

# Exploring the utility of an emerging altmetric platform: a SWOT analysis of Plum Analytics

## 1. Introduction

Plum Analytics is an altmetric tool that provides novel documentation of research usage, reach and impact. By drawing from scholarly sources, as well as media channels, blogs and social media, Plum Analytics build upon, extend and advance traditional measures of citation. In recent years, the platform has become a primary means for scholars and universities to garner altmetric data regarding the public significance of research (Tucker, 2017a, 2017b). While research on altmetric platforms has flourished in recent years (Bawden, 2014), research focused specifically on the Plum platform is still emerging. This report opens a new venue for research by examining Plum Analytics' contributions to the growing landscape of digital documentation.

The report is organized into the following sections: Section 2 presents an overview of Plum Analytics. Section 3 analyzes Plum's primary strengths, weaknesses, opportunities, and threats (SWOT). Section 4 discusses the theoretical, practical, and social significance of the research, while posing questions for future studies. Section 5 offers conclusions.

## 2. An overview of the Plum Analytics

Plum Analytics categorizes research impact into five clusters. The clusters unite to create the "Plum Print," a visual representation located next to a citation or abstract (Figure 1).

The "Plum Print" for each research artifact assigns a different color to each type of data: green for usage, purple for captures, yellow for mentions, blue for social media and orange for citations. Each component of the visual representation expands based on the number of data points in each category (Lindsay, 2016), for example, if usage is the most robust category of impact, the green node is the biggest component of the Plum Print; if captures is the largest category of impact, the purple node is the biggest component of the Plum Print (Figure 2).

### 2.1 Five dimensions of data: the Plum Print

The five dimensions of data illustrated through the "Plum Print" are described below:

- (1) *Usage*: Usage data provides a number of who has clicked on, downloaded, viewed, played or placed a library request for a published document.
- (2) *Captures*: Capture data provides information on who has saved a file, including bookmarks, code forks, favorites, readers and watchers.
- (3) *Mentions*: Mention data measures how the data from an article has been engaged in other articles, including blog posts, comments, reviews, Wikipedia entries and news media.
- (4) *Social media*: Social media data measures tweets, Facebook likes and social media references to the file.



- (5) *Citations*: Citation data includes citation counts from traditional citation indexes like Scopus and also provides indications of societal impact, including citation indexes, patent citations, clinical citations and policy citations.

2.2 Data aggregation: PlumX

Plum Analytics houses a data aggregator, PlumX, that imports researcher data and artifact data from Google Scholar, ORCID, VIVO and institutional repositories (Rathemacher, 2014). PlumX locates and compiles data on multiple types of artifacts, including articles, case studies, abstracts, books, book chapters, data sets, videos from Youtube, Slideshare, Vimeo, Figshare, GitHub, audio recordings, figures, government documents, images, musical scores and maps (Collister and Deliyannides, 2016; Lindsay, 2016). Articles can be identified by a DOI, PubMed ID, ISBN, URL and/or patent numbers (Rathemacher, 2014; Torres-Salinas et al., 2017). Artifacts are then linked to the researchers who created them. Because an article may appear on multiple platforms, PlumX ensures that metrics for all versions of the same item are counted and presented together (Rathemacher, 2014).

Data produced through the Plum interface is available as:

- individual artifact data; and
- institutional aggregate data.

