

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

Spring 10-1-2020

Information Access Skills in Social Science Researchers: Assessment of Competency

Rajesh Singh Dr.

University of Delhi, Delhi, India., rajeshzone29@gmail.com

Shailendra Kumar Prof.

University of Delhi, Delhi, India., shail3@yahoo.com

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Information Literacy Commons](#)

Singh, Rajesh Dr. and Kumar, Shailendra Prof., "Information Access Skills in Social Science Researchers: Assessment of Competency" (2020). *Library Philosophy and Practice (e-journal)*. 4300.
<https://digitalcommons.unl.edu/libphilprac/4300>

Information Access Skills in Social Science Researchers: Assessment of Competency

Abstract: The study assesses levels of Information Access Skills (IAS) in social science researchers at select central universities in Delhi. Questionnaire was used to collect relevant data on skills like information browsing, use of information search tools, and information search strategy consisting of natural language search, keyword search and Boolean search. The descriptive and inferential statistical tools like ANOVA, Post-hoc test using LSD were used to analyze and interpret the collected data. On the competency scale, a big total of 46.2% of researchers were found incompetent in IAS. Suggests measures to enhance the IAS levels of information privileged researchers.

Keywords: Information Access, Information Literacy, Search Strategy, Social Science Researchers, Boolean Search.

Introduction

The advances in information and communication technologies (ICT) have not only revolutionized the entire gamut of availability and access to the variety and vast amounts of information but have also posed multiple challenges to information access. Doctor (1991) argued that people need access to required information; technology itself will not enable people to succeed. Technology solely could not determine access to information, it can only mediate. The library and information profession has always been facilitating easy, speedy and accurate access to extensive information. The concept of information access can be traced back to Ranganathan's five laws of library science (Mathiesen & Fallis, 2008). Responding to the needs of digital information landscape, library profession has devised a new method called 'Information Literacy' (IL) to educate and train users in information handling skills. IL, referred to as research skills or critical thinking skills, has become a vital set of skills and ability in academic work (Yevelson-Shorsher & Bronstein, 2018) to help researchers reshuffle vast amounts of unfiltered, unsupported, and unreliable information on the web and access precise and relevant information. It is considered as a meta-literacy that "enables the acquisition of new skills and knowledge" (Lloyd, 2003) and assimilates media literacy, visual literacy, digital literacy, and information technology fluency (Mackey & Jacobson, 2011). IL is defined as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (ACRL, 2000, p.2). Thus IL is a set of capability and expertise essential to make individuals information literate and enables to identify, retrieve, evaluate and use precise and reliable information from multiple sources available. It provides essential proficiency for academic success and lifelong learning (Folk, 2019).

Information access skills (IAS) refer to the ability to identify and retrieve precise and relevant information. The researchers should possess the required level of understanding about different sources of information, their subject coverage and search features, process to locate and find information, the specific use of search engine features, and formulate precise search queries to achieve their specific information needs for research. Competency refers to a clump of interconnected attitudes, skills, knowledge and other individual attributes that correlate with performance of the individual concerned and can be measured using well-accepted standards. Competency levels are useful as they help to differentiate between individuals having basic skills

and those who are experts. Competency in IAS refers to different levels of expertise in skills and abilities essential to access precise and relevant information. Assessment is a method and process to ascertain whether a learner possesses required skills and if so, to what level. It is not only a method of evaluation; it is also a means for learning. It is used to evaluate the impact or success of instructions at the class, programmatic, or institutional level (Detmering, McClellan & Willenborg, 2019) and helps to remediate for student areas of need, weaknesses, deficits, and so on (Krutkowski, 2017). Today, “outcomes-based assessments have come to the forefront of higher education” (Erlinger, 2018, p.442).

Review of Literature

Navigating through the vast amounts of information on the web is generally confusing and often an overwhelming task (D' Couto & Rosenhan, 2015). Presently, the majority of researchers are from “the millennial generation” (Becker Jr, 2012; Taylor, 2012) exposed to ICT and the Internet from a young age. These researchers have become habitual in using technology in all walks of life in ways unknown to previous generations. They are offhand using a large amount of information persistently and are reluctant to invest significant effort and time to locate, search and retrieve required information (Becker Jr, 2012). These researchers may have the sound technological understanding to manage and use different devices, many times they do not precisely perceive the need, source and strategy to search and retrieve explicit and pertinent information required from multiple available sources (Deyrup & Bloom, 2012). They instead prefer the Internet, using a search engine like Google, then efficiently searching and retrieving information from academic databases which are more complex (Becker Jr, 2012; Greenberg & Bar-Ilan, 2014).

