metrics, active altmetrics, and inactive altmetrics. The social network diagram showed two subgroups that are tied to each other but not to other groups, thus indicating an intersection between altmetrics and traditional metric indicators. Altmetrics complement, and most correlate significantly with, traditional measures. Therefore, in future evaluations of the

social impact of articles, we should consider not only traditional metrics but also active altmetrics. There may also be a transfer phenomenon for the social impact of academic articles. The impact
transfer path has transfer, or intermediate, stations that transport and accelerate article social impact from active altmetrics to traditional metrics and vice versa. This discovery will be helpful to explain the impact transfer mechanism of articles in the Web 2.0 era. Hence, altmetrics are in fact superior to traditional filters for assessing scholarly impact in multiple dimensions and in terms of social structure.

**** *Artigo_404
Coverage and adoption of altmetrics sources in the bibliometric community
Altmetrics, indices based on social media platforms and tools, have recently emerged as alternative means of measuring scholarly impact. Such indices assume
that scholars in fact populate online social environments, and interact with scholarly products there. We tested this assumption by examining the use and coverage of social media environments amongst a sample of bibliometricians. As expected, coverage varied: 82% of articles published by sampled bibliometricians were included in Mendeley libraries, while only 28% were included in CiteULike. Mendeley bookmarking was moderately correlated (.45) with Scopus citation. Over half of respondents asserted that social media tools were affecting their professional lives, although uptake of online tools varied widely. 68% of those surveyed had LinkedIn accounts, while Academia.edu, Mendeley, and ResearchGate each claimed a fifth of respondents. Nearly half of those responding had Twitter accounts, which they used both personally and professionally. Surveyed bibliometricians had mixed opinions on altmetrics' potential; 72% valued download counts, while a third saw potential in tracking articles' influence in blogs, Wikipedia, reference managers, and social media. Altogether, these findings suggest that some online tools are seeing substantial use by bibliometricians, and that they present a potentially valuable source of impact data."
Scientometric Studies, altmetrics sources, Coverage, Accuracy, Reliability, Webometrics
**** *Artigo_405
Do Altmetrics Work? Twitter and Ten Other Social Web Services
Altmetric measurements derived from the social web are increasingly advocated and used as early indicators of article impact and usefulness. Nevertheless, there is a lack of systematic scientific evidence that altmetrics are valid proxies of either impact or utility although a few case studies have reported medium correlations between specific altmetrics and citation rates for individual journals or fields. To fill this gap, this study compares 11 altmetrics with Web of Science citations for 76 to 208,739 PubMed articles with at least one altmetric mention in each case and up to 1,891 journals per metric. It also introduces a simple sign test to overcome biases caused by different citation and usage windows. Statistically significant associations were found between higher metric scores and higher citations for articles with positive altmetric scores in all cases with sufficient evidence (Twitter, Facebook wall posts, research highlights, blogs, mainstream media and forums) except perhaps for Google+ posts. Evidence was insufficient for LinkedIn, Pinterest, question and answer sites, and Reddit, and no conclusions should be drawn about articles with zero altmetric scores or the strength of any correlation between altmetrics and citations. Nevertheless, comparisons between citations and metric values for articles published at different times, even within the same year, can remove or reverse this association and so publishers and scientometricians should consider the effect of time when using altmetrics to rank articles. Finally, the coverage of all the altmetrics except for Twitter seems to be low and so it is not clear if they are prevalent enough to be useful in practice.

**** *Artigo_406

Five challenges in altmetrics: A toolmaker's perspective
The experience of Altmetric LLP, an altmetric tool developer, reveals common issues that demand attention when designing alternative metrics for response to scholarly writings. Identifying what can and should be measured for different user groups is fundamental. A default is to count all relevant mentions in a set of online sources, permitting drill down for more qualitative information. Data source selection varies by need, ranging from government documents to social media comment sites. Since the topic of discussion can be elusive, a tracking method must point backward to original articles or data. Text mining helps for text documents, but audio and video are less workable. Multiple versions of a single article and subsections of books and datasets add ambiguity and redundancy. Valid interpretation depends on context and the relevance and timeliness of data and sources, requiring continual reassessment.
Altmetrics, selection, relevance, redundancy