Figure 1.  
Plum Print embedded  
within a citation

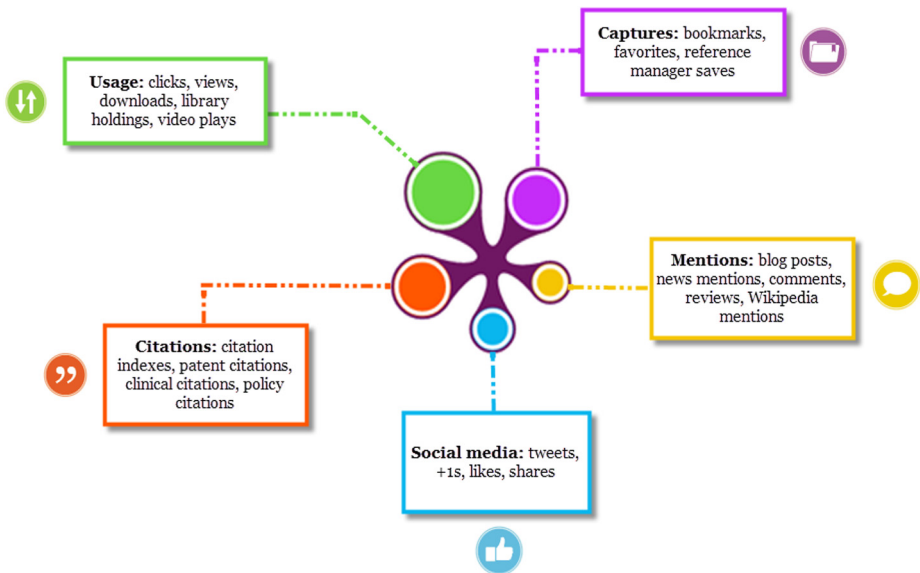
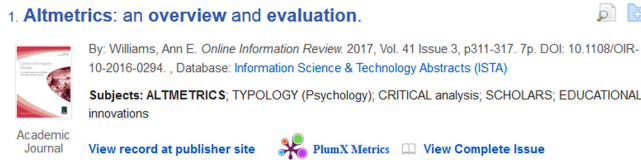


Figure 2.  
Five dimensions of the  
Plum print

## 2.3 Artifact data and aggregate data

2.3.1 *Individual artifact data.* PlumX reports relevant metrics on an article in a single interface (Lindsay, 2016). The data can be displayed on directories, dashboards, widgets and application program interfaces (Rathemacher, 2014). PlumX provides three different reports, including:

- (1) artifacts by publication year;
- (2) sunbursts; and
- (3) artifact overviews (Figure 3).

From an individual artifact, a user can create an “Embed Widget” that can be used to showcase Plum altmetrics on any website (Figure 4).

2.3.2 *Institutional aggregate data.* PlumX profiles are available for researchers and institutions. From the institution screen, users can find researchers who are members of a

