Interrupting Generative AI in LIS: Using Analog, Project-Based, In-Class, Team Work to Validate Core Research Competency Learning

Sarah E. Ryan[a]

[a]University of North Texas, U.S.A.

sarah.ryan@unt.edu

ABSTRACT

Generative AI is a powerful tool that we should be teaching our students to harness. At the same time, we must ensure that our students can perform core research tasks such as finding, reading, summarizing, and synthesizing academic research, in keeping with ALA Core Competency 7A. Because generative AI produces imperfect, college-level writing that can be difficult to identify as non-human, instructors face a new challenge in validating that students have learned 7A's search-summarize-synthesize skills. One solution is the use of analog, scaffolded, in-class research skills activities accompanied by immediate instructor validation and feedback. This paper presents a 20-part literature review assignment as an example. This example demonstrates that when we watch our students reading, annotating, discussing, and mind mapping journal articles, we can be sure that they are learning the skills that will enable them to leverage tools like generative AI as a bridge to advanced work.

In the era of generative AI, more students are contracting out their work to technology (Stahl & Eke, 2024). This is good and bad news.

The good news is that generative AI could help our students to progress to appropriate, advanced work more quickly. Competent librarians and information science professionals possess higher-level research and information management skills than college students, as the American Library Association's "Core Competences of Librarianship" demonstrate. In the context of Bloom's revised taxonomy (Anderson & Krathwohld, 2001), the ALA Competencies emphasize application, analysis, evaluation and creation (i.e., as opposed to recall, recognition, identification, etc.) (ALA Council, 2023). Generative AI offers our students a tool for culling facts, identifying patterns, and creating summary statements, or completing lower-level work, more efficiently. Artificially-generated output can be a stepping stone to higher-level tasks (Eke, 2023) such as drafting a collection development policy or marketing kit for a specific library, or crafting a personal leadership philosophy or professional development plan. This advanced work should predominate the short time that we have with our master's students. In that regard, we should celebrate that ChatGPT and similar tools can remove low-lying obstacles to higher-level work. But generative AI can also be used to avoid or falsify higher-level work.

How Generative AI Complicates Research Skills Assessment

As Stahl and Eke (2023) recently noted, generative AI has advanced to the point that it produces credible student-like output on tasks of varied difficulty. This makes traditional assessment challenging and undermines well-hewn definitions of academic misconduct. While some commenters have suggested that assessment concerns are the musings of luddite instructors (Rudolph, Tan, & Tan, 2023; Stoken-Walker, 2022), many critics fail to explain how instructors can effectively gauge if a human student has demonstrated certain core competencies through a piece of writing. For instance, ALA Competency 7A requires our students to

> Discover, engage with, and synthesize existing research from the field using multidisciplinary approaches to various information issues to align relevant findings to one's own professional development and/or institutional needs.

In essence, library and information instructors should be able to review a student's writing to assess if that human has read, summarized, compared, and contrasted academic research. Some assignments should also show us students' discovery strategies. When students submit re-worked AI-generated writing, we cannot assess if they have satisfied core competency 7A.

Consider a series of three prompts to ChatGPT: 1) What is linked data, 2) What are some sources for this information, and 3) Cite these sources in APA format. These three prompts yield a tidy paragraph summarizing linked data, a seven-point list of key principles of linked data, an eight-point list of the types of information sources one could use and examples of key sources (e.g., key authors), and a seven-item reference list, in imperfect but passable APA format. The summary paragraph is written at a college level (see Good calculator):

> Linked Data is a method of publishing structured data on the web, following principles laid out by Tim Berners-Lee, inventor of the World Wide Web, and others. It extends the

web of interconnected documents to a web of interconnected data. The core idea is to use standardized formats and protocols to enable data to be interlinked and queried in a decentralized manner.

Given paragraphs like this, and in the context of the known limits of AI content detectors (Wu & Flanagan, 2023), it can be difficult to assess if a student has read the underlying resources and developed the submitted synthesis. That is a problem for library and information science educators. A related problem is whether students have adhered to academic integrity standards.

