Challenges and Opportunities in Adapting Digital Technologies in Libraries

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Exploring the Unexplored Dimensions of Research: A Journey into Altmetrics

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ABSTRACT:

Conventional metrics, such as journal impact factor and citation counts, offer limited perspectives on research impact. Altmetrics, a web-based metric study, has emerged to supplement traditional measurements by providing real-time information on scholarly research's digital platform impact. The reviewed literature traces evolution of altmetrics, highlighting its applications and limitations. The historical development of altmetrics identifies key milestones, from initial signs on social media to standardization efforts and acceptance by publishers. Altmetrics comprise various components, including social media, news coverage, citations, online peer review and multimedia platforms. Data aggregators, such as Altmetric.com, ImpactStory, Plum Analytics and Crossref Event Data, play a vital role in tracking and accumulating altmetrics data. Despite its advantages, altmetrics faces criticisms and challenges, including data reliability, gaming, lack of standardization, and discipline-specific differences. In conclusion, altmetrics offer a valuable tool for understanding research impact in the digital age, however awareness of limitations and continuous improvement efforts are essential for the effective use of these metrics in scholarly and societal communication.

Keywords: *Altmetrics, Research, Metrics, Scholarly*

1. INTRODUCTION:

Conventional metrics such as journal impact factor and article citation counts play a crucial role in evaluating and assessing research. However, these metrics constitute only a part of the scholarly ecosystem, capturing just one aspect of impact. The influence of research in the academic community is not well represented by these traditional citation metrics, particularly when it comes to scientific communication. The landscape of scholarly research goes beyond traditional metrics as a majority of research outputs are now accessible in electronic formats with user-friendly mechanisms. Monitoring their accessibility, usage and sharing on digital platforms provides a more comprehensive understanding of the reach and impact of scholarly research, extending beyond traditional measures. In recent times, alongside traditional metrics, a new web-based metric study, known as altmetrics, has been developed to evaluate research quality by tracking and measuring the impact that scholarly research gathers on digital platforms.

Altmetrics offer fast and real-time information about an article's distribution across several media outlets, while standard metrics like citation counts and impact factors can only be obtained years after publication. Altmetrics is still intended to supplement conventional measurements, not to completely replace them. Altmetrics are just metrics that go beyond conventional citations. Priem (2014)defined altmetrics as the "study and use of scholarly impact measures based on activity in online tools and environments."NISO(2016) defined"altmetric as a broad term that encapsulates the digital collection, creation, and use of multiple forms of assessment that are derived from activity and engagement among diverse stakeholders and scholarly outputs in the research ecosystem." Bornmann (2014) stated that "altmetric is a term to describe web-based metrics for the impact of publications and other scholarly material by using data from social media platforms." With the aid of persistent identifiers, altmetrics maps the scholarly influence of web-based digital tools and monitors qualitative data that is a supplement to citation-based, traditional metrics.

2. SIGNIFICANCE OF THE STUDY:

Conventional measures such as article citation counts and journal impact factor are typically time-consuming and offer a limited perspective on research impact, focusing on just one aspect. In contrast, altmetrics offer real-time information, presenting a more comprehensive view of article impact. This study aims to review the concept of altmetrics as a method to evaluate the impact of research.