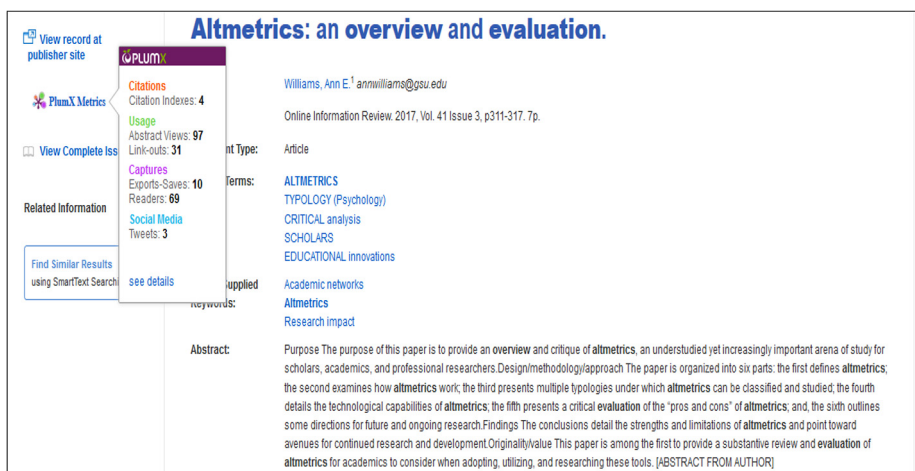


Figure 3.  
Plum X artifact  
overview

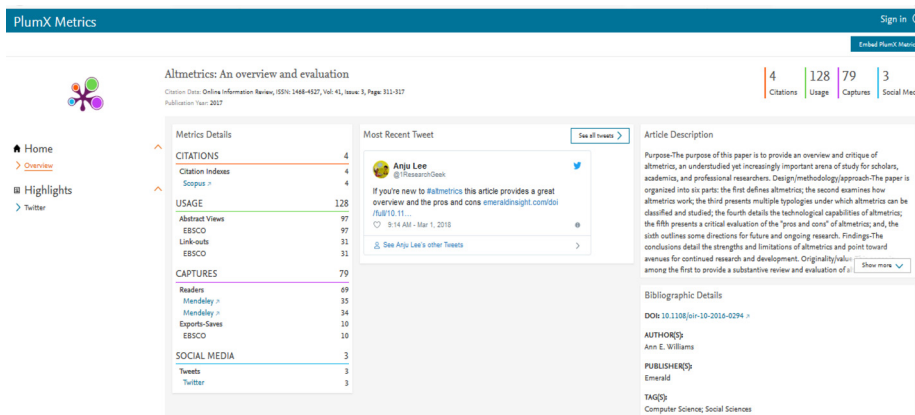


Figure 4.  
Data viewable from  
Plum’s embedded  
widget

given university. Users can then access different options to filter data by individual researcher, artifact or artifact type (Lindsay, 2016) and can view the impact of a given researcher or an entire institution with customizable graphics. Other functions include: PlumX + grants, PlumX funding opportunities and PlumX benchmarks. The PlumX + grants section matches institutions and researchers with a grant database and provides assessments of past performance, including successful application outcomes. The PlumX funding opportunities section enables researchers to search for new grants. The PlumX benchmarks section allows for a comparison of grant outcomes across institutions (Lindsay, 2016).

### 3. SWOT analysis of Plum Analytics

As the popularity of Plum Analytics continues to grow (Crosby, 2016), increased scholarly study of the platform is warranted. To such ends, descriptive SWOT analysis of the site was conducted (for an overview of the SWOT analytic framework, see Helms and Nixon, 2010; Pickton and Wright, 1998; Williams, 2018). The primary goal of this approach is to provide useful information for key stakeholders, including adopters (i.e. colleges, universities and other academic institutions), users (i.e. librarians, researchers and information specialists) and developers looking to improve the functionality of the platform.

Key strengths and weaknesses are detailed below.

#### 3.1 Strengths

- Plum metrics are derived from a broad range of platforms, with a greater reach than other altmetric providers (Tucker, 2017a, 2017b). Web-based sources, including blogs, academic social networks and internet-based news sources are incorporated into Plum Analytics. These measures allow researchers to demonstrate the impact of web-native research in addition to more traditional scholarly outputs (Rathemacher, 2014);
- Plum Analytics tracks multiple types of research sources, including books, book chapters, posters and articles. While other platforms focus primarily on the impact of scholarly journals, PlumX is particularly well suited to assess the broad impact of books by using algorithms that aggregate data generated from multiple ISBN variations (Torres-Salinas *et al.*, 2017);
- Plum Analytics integrates large data sets across platforms and sources quickly and seamlessly. In comparison with other products, including the Web of Science and Scopus that limit the number of items that can be downloaded, Plum Analytics allows for simple entry of large data sets (Torres-Salinas *et al.*, 2017). Additionally, PlumX provides better coverage of Mendeley readers than Altmetric.com (Ortega, 2018);
- Plum Analytics showcase more timely assessments of research impact than traditional metrics. As Hillary Corbett, director of scholarly communications and digital publishing at Northeastern University observes, “altmetrics allow scholars to create a more complete picture of how their work is being accessed and used from the moment of publication – and sometimes years before traditional metrics would show any impact” (Rathemacher, 2014);
- Altmetrics encourage a renewed focus on public engagement. As the value of scholarship is amplified through digital networks, blogs, news outlets and social

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media, altmetrics provide empirical documentation of connections between scholars, academic research and public audiences (Williams, 2017a);

- Plum Analytics help contextualize scholarly work. While some altmetric products use only a numerical scoring system, PlumX uses multiple forms of qualitative, descriptive and comparative data to illustrate various dimensions of impact (Collister and Deliyannides, 2016);
- Plum Analytics facilitate deeper exploration of research by providing direct links to the digital platforms and external settings in which research appears (Rathemacher, 2014);
- Plum Analytics is based on algorithms that can lessen errors introduced by manual data entry processes;
- Plum Analytics has a large user base. As of October 2016, Plum Analytics had 52.6 million individual pieces of research output and had accrued 9.4 billion individual researcher interactions (Crosby, 2016). Plum Analytics is also quickly expanding its presence in the academic publishing marketplace. In 2012, Plum Analytics originated as a provider of alternate metrics for measuring the impact of research. By 2017, Plum Analytics was operating with Elsevier, a host that provides digital solutions and services for research and design, to further promote the prominence of data analytics (Tucker, 2017c). By connecting with Elsevier, Plum Analytics is now available to Elsevier's clients, as well as Scopus, Science Direct and Mendeley; and
- The visual depiction of data presented through the Plum Print allows users to quickly assess impact in multiple domains. Visual depictions are extremely powerful. They draw in users' attention, aid users' evaluation of information and enhance users' retention of knowledge (Williams and Woodacre, 2016).