As their continuous endeavour to manage the library as an intrinsic part of academic life, various skill enhancement training programs have been designed and implemented by academic libraries. Henderson Nunez-Rodriguez and Casari (2011) found a definite improvement in students' self-confidence and their searching capabilities after participating in such programs. However, for library training programs, Hofer, Townsend, and Brunetti (2012) proposed to evolve the plan of action constructed on comprehending the challenges encountered by students when interacting with information. Thus, periodic assessment of IAS has become vital. Many times the technologically competent information seekers overestimate their skills and expertise (Hoffman & Goodwin, 2006). An assessment of the IAS and determination of competency levels allows libraries to acquire an accurate picture of its users and the improvements required (Van Cleave, 2008).

There are plenty of IL assessment Studies. Julien, Gross, and Latham (2018) studied the use of technology in instruction, use of pedagogical methods, collaboration among librarian, faculty and administration and the common challenges faced in IL activities. The study aimed to provide best practices in these areas. Al-Qallaf (2019) found 44.46% of students incompetent to determine their information need, formulate suitable search strategies, understand the scope and purpose and evaluate the quality of information source. Koler-Povh and Turk (2020) assessed the impact of introductory course on scientific research methods based on five parameters of ACRL Standards. The study focused on citation practices in thesis and publications from the thesis. It found post-reform Ph.D. students citing more references on average compared to pre-reform students. Squibb and Zanzucch (2020) explored the research competencies of upper-division students.

Authors concluded that a foundation of information handling skills is suitably inculcated through library instructions and research competency of students increase as they learn. However, there is a dearth of studies focused on IAS assessment of researchers engaged in social sciences in India. The present study aims to fill this gap. The study aims to determine the IAS levels of respondents within and across the subjects and universities. The study findings are presumed to be helpful to all the stakeholders in making policies, conducting IL activities and eventually enhancing the competency levels of researchers in IAS.

Research Objective

- To assess IAS levels of researchers in social sciences at select central universities.

Research Hypotheses

H₀₁: There are no difference in IAS of researchers from different subjects.

H₀₂: There are no difference in IAS of researchers from selected universities.

Scope of the Study

This study is a segment of a larger study. It attempts to assess the IAS levels of researchers enrolled for Ph.D. in the Department of Economics, Geography, History, Law, Political Science, and Sociology at Indira Gandhi National Open University (IGNOU), Jamia Millia Islamia (JMI), Jawaharlal Nehru University (JNU), and University of Delhi (DU). The total population consisted of 3443 researchers. The sampling was stratified by gender, subjects and institutions and 960 researchers were selected for distribution of questionnaire, which is sufficient and accurate for getting valid inferences and generalizations in a closed group. The actual representative sample size of 511 was drawn on the basis of total 3443 researchers using the online sample size calculator of Creative Research System (2012) on a 95% confidence level and 4% confidence intervals. Total 520 responses complete in all respect was included in the study. The study is limited to the researchers on roll during 2015-2017.

Methods and Tools

Questionnaire having multiple-choice questions was used to empirically test the IAS levels of researchers. In addition to the demographic details and library awareness of the researchers, the questionnaire consisted of 50 specific questions developed on the basis of five parameters of *Information Literacy Competency Standards for Higher Education* (ACRL, 2000). It is the most comprehensive and elaborate standard from all available standards and guidelines to empirically test the IL skills of different segments of students. Although ACRL standards have been rescinded with the adoption of Framework for Information Literacy for Higher Education (ACRL, 2016), it is still relevant for outcome-based studies in developing countries like India. The set of 10 questions was developed to test the IAS levels of respondents for information browsing, use of information search tools including search engines and Metasearch engines, and information search strategy consisting of natural language search, keyword search and Boolean search. The responses in questionnaire were manually evaluated and each correct answer was assigned 2 marks. The test scores from each of the questionnaire were then manually tabulated on the basis of selected parameters. The data, thus collected, were further processed and analyzed through SPSS. The study has used various statistical techniques of descriptive and inferential statistics. The “descriptive statistics included frequency distribution, percentage, bar graph, etc and was aided by computing mean, standard deviation and range. Inferential statistics consisted of tools like One-way ANOVA, F-ratio, and Post-Hoc test using Least Significant

Difference (LSD)” (Singh & Kumar, 2020, p.9) . Analysis of Variance (ANOVA) helps compare the relationship between two variables across more than two groups. One-way ANOVA has been applied “to compare the means of more than two groups or levels of an independent variable ...The F-ratio is the ratio of between groups variance to within groups variance. A significant F-ratio indicates that the population means are probably not all equal” (Coakes, Steed & Dzidic, 2006). The differences between specific groups are identified through Post-hoc Test. The present study has used Post-Hoc test using Least Significant Differences (LSD) “to explore all possible pair-wise comparisons of means comprising a factor using the equivalent of multiple t-tests” (Singh & Kumar, 2019, p.103). The self explanatory seven-point performance and competency scale (Singh & Kumar, 2019, p.103) given in Table 1 was used to measure test performance and identify IAS levels.

