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Research Article

Academic Librarians' Knowledge of Bibliometrics and Altmetrics

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Abstract

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.

Introduction

With the advent of social media, digital publishing, and born-digital research, scholarly research impact is changing. Traditional methods of evaluating research impact, such as journal impact factor (JIF) and citation counts, have long served as benchmarks of research productivity. More recently, alternative metrics for assessing impact, altmetrics, have emerged. In addition to citation counts, altmetrics track the impact of individual research articles and other forms of scholarly output via media attention, article views and downloads, database inclusion, and more (Cooper, 2015).

The roles of academic librarians are evolving to include the provision of bibliometrics services to researchers, including both established and emerging measures. As there are more tools available for tracking altmetrics, yet no established standards for conducting altmetrics analysis, it is challenging for academic librarians to help investigators and students understand and use these new measures to complement traditional metrics. While the literature strongly advocates for academic librarians to provide scholarly communication metrics, the fluency of librarians in these methods has yet to be established. This study aims to provide data on this topic.

Literature Review

Research Impact, Old and New

Citation analysis and the JIF were conceived by Eugene Garfield and are widely considered the forerunners of modern bibliometrics (Carpenter, 2014; Herther, 2013). Originally intended to assist librarians in assessing journal

subscriptions, the JIF is now commonly used during tenure and promotion review to assess the quality of a researcher's work by making assumptions about the value of publications in part by whether they appeared in high impact journals. This common misapplication of the JIF has mired the metric in controversy. Criticisms of the JIF include "gaming" the numbers through self-citation; compulsory citations imposed at the behest of journals; questions of mathematical validity; failures to replicate the metric's calculations; and lack of comparability between disciplines (Bollen, Van de Sompel, Smith, & Luce, 2005; Brown, 2014; Carpenter, 2014; Neylon & Wu, 2009). Much of the JIF is derived from citations to a small percentage of its articles, and a lack of context surrounds most citation counts (Belter, 2015).

Measuring research quality based on citation counts can be problematic due to the years it takes for a citation's impact to be revealed, and the lack of journals in some disciplines (Adams & Bullard, 2014; Brown, 2014; Neylon & Wu, 2009). New measures based on citation counts have emerged with varying degrees of success. Among them are the H-Index, defined as the number of an author's papers with citations equal to or higher than *h* (Hirsch, 2005); the G-Index, which places more emphasis on highly cited papers; and Google's i10-Index, based on the number of a researcher's publications that have garnered at least 10 citations (Gutierrez, Beall, & Forero, 2015).

While the JIF and citation counts continue to be instrumental in shaping individual researchers' careers, these measures have not kept pace with the explosion of the digital dissemination of scholarship (Carpenter, 2014). As technology increasingly reshapes the research environment,

more scholarly works are being shared via such social media sites as ResearchGate, Academia.edu, Facebook, Twitter, or even Pinterest, as well as through blogs and online reference managers (Adie & Roe, 2013; Bar-Ilan et al., 2013).

Altmetrics track mentions of journal articles, data sets, presentations, and other research products on social media; bookmarks and downloads in online reference managers; mentions in popular media; data or slide sharing sites; and other web-based forums where scholarship is being shared (ACRL Research Planning and Review Committee, 2014; Adams & Bullard, 2014; Bonn, 2014). Scholarly publishers are moving into the altmetrics field. For example, Wiley, Elsevier, and Nature have formed partnerships with Altmetrics.com, an early aggregator of web impact indicators (Bornmann, 2014; Brigham, 2014; Information Today Newsbytes, 2014). Elsevier recently purchased the online reference manager Mendeley, while Plum Analytics and their research database, PlumX, were purchased by EBSCO in 2014. As a whole, interest in and adoption of altmetrics tools seem to be growing steadily (Roemer & Borchardt, 2013).