**** *Artigo_407
Identifying influential scholars in academic social media platforms
The emergence of social media has created new ways to publish scientific work, foster collaboration, and build professional connections in the research community. The rich data collected in social media platforms has provided new opportunities for assessing scholars' impact other than the traditional citation-based approach. In this paper, we investigate the measures of scholars' influence in academic social media platforms, taking both academic and social impact into account. A real-life dataset collected from Mendeley is used to apply different influence metrics. We first assess the academic influence of scholars based on the scientific impact of their publications using three different measures. Then we investigate their social influence using network centrality metrics. The experiments show that top influencers with high academic impact tend to be senior scholars with many coauthors. Furthermore, academic influence and social influence measures do not strongly correlate with each other, and thus scholars with high academic impact are not necessarily influential from a social point of view. Adding the social dimension could enhance the traditional impact metrics that only take academic influence into account.
social media, ranking, influence, network centrality

**** *Artigo_408
Introduction to Altmetrics for Science, Technology, Engineering, and Mathematics (STEM) Librarians
Quantifying scholarly output via citation metrics is the time-honored method to gauge academic success. Altmetrics, or alternative citation metrics, provide researchers and scholars with new ways to track influence across evolving modes of scholarly communication. This article will give librarians an overview of new trends in measuring scholarly influence, introduce them to altmetrics tools, and encourage them to engage with researchers in discussion of these new metrics."
altmetrics, bibliometrics, citation metrics, social media, scholarly communication

**** *Artigo_409
Monitoring and promoting the impact of pedagogically related scholarship

**** *Artigo_410
New opportunities for repositories in the age of altmetrics
For institutional repositories, alternative metrics reflecting online activity present valuable indicators of interest in their holdings that can supplement traditional usage statistics. A variable

mix of built-in metrics is available through popular repository platforms: Digital Commons, DSpace and EPrints. These may include download counts at the collection and/or item level, search terms, total and unique visitors, page views and social media and bookmarking metrics; additional data may be available with special plug-ins. Data provide different types of information valuable for repository managers, university administrators and authors. They can reflect both scholarly and popular impact, show readership, reflect an institution's output, justify tenure and promotion and indicate direction for collection management. Practical considerations for implementing altmetrics include service costs, technical support, platform integration and user interest. Altmetrics should not be used for author ranking or comparison, and altmetrics sources should be regularly reevaluated for relevance.
altmetrics, digital repositories, impact of scholarly output, statistics, collection management, social web

**** *Artigo_411
New perspectives on article-level metrics: developing ways to assess research uptake and impact online
Altmetrics were born from a desire to see and measure research impact differently. Complementing traditional citation analysis, altmetrics are intended to reflect more broad views of research impact by taking into account the use of digital scholarly communication tools. Aggregating online attention paid to individual scholarly articles and data sets is the approach taken by Altmetric LLP, an altmetrics tool provider. Potential uses for article-level metrics collected by Altmetric include: 1) the assessment of an article's impact within a particular community, 2) the assessment of the overall impact of a body of scholarly work, and 3) the characterization of entire author and reader communities that engage with particular articles online. Although attention metrics are still being refined, qualitative altmetrics data are beginning to illustrate the rich new world of scholarly communication, and are emerging as ways to highlight the immediate societal impacts of research.

**** *Artigo_412
Open access and altmetrics: Distinct but complementary
Open access to publications through electronic journals has dramatically expanded downloading and use of this literature and spurred the rise of alternative metrics to assess article impact. Open access publications have been shown to gain more citations than articles with restricted access, and seven of the 10 most popular articles in 2012 were free public access with the most response, as documented through altmetrics, coming from non-scientists. Altmetrics also enables post-publication filtering and peer review in a nearly immediate timeframe for very large open access journals. Online activity measured through altmetrics highlights attention to the article on its own, less dependent on the validation of a journal name. The field of altmetrics is young, still limited to certain open websites, but with potential for considerable expansion, development and application. Open access and altmetrics can be expected to grow in a complementary and mutually supportive manner.
altmetrics, open access publications, social web, impact of scholarly output, electronic publishing, electronic journals

**** *Artigo_413
Overview of the Altmetrics Landscape
While the impact of article citations has been examined for decades, the "altmetrics" movement has exploded in the past year. Altmetrics tracks the activity on the Social Web and looks at research outputs besides research articles. Publishers of scientific research have enabled altmetrics on their articles, open source applications are available for platforms to display

altmetrics on scientific research, and subscription models have been created that provide altmetrics. In the future, altmetrics will be used to help identify the broader impact of research and to quickly identify high-impact research."