Table 1: Seven Point Performance and Competency Scale

Percentage of Marks	Grade	Performance Grading	Competency Level
91 and above	‘O’	Outstanding	Outstanding
81 to 90	‘E’	Excellent	Excellent
71 to 80	‘A’	Very Good	Very Good
61 to 70	‘B’	Good	Good
51 to 60	‘C’	Fair	Baseline
41 to 50	‘D’	Below Average	Minimal
Below 40	‘F’	Failed/Not Responded	Very Low

Profile of Respondents

The present study measures IAS levels of the researchers. The detail of respondents concerning subjects of research and institutions is depicted in Table 2.

Table 2: Profile of Respondents

University Enrolled		Subject Area of Research						Total
		History	Political Science	Economics	Sociology	Geography	Law	
DU	Number of Respondents	20	20	20	20	20	22	122
	% of Respondents	16.4%	16.4%	16.4%	16.4%	16.4%	18.0%	100.0%
JMI	Number of Respondents	20	28	16	16	20	20	120
	% of Respondents	16.7%	23.3%	13.3%	13.3%	16.7%	16.7%	100.0%
JNU	Number of Respondents	22	24	22	24	24	26	142
	% of Respondents	15.5%	16.9%	15.5%	16.9%	16.9%	18.3%	100.0%
IGNOU	Number of Respondents	24	24	36	24	14	14	136
	% of Respondents	17.6%	17.6%	26.5%	17.6%	10.3%	10.3%	100.0%
Total	Number of Respondents	86	96	94	84	78	82	520
	% of Respondents	16.5%	18.5%	18.1%	16.2%	15.0%	15.8%	100.0%

Analysis of Test Performance

The results and discussions on respondents' test performance grades and IAS levels are deliberated across subjects and institutions.

IAS Levels across Subjects

The details of test performance across the subjects are presented in Table 3. There were only 53.8% of the respondents (consisting of 26.2% 'Good', 17.7% 'Very Good', 8.5% 'Excellent' and 1.5% 'Outstanding') competent on the scale (Table 1) in IAS to efficiently access the information required. They were competent in information browsing, use of information search tools, and capable to formulate information search strategy consisting of natural language search, keyword search and Boolean search. It included 7.3% of respondents from Geography, 7.5% from Sociology, 8.5% from History, 9.0% from Political Science, 9.4% from Law, and 12.1% from Economics. The rest 46.2% of the respondents (consisting of 14.6% 'Very Low', 13.5% 'Minimal' and 18.1% 'Baseline') were lacking competency in IAS. It included maximum 9.4% of respondents from Political Science followed by 8.7% from Sociology 8.1% from History, 7.7% from Geography, 6.3% from Law and 6.0% from Economics.

Table 3: Performance Assessment on IAS- Across Subjects

		Grade and Marks						Total	
		'O' 20	'E' 18	'A' 16	'B' 14	'C' 12	'D' 10		'F' 8 or Less
History	Count	0	10	20	14	14	14	14	86
	% within Subject	0.0%	11.6%	23.3%	16.3%	16.3%	16.3%	16.3%	100.0%
Political Science	Count	2	0	18	27	14	16	19	96
	% within Subject	2.1%	0.0%	18.8%	28.1%	14.6%	16.7%	19.8%	100.0%
Economics	Count	4	11	16	32	16	7	8	94
	% within Subject	4.3%	11.7%	17.0%	34.0%	17.0%	7.4%	8.5%	100.0%
Sociology	Count	0	4	14	21	26	10	9	84
	% within Subject	0.0%	4.8%	16.7%	25.0%	31.0%	11.9%	10.7%	100.0%
Geography	Count	0	9	6	23	16	6	18	78
	% within Subject	0.0%	11.5%	7.7%	29.5%	20.5%	7.7%	23.1%	100.0%
Law	Count	2	10	18	19	8	17	8	82
	% within Subject	2.4%	12.2%	22.0%	23.2%	9.8%	20.7%	9.8%	100.0%
Total	Count	8	44	92	136	94	70	76	520
	% within Subject	1.5%	8.5%	17.7%	26.2%	18.1%	13.5%	14.6%	100.0%

The researchers in Economics scored a higher mean score of 13.83, followed by Law with mean a score of 13.46, History with a mean score of 12.93, Sociology with a mean score of 12.69, Geography with a mean score of 12.31 and Political Science with a mean score of 11.81. The overall mean score is 12.84. The mean score and mean plots suggest that researchers from Economics possessed a higher IAS levels followed by researchers from Law, History, Sociology, Geography and Political Science.

