A Lack of LibGuides: Critical Thinking and Information Literacy

Dr. Elizabeth ZAK
Carthage College, Kenosha, Wisconsin, United States
ezak@carthage.edu

Abstract: *Critical thinking and information literacy are inextricably linked. Specifically, strong critical thinking skills are correlated with strong information literacy skills and vice versa. This can result in information seekers avoiding misinformation in visual and verbal formats. However, current research and scholarship often ignore the importance of critical thinking in information literacy. This often extends to educational communities, such as colleges. LibGuides, valuable online tools meant to educate, often provide resources for students interested in research. However, if students do not have access to these specific resources, or if these resources are difficult to comprehend, then they will struggle to learn these valuable skills. This may result in them being particularly susceptible to harmful misinformation, such as conspiracy theories. By evaluating how public colleges and universities emphasize information literacy and critical thinking, we may identify their strengths and shortcomings. Availability and accessibility to tools discussing information literacy and critical thinking is essential. Unfortunately, current access to these LibGuides is sporadic based on both state and region. I identified and obtained 180 LibGuides from public U.S. colleges and universities. I found that while information literacy and critical thinking are known as beneficial skills, they are not necessarily prominent within LibGuides. Preliminary results demonstrate that while LibGuides are a valuable tool, especially for students at large public universities, many LibGuides do not contain material on information literacy and critical thinking. Furthermore, even if this material is available, LibGuides containing discussion about the link between information literacy and critical thinking are very limited. More research evaluating the link between LibGuides and access to information literacy, critical thinking, and other valuable skill sets is necessary.*

Keywords: Critical thinking, information literacy, misinformation, LibGuides, accessibility

1. Introduction

Information literacy and critical thinking skills are essential for success in both academic and non-academic environments. Information literacy is the ability to "know how to find, evaluate, and use information effectively to solve a particular problem or make a decision---whether the information…comes from a computer, a book, a government agency, a film, or any number of other possible resources" (ACRL, 1989). While information literacy methods are useful, they may not always completely address misinformation (Zak, 2024). Critical thinking is "the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action" (Huitt, 1998). Researchers agree that critical thinking and information literacy are skills that may be used in tandem to avoid

misinformation (Allen, 2009). Current information literacy and critical thinking education may be sporadic in elementary school, and as a result, current college students may enter college unable to practice these instrumental skills (Berg, 2018). College students must learn about critical thinking and information literacy (Silva, 2018; Karanja, 2021). While information literacy and critical thinking are valuable tools for individuals of all ages, they are particularly valuable for college students, often willing and ready to learn about new skills. Furthermore, college or university may be the first time that college students are exposed to information literacy or critical thinking (Diehm, 2014). Oftentimes, librarians teach information literacy and critical thinking habits; they also include online resources in their curricula (Julien, 2018). However, librarians may also provide handy resources and tools meant for students to peruse at their leisure. In many circumstances, libraries at colleges and universities provide tools called LibGuides. These tools are meant to "pull together all types of information about a particular subject or course of study" (Hutchison, 2018). LibGuides often discuss subject-related and research-related topics. Linares and Johnson (2016) explained that "LibGuides are easy to use and accessible in the broadest sense" (p. 4). Because they are free and open-source, LibGuides are fully accessible. Unfortunately, discussion of the topics used and the effectiveness of LibGuides is limited. Similarly, if a student is unable to access information about concepts such as "information literacy" or "critical thinking" then they will struggle with using these concepts when identifying misinformation. Even if these ideas are discussed in the abstract, or otherwise presented as beneficial without being named, college students will still remain confused. It is imperative that we identify shortcomings with these current systems. One essential beginning is an observational evaluation of the availability of tools. I selected 180 LibGuides from public United States colleges and universities. I found that 69 LibGuides had pages on "information literacy," while 15 LibGuides had pages on "critical thinking" and 10 LibGuides had pages discussing the connection between "information literacy" and "critical thinking." The Northeast contained the most pages discussing "information literacy," while the Midwest contained the least pages discussing "information literacy." These results are still preliminary and more research into the relationship between information literacy and critical thinking is necessary.

