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Aha! Centering Student Voices to Better Understand an Instruction Program

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Abstract

This article describes using aha moments as an assessment approach to gain a better understanding of student learning in relation to the six frames in the Association of College and Research Libraries (ACRL) *Framework for Information Literacy for Higher Education*. Librarians asked students to share an aha moment following information literacy instruction sessions during the fall 2022 semester. Researchers coded responses to one of the six IL frames and found that student insights most often reflected learning aligned to the “Searching as Strategic Exploration” frame, though “Information Has Value” also had a strong presence. The results provided a holistic picture of student information literacy learning at Northern Kentucky University and are driving programmatic changes.

Keywords: assessment, student learning, ACRL *Framework*, aha moments, threshold concepts

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Aha! Centering Student Voices to Better Understand an Instruction Program

At Northern Kentucky University (NKU), teaching librarians sought to reinvigorate assessment practices of the library's information literacy instruction program and pursued a wide-scale approach that would delineate student learning among the six frames presented in the Association of College and Research Libraries (ACRL, 2015) *Framework for Information Literacy for Higher Education*. The interconnected frames reflect core concepts of information literacy education and no one frame is meant to be privileged. Yet, when designing information literacy instruction or program outcomes, teaching librarians may find themselves emphasizing some concepts over others. The *Framework* authors wrote that the document was never intended to be prescriptive and, for some librarians, a focus on only one or two frames in their instruction work may be intentional. On the other hand, an over- or underemphasis on some frames over others may not be intentional nor fully understood by teaching librarians, especially when most information literacy instruction occurs in the one-shot context and is spread across academic levels and disciplines.

Inspired by work from Gammons and Inge (2017), NKU librarians used aha moments as a method to assess student learning after information literacy instruction. In doing so, librarians aimed for a holistic understanding of information literacy learning as a result of the library's instructional program. Which concepts left a mark on students and, equally important, which concepts did not? This article will describe the aha moment approach to assessment and include a codebook that mapped student language to the *Framework* concepts. Collectively, aha moments provided librarians with useful, if somewhat surprising, data about student learning and insight into how students articulate their information literacy knowledge. The results also add perspective on the complexity of the "Information Has Value" frame in a one-shot context.

Literature Review

According to the online Merriam-Webster dictionary (n.d.), an aha moment is "a moment of sudden realization, inspiration, insight, recognition, or comprehension." Asking students to share an aha moment after an instruction session is an opportunity to learn students' most significant and transformative takeaway in their own words. These flashes of insight share similarities with the idea of threshold concepts, as described by Meyer and Land

(2003), which are a key underpinning to the *Framework for Information Literacy*. Like an aha moment, crossing a pedagogical threshold is transformative in shaping a learner's understanding of a concept and is "akin to a portal, opening up a new and previously inaccessible way of thinking about something" (Meyer & Land, 2003, p. 1). Main concepts in the *Framework*, like "Research as Inquiry" or "Scholarship as a Conversation," are not designed to be grasped in one class meeting or module (ACRL, 2015, p. 25). However, small insightful moments enhance knowledge, one realization at a time, that align with larger concepts.

Gammons (2016) described the aha moment approach in the *Critical Library Pedagogy Handbook* as a critically conscious approach that asks students to "sift through the session and share a moment of personal impact" (p. 236). In comparison to multiple-choice reflection questions and other standardized methods of assessment, asking students for their aha moment provides more opportunities for students to reflect and describe the learning that most mattered to them. Further, asking students to share a brief, transformative learning experience is a metacognitive act. McCoy (2022) described metacognitive skills as the "invisible" reflective learning that occurs alongside information literacy learning (p. 43). Aha moments provide that reflective space to consider prior knowledge and then articulate how that knowledge or thinking has changed in such a way that is meaningful to the learner.

Gammons and Inge (2017) applied the aha moment approach at the University of Maryland to address a large-scale assessment need of first-year students and their IL knowledge. The researchers asked first-year composition students to share their aha moment following an IL instruction session and coded student responses to the six ACRL frames, specifically looking for evidence of dispositions and knowledge practices that were addressed during the instruction session. Gammons and Inge (2017) found that student aha moments most often aligned with the frames, "Information Creation as a Process" and, to a lesser extent, "Searching as Strategic Exploration."