The one-way ANOVA result: $F(5, 514) = 4.238, p= 0.001$, indicates that there were statistically significant differences at the 0.05 level. Further, Post Hoc analysis shows that there were significant differences in IAS level of researchers between Political Science and History, Political Science and Economics, Political Science and Law; Economics and Sociology, Economics and Geography; Geography and Law. Hence, the hypothesis is rejected.

IASC Levels across Universities

The respondents' test performance details across universities are presented in Table 4. Of the total 53.8% of respondents found competent in IAS, a maximum 21.9% of respondents were from JNU followed by 18.1% from IGNOU, and 6.9% from both DU and JMI. Similarly, of the total 46.2% of the respondents found lacking competency in IAS, maximum 16.5% of the respondents were from DU followed by 16.2% from JMI, 8.1% from IGNOU and 5.4% from JNU.

Table 4: Performance Assessment of IASC - Across Universities

University		Grade and Marks						Total	
		'O' 20	'E' 18	'A' 16	'B' 14	'C' 12	'D' 10		'F' 8 or Less
DU	Count	2	6	6	22	22	20	44	122
	% within University	1.6%	4.9%	4.9%	18.0%	18.0%	16.4%	36.1%	100.0%
JMI	Count	0	4	6	26	26	30	28	120
	% within University	0.0%	3.3%	5.0%	21.7%	21.7%	25.0%	23.3%	100.0%
JNU	Count	4	24	54	32	18	8	2	142
	% within University	2.8%	16.9%	38.0%	22.5%	12.7%	5.6%	1.4%	100.0%
IGNOU	Count	2	10	26	56	28	12	2	136
	% within University	1.5%	7.4%	19.1%	41.2%	20.6%	8.8%	1.5%	100.0%
Total	Count	8	44	92	136	94	70	76	520
	% within Universities	1.5%	8.5%	17.7%	26.2%	18.1%	13.5%	14.6%	100.0%

The researchers from JNU scored the highest mean score of 15.04, followed by researchers from IGNOU with a mean score of 13.91, researchers from JMI with a mean score of 11.20 and researchers from DU with the lowest mean score of 10.69. The overall mean score is 12.84. The mean score and mean plots suggest that researchers at JNU possessed higher IAS levels followed by the researchers at IGNOU, JMI and DU.

The one-way ANOVA result: $F(3, 516) = 65.030, p= 0.000$, indicates that IAS levels of researchers from different universities is statistically significant at the 0.05 level. Further, Post Hoc analysis shows that there were significant differences in the IAS level of the researchers across different universities, except between DU and JMI. Hence, the hypothesis is rejected.

Findings

The significant findings of this assessment study are:

1. The test performance of respondents was abysmal. There were only 53.8% of the respondents competent in IAS, including 26.2% of researchers having 'Good' level of IAS. These 26.2% of researchers could operate in electronic information settings, but essentially require brushing up their IAS.
2. The respondents competent in IAS consisted of maximum 12.1% from Economics followed by 9.4% from Law, 9.0% from Political Science, 8.5% from History, 7.5% from Sociology and only 7.3% from Geography. University wise maximum 21.9% of respondents from JNU followed by 18.1% from IGNOU, and only 6.9% from both DU and JMI were found competent in IAS.
3. The test performance assessment and competency levels as well as the mean score and mean plots suggest that researchers from Economics possessed higher IAS levels followed by researchers from Law, History, Sociology, Geography and Political Science. University wise it was found that researchers from JNU possessed a higher IAS levels followed by the researchers at IGNOU, JMI and DU.
4. Significant differences in IAS levels of respondents were found between Political Science and History, Political Science and Law, Political Science and Economics; Economics and Sociology, Economics and Geography; and Geography and Law. University wise there were significant differences in IAS levels of the researchers from different universities, except between DU and JMI.
5. As much as 46.2% of the respondents were having baseline or below IAS. It included maximum 9.4% of respondents from Political Science followed by 8.7% from Sociology 8.1% from History, 7.7% from Geography, 6.3% from Law and 6.0% from Economics. The respondents lacking competency in IAS included a maximum of 16.5% from DU followed by 16.2% from JMI, 8.1% from IGNOU and 5.4% from JNU.
6. The performance assessment and corresponding competency levels of the respondents suggest that IAS of social science researchers from all the subjects and universities understudy is weak and needs proper attention.
7. Researchers from Economics and JNU possessed a higher level of IAS. However, 6.0% of researchers in Economics and 5.4% of researchers in JNU possessed baseline or below level of IAS. The mean score of responses of researchers in Sociology, Geography and Political Science and from JMI and DU is below overall mean score.