2. Literature Review

Current research identifies information literacy and critical thinking as linked; however, research discussing examples of critical thinking and information literacy is still limited. Hattingh et al (2020) argue that critical thinking is a form of information literacy. They further stated that more research into the use of students' ability to identify misinformation is necessary. Rezaei et al (2021) also identified current research linking information literacy and critical thinking, finding that critical information literacy and information literacy education are two emerging topics in computer and information science. While critical thinking and information literacy are linked, current research identifying the education of importance between the two is still relatively limited.

Researchers have studied information literacy instruction. Julien et al (2018) surveyed information literacy instruction in academic libraries, finding that librarians have insufficient time to teach college students information literacy skills. They also found that many librarians used tools such as LibGuides to teach college students about information literacy. Ennis et al (2018) examined an ideal hypothetical curriculum for a freshman class, explaining that subject-specific critical thinking education is essential for all majors. Goodset (2020) created a rubric for librarians teaching information literacy, arguing that an ideal course would use personal connection and online discussions. They also explained that critical thinking skills and promotion of critical thinking are essential for information literacy students. This rubric is still underutilized. Furthermore, while information literacy education is valuable and important, many current college students choose to obtain their information in an online format.

LibGuides are useful online tools for both general and specific education. Subject-specific guides have proven valuable: engineering specific LibGuides were helpful to engineering students (Osorio, 2015). LibGuides are useful teaching tools for both information literacy and critical thinking. Librarians use LibGuides to aid in teaching information literacy (Mokia, 2012; Powers, 2017; Carey, 2021). Mokia and Rolen (2012) explained that LibGuides may be used to teach college students specifically about information literacy techniques. After surveying undergraduate students and finding that LibGuides and web sites both provided content effectively, Bowen (2013) explained that "LibGuides fits well and has a role to play in the ongoing quest for quality online IL instructional content" (p.166). Powers et al (2017) further explained the importance of using LibGuides in tandem with traditional classroom instruction to teach information literacy. Duffy et al (2021) found that when teaching with LibGuides, librarians often taught exercises meant to promote critical thinking and information literacy skills. LibGuides also teach critical thinking skills (Bartram, 2019). Stuit et al (2017) identified critical thinking as a major skill necessary to identify fake news. They found that LibGuides encouraged critical thinking skills, both as a topic and within other disciplines. While researchers agree that LibGuides effectively teach information literacy and critical thinking, more research into their availability and accessibility is necessary.

Librarians have also used LibGuides to teach information literacy in the classroom. Specifically, Withorn et al found that the ACRL stated that LibGuides were useful for information literacy instruction (Withorn, 2020). LibGuides could be used with instruction to teach valuable information literacy skills. Specific courses teaching the use of Libguides are helpful for current college students; however, these courses are still localized rather than widespread (Wightman, 2023). Clever (2020) suggested that faculty members and librarians collaborate to properly integrate Libguides into instructor-specific courses: for example, a Biology professor could teach students to use a Biology LibGuide. At a different level, McCarthy and Macdonald (2022) evaluated a statewide LibGuide initiative across Rhode Island. They found that participants engaged in lively discussion after the presentations. Dobbs et al (2013) suggested that LibGuides be evaluated by both classroom implementation and independent online traffic. Yelinek et al (2010) designed and implemented an information literacy course at a private university in Indiana; while the course proved beneficial for students' information literacy skills, they then moved it online as a LibGuide. This resulted in the course reaching more students, as well as positively impacting their information literacy skills. LibGuides have also been used internationally: Becker et al (2021) also implemented an information literacy LibGuide at a South African university during the Covid-19 pandemic and found that while students struggled with accessing the LibGuide itself, engagement was relatively high. While LibGuides are a valuable resource, many students still have limited access to them. Current research does not discuss LibGuide availability within United States region or state level. More research into general LibGuide availability is necessary.

Based on the current literature, I identified the following research questions:

- How do current LibGuides discuss information literacy and critical thinking?
- How do LibGuides' discussion of information literacy and critical thinking differ based on region?