Eva et al. (2021) at the University of Lethbridge applied a similar assessment approach after noticing first-year students in a general education course were using weak search methods and sources in their assignments, even after receiving information literacy instruction. Researchers asked students to complete short learning reflections that included their aha moments following participation in newly developed information literacy labs. Student responses were coded to the six ACRL frames, as well as four additional researcher-created

frames, and “Searching as Strategic Exploration” emerged as the dominant frame (Eva et al., 2021). The researchers used the results to identify trends in first-year student learning and to better understand information literacy knowledge following the labs.

Using aha moments as an approach to assess information literacy instruction is not widely documented, nor is any other approach that maps qualitative data to the *Framework* concepts. Additionally, the examples shared above focus on first-year students. This research at NKU sought to extend and build on prior studies by using aha moments to assess students’ information literacy habits and knowledge across the undergraduate student population.

IL Teaching and Learning at Northern Kentucky University

The NKU Library created its Education & Outreach Services (EOS) department in 2020, reorganizing librarians from a few different units, including the former instructional services unit. This was partially due to the university adopting information literacy as the topic of the institution’s Quality Enhancement Plan (QEP). The QEP is a required component for schools accredited by the Southern Association of Colleges and Schools Commission on Colleges. The reorganization devoted more teaching librarians to lead information literacy efforts tied to the QEP, *GEARUP with Information Literacy*. GEAR is an NKU-developed acronym for Gather, Evaluate, Apply, and Respect. The QEP included an assessment plan that integrated analysis of artifacts from students in revised GEAR courses taught by disciplinary faculty. However, the assessment of librarian-led instruction, in the one-shot format, needed attention, especially as the number of teaching librarians, with varying levels of experience and approaches, expanded in the department.

Initially, EOS librarians used the instruction survey from ACRL’s Project Outcome (<https://acrl.projectoutcome.org/>). Project Outcome provides several standardized surveys to measure library outcomes, including one that focuses on the impact of instruction services. The data collected was valuable for EOS librarians to communicate the library’s positive impact on students and their exposure to resources. However, the survey did not tell librarians specifics about the content learned nor how it connected with the *Framework* or local GEAR outcomes.

During the fall 2022 semester, EOS librarians began using a new standardized lesson plan to teach most sections of a first-year writing course (ENG 101). The plan addressed learning outcomes aligned with the frames, “Searching as Strategic Exploration” and “Information

Has Value,” and librarians wondered if student takeaways would also align with the frames. As a department, the librarians had made some attempts to scaffold concepts across academic levels, but standardized approaches (like the plan for ENG 101) were not used nor were consistent learning outcomes always applied, especially in upper-level courses where assignments and course instructors varied each semester. Ultimately, EOS librarians wanted an inventory of student learning, across academic levels, so they could understand what concepts were sticking with students and identify learning gaps. Further, librarians wondered how learning might differ between those who had attended prior instruction sessions and those who had not. Librarians decided to use the aha moment approach due to its brevity and the potential to gather useful programmatic data that would delineate learning between different populations.

Method

The authors used a Qualtrics survey with the prompt: “Please describe your aha moment from this session in two sentences or less. An aha moment is a moment where you had sudden insight or discovery of new knowledge.” The survey also asked respondents to provide their academic level and whether they had previously attended one or more instruction sessions in the library. The authors placed QR codes in each classroom that linked students to the survey. Completing the survey was optional and not tied to a course assignment or extra credit. After each instruction session, teaching librarians invited students to scan the codes and voluntarily complete the survey.

The authors piloted the aha moment assessment during the 2021/2022 academic year and used nearly 400 student responses collected during the fall 2021 semester to develop a codebook. These initial 400 responses came from about 800 students in 19 distinct undergraduate and three graduate courses, some with multiple sections. Forty percent of the respondents were in their first year, 5% were graduate students, and the remaining students were sophomores, juniors, and seniors. A librarian and an MLIS graduate student individually coded each aha moment to one of the six ACRL frames and one of the GEAR outcomes, which librarians had previously mapped to the ACRL frames. Researchers compared their codes with each other and talked through discrepancies, using the knowledge practices and dispositions within each frame to guide decisions. This work led to the creation of a codebook that describes how researchers translated student takeaways to one of the six frames (see Table 1).