### 3.2 Weaknesses

- Plum metrics account for research from traditional journals, as well as from sources that have not been peer reviewed, therefore, Plum metrics are not a replacement for traditional metrics (Williams, 2017b, 2018). Rather, it is best to use Plum data in combination with traditional metrics, including journal impact factors and citations counts;
- While altmetrics are promising, they have not yet replaced traditional measures of scholarly impact (Lindsay, 2016);
- Plum Analytics are faced with some of the same problems as traditional citation metrics, including author disambiguation and lack of regulation (Brigham, 2014);
- Altmetric tools such as [Altmetric.com](http://Altmetric.com), PlumX and Crossref event data (CED), can yield discrepant counts of metrics in their data, which may, in turn, cast doubt on the reliability of these tools for measuring impact (Ortega, 2018);
- The five dimensions of Plum Analytics are not always mutually exclusive. Because of potential overlap between the five domains, the validity of the measures may be compromised (Torres-Salinas *et al.*, 2017);
- Plum output data does not precisely match Plum input data. For example, Torres-Salinas *et al.* (2017) found that not all output records conserve the original ISBN

input numbers thereby leaving researchers to manually verify the accuracy of results;

- Data processing speeds may be slowed if the size of the data sample is very large. For samples with less than 50,000 items, the processing is normally completed within three hours (Torres-Salinas *et al.*, 2017), however, processing time increases as sample size increases;
- Subscription to Plum Analytics is not free. Costs can be prohibitive and lessen the likelihood of adoption (Lapinski *et al.*, 2013);
- PlumX data are made available to institutions in exchange for access to their institutional repository usage data (Rathemacher, 2014), which can, in turn, compromise data security and information privacy; and
- PlumX tools are not directly available to individual researchers. Currently, they are only available to scholars through university-wide subscriptions (Lapinski *et al.*, 2013).

As Plum Analytics continues to grow and develop, it becomes essential to consider the opportunities and threats that the site may face in the future. Some of the primary opportunities and threats on the horizon are presented below.

### 3.3 Opportunities

- Altmetrics, like those produced by Plum Analytics, can be used by researchers to showcase the public significance and impact of their work (Williams, 2017a, 2017c);
- Plum Analytics provides individual researchers with data they can use to bolster CVs, job applications and tenure and promotion dossiers. Making these resources free for researchers to adopt and use could sustain the future growth of Plum Analytics;
- Plum Analytics captures networked scholarship that is leveraged by scholars to build their scholarly brands and strengthen their scholarly identities (Williams and Woodacre, 2016; Williams, 2018). This asset could be further promoted to researchers as a means of increasing popularity and use;
- In the future, Plum could continue to increase the number of measures and impact indicators they offer. As of 2017, PlumX delivered 26 measures, whereas, [Altmetric.com](#) delivered only 18. This has been viewed as a strategic advantage that PlumX holds over [Altmetric.com](#), which will need to be maintained over-time to secure a position in the academic publishing market (Torres-Salinas *et al.*, 2017);
- To enhance bibliographic data and account for ISBN variations between input and outputs, PlumX could create its own data index of the book entries/ISBNs, which could be of potential value to universities, libraries and researchers (Torres-Salinas *et al.*, 2017);
- Some university rankings do not include metrics of scholarly books in their ratings of research productivity. By continuing to provide fruitful data of book metrics, Plum Analytics could leverage its unique ability to report empirical data inclusive of all scholarly manuscripts (Torres-Salinas *et al.*, 2017);

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- Plum Analytics has recently been purchased by Elsevier and will now have the direct means to incorporate Plum Analytics data into Mendeley profiles (Carpenter, 2017);
  - Communication researchers and information scientists are strategically positioned to continue exploration of and experimentation with emerging altmetrics. Librarians will play a key role in education and outreach concerning these tools (Lapinski *et al.*, 2013);
  - Plum Analytics quest for inclusivity presents an opportunity to bring new and undiscovered research to the forefront and may work to level the playing field between new and established researchers (Rathemacher, 2014); and
  - Plum Analytics work with academic institutions to decide what metrics are tracked. While these decisions are currently made at the institutional level, empowering individual researchers to have more control in the data selection and collection process will strengthen the long-term viability of the platform.