3. Methodology

I found 180 LibGuides from public United States colleges and universities. I evaluated whether or not the LibGuides contained a section discussing information literacy, whether the LibGuides contained a section discussing critical thinking and whether either section mentioned the other concept. I searched specifically for the terms "information literacy," and "critical thinking." Based on these guidelines, a college or

university could have a page on "information literacy" that mentioned "critical thinking", but no page on "critical thinking" specifically. Conversely, a college or university could have a page on "critical thinking" but no page on "information literacy" and no mention of the connection between the two concepts. Libguides that discussed misinformation without the term "information literacy" were dismissed. Libguides that discussed critical thinking skills without the term "critical thinking" were likewise dismissed. I chose to search for the terms rather than general ideas, as a typical college student interested in information literacy or critical thinking would use these terms to search for information about them. While a LibGuide or web page might explain the importance of critical thinking without using the terminology itself, a student using the term to search might be frustrated and abandon their search. Therefore, while there may be LibGuides that discuss "information literacy" and "critical thinking" without using the term, they were not explored in this research.

I specifically focused on public United States colleges and universities because they are federally funded (Lee, 2017). Therefore, a LibGuide discussing "information literacy" or "critical thinking" would show some federal financial stake in the importance of these tools. I did not further evaluate the cost or financial vested interest in LibGuides, information literacy, or critical thinking. I also chose to group states by region in the United States. I evaluated at least one university per state, and 45 universities per region (Northeast, South, Midwest, West). This number allowed me to conduct cursory descriptive statistics and specifically evaluate the availability of this information between region. Because of the major differences in public university count between states, I did not evaluate state-specific "information literacy" or "critical thinking" presence in LibGuides. This meant that I could delve further into the regions explored.

4. Results

I now discuss my results. I found that 69 LibGuides from public United States colleges and universities had a page discussing "information literacy" and 111 LibGuides did not have a page discussing "information literacy." Similarly, 15 LibGuides from public United States colleges and universities had a page discussing "critical thinking" and 165 LibGuides from public United States colleges and universities did not have a page discussing "critical thinking." I finally found that 10 LibGuides from public United States colleges and universities did not discuss the connection between "information literacy" and "critical thinking" and 170 LibGuides did not discuss the connection between "information literacy" and "critical thinking."

I further examined the LibGuides at the United States region level. I found that 18 LibGuides from public United States colleges and universities in the West had a page discussing "information literacy", 1 LibGuide from public United States colleges and universities from the West had a page discussing "critical thinking" and 2 LibGuides from public United States colleges and universities in the West had a page discussing the connection between "information literacy" and "critical thinking." I found that 17 LibGuides from public United States colleges and universities in the South had a page discussing "information literacy", 3 LibGuides from public United States colleges and universities from the South had a page discussing "critical thinking" and 0 LibGuides from public United States colleges and universities in the South had a page discussing the connection between "information literacy" and "critical thinking." I found that 13 LibGuides from public United States colleges and universities in the Midwest had a page discussing "information literacy", 6 LibGuides from public United States colleges and universities from the Midwest had a page discussing "critical thinking" and 1 LibGuide from public United States colleges and universities in the Midwest had a page discussing the connection between "information literacy" and "critical thinking." I found that 21 LibGuides from public United States colleges and universities in the Northeast had a page discussing "information literacy", 5 LibGuides from public United States colleges and universities from the

Northeast had a page discussing "critical thinking" and 7 LibGuides from public United States colleges and universities in the Northeast had a page discussing the connection between "information literacy" and "critical thinking."

I found that the covariance between whether a university's LibGuide had a page discussing "information literacy" and "critical thinking" was .029 and the correlation between whether a university's LibGuide had a page discussing "information literacy" and "critical thinking" was .22. I found that the covariance between a university's LibGuide having a page discussing "information literacy" or "critical thinking" and whether the connection between the two was discussed was .026, while the correlation between a university's LibGuide having a page discussing "information literacy" or "critical thinking" and whether the connection between the two was discussed was .37. I finally found that the covariance between whether a LibGuide in a university of a specific region had a page discussing "information literacy" and "critical thinking" was -1.685 and the correlation between whether a university in a specific region's LibGuide a page had discussing "information literacy" and "critical thinking" was -.3072.