While definitions of academic integrity vary, most focus on whether students have behaved honorably by not plagiarizing or cheating (Macfarlane, Zhang, & Pun, 2014). In some regards, the rules are clear—e.g., don't buy a paper from a mill—but in other ways, academic integrity is part of the hidden curriculum of academia (Saunders, et al., 2015; Smith, 2013). Though every university, and some departments, have academic integrity policies, they are often poorly written, culturally biased, and fail to sufficiently parse unacceptable behaviors (Taylor & Bicak, 2019). While reasonable students should understand that turning in another person's paper is prohibited, what should they conclude about spell check? The Microsoft Word thesaurus? GoogleScholar as a cite generator? Etc. Generative AI offers more tools to the student author, ranging from paragraph re-writing to knowledge summary. Few academic integrity policies are rich enough to provide good guidance on the use of generative AI to the student or instructor. This new issue compounds long-term challenges in research skills teaching and assessment.

The Long-Term Challenges of Teaching Research Information Searching, Summarization, and Synthesis

Librarians and LIS instructors have long documented the difficulties of teaching research information searching, resource summarization, and academic literature synthesis (Cochran & Beatty, 2023; Hicks, 2017; Hosier, 2015; Saunders, et al., 2015). We know that students face different challenges based upon their individual educational backgrounds and educational-cultural backgrounds (Saunders et al., 2015). In a survey of LIS students from 18 nations, Saunders and colleagues (2015) discovered national differences in students' perceptions of the difficulty of constituent skills such as rephrasing and knowing if a use of a source constituted plagiarism. For instance, "[s]tudents in the United States expressed the least difficulty with knowing whether use of a source constitutes plagiarism (13%), but were somewhat more likely than students in Switzerland to agree that knowing when to cite a source is difficult (12% and 9% respectively)" (Saunders et al., 2015, p. S87). The study team urged faculty to consider incorporating research exercises into their classes (Saunders et al., 2015). Other researchers have advocated for scaffolded assignments.

Assignment scaffolding, or the use of sub-tasks and check-in points, is a promising strategy for teaching literature finding, summarizing, and comparing skills (Hicks, 2017; McNiff & Hays, 2020). In a pilot program with MLIS students, McNiff and Hays (2020) discovered that a scaffolded information searching assignment with in-class and active learning components helped students to become better and more confident literature finders. Their participants appreciated that they would learn a search skill, immediately practice it, and then reflect on their practice with the instructor (McNiff & Hays, 2020). In a mock article assignment with MLIS

students and librarian peer reviewers, Hicks (2017) discovered that students gained practice insights and writing confidence from librarians' responses to their short articles. Some of these students wanted more time for revision and classmate review prior to external peer review (Hicks, 2017). Regardless of how the assignment evolves, Hicks emphasized the importance of communal activities that underscore that our professional competencies—even research competencies—are developed via interaction and collaboration with our peers.

In sum, it has long been difficult to teach search-summarize-synthesize skills. Instructors have found success via scaffolded assignments, active and communal learning, immediate instructor feedback, and other techniques. Still, no single technique resolves next-generation research issues, including wholesale outsourcing of literature reviews to generative AI systems. A combination of analog, scaffolded, active, communal, and immediately-assessed techniques can help us ensure that our students are achieving ALA Competency 7A.

INTERRUPTING MYRIAD INSTRUCTIONAL CHALLENGES: USING AN ANALOG, TEAM-BASED LITERATURE REVIEW PROJECT TO ENSURE 7A COMPETENCE

Unpacking ALA Competency 7A

The beauty of the ALA Core Competences of Librarianship are the guidance and flexibility they offer instructors. As noted above, Competency 7A seems to require students to show that they can find, read, summarize, and compare/contrast academic literature. For many LIS instructors, 7A will translate into assessment criteria like this:

1) Found and read academic publications
   a. Selected mostly peer-reviewed journal articles
      i. Optional: Checked journal websites, Ulrichs
   b. Favored recent/current resources (i.e., for non-historical topics)
   c. Excluded resources that did not relate to the specified topic
   d. Concentrated on the LIS discipline or a related discipline
   e. Optional: Featured resources using a particular research methodology
2) Summarized each resource
   a. Identified the main thesis
   b. Identified the most important research finding (i.e., for empirical articles)
   c. Identified the significance and impact of the article
   d. Understood the methodological choices (i.e., for empirical articles)
   e. Analyzed the methodological strengths and weaknesses
   f. Justified the resource's suitability for inclusion in the literature review
   g. Cited the research in a designated format (e.g., APA)
3) Compared/contrasted academic literature
   a. Identified overlapping ideas and conversations
   b. Analyzed agreements and disagreements among different authors/resources
   c. Synthesized broad themes, lessons, or findings
   d. Optional: Discerned historical changes in ideas, theories, or outcomes

      e.   Grouped resources into subtopics of the specified topic
      f.   Labeled subtopics
          i.   Crafted multi-word subheadings
         ii.   Articulated different, usually mutually-exclusive, subheadings
       iii.   Ensured that each subheading captured the main point of its underlying resource collection

Unpacked, competency 7A includes a range of advanced skills. Fortunately, much of this learning can be done in class through a series of guided, paper-based exercises. If structured as a team project, students can be working through the 7A competencies in teams, with the assistance of their instructor, while the instructor or teaching assistant assesses their progress. A pilot project in the introductory LIS foundations class at [author's university] demonstrates the potential of this approach to both increase student mastery of foundational skills and reduce the submission of AI-generated work.

      a.   The Pilot Project: The Team Literature Review Research Poster Project

In fall 2023, I launched a pilot project in [course number and name], a core course for students earning Information Science or Library Science master's degrees at [my university]. The course covers the history, roles and scope of the information and knowledge professions, including topics such as: cybersecurity, diversity, ethics, intellectual freedom, privacy, etc. Course activities emphasize research, team building, and leadership skills. Enrolled students specialize in fields ranging from Archival Studies to Health Informatics to Information Systems to Music Librarianship. At our university, most domestic students complete [course prefix and number] online rather than face-to-face. In my fall 2023 face-to-face section, three students were domestic and 42 were international students from India, Indonesia, and Iran.

The pilot project was prompted by several of the challenges described above and some unique to the instructor's prior experience teaching the course. The four primary challenges identified at the start of the project were:

1. Digital publishing and web-based retrieval obscure material type (e.g., chapter vs. article)
2. Diverse student educational backgrounds lead to divergent understandings of research collection, description, and representation
3. Incoming LIS students rarely know the field's journals, key authors, topical trends, etc.
4. Students often start gathering materials without a clear goal or plan
5. Plagiarism and generative AI outsourcing have been on the rise in this course

The project unfolded over twelve weeks, included 14 in-class activities and six outside assignments, and concluded in a conference-style research poster presentation session. The table below presents the 20 activities and assignments aligned to the 7A competencies. Students received 800 points for the project, amounting to 80% of their semester grade. This included: (a) 50 points each for eight in-class activities; (b) 40 points each for the five articles they brought to class (in print); and (c) 200 points for their team research project poster.