Excitement about the potential of altmetrics to revolutionize research impact measurement is extensive in the LIS field. One of these new measures' attractive features is their speed. Traditional citations may take years to yield measurable impact, while altmetrics can theoretically reveal impact in weeks, days, or even minutes (Brown, 2014; Dinsmore, Allen, & Dolby, 2014; Lapinski, Piwowar, & Priem, 2013; Piwowar & Priem, 2013). Also important is the possibility of measuring a broader scope of materials and "products" in addition to traditional manuscripts (Bornmann, 2014, 2015; Herther, 2013; Howard, 2015; Lapinski et al., 2013; Piwowar & Priem, 2013).

There are caveats to using altmetrics including: author disambiguation and numbers gaming (Bornmann, 2014; Brigham, 2014; Brown, 2014;

Galligan & Dyas-Correia, 2013); the sheer volume of data needed to track altmetrics through the internet is daunting (Adie & Roe, 2013); and traditional measures like citation analysis and JIF are embedded in the promotion and tenure process (Bazeley, Waller, & Resnis, 2014).

The chief critique of altmetrics is the lack of empirical examination, standardization, or regulation (Bornmann, 2014; Brigham, 2014; Carpenter, 2014; Herther, 2013; Lapinski et al., 2013). At this stage of development, altmetrics are more suited to complementing traditional metrics than to supplanting them. The National Information Standards Organization (NISO) has identified 25 key areas in which altmetrics need standardization, including the identification of research types to be tracked, more empirical investigation into the use of altmetrics as research impact measures, and strategies to address potential manipulation (Carpenter, 2014; Gunn, 2014; Herther, 2013; National Information Standards Organization, 2014) .

The Emerging Role of the Academic Librarian

Research libraries are being called upon to provide improved research support services and access to bibliometric tools. This is a natural extension of the LIS field in which bibliometrics practice and research has been situated. New metrics provide the opportunity for academic librarians to practise their skills such as database navigation and analysis, familiarity with tools such as Web of Science and Scopus, and experience with the university promotion and tenure processes, in a new context (Åstrom & Hansson 2012; Bladek 2014; Brigham, 2014; Brown, 2014; Gumpenberger, Wieland, & Gorraiz, 2012; Herther 2013; Kennan, Corrall, & Afzal, 2014; MacColl 2010a; MacColl 2010b; Roemer and Borchardt 2013; Roemer & Borchardt, 2015a).

Despite the notion that bibliometrics and altmetrics services are an excellent fit for the academic library, it may be that academic

librarians are not, as a whole, educationally prepared to provide them. Formal training in bibliometrics is a rarity for librarians, which has led to a call for the incorporation of bibliometrics education into the generalized LIS curriculum. In many other countries where interest and emphasis may be strong, formal education or training also is lacking (Bladek 2014; Kennan, Corrall, and Afzal 2014; Zhao 2011).

Current Research on Altmetrics and Academic Librarians

Roemer and Borchardt (undated) state that "Academic librarians have been and continue to be involved with altmetrics at every level," but quantitative measures of that involvement are scarce in the LIS literature. In a November 2015 conference paper, Konkiel, Sutton, and Levine-Clark reported on some aspects of a large-scale survey of U.S. academic librarians' knowledge and use of altmetrics. While the bulk of those data are not yet published and available for review, preliminary results from the study indicate a low familiarity with or use of altmetrics when compared to more traditional metrics such as the JIF or citation counts. Respondents to the team's survey also indicated low numbers of reference encounters surrounding metrics of any kind. Librarians' interest in altmetrics and bibliometrics is not just a U.S. phenomenon; it is international. Kennan, et al. (2014) surveyed librarians in Australia, the U.K., Ireland, and New Zealand in 2012 and reported on their opinions predominately on bibliometrics, with some mention of altmetrics. There is also an unpublished research report on the use of altmetrics by Spanish librarians and scholars (González-Fernández-Villavicencio, Dominguez-Aroca, Calderón-Rehecho, & Garcia-Hernández, 2015). The scarcity of published studies illustrates the need for more concrete knowledge on this topic. What do academic librarians truly know about altmetrics?