### 3.4 Threats

- Competitors can, directly and indirectly, influence the continuity, development and impact of Plum Analytics;
- An array of altmetric providers (e.g. Piwowar, [Altmetric.com](http://Altmetric.com) and CED) currently offer similar products and services;
- Altmetric competitors vie with one another for academic customers, which can lead to the downfall of any given data provider;
- Decisions regarding the adoption and use of Plum Analytics may be influenced by the value Plum products and services offer in comparison with other altmetric providers.
- Examples of notable competitive values and benefits available through other altmetric providers include the following:
  - (a) Piwowar hosts an “ImpactStory” that tracks the impact of a researcher’s full body of scholarship while also placing each work into the context of other works produced within the same discipline and timeframe (Rathemacher, 2014);
  - (b) CED extracts more Wikipedia citations than PlumX (Ortega, 2018);
  - (c) In the domain of blogs, news and tweets, [Altmetric.com](http://Altmetric.com) has better coverage than Plum Analytics (Ortega, 2018); and
  - (d) Plum’s trademark “Plum Print” presents a unique form of data visualization, however, [Altmetric.com](http://Altmetric.com) also promotes data visualization in the form of a “Donut” symbol used to showcase the multiple metrics they produce (Brigham, 2014).
- In a competitive marketplace, threats to academic values of openness and transparency may arise. Altmetrics providers, including Plum Analytics, need to maintain openness and transparency in designing, promoting, and monitoring their delivery tools, methods and measurement techniques to sustain value in an academic marketplace;
- In digital environments, threats of “gaming” can occur. Altmetrics providers including Plum Analytics can be compromised by “gaming,” through which



individuals and companies create multiple social media profiles programed to endorse links to certain articles as a means of artificially inflating altmetrics (Brigham, 2014, p. 443);

- Data collection glitches can threaten the accuracy of reported data. Ensuring the validity of data outputs is necessary for maintaining the credibility of the platform. While much of the Plum Analytic data collection process is automatic, users must manually verify that all data sources are active and linking correctly to the Plum database to ensure the accuracy and efficacy of the output data;
- The viability of Plum Analytics is currently dependent upon institutional resources needed to pay for services; and
- The continued success of Plum Analytics is dependent upon the acceptance of altmetrics as valued means of assessing scholarly research (Rathemacher, 2014; Williams, 2017a).

#### 4. Discussion

In review, this work conceptualizes and outlines what Plum Analytics are and how they work, while also illustrating the value that altmetrics bring to researchers, academic communities and the public at large. The analysis highlights several overarching themes regarding the utility and performance of the platform. Among the technology's notable strengths, Plum Analytics provides:

- unique information about the scope and reach of research;
- broad and robust measures of research impact inclusive of web-native scholarship; and
- timely information about research impact not available through traditional metrics.

The analysis also points to weaknesses of the digital platform including:

- barriers to entry that limit access for researchers who do not have a subscription to the service;
- costs required to use the platform without an institutional affiliation; and
- internal validity concerns stemming from the potential overlap between evaluation categories.

Looking to the future, Plum Analytics introduces opportunities, such as:

- further strengthening engagement between researchers and the public;
- enhancing the means by which researchers can tailor messages to reach target audiences; and
- educating academic communities about how analytics can be used to build and strengthen scholarly reputations.

It is important to also note threats that could hamper the development of altmetrics such as

- ownership and partnership changes that have limited the platform's growth;
- promotional challenges that have not been met to fully raise awareness among researchers and academic institutions; and
- competition with various altmetric providers, including, [Altmetric.com](https://www.altmetric.com), that are also gaining popularity.



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Developments in each of these domains should continue to be monitored over time as the platform progresses.

#### 4.1 *Significance of the findings*

The findings hold social, theoretical and practical/applied significance.

4.1.1 *Social significance.* A primary societal benefit of Plum Analytics is the opportunity for researchers to easily measure and enhance the public impact of their scholarship. By monitoring how research flows through digital and social media, researchers can identify networks that are promoting their research and can amplify public engagement within and across those networks. Information garnered about social media use and sharing can also be used by researchers to tailor information to specific audiences who may be well-served by learning about particular research findings. In addition to using measures of social networking to identify members of the public who are encountering research, academics can also use this information to communicate directly with those who are discussing and forwarding their scholarship. Such discussion can, in turn, incite the attention of a participant's larger social network, and can thereby expand the overall reach of the research.

As scholarship attracts media attention, these analytics also highlight the impact of research reported in the news. Not only can scholars use the metrics to see when their research is cited in news reports but they can also observe how news of their work circulates online. Researchers can then use this information to communicate directly with journalists who are promoting their work and with audiences who are being served by their research.