	Assignment (I = in-class; O = outside class)	Week	Pre-7A	7A: Find/read	7A: Summarize	7A: Compare
1	Review print journal volume to understand volume/issue/article; select an article, create its APA cite (I)	1	X		x (APA citation)	
2	Deliver 30-second speech on research topic that interests you (individual) (I)	1	X	x (articulate a topic)		
3	Review your assigned articles in pairs, use the worksheet "Digesting & Understanding…" and a Qualtrics instrument to log: APA citation, discipline of study, method of study (I)	2	X		x (citation, discipline, method)	
4	Draw a poster of your top two research interests; present at class poster session; find others with similar interests, form research team, and determine first research finding goal (I)	2	X	x (articulate a topic)		
5	Find a peer-reviewed journal article for your team project, print it, and bring to class (O)	2		x		
6	Swap articles with teammate and use the worksheet "Annotated Bibliography…" to create APA citation, check discipline and peer-review, and summarize, evaluate, justify the article (I)	3		x (read an article)	x	
7	Find a second peer-reviewed journal article for your team project, print it, and bring to class (O)	3		x		
8	Listen to APA citation lecture, review hand-out, and take in-class quiz (Canvas) (I)	4	X		x (APA citation)	
9	Swap articles with teammate and use worksheet "Teammate Literature Review Screening" to quickly assess fit for team literature review, including: thesis, main finding, weakness, and inter-relation to other team articles (I)	4		x	x	x (inter-relation to other team articles)
10	Interview (reference style) classmate who is not on your team about their project, determine if their topic is too narrow or broad, and offer them advice on finding their next article (I)	4	X	x		
11	Meet with your research team to discuss the breadth/narrowness of your topic and articulate a search strategy for the remaining articles (I)	4	X	x		
12	Find a third peer-reviewed journal article. . . (O)	4		x		
13	Listen to lecture on mind maps, review example LIS literature review mind map, and create team mind map using all gathered articles (i.e., 12 articles for a four-person team) (I)	5			x	x (mind-map of ~9-12 articles)
14	Find a peer-reviewed journal article. . . (O)	5		x		
15	Review Svard article with instructor/class re: how each part could contribute to a lit. review (I)	6		x	x	
16	Find a fifth peer-reviewed journal article. . . (O)	6		x		
17	Review PPT poster templates, select a template, begin to map out your subsections and articles (I)	7			x	X
18	Complete scavenger hunt including research poster examination (e.g., font, use of visuals) (I)	10	X			x (synthesize w/ visuals)
19	Complete team research poster in PPT (O)	11			X	x
20	Present team poster at class conference (I)	12			x	x

Validation, Assessment, and Insights into Students' Learning

During the project, I was able to immediately validate most 7A sub-competencies in class, including: finding and reading peer-reviewed resources; identifying a resource's discipline, main ideas, and various strengths/weaknesses; locating and describing an empirical article's methodology(ies); justifying a resource's fit within a literature review/paper on a specific topic, and comparing and contrasting academic literature, including developing sub-topical collections, labelling those collections, and writing succinct synthesized descriptions of the collections. The poster format forced groups to craft succinct sub-topical sections. Some poster sections still marched through each resource one by one, but all posters contained at least one successful synthesis of literature and students seemed to grasp that those sections were the most successful.

Prior to the project, I had not been able to validate that some students had read any academic journal article beyond its abstract. I had not identified the specific difficulties my students faced in crafting APA citations. For instance, many of my Indian students struggled to identify an author's "last name," "first name," and "middle initial(s)" because naming conventions differ between the U.S. and India. Had I not had students write APA citations five times, in class, I would not have understood this difficulty. Our class poster session also offered a bird's eye view of the class's learning, including domain knowledge gains.

Through the project, students gained domain knowledge such as the PREMIS Data Dictionary for Preservation Metadata and the Hamming distance method for iris matching in bio-authentication. Their resource collections were more focused, better organized, and better synthesized than in the four prior semesters I taught INFO 5000, when students had completed term papers individually. During the fall 2023 poster session, students explicated their research processes and challenges, and adeptly described their final resource collections.

My fall 2023 summative student evaluation score was my highest for [class prefix and number]. Students also wrote to me with effusive praise for the project. They reported learning: (1) how to find articles using library databases (i.e., not just GoogleScholar); (2) how to deconstruct a journal article and identify its parts; (3) domain knowledge; and more. Many wrote before and after the course to say that they had had fun with the project and learned a lot.

Students seemed to connect more with their classmates than in previous semesters. In fall 2023, students had to walk around and talk to each other throughout the semester (e.g., topic of interest poster presentation, reference interview of a non-teammate, etc.). At our final poster session, students ate snacks, milled around, asked each other questions, and took pictures with their teammates and posters. The conference poster session seemed to unite the class; I hope it decreased students' feelings of isolation too. The connecting power of such activities deserves more research, especially as we utilize analog work with our online learners.

CONCLUSION

Teaching literature review skills has always been difficult because academic research is complicated, technical, and specialized. Students face myriad challenges in becoming competent

readers and critiques of academic work. With the advent of generative AI, some students will avoid this difficulty learning by employing bots to find, describe, and analyze academic literature. This is not at all surprising and not all bad. As instructors, we can embrace analog teaching exercises, including scaffolded team-based projects with heavy in-class work, as a means of validating and assessing core skills and encouraging students to embrace the hard work that will help them become scholars of library and information science. With LIS competence and mastery, our students can then use generative AI as a bridge to advanced work.