With the development of the codebook and realizing the value of the collected aha moments for the broader profession, librarians sought IRB approval. After receiving an exemption for spring 2022 and approval to continue without review, librarians invited students to share their aha moment after nearly every instruction session during the fall 2022 semester. The librarian and a graduate student followed the same process as the prior year of individually coding comments using the codebook and then meeting to discuss differences. Due to the variety of responses around the “Information Has Value” frame, the codebook was slightly revised to divide the frame into three subcodes: *Bias*, *Privilege*, and *Attribution* (see Table 1). While responses from the fall 2021 semester were used to develop the initial codebook, this article is only sharing the results and analysis of responses from the IRB-approved study in fall 2022 semester.

Table 1: ACRL Frames and Aha Moments Codebook

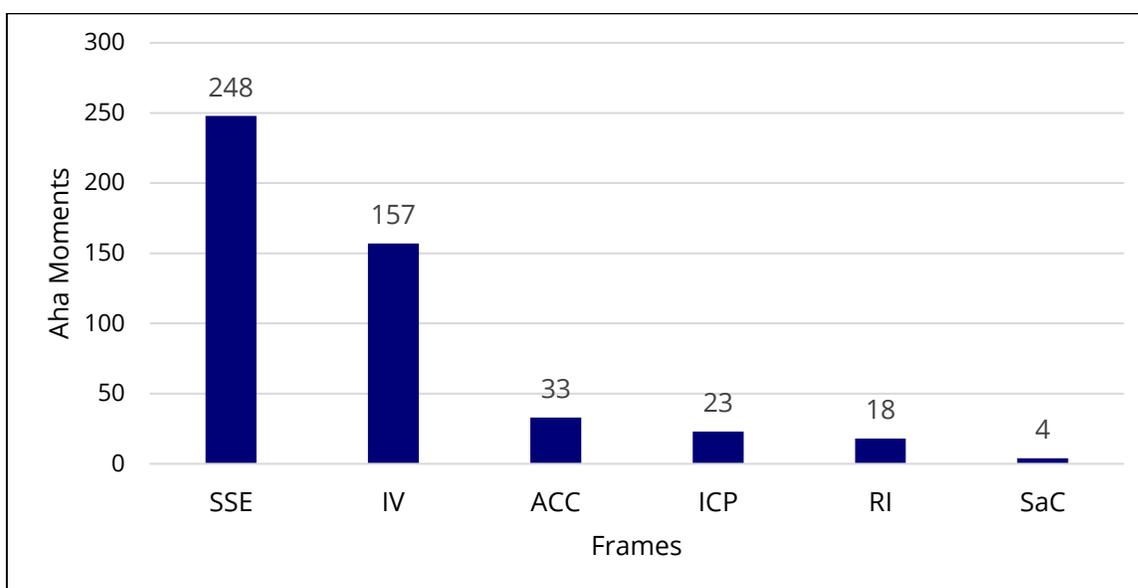
Frame	Description	
Authority Is Constructed and Contextual (ACC)	Comments about evaluating information, including the use of the SIFT method (fact-checking); credibility of sources; any mention of authority; recognizing value/expertise of different types of sources (not only peer-reviewed); recognition of author point-of-view/bias.	
Information Creation as a Process (ICP)	Comments about the information production cycle and recognition of different types of sources; considering information format as an evaluation strategy (popular versus scholarly); learning about the peer review process.	
Information Has Value (IV)	Bias	Comments that indicate a recognition of bias in systems/algorithmic bias; consideration of how one’s online interactions influence the information received.
	Privilege	Comments that reflect a realization, sometimes for the first time, that the library provides access to a lot of resources, and that realization may include the cost of information. Comments also included a recognition of copyright and licensing restrictions.
	Attribution	Comments that reflect awareness or increased knowledge about the use of citation tools; the value or importance of citing sources.
Research as Inquiry (RI)	Comments about organizing/synthesizing sources; building on the ideas of others; research question or topic development; learning something about a topic. Comments that reflect a recognition of the ambiguous nature of research; displays intellectual humility.	
Scholarship as Conversation (SaC)	Comments that indicate an awareness or use of citation chaining; awareness that sources connect forward and backward; awareness of one’s ability to contribute to a conversation and interact with sources.	
Searching as Strategic Exploration (SSE)	Comments about finding or using resources by subject/topic; specific search strategies (narrowing, subject headings, advanced search options); getting help; managing the search process.	