3. REVIEW OF RELATED LITERATURE:

Priem et al.(2010) proposed adopting the term "Altmetrics" in the altmetrics manifesto. The authors claim that in order to choose the most important source from the scholarly literature, the academic community uses filters. Even though the conventional filters are becoming overloaded, the academic community is able to create new filters because of the development of new web tools. These filters are altmetrics, which show how quickly and widely scholarship has an impact. Priem, Groth&Taraborelli (2012) outlined in their paper "The Altmetric Collection" the necessity and significance of citation-based filters in assessing the impact of research. Researchers have indicated that in order to collect data on wider effects and offer more specific information on the scientific system, new procedures and approaches are required. The study and application of scholarly impact metrics based on activity in online tools and environments is known as altmetrics. Most of the time, altmetrics is a subset of webometrics and scientometrics. Alperin (2013) in his insightful study discussed the advantages that both ordinary researchers and emerging nations could benefit from the use of altmetrics. A few creative minds have tried to reinvent scholarly communication by introducing novel metrics called altmetrics. Altmetrics is a useful instrument that gives these alternative scholars an advantage by assessing research that transcends national borders. Cave (2013) reviewed altmetrics and its application and predicted that they will be utilized soon to determine the impact of research on a wider scale. Altmetrics have been made available by publishers and open-source platforms to track the impact of scientific research. There are also a number of subscription-based platforms available that provide altmetrics data. Torres, Cabezas& Jimenez (2013) examined the idea of altmetrics, or alternative metrics, which were brought up by the creation of new Web 2.0 based indicators for the assessment of scholarly work and study. The findings demonstrate that, based on altmetrics, the most cited papers also have the greatest impact. Bornmann (2014) pointed out that while bibliometrics and peer review have become the accepted methods for assessing the impact of research in Science, there is currently no accepted framework for assessing the societal impact of research. Altmetrics is a thought-provoking alternative for evaluating the social impact of research. The definition, categorization, advantages, and downsides of altmetrics for impact measurement were covered by the author. Brigham (2014) explained about the fundamentals of altmetrics and its tools and how libraries can use them. To assess the research or academic influence, conventional assessment techniques like journal impact factor or citation counts have been employed. These are not, however, all-inclusive and accurate research measurement instruments. By monitoring research products such as datasets and software when they are mentioned online, altmetrics are paving the way for a new method of measuring the impact of these tools in addition to article-level metrics. Priem (2014) explored altmetrics, a method for analyzing activity in internet tools and systems to find previously undetectable signs of scholarly impact. A growing number of academics are using internet resources like Mendeley, Twitter, and blogs, which may help us assess the hidden effects that traditional citations ignored. The researcher has defined altmetrics, talked about studies on altmetric sources, and described the applications, limitations and suggested directions for further study. Roemer and Borchardt (2015) discussed a number of crucial topics, such as conflicts and possibilities of altmetrics. Without question, the collection of online data which could contain interactions between the scholarly impact and academic impact is the foundation of altmetrics. The two main points of controversy in the development of

altmetrics are gaming and correlation with bibliometrics. Even with all of the debates and criticism, altmetrics still offer a significant and special chance to close gaps in the scholarly impact. Kumar et al. (2016) examined altmetrics, a new category of alternative metrics for study of web research. The result of increased social media use demands the use of altmetrics, which measures academic content found on web 2.0 social media platforms online. Williams (2017) examined the overview and assessment of altmetrics. This study's main goals were to give a thorough overview and analysis of altmetrics and investigate their significance for researchers, academics and scholars. The concept of altmetrics, how it operates, its typologies, its technological capabilities, its critical evaluation and some prospects for current and future research are all covered in the six sections that make up this study. Nuzzolese et al. (2018) carried out research to investigate the efficacy of altmetrics in evaluating the quality of research. The primary goal of this study was to thoroughly examine whether any correlations exist between traditional (such as citation count and h-index) and alternative (such as altmetrics) indicators, and which of them might be useful for assessing academics. Banshal, Singh &Muhuri (2020) evaluated the efficacy of altmetric mentions' ability to forecast future citations of academic papers using data from ResearchGate and three more social media networks. The study's main goal was to investigate the kind and strength of the relationship between altmetrics and citations utilizing three social media platforms and ResearchGate. Thelwall (2020) examined the benefits and drawbacks of using altmetrics in research evaluation. Altmetrics have the potential to be beneficial for evaluating research since they can show significant non-academic consequences and show impact earlier than citations after an item is released. Frequently, these drawbacks include gaming and their inability to interpret the facts in ways that will have a particular impact. Nuredini (2021) carried out research on altmetrics for digital libraries, looking at its theory, uses, assessment, and suggestions. Researchers investigated altmetrics as a novel way to find relevant articles in the field of economic and business studies literature from a variety of library portals. Khatale and Raut (2024) studied the influence of Indian Library and Information Science journals through altmetric analysis. Web of Science and Altmetric explorer were used to collect the data. Altmetric Attention Score and Citations of scholarly journals are weakly correlated across all studied Indian LIS journals.

4. HISTORICAL DEVELOPMENT OF ALTMETRICS:

Since its conception in early 2010, altmetrics, a relatively new method of assessing the influence and visibility of scholarly work, has gained a lot of interest from the scholarly communication community. Several significant turning points in the history of altmetrics can be identified:

4.1 Initial Signs : The origins of altmetrics in the dissemination of scientific knowledge can be traced from the rise of social media tools like Facebook and Twitter. Scholars started utilizing these platforms for sharing research outputs.

4.2 Altmetrics Manifesto : The term "altmetrics" was first used in 2010 by a group of academics that included Jason Priem, Dario Taraborelli, Paul Groth and Cameron Neylon. Their work, Altmetrics Manifesto, outlined the objectives and guiding principles of altmetrics. (Priem et al., 2010)

4.3 Launch of Altmetric.com : Euan Adie in 2011 launched Altmetric.com, one of the pioneering companies in the field.

4.4 Integration with Research Platforms : As altmetrics gained popularity, more and more research platforms and tools began to include altmetric indicators. In 2011, for instance, the Public Library of Science (PLOS) started using altmetrics.