REFERENCES

ALA Council. (2023). ALA's core competences of librarianship. Retrieved March 16, 2023 from:
https://www.ala.org/educationcareers/sites/ala.org.educationcareers/files/content/2022%20ALA%20Core%20Competences%20of%20Librarianship_FINAL.pdf

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of educational objectives*. Longman.

Cochran, C. A. & Beatty, L. (2023). *Teaching the annotated bibliography: A resource for instructors, librarians, and other academic professionals*. Routledge.

Eke, D. O. (2023). ChatGPT and the rise of generative AI: Threat to academic integrity?. Journal of Responsible Technology, 13, 100060.

Hicks, A. (2017). Participation as pedagogy: Student and librarian experiences of an Open Access publishing assignment. *Journal of Education for Library and Information Science*, *58*(3), 160-175.

Hosier, A. (2015). Teaching information literacy through 'un-research.' *Communications in Information Literacy*, *9*(2), 126-135.

Good calculator. Retrieved on March 16, 2024 from https://goodcalculators.com/flesch-kincaid-calculator/

Macfarlane, B., Zhang, J., & Pun, A. (2014). Academic integrity: a review of the literature. *Studies in higher education*, *39*(2), 339-358.

McNiff, L., & Hays, L. (2020). How master of library studies students learn to search for information: A pilot study. *Journal of Education for Library and Information Science*, *61*(4), 463-480.

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?. *Journal of applied learning and teaching*, *6*(1), 342-363.

Saunders, L., Kurbanoglu, S., Boustany, J., Dogan, G., Becker, P., Blumer, E., Chowdury, S., Dobreva, M., Gendina, N., Grgic, I. H., Haddow, G., Koltay, T., Kortelainen, T., Krakowska, M., Majid, S., Mezhova, M., Repanovici, A., Rudžioniene, J., Schneider, R., Terra, A. T., & Todorova, T. Y. (2015). Information behaviors and information literacy skills of LIS students: an international perspective. *Journal of education for library and information science*, *56*(s1), S80-S99.

Smith, B. (2013). *Mentoring at-risk students through the hidden curriculum of higher education*. Lexington Books.

Stadler, D., Rojas, A., Perrenod, W., & Keyes, C. (2021). Using a scaffolding approach to integrate the information cycle into a library instruction course: A review and small case study. *Journal of Education for Library and Information Science, 62*(2), 119-136. DOI: 10.3138/jelis.62.2-2020-0011

Stahl, B. C., & Eke, D. (2024). The ethics of ChatGPT – Exploring the ethical issues of an emerging technology. International Journal of Information Management, 74, 102700.

Stokel-Walker, C. (2022). AI bot ChatGPT writes smart essays-should academics worry?. *Nature*. Retrieved on March 16, 2024 from https://www.nature.com/articles/d41586-022-04397-7

Taylor, Z. W., & Bicak, I. (2019). Academic honesty, linguistic dishonesty: Analyzing the readability and translation of academic integrity and honesty policies at U.S. postsecondary institutions. *Journal of Academic Ethics*, *17*, 1-15.

Wu, H., & Flanagan, T. (2023). The limits of AI content detectors. *Journal of Student Research*, *12*(3).

APPENDIX: SAMPLE IN-CLASS WORKSHEET

Annotated Bibliography: Article Analysis Sheet

Your name   _____

APA article citation   _____

_____

Is your article from a LIS journal?   _____ yes   _____ no

Is the journal peer-reviewed (check Ulrichs!)   _____ yes   _____ no

I.   **Summarize**

a.   What is the main thesis, question, or point of this article?

b.   What is the most important finding of this research? (significance)

c.   Why does this article matter? (impact)

II.   **Evaluate**

a.   What is a methodological (e.g., way the data was gathered) or theoretical (i.e., broadly) strength of the article?

b.   What are two methodological or theoretical weaknesses of the article?

III.   **Justify**: In your words, why should your team include this article in your literature review?