Aims

Before best practices can be established in the area of providing research impact services to faculty or students, it is important to ascertain the level of awareness that academic librarians have of new and traditional metrics and the services that provide them. Research questions for the study were:

1. Are academic librarians more familiar with established measures of research impact (bibliometrics) than with the emerging field of altmetrics?
2. What are the attitudes of academic librarians toward altmetrics versus traditional measures (bibliometrics)?
3. Are academic librarians being called upon by faculty to provide information about new research impact measures, and if so, what has characterized these interactions?
4. What are academic libraries doing, or what could they be doing regarding altmetrics?

The development of the research questions and identification of the independent variables for the study were based on two concepts. First, simple logic suggested that bachelor's degree and higher granting institutions would be more engaged with publication and research impact, and librarians there would be more likely to be familiar with research impact measures because they would be called upon to engage with them. It also seemed logical that reference librarians would be more likely to explore research impact in their interactions with faculty and students. The idea that librarians newer to the profession would have more knowledge of the newer metrics reflects Thomas Kuhn's (1962) suggestion that new ideas are generally promulgated by new generations and not by the older professionals. In other words, technological advances have made it possible to track the impact of research outputs in new ways, as well as boosting the ease of traditional bibliometrics. But has the availability of new

metrics generated a paradigm shift or even a revolution in tracking research impact?

Methods

This study targeted academic librarians in the state of Oklahoma. Publicly available information on academic library websites for all 2-year and 4+ year colleges and universities in the state (N=38) was used to gather names and email addresses of librarians, and all but three institutions had this information posted. In this study, "librarian" was defined as a person whose job title was "librarian," and was not limited to people with specific educational backgrounds (such as an MLIS). In total, 228 librarians, 38 at 2-year institutions and 190 at 4+ year institutions, were identified and in July 2015 were emailed a survey solicitation with a link to the survey instrument. Two follow up emails were sent in August to generate more responses. As an incentive for participation, the opportunity to win a $20 Amazon gift card was offered. The survey consisted of seven open-ended questions and thirteen closed-ended questions including seven Likert-type, two "check all that apply," and four others. These questions were designed to answer the research questions provided above. See appendix for the survey instrument.

Limitations of the Study

Only librarians in Oklahoma were surveyed and these results may not be reflective of librarians outside the state. This was a population survey, not a sample survey, so inferential statistics (such as significance testing) were not appropriate. Three-quarters of those surveyed did not respond and it is unknown whether they differed on some characteristics from those who did respond. Since survey responses were anonymous, a comparison of responders to non-responders is not possible. With these limitations it is not appropriate to generalize the study findings outside of the group of librarians who responded. Additionally, the survey presented the term "altmetrics" without

defining it. Respondents may have had different definitions in mind when answering the survey questions.

Results

Survey Response Rate

A total of 58 usable responses were received for an overall response rate of 25.4%. By type of institution, ten librarians at 2-year institutions responded, for a response rate of 26.3%. Responses were received from 48 librarians at 4+ year institutions resulting in a response rate of 25.3% for that group.

Description of the Variables

There were two types of information used as dependent variables. One type was respondents' knowledge or opinions of various research impact measures as indicated by their answers to survey questions. The second type of dependent variables was scores on two items. One of these scores, Bibliometrics Familiarity, was computed by adding up the number of bibliometrics items from Question 3 with which respondents reported familiarity. Their score on this item could range from zero (not familiar with any of the listed items) up to five (familiar with all of them). The actual scores from these respondents ranged for zero to four, with a mean score of 1.71. The other score item, Altmetrics Familiarity, was computed by adding up the number of altmetrics items from Question 2 with which respondents were familiar. Again, the theoretical range was from zero to five, and for this item the actual range was also zero to five. The mean on this score was .74. Additional dependent variables included a number of open-ended questions that asked about faculty, student, and librarian interest in learning about these measures and services, outreach efforts, and current initiatives.