Results

During the fall 2022 semester, 528 students responded to the aha moment survey from 19 distinct courses, some with multiple sections. About 1,300 students were provided with the opportunity to complete the survey. Fifty-five comments were removed from the analysis because the student indicated they did not have an aha moment or the comment was irrelevant to information literacy learning. Additionally, one graduate student was removed from the analysis, because they were the only graduate student in the sample. A handful of students (11) provided two aha moments within their response. In total, librarians coded 483 aha moments from 472 undergraduate students. Participants represented all academic levels: first-year students ($n = 272$), sophomores ($n = 78$), juniors ($n = 51$), and seniors ($n = 71$). About 29% of respondents indicated they had attended a prior instruction session with librarians.

The majority of aha moments reflected knowledge practices or dispositions aligned with the “Searching as Strategic Exploration” (SSE) frame ($n = 248$). Another significant portion of student comments aligned with the “Information Has Value” (IV) frame ($n = 157$). Of the remaining frames, “Authority Is Constructed and Contextual” (ACC) ($n = 33$), “Information Creation as a Process” (ICP) ($n = 23$), and “Research as Inquiry” (RI) ($n = 18$) had a slight presence. “Scholarship as Conversation” (SaC) ($n = 4$) was nearly absent in the sample. (see Figure 1).

Figure 1: Student Aha Moments Coded to the Framework



The aha moments followed a similar pattern when coded to NKU's QEP-related GEAR outcomes. Since Gather maps to the "Searching as Strategic Exploration" frame as well as to some concepts relevant to "Information Has Value," the Gather category represented nearly 80% of the responses (see Table 2). Like "Scholarship as a Conversation," the Apply and Respect outcomes are barely present in the sample.

Table 2: Student Aha Moments Coded to Local GEAR Outcomes

GEAR Outcome	ACRL Frame	Number of Aha Moments
Gather	Searching as Strategic Exploration; Information Has Value	385
Evaluate	Authority Is Constructed & Contextual; Information Creation as a Process	56
Apply	Research as Inquiry; Scholarship as Conversation	22
Respect	Information Has Value; Scholarship as Conversation	20

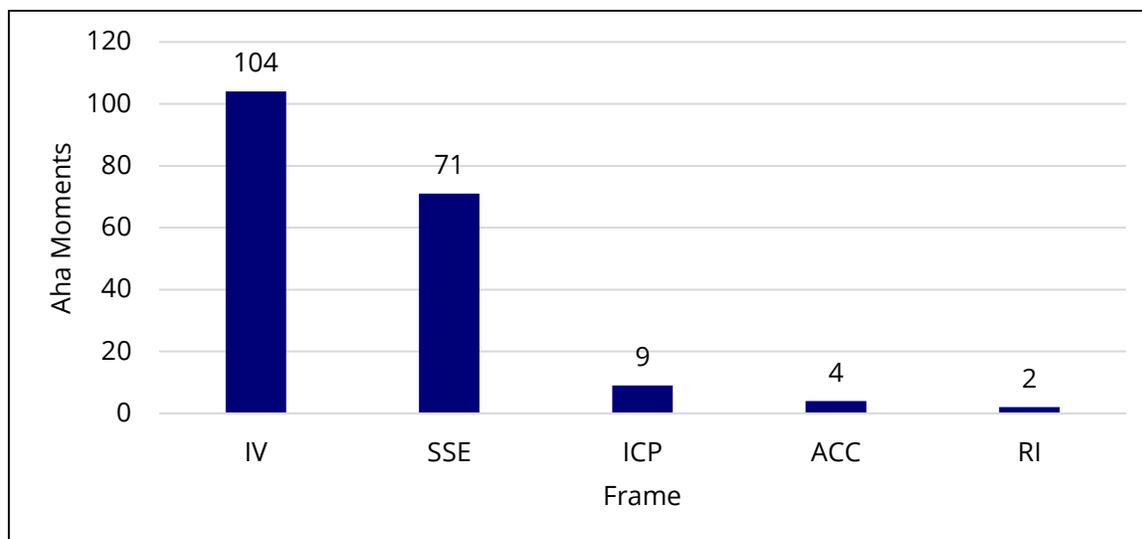
Researchers assigned subcodes to the 157 aha moments that mapped to the "Information Has Value" frame. *Privilege* was the most common subcode, representing more than half of the IV-aligned comments (53%). These comments focused on issues of access, including the cost of access, to information. The *Bias* subcode reflected aha moments that pointed to a realization of bias, especially algorithmic bias, within information systems. These comments represented 34% of the IV codes. The remaining 13% mapped to the *Attribution* subcode and reflected student takeaways about the importance of citations and the usefulness of citation tools.