5.   Discussion

Information literacy and critical thinking are inextricably linked in both their necessity and use. The ability to critically evaluate information, analyze and synthesize information is essential for success both in and out of the classroom. Identifying their use in LibGuides provided insight into the unfortunate lack of discussion regarding information literacy, critical thinking, and their connection.

5.1 Information Literacy and Critical Thinking

LibGuides may provide valuable information literacy resources. However, less than 50% of the universities surveyed had a LibGuide that had a page discussing "information literacy" while less than 10% of the universities surveyed had a LibGuide that had a page discussing "critical thinking." Unfortunately, this shows a lack of resources discussing either of these elements. While coursework is important, college students are often limited in the classes they may take. As a result, a lack of LibGuides discussing "information literacy" and "critical thinking" shows that out-of-classroom education is still sparse. This is concerning: there is a clear demand for LibGuides, and a clear demand for more information about information literacy and critical thinking.

Initial results at the state level often varied based on the number of public universities or colleges that each state had. In many cases, if a state had less than five public universities, they did not have a LibGuide that had a page discussing "information literacy," "critical thinking," or the link between the two. While state-level evaluation is important, because of the varied number of universities by state, it would be difficult to truly examine the LibGuides by state. As a result, evaluating the regions was also valuable.

All of the universities examined for each region had a LibGuide that had a page discussing "information literacy" and "critical thinking." Interestingly, the region that had the most LibGuide pages discussing one term had the least LibGuide pages discussing the other term. The Midwest had the least LibGuide pages that discussed "information literacy" and the most LibGuide pages that discussed "critical thinking." The Northeast had the most LibGuide pages that discussed "information literacy" as well as its connection with "critical thinking." The region that had the least explicit connections between "information literacy" and "critical thinking" was the South. The West had the least LibGuide pages that discussed "critical thinking." Each region was relatively limited in their discussion of "information literacy" or "critical thinking." While this shows that different universities in each region have the resources discussing "information literacy" and "critical thinking," there is no region that discussed "information literacy" or "critical thinking" in more

than 50% of the LibGuide pages. Information literacy research by region is relatively limited: while Pierri et al (2021) evaluated belief in misinformation by region, they found that regions with lower vaccination rates were likewise less informationally literate (Pierri, 2021). Similarly, the lack of LibGuides discussing "information literacy" may be linked to population: Bozarth et al (2022) found that the most populous state had the most low-credible posts, while the least populous state had the least low-credible posts (Bozarth, 2022). This only provides a partial explanation, as the most (California) and least populous state (Wyoming) are both in the Western region. Therefore, while the regions showed a difference in information literacy found in LibGuides, this difference was ultimately minimal. Researchers have found that often states are divided by information literacy level at the urban or rural level (Usher, 2024). More research into information literacy within states and within regions within a state is necessary.

Unfortunately, less than 50% of the LibGuides in all regions had a page discussing "information literacy" and less than 25% of the LibGuides had a page discussing "critical thinking." Less than 20% of all the LibGuides explicitly discussed the link between "information literacy" and "critical thinking." Overall, while all the LibGuides had different pages discussing major-specific coursework, there was a major lack of pages discussing "information literacy," "critical thinking" and the link between the two. These results may be unsurprising, as most of the LibGuides did not have a page discussing "information literacy" or "critical thinking;" however, they are no less concerning. For students to understand the connection between "information literacy" and "critical thinking," a page discussing the explicit connection between the two would be helpful.

I found that if a college or university had a LibGuide discussing "information literacy" or "critical thinking," they were more likely to discuss the connection between the two. This is important, as it shows how intertwined these two concepts are. Furthermore, it shows that if students are exposed to one concept, they may be exposed to the other. This is particularly valuable, as at the regional level, there was a negative, inverse relationship between "information literacy" and "critical thinking." Unfortunately, because there were so few LibGuides discussing "information literacy" or "critical thinking," these results are still preliminary and limited.