The study's independent variables included type of institution: 2-year (17.2%, 10) versus 4+-year (82.8%, 48); number of years as a librarian,

from five or fewer years (34.5%, 20) to six or more years (65.5%, 38); and primary job responsibilities divided into reference and user services (60.3%, 35) versus non-reference positions (39.7%, 23). The job responsibility categorization was created from respondents' answers to a closed-ended question and an "other, please specify" section which allowed people to elaborate on their job duties.

Data Analysis

The first research question was: "Are academic librarians more familiar with established measures of research impact (bibliometrics) than with the emerging field of altmetrics?" When asked how familiar they were "with the concept of altmetrics to assess research impact" fewer than 10 percent (8.6%, 5) of respondents rated themselves as very familiar, and one-quarter indicated that they were "not familiar at all" (25.9%, 15). The majority were in the middle at "slightly familiar" (34.5%, 20) or "not very familiar" (31.0%, 18).

Respondents were then given a list of bibliometric methods and asked to indicate the ones with which they were familiar (this was a "check all that apply" question. See Question 3 in the appendix). Most respondents knew some of the listed methods, with only 20.7% (f=12) indicating that they did not know any of the ones listed. The most common familiarity was with citations counts (74.1%, 43) and JIF (65.5%, 38). Around one-quarter (24.1%, 14) were also familiar with the H-Index, but almost no respondents knew about the i10-Index (5.2%, 3) or the G-Index (1.7%, 1).

Respondents were less likely to have knowledge of altmetrics tools. When given a list of tools (Question 2), two-thirds (63.8%, 37) were not familiar with any of the ones listed. Around one-quarter had heard of Altmetric.com (25.9%, 15) and Mendeley (24.1%, 14). Less well-known were Impactstory (13.8%, 8) and PlumX (8.6%, 5). With the "other, please specify" option, one respondent wrote in PLOS. See Table 1.

In order to compare knowledge across different independent variables, the data were condensed

Table 1
Respondents' Familiarity with Bibliometrics Methods and Altmetrics Tools

	% and f N=58
Familiarity with Bibliometrics Methods	
Citation Counts	74.1% (f=43)
Journal Impact Factor	65.5% (f=38)
H-Index	24.1% (f=14)
i10 Index	5.2% (f=3)
G-Index	1.7% (f=1)
None	20.7% (f=12)
Familiarity with Altmetrics Tools	
Altmetric.com	25.9% (f=15)
Mendeley	24.1% (f=14)
Impactstory	13.8% (f=8)
PlumX	8.6% (f=5)
Other (PLOS)	1.7% (f=1)
None	63.8% (f=37)

Table 2
Comparison of Means Across Types of Independent Variables

	6+ Years as Librarian Mean, N	5 or Fewer Years as Librarian Mean, N
Bibliometrics Familiarity	2.03 (N=38)	1.10 (N=20)
Altmetrics Familiarity	.89 (N=38)	.45 (N=20)
	4+ Year School	2-Year School*
Bibliometrics Familiarity	1.81 (N=48)	1.20 (N=10)
Altmetrics Familiarity	.83 (N=48)	.30 (N=10)
	Reference & User Services	Non-Reference Librarians
Bibliometrics Familiarity	1.69 (N=35)	1.74 (N=23)
Altmetrics Familiarity	.77 (N=35)	.70 (N=23)

*N for this category is small. View these numbers with caution.

into two scales, "Bibliometrics Familiarity" and "Altmetrics Familiarity," as described previously. A mathematical average (mean) score was calculated and indicated that, on average, respondents were familiar with nearly two (1.71) bibliometric methods, and almost one (.74) altmetrics tool. Note that the large number of respondents with no knowledge of these items pulls the mean score down: 20.7% (12) claimed no knowledge of bibliometrics and 63.8% (37) had heard of none of these altmetrics. When those respondents were set aside and means calculated for those who were familiar with one or more items, mean scores showed knowledge of slightly more than two (2.15) bibliometrics and slightly more than two (2.15) altmetrics. In the following analysis the mean scores include the "none" answers.