A couple of differences emerged between first-year student and non-first-year student takeaways, though after further analysis this difference is attributed to multiple sections of ENG 101 in the sample, which is a course that primarily consists of first-year students. Therefore, the differences are more likely due to the lesson plan in the ENG 101 class, rather than the fact that the students are in their first year. Overall, "Searching as Strategic Exploration" was the main takeaway for upper-level students, with 61% of sophomores, juniors, and seniors sharing an aha moment aligned with that frame. However, less than half of comments from first-year students (44%) aligned with the SSE frame—nearly equal to the 41% of comments that aligned with the "Information Has Value" frame. Meanwhile, only 20% of upper-level students shared aha moments that aligned with the IV frame.

The first-year student sample included 190 aha moments from students in multiple sections of ENG 101 and, while there were some differences between sections, the "Information Has

Value” frame dominated with 55% of ENG 101 aha moments coded to the IV frame ($n = 104$). Among those aha moments, 51% were assigned the *bias* subcode and 44% were assigned the *privilege* subcode. Less than 5% had takeaways assigned to the *attribution* subcode. Meanwhile, “Searching as Strategic Exploration” aligned with only 37% of the aha moments ($n = 71$) in ENG 101 sections. See Figure 2 for a breakdown of responses in ENG 101.

Figure 2: ENG 101 Students’ Aha Moments Coded to the Framework



There was very little difference in learning takeaways when comparing responses from those who had attended a prior instruction session versus those who had not. Librarians assumed those with prior instruction might have takeaways that aligned with concepts other than “Searching as Strategic Exploration,” since it was likely such students had already been exposed to SSE concepts. However, findings revealed the opposite, though the difference was small. Those with prior instruction and those without exposure to instruction were both more likely to share a takeaway that aligned with SSE (55% and 49% respectively) and, to a lesser extent, IV (28% and 34% respectively).

Discussion

Searching as Strategic Exploration

NKU student takeaways following an information literacy session most often aligned with the “Searching as Strategic Exploration” frame. Participants demonstrated this insight with comments about exposure to resources for the first time. For example, a first-year student

said, “I learned a lot about getting onto databases. I did not know how to use it before.” And another first-year student said, “My aha moment was realizing there were more ways to research.” Other SSE-related comments reflected on search techniques or the use of specific resources, such as the sophomore who learned “why we put quotes in our searches,” the senior who learned about “using [a] thesaurus to find better language,” and another senior who said, “I didn’t know you could find so many articles to use for research.” While the majority of comments in this category reflected on the use of library resources, some students also talked about using Google or Google Scholar.

It was somewhat surprising for teaching librarians that just over half of the coded aha moments reflected “Searching as Strategic Exploration.” Librarians had expected more variety among the takeaways, especially among upper-level students. However, in most classes, librarians almost always integrate SSE concepts, even when the librarian may not consider it the focus of the session. Additionally, this finding aligns with prior research on the topic that also found student takeaways, at least among first-year students, often connected with the SSE frame (Eva et al., 2021; Gammons & Inge, 2017). The introduction of databases and search techniques is often a new concept for students, especially first-year students. Since many students attend information literacy instruction sessions in the context of preparing for a research paper or other assignment, “Searching as Strategic Exploration” concepts may have a more practical component that is immediately relevant to students. Being introduced to a new resource and being able to search it more effectively for a research assignment may feel immediately insightful; whereas insight gained about source expertise (i.e., “Authority Is Constructed and Contextual”) or the research process (i.e., “Research as Inquiry”) may feel less immediate for students.