4.5 Standardization Efforts : A number of standardization projects were launched in order to establish best practices and guarantee the validity of altmetric data. In 2013, the Altmetric Data Quality Code of Conduct was introduced followed by the release of the Altmetrics API.

4.6 Acceptance by Publishers and Institutions : After realizing the value of altmetrics in

assessing the influence of research, academic institutions and publishers began including altmetrics indicators into their assessment procedures.

4.7 Transforming Indicators and Metrics : New metrics and indicators are constantly being added to altmetrics in order to capture all facets of research effect. Data on citations, article downloads, media attention, policy document attention, views and more may be included in these metrics.

Overall, the history of altmetrics illustrates how the subject keeps growing as more people become aware of the shortcomings of traditional citation-based metrics and seek alternate ways to measure the influence of research in the digital age.

5. COMPONENTS OF ALTMETRICS:

Altmetrics create metrics of research output using a variety of data sources. It consists of several elements that provide an exhaustive evaluation of the impact of the research. These components are:

5.1 Social Media Platforms : Altmetrics monitors how research output is shared, mentioned, and discussed on a variety of social media sites, including Pinterest, Google+, Facebook, Twitter, Reddit, and SinaWeibo.

5.2 Coverage of News and Media : Altmetrics take into account the amount of media coverage academic work receives in blogs, online news sources, press releases, publications, and news pieces.

5.3 Bookmarking and Saving tools : Altmetrics count the number of times a scientific publication is bookmarked or saved by users in Mendeley or other social bookmarking apps.

5.4 Citations and Policy Documents : Although they go beyond traditional citations, citation counts are still a part of altmetrics as altmetrics monitor citations from academic databases such as Dimensions and the Web of Science. Altmetrics also track policy documents, wikipedia, patents, clinical guidelines, government reports, etc.

5.5 Online Peer Review and Recommendations : Altmetrics monitors how many reviews or ratings scholarly works obtain on platforms such as Publons, Syllabi, and Faculty Opinions. Positive comments and suggestions could be an indication of the research's influence and impact.

5.6 Multimedia Platforms : Altmetrics also covers non-conventional video-uploading platforms like YouTube. These video-uploading platforms assist scientists, researchers or institutions to disseminate their research in various forms like video lectures, demonstrations, interviews and presentations.

6. ALTMETRICS DATA AGGREGATORS:

According to Karmakar, Banshal& Singh(2021)"An altmetrics aggregator is typically a platform which tracks and accumulates various types of events from different social media, academic social networks and other platforms for scholarly articles." The major data aggregators are represented in Figure 1. KNAW Pure Blog (n.d.)

Figure 1: Altmetrics Data Aggregators

6.1 Altmetric.com : One of the first altmetric data aggregator platforms, altmetric.com was founded in 2011 by Euan Adie and is based in London, United Kingdom. It is a member of the digital science product family and analyzes and tracks online activity and conversations surrounding scholarly outputs. It is a widely used data aggregator tool that tracks and supplies altmetric data of scholarly research outputs.

6.2 ImpactStory : Accoring to ImpactStory (2024)"Impactstory is an open-source website that helps researchers explore and share the online impact of their research." It was originally started as "total-impact", a hackathon project at the Beyond Impact workshop in 2011.

6.3 Plum Analytics : In 2011, Mike Buschman, a former Microsoft librarian, and Andrea Michalek, an entrepreneur, established Plum Analytics. They created PlumX, an analytical tool. (Brigham, 2014)Plum Analytics tracked 67 different types of research outputs which are named as 'artifacts'.

6.4 PLOS Article-Level Metrics : One of the first publishers to implement Article Level Metrics (ALM) for open-access journals was the Public Library of Science (PLOS). Since 2009, PLOS has gathered and presented a variety of metrics for publications; however, as of August 2013, PLOS was using and providing a collection of differently categorized ALM. (Fenner, 2013) In order to track and show article-level metrics for scientific papers, the Open Access publisher Public Library of Science (PLOS) launched Lagotto, an Open Source program, in March 2009.

6.5 Crossref Event Data : The non-profit organization Crossref offers the Crossref Event Data service, which is primarily concerned with making scholarly content discovery and linking possible. A mention in a news article, wikipedia page, blog post, conversation, or comment on social media can all be considered as event. Citations in datasets and patents are another type of event.