**** *Artigo_414
PlosOpenR – Exploring FP7 funded PLOS publications
This case study explores alternative science metrics on grant-supported research publications. The study is based on plosOpenR, a software package for the statistical computing environment R. plosOpenR facilitates access to the application programming interfaces (API) provided by Open Access publisher Public Library of Science (PLOS) and OpenAIRE – Open Access Infrastructure for Research in Europe.We report 1,166 PLOS articles that acknowledge grant support from 624 different research projects funded by the European Union's 7th Framework Programme (FP7). plosOpenR allows the exploration of PLOS Article-Level Metrics (PLOS ALM), including citations, usage and social media events as well as collaboration patterns on these articles. Findings reveal the potential of reusing data, that are made openly and automatically available by publishers, funders and the repository community.
Research evaluation, article-level metrics, statistical computing, R, PLOS, open access, OpenAIRE, 7th Framework Programme

**** *Artigo_415
Recent trends in biomedical informatics: a study based on JAMIA articles
In a growing interdisciplinary field like biomedical informatics, information dissemination and citation trends are changing rapidly due to many factors. To understand these factors better, we analyzed the evolution of the number of articles per major biomedical informatics topic, download/online view frequencies, and citation patterns (using Web of Science) for articles published from 2009 to 2012 in JAMIA. The number of articles published in JAMIA increased significantly from 2009 to 2012, and there were some topic differences in the last 4 years. Medical Record Systems, Algorithms, and Methods are topic categories that are growing fast in several publications. We observed a significant correlation between download frequencies and the number of citations per month since publication for a given article. Earlier free availability of articles to non-subscribers was associated with a higher number of downloads and showed a trend towards a higher number of citations. This trend will need to be verified as more data accumulate in coming years.
Bibliometrics

**** *Artigo_416
Research impact: Altmetrics make their mark

**** *Artigo_417
Riding the crest of the altmetrics wave: How librarians can help prepare faculty for the next generation of research impact metrics

**** *Artigo_418
Social Media Release Increases Dissemination of Original Articles in the Clinical Pain Sciences

A barrier to dissemination of research is that it depends on the end-user searching for or ‘pulling’ relevant knowledge from the literature base. Social media instead ‘pushes’ relevant knowledge straight to the end-user, via blogs and sites such as Facebook and Twitter. That social media is very effective at improving dissemination seems well accepted, but, remarkably, there is no evidence to support this claim. We aimed to quantify the impact of social media

release on views and downloads of articles in the clinical pain sciences. Sixteen PLOS ONE articles were blogged and released via Facebook, Twitter, LinkedIn and ResearchBlogging.org on one of two randomly selected dates. The other date served as a control. The primary outcomes were the rate of HTML views and PDF downloads of the article, over a seven-day period. The critical result was an increase in both outcome variables in the week after the blog post and social media release. The mean 6SD rate of HTML views in the week after the social media release was 18618 per day, whereas the rate during the other three weeks was no more than 663 per day. The mean 6SD rate of PDF downloads in the week after the social media release was 464 per day, whereas the rate during the other three weeks was less than 161 per day (p,0.05 for all comparisons). However, none of the recognized measures of social media reach, engagement or virality related to either outcome variable, nor to citation
count one year later (p.0.3 for all). We conclude that social media release of a research article in the clinical pain sciences increases the number of people who view or download that article, but conventional social media metrics are unrelated to the effect.

**** *Artigo_419
The correlations between article citation and references' impact measures: What can we learn?

We examined the correlations between an article's citation count (as an indicator of the article's quality) and different impact measures regarding the article's references (as indicators of the quality of the authors' information seeking while producing the article). Two research questions of interest were studied. First, do authors' information seeking and use affect the quality of their research output? Second, if yes, which metrics can better identify those references that may inspire researchers to produce high quality research work (so that we can recommend these references to others)? We found that the impact measures for the references have a slight or moderate correlation with article citations. Among these measures, references' article level impact measures calculated based on altmetrics data sources have a consistently stronger correlation with high quality research output, which may serve to identify helpful articles for researchers."
Bibliometrics, altmetrics, information seeking and use

**** *Artigo_420
The many faces of article-level metrics
The Public Library of Science (PLOS) collects a range of alternative metrics about the articles they publish to provide different, more meaningful and granular insights into reader response. PLOS captures usage statistics, social shares, academic bookmarks and both scholarly and non-scholarly citations, all offering distinct types of information. Early interest in an article is more apparent through HTML views and mentions on social sharing sites than usage statistics, and Mendeley bookmarking reflects interest but does not correlate with citation count. An article's appearance in citation databases commonly takes at least two years. Mentions in blogs often stimulate commentary and critique. Instead of presenting only a simplistic citation number, PLOS offers article level metrics (ALM) signposts reflecting ALM that capture the variety of response, audience, timing, purpose and impact of a scientific article.
altmetrics, scholarly publishing, impact of scholarly output, social web, citation impact, collaborative filtering