Similarly, teaching librarians were surprised and a little disappointed to see so much alignment between student takeaways and the local Gather concept from GEARUP. This is not to dismiss the importance of seeking information and using reliable resources and search techniques; however, Gather is only one part of the information literacy equation at NKU’s campus. Teaching librarians did not realize Gather was dominating takeaways to such an extent though, upon collective reflection, Gather concepts are taught frequently. As a department, librarians have discussed the tension between a desire to teach an array of information literacy concepts and the requests from faculty to teach students “the library.” Therefore, in nearly every lesson plan, searching and using library resources is integrated to some extent, even if it is not the librarian’s primary focus, and thus this increases the chance that it may become a student’s aha moment.

Information Has Value

Some classes did break the SSE-dominant pattern. ENG 101, a general education writing course, is one example that demonstrates lesson plans can be designed to introduce new students to important resources while contextualizing other information literacy concepts. The information literacy lesson plan for ENG 101 sections is centered on two ideas: algorithmic bias and information privilege. NKU librarians adapted a worksheet from Acosta (2018) that guides students in applying various Google Autocomplete searches and interrogating the results of Google Image searches. The exercises provide students an opportunity to recognize how information systems are influenced by bias and can marginalize groups of people, a knowledge practice embedded in the “Information Has Value” frame. The second part of the lesson is about the cost of information. Teaching librarians share with students the library’s annual budget for information access and guide students through an information privilege walk, adapted from librarians at Duke University (n.d.). Librarians wrap up the class by making sure students are aware of their access, as university students, to library-specific resources. This exercise allows librarians to ensure students are familiar with research resources, most of which are new for the students but also exposes them to information access issues. Elements of “Searching as Strategic Exploration” are in this latter part of the class, but “Information Has Value” is the focus.

As a result of the lesson, it is not surprising that students’ aha moments coded most often to the “Information Has Value” frame. It was gratifying to see that even new students, who likely had little to no exposure to library resources prior to the session, found ideas beyond “Searching as Strategic Exploration” to be meaningful. For example, an ENG 101 student stated their aha moment was, “The insane amount of inherent bias that Google has. I never knew just how much [G]oogle images could reflect the sociocultural bias of the world we live in.” Other examples include students who shared realizations like, “Information costs a lot of money” and the student who was surprised about, “The different ways you have information privilege as an NKU student.”

While coding comments from ENG 101 students, and other classes, researchers had several discussions about the complexity of the “Information Has Value” frame. In addition to bias and privilege, aha moments in the sample also reflected takeaways relevant to attribution (“I learned that the citation tool is going to be my best friend for the year”). While coding, librarians realized the IV frame was relevant to a lot of the aha moments, but the moments were not always telling the same story about what students were taking away. The frame

addresses concepts that can arguably stand alone. “Information Has Value” is a concept that recognizes information sources as a commodity. Due to this value, information creators deserve respect and attribution, but critical learners also come to acknowledge barriers that prevent or limit access to the commodity. The ENG 101 lesson plan addressed this concept, at a foundational level, by sharing an information price tag with students and guiding them to recognize the existence of information privilege for those with educational, financial, or social means.

Perhaps separately, a frame should more explicitly address bias, with attention to algorithmic bias. For example, one of the “Information Has Value” knowledge practices states that learners will “understand how and why some individuals or groups of individuals may be underrepresented or systematically marginalized within the systems that produce and disseminate information” (ACRL, 2015, p. 16). With the increase of artificial intelligence tools and the potential threat of these tools to enhance biases, this knowledge practice could expand within a frame that pays more explicit attention to bias and its many nuances. Burkholder and Phillips (2022) described the complexities around the concept of bias, including the lack of a clear definition, and called on the librarian profession to develop a “stronger pedagogical strategy” to help learners recognize and evaluate bias in sources (p. 64). Saunders (2017) pointed to the existing, though limited, mentions of bias in the *Framework*—both in the ACC and IV frames—as a positive step toward acknowledging how information literacy can address social justice issues. However, Saunders (2017) suggested the authors could do more and proposed a “Social Justice” frame to be added to the *Framework*, with knowledge practices and dispositions that provide learners the opportunity to deeply interrogate concepts related to bias and power inherent to information sources.