Discussion

In an era of abundant information and effortless access to it, researchers should have complete control over the process and techniques to access precise and relevant information. The findings of the study have made it clear that a big chunk of researchers is trailing in competency level and retain the only baseline or below IAS. It is consistent with the findings of many previous studies. Malanga (2017), Maurer, Schloegl & Dreisiebner (2016), and Dempsey and Valenti (2016) found students highly deficient in organizing literature, identifying diverse sources of information and locate appropriate source to access precise and relevant information. Students were found mostly unfamiliar with effective use of Boolean connectors and many of them used

odd combinations of connectors. Dalal, Kimura, and Hofmann (2015) reported that most of the respondents were not able to use keywords appropriately and failed in precisely articulating their information needs. In the information-rich environment, it is a concern for academic and research survival.

During the course of research multiple reasons are observed for incompetency of researchers. The IL activities are limited because of the lack of earmarked IL units; IL programs partially follow the standards and guidelines; Ph.D. course work lacks IL content. There are specified challenges in promoting IL skills. It includes shortage of space and infrastructure, faculty indifference, lack of trained staff, lack of time, lack of administrative support and lack of student motivation. For inculcating and enhancing appropriate level of information handling skills among students, a lot is still to be done. Each university in India should develop an earmarked IL unit with proper infrastructure and qualified staff. It is essential to incorporate IL content in Ph.D. course work and universities may start a credit based IL course structured on specific standards and guidelines. Academic libraries are “partner in the educational mission of the institution to develop and support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning” (ACRL, 2018). Academic librarians are vital in developing IL skills. IL instruction is a “fundamental professional practice in academic libraries and academic librarians are primary providers of information literacy instruction generally” (Julien, Gross & Latham, 2018, p. 191). Librarians as an adroit of information science field (Townsend, Hofer, Lin Hanick & Brunetti, 2016) should extend their expertise in electronic information resources and information retrieval to instructors providing IL instruction in a discipline-specific context (Oakleaf, Millet & Kraus, 2011). Librarians should “focus on developing search terms” and “teach limiters or facets” (Fawley & Krysak, 2012). Thus, there is a “need for effective instructional practice on the part of librarians, as well the important role of course instructors in the attainment of IL competencies” (Walker & Whitver, 2020, p.9).

IL provides crucial and mandatory competency among our “Google generation” researchers having effortless access to abundant and ambiguous quality online information (Foo, Majid & Chang, 2017). The issues and challenges of information access can be primarily addressed through multiple IL activities. Effective IL education and training can be provided by incorporating it into the process of teaching and learning (Lloyd, 2017). Library instructions are not as adequate as curriculum integrated instructions (Wang, 2014). However, many times, it becomes challenging to incorporating IL into the curriculum. Rosman, Mayer and Krampen (2016) identified some common challenges as equating IL with computer literacy, misconception of millennial students and no space in the curriculum. Collaboration between library and faculty is necessary for students’ motivation and incorporating IL into the higher education curriculum (Perez-Stable, Arnold, Guth & Vander Meer, 2020). Lack of collaboration and the time and efforts required to collaborate has been identified as the biggest barrier in IL instruction (Julien, et al, 2018). The findings of the present study also strengthen the need of collaboration. Academic librarians should promote asset-based approaches to developing students’ IL to the instructional colleagues (Ardoin, 2018; Martin, Smith & Williams, 2018). Collaboration may take place by collaborative curriculum development and/or teaching (White-Farnham & Gardner, 2014); embedding a librarian in the classroom (Hearn, 2005); or learning community models, wherein librarians provide resources and/or training to support faculty-led IL instruction in the composition classroom (Sult & Mills, 2006). In such collaborations, the “people-based

initiative(s)” should be avoided in view of the potential risks to sustainability (Currie & Eodice, 2005).

Many times students pretend over their competency in IL skills and exhibit overconfidence in their abilities to find information (Mercer, Weaver, Figueiredo & Carter, 2020). Competency in information access and use of advance search features are vital for researchers. The advanced search strategies are associated with better grades in all fields of study (Robinson & Bawden, 2018). Competency in the use of Boolean operators is often accepted as proof of information retrieval expertise. It has been placed as a performance indicator within ACRL Standards. However, scrutiny of test responses reveals that most of the researchers across subjects and institutions failed in responding correctly to the queries related to the use of Boolean connectors. Thus inclusion of concept and use of Boolean connectors in all information skill enhancement programs and activities has become imperative. University libraries in India should utilize the online platform and develop specifically designed comprehensive 'Online Information Literacy Tutorials' emphasizing more on information access skills. Such online tutorials may have far-reaching impact in developing all-round information skill competency.