**** *Artigo_421
The power of altmetrics on a CV
Alternative metrics demonstrate the value and influence of scholars' work apart from traditional citation counts and can enhance the impact of a CV. Altmetrics provide additional,

supplementary information and can balance misleading metrics tied to particular journals. More timely than traditional metrics, altmetrics quickly reveal the impact of recent work and add authority to different types of scholarly products not captured as articles. Altmetrics can capture social media references that escape traditional metrics and reflect public engagement prompted by scholarly writing. The availability of altmetrics expands publishing opportunities to include new venues and stimulates innovative strategies for evaluating research. When included in a CV altmetrics must be accurate, clear and meaningful.
altmetrics, career development, impact of scholarly output, social web

**** *Artigo_422
The role of Twitter in the life cycle of a scientific publication
Twitter is a micro-blogging social media platform for short messages that can have a long-term impact on how scientists create and publish ideas. We investigate the usefulness of twitter in the development and distribution of scientific knowledge. At the start of the 'life cycle' of a scientific publication, twitter provides a large virtual department of colleagues that can help to rapidly generate, share and refine new ideas. As ideas become manuscripts, twitter can be used as an informal arena for the pre-review of works in progress. Finally, tweeting published findings can communicate research to a broad audience of other researchers, decision makers, journalists and the general public that can amplify the scientific and social impact of publications. However, there are limitations, largely surrounding issues of intellectual property and ownership, inclusiveness and misrepresentations of science 'sound bites'. Nevertheless, we believe twitter is a useful social media tool that can provide a valuable contribution to scientific publishing in the 21st century.
social media, tweets, altmetrics, scientific publishing

**** *Artigo_423
The value and use of social media as communication tool in the plant sciences
Social media now complements many parts of our lives. Facebook, Twitter, YouTube and many other social networking sites allow users to share and
interact with online content and to connect with like-minded people. Its strengths – rapid dissemination and amplification of content and the ability to lead informal conversations – make it a powerful tool to use in a professional context. This commentary explains the overall concept of social media and offers suggestions on usage and possible types of scientific content. It advises researchers on the potential benefits and how to take a strategic approach towards building a social media presence. It also presents examples of effective social media use within the plant science community. Common reasons for scientists to not engage with social media include the fear of appearing unprofessional, posting something wrong or being misunderstood, or a lack of confidence in their computer skills. With the rapid changes in academic publishing, dissemination and science communication, as well as the rise of 'altmetrics' to track online engagement with scientific content, digital literacy will become an essential skill in a scientist's tool kit. Social media, Social networking, Hashtag, Blogging, Science communication

**** *Artigo_424
What Can Article-Level Metrics Do for You?
Article-level metrics (ALMs) provide a wide range of metrics about the uptake of an individual journal article by the scientific community after publication. They include citations, usage statistics, discussions in online comments and social media, social bookmarking, and recommendations. In this essay, we describe why article-level metrics are an important extension of traditional citation-based journal metrics and provide a number of example from

ALM data collected for PLOS Biology.

**** *Artigo_425
When Social Media Meets Scholarly Publishing

**** *Artigo_426
Alternative metrics

**** *Artigo_427
Altmetrics in the wild: Using social media to explore scholarly impact
In growing numbers, scholars are integrating social media tools like blogs, Twitter, and Mendeley into their professional communications. The online, public nature of these tools exposes and reifies scholarly processes once hidden and ephemeral. Metrics based on this activities could inform broader, faster measures of impact, complementing traditional citation metrics. This study explores the properties of these social media-based metrics or ""altmetrics"", sampling 24,331 articles published by the Public Library of Science. We find that that different indicators vary greatly in activity. Around 5% of sampled articles are cited in Wikipedia, while close to 80% have been included in at least one Mendeley library. There is, however, an encouraging diversity; a quarter of articles have nonzero data from five or more different sources. Correlation and factor analysis suggest citation and altmetrics indicators track related but distinct impacts, with neither able to describe the complete picture of scholarly use alone. There are moderate correlations between Mendeley and Web of Science citation, but many altmetric indicators seem to
measure impact mostly orthogonal to citation. Articles cluster in ways that suggest five different impact ""flavors"", capturing impacts of different types on different audiences; for instance, some articles may be heavily read and saved by scholars but seldom cited. Together, these findings encourage more research into altmetrics as complements to traditional citation measures.