6.6 Scholarometer : According toKaur, Radicchi&Menczer(2013)"Scholarometer is a social tool for scholarly services developed at Indiana University, with the goal of exploring the crowdsourcing approach for disciplinary annotations and cross-disciplinary impact metrics. The data collected by Scholarometer is available via an open API."

Most of these altmetric data aggregators are based on a similar philosophy to capture online events around scholarly objects. The researcher must be aware of the scope of the altmetrics data aggregator when choosing one, particularly the research outputs it tracks, the scholarly identifiers it uses, the data collection methodology it employs, and the metrics reporting procedure.

7. BENEFITS OF ALTMETRICS:

Erfanmanesh(2017)Stated "Many advantages of altmetrics over traditional citation-based metrics are there including providing real-time data, broader and more diverse audiences, speed, transparency, greater level of openness and ease of data collection using APIs."Some of the key benefits of altmetrics include:

7.1 Wider Impact Assessment : Altmetrics can measure a more diverse impact of research by considering a wide range of indicators beyond citations. They provide a more thorough assessment of the impact of research by taking into account a range of factors, including downloads, views, social media mentions, saves, and discussions. (Kumar et al., 2016)

7.2 Diversified Involvement : Altmetrics monitors a range of sources, such as online reference managers, blogs, policy documents, news sources, and social media platforms. This enables researchers to be aware of how their work is viewed and disseminated to various audiences, including members of the public, decision-makers, and practitioners.

7.3 Timeliness : Altmetrics can produce real-time data on how research is being received and discussed. Altmetrics provide data that is more up-to-date, indicating influence in days instead of years. (Piwowar, 2013)

7.4 Accessibility and Openness : The majority of the time, altmetrics data is publicly available, encouraging transparency and repeatability. According to Piwowar (2013) "Altmetrics offers a potential impact on diverse audiences including scholars, practitioners, clinicians, educators and the general public" which displays the openness of these metrics.

7.5 Societal Impact : By offering a way to assess the research's wider societal impact and relevance and by helping researchers understand how their work is being accessible and discussed outside of academia, altmetrics increase the reach and influence of research beyond academic

bounds.

Overall, altmetrics supplement conventional citation-based metrics by offering a quick comprehensive, and varied knowledge of the effect of research.

8. CRITICISMS AND CHALLENGES:

Like any emerging field, altmetrics also face several challenges and criticisms. Commonly observed problems include poor data quality and dependability, the possibility of manipulation or gaming, and the absence of established procedures for analyzing and disclosing altmetrics.

8.1 Data Reliability and Quality : The quality and reliability of altmetrics data range significantly throughout data sources. Data security, privacy and quality are all at risk since some data sources are open to spam, manipulation and inaccurate data.

8.2 Gaming and Bias : Gaming can have an impact on altmetrics since it can artificially increase mentions and engagements in online digital media. Altmetrics could be biased if some research outputs are more likely to be shared, discussed and given more attention than others because they are more relevant, accessible or controversial.

8.3 Lack of Standardization : There is no commonly acknowledged methodology for gathering and analyzing altmetrics data from various sources of information. Setting up standardized metrics is difficult due to the diversity of data, including social media mentions, views, bookmarks and downloads.

8.4 Significant Differences by Discipline : It can be challenging to create inclusive altmetrics that accurately reflect the research impact across all disciplines since different fields have distinct communication and publication strategies. As a result, altmetrics may not capture influence across disciplines in the same way.

There is continuous research and development being done in the altmetrics sector to address these problems and improve the data excellence, dependability, unbiasedness, standardization, and interpretation of altmetrics.

9. CONCLUSION:

As a relatively new technique in metric studies, altmetrics aims to address the drawbacks of traditional citation-based indicators by giving funding agencies, academic institutions, publishers, pharmaceutical companies and corporate R&D departments a comprehensive understanding of the impact and reach of the scholarly works they produce. Over the past decade, altmetrics gained a lot of interest as a way to measure the impact of academic outputs on society in the digital age as well as their wider reach. Altmetrics offer a more comprehensive knowledge of research impact and provide a multidimensional evaluation of research influence by integrating many data sources and capturing attention, engagement and dissemination. However it is essential to be aware of the drawbacks and restrictions that come with altmetrics, such as the possibility for gaming or biases present in online forums. To ensure reliability, it is crucial to develop best practices and improve procedures. In the digital age, altmetrics provide a great way to investigate and understand the shifting dynamics of how research affects scholarly and societal communication.

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