4.1.2 *Theoretical significance.* The theoretical take-away from the findings is essential to the continued study of altmetrics and altmetric platforms. Most importantly, the outcomes of this study show that the significance of altmetric platforms, like Plum Analytics, is largely dependent upon scholars' use and adoption of the technology. This underscores a theoretically motivated view from the vantage of use and dissemination that will be particularly important as the platform evolves (Blumler and Katz, 1974; Parker and Plank, 2000; Rogers, 2010).

The disciplines of communication and information studies are home to theoretical perspectives that will inform future research, while also forging a dialogue between these complementary areas of study. In the domain of communication, the theory of uses gratifications provides a relevant backdrop for studying the ways in which diverse publics use research to meet diverse needs (Blumler and Katz, 1974; Parker and Plank, 2000). In the domain of information studies, the study of altmetrics can be contextualized through the theoretical lens of information dissemination and the diffusion of innovation (Rogers, 2010). As digital analytics develop across time, these complementary theoretical perspectives can be merged to longitudinally evaluate the use and evolution of digital analytic platforms and research metrics. Furthermore, continued study in this domain will open new opportunities for interdisciplinary research, as altmetrics are not field-specific, but are of importance to all disciplines.

4.1.3 *Practical/applied significance.* The findings carry practical significance to researchers. Most notably, this study documents the importance of digitally based measurement. While some academic institutions and scholars continue to place higher value on print-based publications and traditional citation measures, the world of scholarship is expanding in a digital landscape (Laakso *et al.*, 2011; Odlyzko, 1999). In recognition of this evolution, more robust measurement tools that capture the presence and reach of online scholarship need to be more fully understood and embraced. This is not to dismiss the value

of traditional publication conduits and measures but rather to broaden our understanding of the impact that scholarship carries within digital spaces. Expanded metrics are particularly important in the context of promotion and tenure decisions, which focus heavily on the “impact” of research (Holden *et al.*, 2005; Hendrix, 2010). Plum Analytics, and other digital measurement tools, can play a role in contextualizing and substantiating the impact of research, as they provide information of public engagement with research and immediate measures of academia’s “real-world” significance (Williams, 2017a).

Continued discussion concerning the normative implications of altmetric platforms is warranted. As the world of publication grows, a need to embrace research across various publication modes is evident. Online publication venues should not be dismissed as lesser than traditional print publications. Rather, online and offline publication venues should both be acknowledged and valued as contributing to the expansion of our collective knowledge (Johnson, 2005; Lewis, 2012). The normative implications of this perspective will require sustained attention from researchers as digital scholarship and measurement tools advance.

*4.1.4 Future research.* Future research should continue to explore the adoption, use, significance, and impact of Plum Analytics and other altmetric tools. Some important, untapped research questions that await further exploration include the following:

- RQ1. How are scholars using altmetrics, generally, and Plum Analytics, specifically?
- RQ2. From a theoretical perspective, what are the uses and gratifications that academics garner from altmetrics? What value(s) do these measures provide to scholars? (for an overview of uses and gratifications theory see Blumler and Katz, 1974; Parker and Plank, 2000);
- RQ3. From an applied perspective, does the shifting nature of open access publishing, and the metrics that assign value to public scholarship, lead scholars to write to broader audiences? How can altmetric tools help to encourage and promote public engagement with research?
- RQ4. From a socio-technological vantage, how might increasing the transparency of the algorithms underlying altmetrics influence academics’ adoption and use of these new tools? (Manca, 2018);
- RQ5. From an institutional perspective, how many and what types of institutions have adopted PlumX? What values do they derive from these metrics?
- RQ6. From a methodological vantage, how stable, reliable and valid are altmetric data? (Torres-Salinas *et al.*, 2017, p. 10); and
- RQ7. From a critical and analytic perspective, how can institutions and researchers compare and evaluate, the different altmetrics that have recently emerged? (Collister and Deliyannides, 2016).

## 5. Conclusion

New media afford opportunities for academics to discover and develop new methods and venues for data collection and analysis. As the digital environment continues to grow, these tools promise to improve the dissemination and evaluation of research while encouraging continued and future dialogues among varied researchers, audiences and disciplines. Scholars should not only be aware of these new platforms but should also look to evaluate, improve and embrace change.

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