**** *Artigo_428
Altmetrics: alternative ways of measuring scholarly impact based on the social web
In recent years there has been a growing demand for objective article-level assessment of research impact.
It has evolved from the trends that social media found its use in research and that the movement toward open access accelerated online dissemination of scholarly information. Researchers shifted their venues of professional communications and research workflow to the Web. Created to meet the needs of the Web Age, “altmetrics” will allow article-level, real-time measures of research impact but not citations, using social media. Being still at an early stage, “altmetrics” have the potential to develop as new complements to traditional metrics through tools development and Twitter-based citation projections. To become popular, these new metrics would need to work together with open access for mutual harmony and benefit. This paper overviews the emergence, present situation, relationship with both social media and open access, and opportunities of “altmetrics”."
altmetrics, bibliometrics, peer review, impact factor, Open Access, social media, Twitter, Mendeley, PLoS, scholarly communication

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From bibliometrics to altmetrics: A changing scholarly landscape
Bibliometrics takes center stage for this Bulletin, with a review tracing its historical foundation in the mid-19th century through forecasts of its expanding uses in future research. The scope of

bibliometrics has grown from generalized statistical bibliography, the quantitative study of patterns and references in written communication, to an increasing range of identified subfields. SIG/MET, the recently established ASIS&T special interest group (SIG), reflects the growing research focus on metrics in information science. This issue explores bibliometrics within and outside the information science field, the webometrics of the links to the ASIS&T website, an altmetric view of JASIST readership and metrics-based visualizations of co-authorship patterns in the field of bibliometrics itself. Interviews with four distinguished ASIS&T members active in bibliometrics consider where metrics research has come from and where it may be headed.
bibliometrics, webometrics, quantitative analysis, electronic visualization, scholars, information science history, research methods

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Introduction metrics & ASIS&T
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Keywords:bibliometrics, webometrics, quantitative analysis, electronic visualization, scholars, information science history, research methods

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Key Issue - Scientometrics, bibliometrics, altmetrics: some introductory advice for the lost and bemused

**** *Artigo_432
Scientific bloggers under the altmetric microscope
In this paper we present a preliminary altmetric study of scientific bloggers and how they use different social media (i.e. blogs, social bookmarking systems, and Twitter) for scholarly communication, information dissemination, and creation of visibility. We analyzed linking behavior in blog posts and tweets, number of comments assigned to blog posts and share of publications found in social bookmarking systems. Results show that heavy tweeting and blogging do not result in large numbers of followers and comments, tweets and blog posts contain lots of URLs and self-citations, and share of publications found in social bookmarking systems varies between different platforms.
Altmetrics, social bookmarking, blogs, Twitter, CiteULike, Bibsonomy, self-citation, scholarly communication

**** *Artigo_433
Do altmetrics assess societal impact in a comparable way to case studies? An empirical test of the convergent validity of altmetrics based on data from the UK research excellence framework (REF)
Altmetrics have been proposed as a way to assess the societal impact of research. Although altmetrics are already in use as impact or attention metrics in different contexts, it is still not clear whether they really capture or reflect societal impact. This study is based on altmetrics,

citation counts, research output and case study data from the UK Research Excellence Framework (REF), and peers' REF assessments of research output and societal impact. We investigated the convergent validity of altmetrics by using two REF datasets: publications submitted as research output (PRO) to the REF and publications referenced in case studies (PCS). Case studies, which are intended to demonstrate societal impact, should cite the most relevant research papers. We used the MHq' indicator for assessing impact – an indicator which has been introduced for count data with many zeros. The results of the first part of the analysis show that news media as well as mentions on Facebook, in blogs, in Wikipedia, and in policy-related documents have higher MHq' values for PCS than for PRO. Thus, the altmetric indicators seem to have convergent validity for these data. In the second part of the analysis, altmetrics have been correlated with REF reviewers' average scores on PCS. The negative or close to zero correlations question the convergent validity of altmetrics in that context. We suggest that they may capture a different aspect of societal impact (which can be called unknown attention) to that seen by reviewers (who are interested in the causal link between research and action in society).

Bibliometrics, Altmetrics, MHq, Societal impact, Case studies, Research excellence framework, REF2014