Other Frames

To a lesser extent, students connected with other concepts, but these additional takeaways were mostly limited to a few specific classes. For example, the “Authority Is Constructed and Contextual” frame was a major takeaway for students in one general education anthropology class. Out of the 14 respondents, 13 comments coded to the ACC frame and primarily focused on insights about fact-checking information, such as “I didn’t know that you should go to a different website and fact check!” and “I never thought to use an actual fact checker.” In this 50-minute class, the librarian focused entirely on fact-checking, using Caulfield’s (2019) SIFT approach to guide discussion and activities. A similar break from the SSE- and IV-dominated takeaways appeared from students in a political science research

methods class. From the class, half of the student's aha moments ($n = 6$) reflected "Research as Inquiry" after the instructor engaged students in a concept mapping exercise.

Though a small number, the majority of the "Information Creation as a Process"-related comments came from ENG 101 students and reflected on ideas about the information cycle and recognition of different types of sources, including peer-reviewed information. Finally, "Scholarship as Conversation" was nearly nonexistent in this sample. The few comments that did map to this frame reflected recognition of connections between articles and the use of citation chaining.

Limitations

Asking students to share an aha moment after a one-shot session necessitates that students quickly respond. On the one hand, this yields authentic, in-the-moment insights. However, it also requires students to come up with a response quickly and share an insight before they have had a chance to put it into action. Somewhat related, the high number of SSE responses could be a result of search strategies and resources almost always being taught in the final portion of any session. Since the survey was administered at the end of the session, recency bias may play a role, because the concept (or resource) students had just learned may be the easiest to recall and the quickest to report. It is recommended that researchers consider designing their research in such a way that they inform students about the assessment at the beginning of the class so that students might consider aha moments throughout the class period. A final limitation of this study is the lack of graduate students. Future studies might consider how information literacy instruction impacts the graduate-level population.

Conclusion

The findings presented here provided valuable evidence for the NKU teaching librarians and led to an aha moment of their own. Librarians assumed student takeaways would map somewhat proportionately to most, if not all, of the *Framework* concepts but found that was largely not the case. Student takeaways after an information literacy session most often related to searching. This work also builds on prior research that found similar patterns of student learning connected to the "Searching as Strategic Exploration" frame. As a profession, librarians need to consider explicit approaches to teach other frames, and in such a way that is meaningful for students. This does not mean we should dismiss the "Searching as Strategic Exploration" frame or the value students place on these concepts. However,

students can walk out of a session with greater awareness of resources while contextualizing those resources around concepts like inquiry and authority.

At NKU, this data has led to lesson plan revisions and continues to inspire pedagogical conversations about the best way to teach information literacy concepts. Librarians are using the data to redesign lesson plans. For example, since students are primarily taking away information relevant to the “Information Has Value” frame in their first-year writing course, and the lesson plan is designed around this frame, the second-year writing course (also required) was recently reshaped to focus on “Authority Is Constructed and Contextual” and “Research as Inquiry.” Librarians are looking at additional lesson plans, including upper-level research methods courses, to map where searching techniques might be less emphasized and more time could be spent on other frames, including “Scholarship as Conversation.” This should lead to meaningful curriculum mapping with more scaffolded instruction.

Aha moments as an approach to assessment have a lot of value in one-shot information literacy sessions. The simplicity both for students taking the assessment as well as instructors administering it allows for assessment to happen without taking away from instruction time. Finally, the format of the assessment provides students an opportunity to voice what is most important and impactful to their knowledge. The aha approach yields authentic assessment data that is rich with opportunities for teaching librarians who aim to develop holistic information literate learners.

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