These findings support the literature. While a not-insubstantial number of LibGuides had pages discussing "information literacy," this topic is still underrepresented (Julien, 2018). Undergraduate students are also interested in information literacy but may only have access to this topic via a LibGuide page (Mokia, 2012; Powers, 2017). Lack of access to information literacy resources is an ongoing problem. While students are interested in these resources, and librarians are willing to provide them, there is still a disconnect between the demand and resources available. Much of this is due to a lack of resources and general support: we must fund libraries and librarians (Guillian, 2015; Lundy, 2020). More research into the locations of and availability of these LibGuides is essential.

5.2 Correlation and Covariance

I now discuss the implications of the correlation and covariance between "information literacy" and "critical thinking." The covariance between pages discussing "information literacy" and "critical thinking" was .029, while the correlation was .22. This shows a weak, positive relationship between the two. This is particularly valuable, as it shows that although there is a likelihood that a student searching for education on information literacy or critical thinking, it is not high. Therefore, researchers and library professionals must seek to design more LibGuides that both discuss information literacy and critical thinking. Similarly, a positive covariance and correlation between pages discussing "information literacy" or "critical thinking" is likewise helpful. Although this covariance, .026, is positive, it shows that there is a slightly higher likelihood that a LibGuide contains pages on both "information literacy" and "critical thinking" than pages

on either "information literacy" or "critical thinking." Although learning about either skill is helpful, a slightly higher correlation of both tools shows that students exposed to information literacy may also be able to learn about critical thinking. This is ultimately beneficial. However, when examining the regional breakdown, and specific regions, there is a negative covariance (-1.685) and a negative correlation (-.3072) between having an "information literacy" LibGuide and a "critical thinking" LibGuide. The likelihood of having a page that discussed "information literacy" was negatively impacted by having a page that discussed "critical thinking" and vice versa. While this is not necessarily a concern, and the correlations and covariances are all relatively weak, it is still important to identify their existence and their potential implications.

5.3 Partial Solutions

One solution to this issue is to simply design more LibGuides discussing information literacy in each region. Allocating more funding to prioritize information literacy education is essential. However, more solutions include more coursework in information literacy as well as more implementation of information literacy in all disciplines. Furthermore, although this paper only explores pages discussing "information literacy," more research discussing the quality of the LibGuides themselves is necessary. All states and regions must prioritize the development of LibGuides and coursework discussing information literacy. This prioritization will include more research into the development of these LibGuides as well as more funding for research into effectiveness of specific wording. Researchers agree that information literacy LibGuides are effective and helpful. Unfortunately, these resources are still incredibly sparse. More research is also important to truly identify the interdisciplinary nature of information literacy.

6. Limitations

This study contains a number of limitations. Using only LibGuides is a limitation. There are many different available tools for someone to learn about information literacy. However, for the purpose of evaluating different available information sources for public college and university students, LibGuides are an effective tool. While 180 is a reasonable number for descriptive statistics, it is still low. Similarly, although some LibGuides may not have contained "information literacy" or "critical thinking" as major sections, they may have also discussed information literacy or critical thinking themes. While LibGuides are often named accurately, scholars have also raised some concern about misleading or confusing titles for guides (Linares, 2016). This is a slight limitation, but still demonstrates the importance of verbiage when discussing all terms. Many students may have been limited in their exposure to LibGuides. Furthermore, since LibGuides are often designed at the discretion of librarians or administration, the absence or presence of a subject-specific LibGuide may show a bias for or against the exposure to particular information. Since most LibGuides are free and open access, students at public colleges and universities could have used another school or region's LibGuide to learn about information literacy. However, this implies a different level of digital literacy and vested interest: therefore, focusing on region was a useful choice. In the future, evaluating all the LibGuides of a particular state's universities, or all the LibGuides of a particular region's universities would prove beneficial to better understanding open-source information literacy education. More research evaluating information literacy and critical thinking education is essential.