Further research may be conducted to find the causes of low IAS in different segments of academics; developing comprehensive IAS scale; assessment of IAS in specific target group or subject; and more importantly areas of collaboration between library professionals and teaching faculty for different IL activities emphasizing IAS.

Conclusions

Researchers today are information privileged (Hare & Evanson, 2018). “The collection of information is strategically important to a scholar’s research work and, by nature, requires complete interaction with the information” (Du & Evans, 2011, p.299). The doctoral students require comprehensive information for their research and hence should possess strong information handling and use skills to achieve their research goals (Barry, 1997). The findings clearly indicate the deficiencies in IAS of a large number of researchers and calls for urgent attention of the situation for better utilization of and a good return on investments (ROI) in e-resources. The findings of present study will help all the stakeholders in planning and execution of multiple IL activities with an emphasis on IAS. In the higher education and research institutions, comprehensive IL activities have become essential "to empower the students, researchers and faculty members to seek, evaluate, use and create information effectively and efficiently to achieve their educational, social, occupational and personal goals” (Singh & Kumar, 2018, p.139). IL skills cannot be taught overnight, it requires a continuous process of learning. The findings of study vehemently necessitate devising an appropriate plan and proper implementation of multiple IL programs to promote information access skills and enhance the concerned competency level.

References

- ACRL. (2000). Information literacy competency standards for higher education. Retrieved from <https://alair.ala.org/handle/11213/7668>.
- ACRL. (2016). Framework for information literacy for higher education. Retrieved from www.ala.org/acrl/standards/ilframework.

- ACRL. (2018). Standards for libraries in higher education. Chicago: American Library Association). Retrieved from www.ala.org/acrl/standards/standardslibraries.
- Al-Qallaf, C. L. (2019). Information literacy assessment of incoming students in an information studies graduate program. *Global Knowledge, Memory and Communication*, 68(3), 223-241. <https://doi.org/10.1108/GKMC-07-2018-0062>.
- Ardoin, S. (2018). Helping poor-and working-class students create their own sense of belonging. *New directions for student services*, 162, 75-86. <https://doi.org/10.1002/ss.20263>.
- Barry, C. A. (1997). Information skills for an electronic world: Training doctoral research students. *Journal of information science*, 23(3), 225-238. <https://doi.org/10.1177/016555159702300306>.
- Becker Jr, C. H. (2012). Student values and research: Are millennials really changing the future of reference and research?. *Journal of Library Administration*, 52(6-7), 474-497. <https://doi.org/10.1080/01930826.2012.707948>.
- Coakes, S. J., Steed, L. & Dzidic, P. (2006). *SPSS version 13.0 for Windows*. Australia: John Wiley and Sons.
- Creative Research Systems (2012) *Sample size calculator*. Retrieved from <http://www.surveysystem.com/sscalc.htm>.
- Currie, L., & Eodice, M. (2005). Roots entwined: Growing a sustainable collaboration. *Centers for learning: Writing centers and libraries in collaboration*, 42-60.
- Dalal, H. A., Kimura, A. K., & Hofmann, M. A. (2015). Searching in the wild: Observing information-seeking behavior in a discovery tool. *Proceedings of the ACRL*, 668-675. Retrieved from http://www.ala.org/acrl/sites/ala.org.acrl/files/content/conferences/confsandpreconfs/2015/Dalal_Kimura_Hofmann.pdf.
- D' Couto, M., & Rosenhan, S. H. (2015). How students research: Implications for the library and faculty. *Journal of Library Administration*, 55(7), 562-576. <https://doi.org/10.1080/01930826.2015.1076312>.
- Dempsey, M., & Valenti, A. M. (2016). Student use of keywords and limiters in web-scale discovery searching. *The journal of academic librarianship*, 42(3), 200-206. <https://doi.org/10.1016/j.acalib.2016.03.002>.
- Detmering, R., McClellan, S., & Willenborg, A. (2019). A seat at the table: Information literacy assessment and professional legitimacy. *College & Research Libraries*, 80(5), 720-737. <https://doi.org/10.5860/crl.80.5.720>.
- Deyrup, M. & Bloom, B. (2012). The truth is out: How students REALLY search. In *Proceedings of the Charleston Conference* (pp. 203-208). Retrieved from <http://docs.lib.purdue.edu/charleston/2012/Users/2/> <https://doi.org/10.5703/1288284315103>.
- Doctor, R. D. (1991). Information technologies and social equity: Confronting the revolution. *Journal of the American Society for Information Science*, 42(3), 216-228. [https://doi.org/10.1002/\(SICI\)1097-4571\(199104\)42:3<216::AID-ASI7>3.0.CO;2-Y](https://doi.org/10.1002/(SICI)1097-4571(199104)42:3<216::AID-ASI7>3.0.CO;2-Y).
- Du, J. T., & Evans, N. (2011). Academic users' information searching on research topics: Characteristics of research tasks and search strategies. *The Journal of Academic Librarianship*, 37(4), 299-306. <https://doi.org/10.1016/j.acalib.2011.04.003>.