Mean scores for Bibliometrics Familiarity and Altmetrics Familiarity were compared across independent variables. People with six or more years in the profession were familiar with nearly twice as many bibliometrics (2.03 to 1.10) and altmetrics (.89 to .45) as those with five or fewer years of experience. Those at 4+ year colleges and universities were more familiar with bibliometrics (1.81 to 1.20) and altmetrics (.83 to

.30) than those at 2-year schools, but since the N for the 2-year schools is quite small, these results should be viewed with caution. There was little difference of knowledge between people who worked in reference and user services compared to those who held other types of positions (1.69 to 1.74, and .77 to .70). See Table 2.

Research question 2 asked, "What are the attitudes of academic librarians toward altmetrics versus traditional measures (bibliometrics)?" The most widely used traditional metrics are JIF and citation counts. The H-Index, G-Index, and i10-Index use calculations based on citation count and could be considered less commonly used traditional metrics. The research question is difficult to answer because few respondents had an opinion about the less commonly used metrics. In fact, when asked about their opinions of particular metrics most chose "I don't know" as their answer for Hirsch's H-Index (75.9%, 44), Google's i10-Index (93.1%, 54), and Egghe's G-Index (94.8%, 55). While most respondents (67.2%, 39) also said they didn't know about altmetrics as an effective measure of individual research productivity, enough answered this question for a comparison to JIF and citation

Table 3
Opinions About Effectiveness of Various Measures of Research Impact (N=58)

	Effective	Ineffective	Don't know
Citation Counts	65.5% (38)	13.8% (8)	20.7% (12)
JIF	39.7% (23)	19.0% (11)	41.4% (24)
Altmetrics	31.0% (18)	1.7% (1)	67.2% (39)
H-Index	20.7% (12)	3.4% (2)	75.9% (44)
I-10 Index	6.9% (4)	0.0% (0)	93.1% (54)
G-Index	1.7% (1)	3.4% (2)	94.8% (55)

counts. About two-thirds of respondents (65.5%, 38) held the opinion that citation counts are effective for assessing an individual investigator's research impact. This was about twice as many as those who thought journal impact factor (39.7%, 23) or altmetrics (31.0%, 18) were effective. See Table 3.

Respondents were asked for their open-ended comments about areas for improvement for research impact measures and altmetrics. From the eleven responses, respondents felt that there are problems with traditional citation-based measures that might be able to be addressed with altmetrics. The problems listed included the idea that highly cited authors might publish "garbage that is later withdrawn from publication" but the article received a high citation count. Uncited literature has "an important role in the body of research as a whole" but that isn't recognized through citation counts. Traditional resources like Web of Science are difficult to use and altmetrics are easier and more current ways of measuring impact. Problems that respondents recognized with the use of altmetrics were that there is a lack of standards for what these metrics mean. A saved article doesn't mean it was "used in a meaningful way." These metrics should not be over-valued "because they can be manipulated," and they "should be used only with extreme caution." Several respondents also recognized a need for more awareness among faculty and librarians, and that workshops would be ideal.

Research question 3 asked, "Are academic librarians being called upon by faculty to provide information about new research impact measures, and if so, what has characterized these interactions?" Very few librarians reported that faculty or students requested information about altmetrics. In fact, 89.7% (52) had zero such requests. A small number (8.6%, 5) received one to five information requests, and one respondent (1.7%) reported six to ten requests. This survey question was accompanied by an open-ended option. Examples given of requests included: citation analysis of professor's publications, mentions of a faculty member in popular media, usage counts (full text, citations, data, etc.), and help in determining the impact factor of an obscure journal.

The final research question was, "What are academic libraries doing, or what could they be doing regarding altmetrics?" This was addressed with a number of open ended questions about a variety of types of outreach, initiatives, and training.

Respondents were asked what types of outreach were currently being offered at their institutions on altmetrics and traditional research impact measures. Four librarians reported covering altmetrics in campus workshops, sessions, and discussions at faculty orientation. Two had written LibGuides on altmetrics. One library was in the process of marketing their altmetrics information and another expected to start using

altmetrics in a new Digital Commons. Three didn't know of any efforts on their campuses. Concerning traditional metrics outreach, five librarians mentioned offering citation counts, and three JIF. There were three comments about individual consultations and five on workshops that their libraries offer. One stated LibGuides and two said they didn't know. When asked what types of outreach they believed could help faculty and students learn about research impact measures and altmetrics, eleven respondents mentioned various sorts of trainings and opportunities including classes, workshops, webinars and online videos, and conferences or seminars. Two thought the best way would be to start demonstrating what is available and what works. Two others said that faculty and students on their campuses were not interested in learning new things. Respondents were mostly not aware of initiatives underway at their institutions to capture altmetrics data.

The librarians in the study were very interested in learning more about altmetrics. In fact, 84.2% (48) said that they would attend if a free workshop was offered at their institution. When asked what tools could help them learn more about research impact measures and altmetrics, ten mentioned some type of training, although several were careful to point out that it should come from knowledgeable sources such as ACRL, Digital Commons, or vendors. Specific training types mentioned included sessions, workshops, webinars and online videos, guides, descriptions, and outlines. One respondent stated they could learn on their own using Google, and two made general comments that they were interested in learning more.

Discussion

This study has a few measures that can be compared to findings from other studies, and it has a number of unique findings to report. First and most importantly, the data revealed that there appears to be a dearth of knowledge among academic librarians in Oklahoma about altmetrics tools, and most of the librarians who

responded to the survey were not familiar with newer forms of bibliometrics (H-Index, etc.). Among respondents, librarians who had been in the profession over five years were more familiar with both altmetrics and bibliometrics. Citation counts and journal impact factor have been used for many years, and it is unsurprising that librarians are likely to be familiar with their advantages and limitations. However, other measures such as the more recent bibliometric calculations (i10 Index, G-Index, and H-Index) and altmetrics are newer and generally less well-known.

Konkiel et al. (2015) found that at universities with the highest Carnegie classification level, 30% of most academic librarians and 50% of "scholarly communication support" librarians reported having "very expert familiarity" with altmetrics, while in the current study, only 8.6% claimed that they were "very familiar." It is not surprising that librarians at research-intensive universities would have more familiarity than librarians from a mixture of college and university levels. The current study seems to bear out findings in the literature that for many library professionals, more education regarding bibliometrics and altmetrics is needed. While Konkiel et al. found that a very specific job category of librarians had more familiarity with altmetrics, the current study compared reference and user services librarians with non-reference librarians and found no meaningful difference in knowledge between job types.

Despite calls in the literature for librarians to be involved with providing altmetrics for the scholars on their campuses, most respondents reported that they had received no such requests from faculty. A small number of the librarians in the study had taught about altmetrics in various workshops and discussions, and some had written LibGuides or used other marketing. A handful of librarians offered standard bibliometrics services individually or in workshops. While the current study confirms the literature's reflection of librarians' interest in bibliometrics and altmetrics, respondents'

experiences in this study reveal little evidence of research support requests from other members of their institutions. This is in keeping with preliminary findings from Konkiel et al. (2015).

Most respondents wanted to learn more about altmetrics and expressed interest in various types of training. Two international studies have also reported that academic librarians in a variety of countries are interested in altmetrics and bibliometrics training by their institutions, through vendors, or for LIS schools to add this to their curricula (González-Fernández-Villavicencio, et al., 2015; Kennan, et al., 2014). While Roemer and Borchardt (2015b) advocate that early career librarians should be providers of altmetrics in their jobs, this study found that early career librarians were less likely to be familiar with research metrics than their more experienced counterparts. This finding did not support Kuhn's (1962) observation that new discoveries are championed by newer professionals rather than those already established in their careers. Additionally, while altmetrics may have the potential for generating a paradigm shift in the way research impact is measured in the LIS profession, this small study suggests that it remains to be seen whether these newer metrics will revolutionize LIS practice in this area in any wide-spread manner.

Conclusions

Technological advances are pushing the dissemination of research into new venues and traditional bibliometrics are not capturing the impact of these new practices. Altmetrics offer new ways to measure research impact. The literature advocates for librarians to take up these cutting-edge technologies. However, there is little hard data in the literature showing if and how librarians are using altmetrics. Future studies that produce concrete evidence would be valuable to the profession. One potential direction for future research might include in-depth interviews with librarians who are using altmetrics in their jobs to discover how they are using them and for what purposes. Information-seeking behaviour studies of both scholars and librarians who are searching for information on research impact could be valuable. It might also be useful to explore the opinions of tenured faculty who make decisions on tenure review boards as to whether or not they positively view alternative metrics. There is much work to be done before the potential for and use of altmetrics in academia is well-understood.

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APPENDIX: Survey Questions

Q1: How familiar are you with the concept of altmetrics to assess research impact?
1 = very familiar, 2 = slightly familiar, 3 = not very familiar, 4 = not familiar at all

Q2: With which of the following altmetrics-related services are you familiar? Please check all that apply.
      q2a: Altmetric
      q2b: Impactstory
      q2c: Mendeley
      q2d: PlumX
      q2e: I have never heard of any of these services
      q2f: other, please specify

Q3: With which of the following methods of assessing research impact are you familiar? Please check all that apply.
      q3a: journal impact factor
      q3b: citation counts
      q3c: h-index
      q3d: g-index
      q3e: i-10 index
      q3f: none
      q3g: other, please specify

Q4: In your opinion, how effective is the journal impact factor in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective
4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q5: In your opinion, how effective are citation counts in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective
4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q6: In your opinion, how effective is the H-Index in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective

4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q7: In your opinion, how effective is the G-Index in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective
4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q8: In your opinion, how effective is the i-10 Index in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective
4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q9: During the past year, how many information requests regarding altmetrics have you received from a faculty member or student at your institution?
1= 0, 2 = 1-5, 3 = 6-10, 4 = more than 10

Q10: If you have received an information request from a faculty member or student at your institution regarding altmetrics in the past year, please describe some of these interactions and the specific information requested. If not applicable, please select n/a.

Q11: In your opinion, how effective are altmetrics in assessing an individual investigator's research impact?
1 = very ineffective
2 = ineffective
3 = somewhat ineffective
4 = I don't know
5 = somewhat effective
6 = effective
7 = very effective

Q12: What, if any, types of outreach does your library offer regarding altmetrics?

Q13: What, if any, types of outreach does your library offer regarding traditional research impact measures? Examples could include the journal impact factor, citation counts, the H-Index, the G-Index, or the i-10 Index.

Q14: If a free workshop was offered at your institution regarding research impact assessment and altmetrics, would you attend?
1= yes, 2 = no

Q15: Please describe any initiatives underway at your institution to collect altmetrics data.

Q16: In your opinion, in what areas do research impact measures and altmetrics need improvement?

Q17: What tools could help you learn more about research impact measures and altmetrics?

Q18: What types of outreach do you believe could help faculty and students learn more about research impact measures and altmetrics?

Q19: How many years have you served as a librarian?
1 = <1 year, 2 = 1-5 years, 3 = 6-10 years, 4 = more than 10 years

Q20: In what department do you primarily operate as a librarian?
1= reference, 2 = ILL, 3 = serials, 4 = systems, 5 = special collections, 6 = other, please specify