7. Conclusion

Current college students use library tools, both in and out of the library. Likewise, college often serves as a place of exposure for many students to new ideas, including information literacy, and critical thinking. Information professionals, including librarians, have implemented LibGuides as a source of obtaining

information and learning further about information resources. While LibGuides are an important tool for teaching valuable research skills, LibGuides discussing information literacy, critical thinking skills and the connection between the two are rare. Specifically, certain states did not have LibGuides discussing information literacy and critical thinking, and certain regions contained more LibGuides discussing information literacy and critical thinking than others. This clearly demonstrates that undergraduate students do not have complete access to information literacy, critical thinking and other important tools for discerning between correct information and misinformation. More research is certainly necessary, as this is a brief, cursory analysis of current and available LibGuides. Similarly, evaluating the depth of discussion of information literacy and critical thinking is essential to further understand their connection. Although LibGuides discussing information literacy and critical thinking are an important resource, they must be more accessible and available to current undergraduate and graduate students.

References

Allen, M. (2014). Promoting critical thinking skills in online information literacy instruction using a constructivist approach. In *Critical thinking within the library program* (pp. 20-37). Routledge.

Al-Zou'bi, R. (2021). The impact of media and information literacy on acquiring critical thinking skill by the educational faculty's students. *Thinking Skills and Creativity, 39,* 100782.

Association of College and Research Libraries. (1989). *Presidential committee on information literacy.*

Bartram, J. (2019). Library: Peer support community: Literature review.

Bowen, A. (2014). LibGuides and web-based library guides in comparison: Is there a pedagogical advantage? *Journal of Web Librarianship, 8*(2), 147-171.

Becker, D. A., Arendse, J., Tshetsha, V., Davids, Z., & Kiva-Johnson, V. (2022). The development of LibGuides at Cape Peninsula University of Technology Libraries and the impact of the COVID-19 lockdown on their usage. *IFLA Journal, 48*(1), 57-68.

Berg, C., Malvey, D., & Donohue, M. (2018). Without foundations, we can't build: Information literacy and the need for strong school library programs. *In the Library with the Lead Pipe*. https://www.inthelibrarywiththeleadpipe.org/2023/01/information-literacy-and-strong-school-library-programs/

Bozarth, L., Quercia, D., Capra, L., & Scepanovic, S. (2022). The role of the Big Geographic Sort in the circulation of misinformation among US Reddit users. *arXiv preprint* arXiv:2205.10161.

Carey, J., Pathak, A., & Johnson, S. C. (2021). Information literacy session attendance and library website visit frequency: Impacts on awareness of LibGuides among undergraduate and graduate health professions students at an urban campus.

Clever, K. A. (2020). Connecting with faculty and students through course-related LibGuides. *Pennsylvania Libraries: Research & Practice, 8*(1), 49-57.

Diehm, R. A., & Lupton, M. (2014). Learning information literacy. *Information Research, 19*(1), 1-15.

Dobbs, A. W., Sittler, R. L., & Cook, D. (Eds.). (2013). *Using LibGuides to enhance library services: A LITA guide* (Vol. 23). American Library Association.

Duffy, B., Maluski, K., & Levitan, G. (2021). Framing the guides: Transforming LibGuides creation through conceptual integration with the ACRL framework.

Ennis, R. H. (2018). Critical thinking across the curriculum: A vision. *Topoi, 37,* 165-184.

Forati, A. M., & Ghose, R. (2021). Geospatial analysis of misinformation in COVID-19 related tweets. *Applied Geography, 133,* 102473.

Fourney, A., Racz, M. Z., Ranade, G., Mobius, M., & Horvitz, E. (2017, November). Geographic and temporal trends in fake news consumption during the 2016 US presidential election. In *CIKM* (Vol. 17, pp. 6-10).

Goodsett, M. (2020). Best practices for teaching and assessing critical thinking in information literacy online learning objects. *The Journal of Academic Librarianship, 46*(5), 102163.

Giullian, J. C., & Zitser, E. A. (2015). Beyond LibGuides: The past, present, and future of online research guides. *Slavic & East European Information Resources, 16*(4), 170-180.