- Erlinger, A. (2018). Outcomes assessment in undergraduate information literacy instruction: A systematic review. *College & Research Libraries*, 79(4), 442-479. <https://doi.org/10.5860/crl.79.4.442>.
- Fawley, N., & Krysak, N. (2012). Information literacy opportunities within the discovery tool environment. *College & undergraduate libraries*, 19(2-4), 207-214. <https://doi.org/10.1080/10691316.2012.693439>.
- Folk, A. L. (2019). Reframing information literacy as academic cultural capital: A critical and equity-based foundation for practice, assessment, and scholarship. *College & Research Libraries*, 80(5), 658-673. <https://doi.org/10.5860/crl.80.5.658>.
- Foo, S., Majid, S., & Chang, Y. K. (2017). Assessing information literacy skills among young information age students in Singapore. *Aslib Journal of Information Management*, 69(3), 335-353. <https://doi.org/10.1108/AJIM-08-2016-0138>.
- Greenberg, R., & Bar-Ilan, J. (2014). Information needs of students in Israel—A case study of a multicultural society. *The Journal of Academic Librarianship*, 40(2), 185-191. <https://doi.org/10.1016/j.acalib.2013.10.002>.
- Hare, S., & Evanson, C. (2018). Information privilege outreach for undergraduate students. *College & Research Libraries*, 79(6), 726-736. <https://doi.org/10.5860/crl.79.6.726>.
- Hearn, M. R. (2005). Embedding a librarian in the classroom: an intensive information literacy model. *Reference services review*, 33(2), 219-27. <https://doi.org/10.1108/00907320510597426>.
- Henderson, F., Nunez-Rodriguez, N., & Casari, W. (2011). Enhancing research skills and information literacy in community college science students. *The American Biology Teacher*, 73(5), 270-275. <https://doi.org/10.1525/abt.2011.73.5.5>.
- Hofer, A. R., Townsend, L., & Brunetti, K. (2012). Troublesome concepts and information literacy: Investigating threshold concepts for IL instruction. *portal: Libraries and the Academy*, 12(4), 387-405. <https://doi.org/10.1353/pla.2012.0039>.
- Hoffman, C., & Goodwin, S. (2006). A clicker for your thoughts: Technology for active learning. *New Library World*, 107(9/10), 422-433. <https://doi.org/10.1108/03074800610702606>.
- Julien, H., Gross, M., & Latham, D. (2018). Survey of information literacy instructional practices in US academic libraries. *College & research libraries*, 79(2), 179-199. <https://doi.org/10.5860/crl.79.2.179>.
- Koler-Povh, T., & Turk, Z. (2020). Information literacy of doctoral students in engineering and the librarian's role. *Journal of Librarianship and Information Science*, 52(1), 27-39. <https://doi.org/10.1177/0961000618767726>.
- Krutkowski, S. (2017). A strengths-based approach to widening participation students in higher education. *Reference Services Review*, 45(2), 227-241. <https://doi.org/10.1108/RSR-10-2016-0070>.
- Lloyd, A. (2003). Information literacy: The meta-competency of the knowledge economy? An exploratory paper. *Journal of Librarianship and information Science*, 35(2), 87-92. <https://doi.org/10.1177/0961000603352003>.
- Lloyd, A. (2017). Information literacy and literacies of information: A mid-range theory and model. *Journal of Information Literacy*, 11(1), 91-105. <https://doi.org/10.11645/11.1.2185>.

- Mackey, T. P., & Jacobson, T. E. (2011). Reframing information literacy as a metaliteracy. *College & research libraries*, 72(1), 62-78. <https://doi.org/10.5860/crl-76r1>.
- Malanga Mr, D. F. (2017). Assessing information literacy skills: a survey of undergraduate education students at the University of Livingstonia in Malawi. *Library Philosophy & Practice*, 1806. Retrieved from <https://digitalcommons.unl.edu/libphilprac/1806>.
- Martin, G. L., Smith, M. J., & Williams, B. M. (2018). Reframing deficit thinking on social class. *New Directions for Student Services*, 162, 87-93. <https://doi.org/10.1002/ss.20264>.
- Mathiesen, K., & Fallis, D. (2008). Information ethics and the library profession. In K.E. Himma & H.T. Tavanni (Eds.), *The handbook of information and computer ethics* (pp. 221-244). John Wiley & Sons. <https://doi.org/10.1002/9780470281819.ch9>.
- Maurer, A., Schloegl, C., & Dreisiebner, S. (2016). Comparing information literacy of student beginners among different branches of study. *Libellarium: journal for the research of writing, books, and cultural heritage institutions*, 9(2), 309-319. <https://doi.org/10.15291/libellarium.v9i2.280>.
- Mercer, K., Weaver, K. D., Figueiredo, R., & Carter, C. (2020). Critical appraisal: The key to unlocking information literacy in the STEM disciplines. *College & Research Libraries News*, 81(3), 145-148. <https://doi.org/10.5860/crln.81.3.145>.
- Oakleaf, M., Millet, M. S., & Kraus, L. (2011). All together now: Getting faculty, administrators, and staff engaged in information literacy assessment. *portal: Libraries and the Academy*, 11(3), 831-852. <https://doi.org/10.1353/pla.2011.0035>.
- Perez-Stable, M. A., Arnold, J. M., Guth, L. F., & Vander Meer, P. F. (2020). From service role to partnership: Faculty voices on collaboration with librarians. *portal: Libraries and the Academy*, 20(1), 49-72. <https://doi.org/10.1353/pla.2020.0004>.
- Robinson, L., & Bawden, D. (2018). International good practice in information literacy education. *Knjižnica. Revija za področje bibliotekarstva in informacijske znanosti*, 62(1-2), 169-185. Retrieved from <http://openaccess.city.ac.uk/19385/>.
- Rosman, T., Mayer, A. K., & Krampen, G. (2016). A longitudinal study on information-seeking knowledge in psychology undergraduates: Exploring the role of information literacy instruction and working memory capacity. *Computers & Education*, 96, 94-108. <https://doi.org/10.1016/j.compedu.2016.02.011>.
- Singh, R., & Kumar, S. (2018). Information literacy competency of social science researchers in different periods of research: A study. *JLIS*, 43(1), 123-140.
- Singh, R., & Kumar, S. (2019). Information Literacy Competency Level of Social Science Researchers with Respect to Information Use Ethics: A Study. *DESIDOC Journal of Library & Information Technology*, 39(2), 101-108. <https://doi.org/10.14429/djlit.39.2.13507>.
- Singh, R., & Kumar, S. (2020). An empirical assessment of information literacy competency of social science researchers: a gender perspective. *Annals of Library and Information Studies (ALIS)*, 67(1), 7-16.
- Squibb, S. L. D., & Zanzucchi, A. (2020). Apprenticing researchers: Exploring upper-division students' information literacy competencies. *portal: Libraries and the Academy*, 20(1), 161-185. <https://doi.org/10.1353/pla.2020.0008>.
- Sult, L., & Mills, V. (2006). A blended method for integrating information literacy instruction into English composition classes. *Reference services review*, 34(3), 368-88. <https://doi.org/10.1108/00907320610685328>.

- Taylor, A. (2012). A study of the information search behaviour of the millennial generation. *Information research: an international electronic journal*, 17(1),1.
- Townsend, L., Hofer, A. R., Lin Hanick, S., & Brunetti, K. (2016). Identifying threshold concepts for information literacy: A Delphi study. *Communications in Information Literacy*, 10(1), 23-49.
- Van Cleave, K. (2008). The self-study as an information literacy program assessment tool. *College & Undergraduate Libraries*, 15(4), 414-431. <https://doi.org/10.1080/10691310802554887>.
- Walker, K. W., & Whitver, S. M. (2020). Assessing information literacy in first year writing. *The Journal of Academic Librarianship*, 46(3), 102136. <https://doi.org/10.1016/j.acalib.2020.102136>.
- Wang, L. (2014). Curriculum and curriculum integration of information literacy in higher education. In M. Hepworth & G. Walton (Eds.), *Developing people's information capabilities: Fostering information literacy in educational, workplace and community contexts* (pp. 31-49). Emerald.
- White-Farnham, J., & Gardner, C. C. (2014). Crowdsourcing the curriculum: Information literacy instruction in first-year writing. *Reference Services Review*, 42(2), 277-92. <https://doi.org/10.1108/RSR-09-2013-0046>.
- Yevelson-Shorsher, A., & Bronstein, J. (2018). Three perspectives on information literacy in academia: Talking to librarians, faculty, and students. *College & Research Libraries*, 79(4), 535-553. <https://doi.org/10.5860/crl.79.4.535>.