Hossein Rezaei, M., & Tashk, A. (2021). An analysis of common subjects between information literacy and critical thinking papers indexed in the Web of Science Database.

Hutchison, K. (2018). What is a LibGuide? *LibAnswers.* Retrieved October 20, 2023, from https://libanswers.com/faq/what-is-a-libguide

Huitt, W. (1998). Critical thinking: An overview. *Educational Psychology Interactive, 3*(6), 34-50.

Julien, H., Gross, M., & Latham, D. (2018). Survey of information literacy instructional practices in US academic libraries. *College & Research Libraries, 79*(2), 179.

Karanja, L. (2021). Teaching critical thinking in a college-level writing course: A critical reflection. *International Online Journal of Education and Teaching, 8*(1), 229-249.

Lee, Y. J. (2017). Understanding higher education institutions' publicness: Do public universities produce more public outcomes than private universities? *Higher Education Quarterly, 71*(2), 182-203.

Linares, R. H., & Johnson, A. M. (2016). Comparing apples to apples and oranges: An exploration of the use of LibGuides in ARL libraries. *The Southeastern Librarian, 64*(1), 16.

Lundy, R., & Curran, R. (2020). Desperately seeking funding: Library guides to student funding. *Reference Services Review, 48*(3), 415-431.

Machete, P., & Turpin, M. (2020). The use of critical thinking to identify fake news: A systematic literature review. In *Responsible design, implementation and use of information and communication technology: 19th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, I3E 2020, Skukuza, South Africa, April 6–8, 2020, Proceedings* (Part II, pp. 235-246). Springer International Publishing.

Mann, B., Arnold, J. L., & Rawson, J. (2013). Using LibGuides to promote information literacy in a distance education environment. In *Using LibGuides to enhance library services: A LITA guide* (pp. 221-234).

McCarthy, C. A., & MacDonald, M. C. (2022). We're all in it together: Professional development linking multi-type libraries with information literacy instruction across one state.

Mokia, R., & Rolen, R. (2012). LibGuides: Improving student and faculty access to information literacy. *Codex: The Journal of the Louisiana Chapter of the ACRL, 1*(4), 37-45.

Osorio, N. L. (2015). Electrical engineering reference resources: A survey from LibGuides. *Collection Building, 34*(1), 6-12.

Pierri, F., Perry, B., DeVerna, M. R., Yang, K., Flammini, A., Menczer, F., & Bryden, J. (2021). The impact of online misinformation on US COVID-19 vaccinations.

Powers, J., Musgrove, A., & Rebar, L. (2017, March). Creative applications of LibGuides to teach undergraduate students information literacy skills. In *Society for Information Technology &*

Teacher Education International Conference (pp. 1407-1413). Association for the Advancement of Computing in Education (AACE).

Silva, H., Lopes, J., & Dominguez, C. (2018, June). Enhancing college students' critical thinking skills in cooperative groups. In *International Conference on Technology and Innovation in Learning, Teaching and Education* (pp. 181-192). Cham: Springer International Publishing.

Stuit, M., Rose, M., & Lee, A. (2017). Check your facts: Teaching critical thinking on news.

Usher, N. (2023). Delegitimizing rural public health departments: How decaying local news ecologies, misinformation, and radicalization undermine community storytelling networks. *The ANNALS of the American Academy of Political and Social Science, 707*(1), 90-108.

Wightman, R. I. (2023). Instruction by design: Embedding the library into curriculum design. In *Leading dynamic information literacy programs* (pp. 85-97). Routledge.

Withorn, T., Messer Kimmitt, J., Caffrey, C., Andora, A., Springfield, C., Ospina, D., ... & Vermeer, W. (2020). Library instruction and information literacy 2019. *Reference Services Review, 48*(4), 601-682.

Yelinek, K., Neyer, L., Bressler, D., Coffta, M., & Magolis, D. (2010). Using LibGuides for an information literacy tutorial: Tutorial 2.0. *College & Research Libraries News, 71*(7), 352-355.

Zak, E. (2024). Three years of misinformation: A case study of information literacy methods.

Declarations: