The Future of Engineering Education

2024 Annual Conference & Exposition

Oregon Convention Center
Portland, OR . June 23 - 26, 2024

ASEE

Paper ID #41165

Undergraduate Engineering Transfer Students and the One-Shot Library Resource Instruction: Using Nearpod to Promote Active Student Engagement

Beth Carpenter, University at Buffalo, The State University of New York

Beth Carpenter is the Undergraduate Engineering & Instruction Librarian at the University at Buffalo. Innovating instruction, instructional technology, and supporting undergraduates through library instruction are her main areas of research, scholarship, and librarian activity.

Ms. Erin Rowley, University at Buffalo, The State University of New York

Erin Rowley is the Head of Science and Engineering Library Services at the University at Buffalo and serves as the Engineering Librarian. Her research interests include the use of technical standards in engineering education, the role of the librarian in entrepreneurial information literacy, and collaboration between business and engineering librarians in academia.

Undergraduate Engineering Transfer Students and the One-Shot Library Resource Instruction: Using Nearpod to Promote Active Student Engagement

Abstract

When invited to conduct a typical "one-shot" instruction on library resources, librarians often have to manage time to include relevant resources while also addressing in-class questions. While there is a desire for active engagement and participation, it isn't always a guarantee. The required course for undergraduate engineering transfer students at the University at Buffalo has, for many years, included a session with librarians to introduce the university's library resources. Having the opportunity to work directly with students who have recently transferred is a unique challenge as they have even more varied experiences with libraries and research resources. From Fall 2022 to Fall 2023, librarians piloted an approach that was more interactive than the previous traditional one-shot and subsequent homework assignment. This case study details the use of Nearpod, an online tool for educators to create and present interactive lessons, to make library resource instruction more interactive, while allowing faculty instructors to use student responses as in-class participation points. While more detailed student-focused data will be collected in subsequent semesters, this paper examines the faculty response and feedback to this instructional change, along with lessons learned by the librarians.

Introduction

When librarians are afforded the opportunity to visit classrooms for instruction, we want to ensure that we maximize our time with the students while simultaneously giving them the time and space to learn library skills. Transfer students come to the University at Buffalo (UB), a Carnegie R1 doctoral university, with experience from other institutions, which can range from a small four-year college to a large community college, and everything in between. This means that level-setting must occur to ensure that transfer students are aware of all the library resources available to them as UB students.

The School of Engineering and Applied Sciences (SEAS) helps engineering transfer students at UB acclimate to their campus through a mandatory transfer student seminar. A guest lecture with an engineering librarian has been a staple of this course for many years. This paper will discuss the transition from a traditional assignment format following a front-loaded library resources lecture to an interactive, computer-based assignment concurrent with library instruction. As will be detailed in subsequent sections, we elected to utilize Nearpod, a multi-featured Student Response System (SRS), which allows for the collection of feedback through an interactive presentation as well as the ability to implement collaborative tools.

This new format utilizing Nearpod has been implemented in all course sections each semester since Fall 2022. However, this research is a work in progress as our ultimate goal is to conduct an institutional review board-approved study that includes a pre-test and post-test to assess the information gleaned by the transfer engineering students at UB.

Literature Review

Information literacy instruction for transfer students, and assessing this instruction, is a topic covered in the literature [1-5]. However, we did not discover any literature that focused solely on transfer students in engineering disciplines. Further, very little of the literature emphasizes a

partnership between engineering faculty and librarians to ensure the success of information literacy for transfer students. In our case study, we relied heavily on Nearpod to foster an engaging and interactive environment for transfer engineering students. Therefore, this section will examine the existing literature in two main areas: engineering instruction using Nearpod, as well as information literacy for transfer students (of any discipline).

Engineering Instruction Using Nearpod

Nearpod is an online tool for educators to create and present interactive lessons with assessment resources and gamification options. It is used primarily by educators in K-12 classrooms but has also gained popularity in higher education. McMonigle utilized Nearpod for information literacy instruction for engineering students [6]. The paper referenced the Association for College and Research Libraries' (ACRL) "Framework for Information Literacy in Higher Education" (herein referred to as the Framework) [7]. The Framework is comprised of six core concepts that library instructions should include. McMonigle states that Concept 6, "Searching as Strategic Exploration" is what is most relevant to the task of database use. It was this thinking that influenced McMonigle to explore using Nearpod to make information literacy instruction more interactive while also leveraging various technologies that students use (laptops, tablets, and smartphones).

Romero Rodriguez also used Nearpod with engineering students for instruction purposes [8]. While the goal of this case study was to increase motivation and academic performance, the instruction was not tied to information literacy. Instead, Romero Rodriguez used the gamification aspects of Nearpod to deliver instruction on the engineering curriculum to two of their three course sections, with the last section receiving instruction as traditional lectures. They found the vast majority (98%) preferred the gamification instruction used in Nearpod to the traditional methods. In addition, 91% of forty-seven students surveyed shared that lectures using Nearpod increased their motivation for the course topics. The gamified group also had an increased passing rate and higher average scores.

Ultimately both McMonigle and Romero Rodriguez's papers demonstrate the positive effect Nearpod has on instruction, especially geared toward undergraduate-level engineering students. While neither paper examined the use of Nearpod with engineering transfer students, other available research does focus on information literacy and library resource instruction for transfer students.

Information Literacy Instruction for Transfer Students

While first year student information literacy programs seem abundant and are often well-accounted for at various institutions, Grigg and Dale found that the population of transfer students at the University of North Carolina at Greensboro was not adequately addressed [9]. It was determined they did not have sufficient data on the information skill level of transfer students. Therefore, the librarians chose to study this topic with a survey of incoming transfer students. Ultimately, Grigg found that a partnership with the Transfer Student Office was a major "win" of the project as that would be necessary to continue to grow library outreach efforts for transfer students [10]. This paper demonstrates that librarians need to consider transfer students

when it comes to information literacy instruction. It also highlights the importance of librarians partnering with the appropriate groups and people outside of the library to ensure long-term success.

Gregor and McBridge also talk about the importance of building relationships with units outside of the library to help support transfer students [11]. They document their experience at Appalachian State University (ASU) in partnering with academic units and other student support offices to provide information literacy instruction as well as develop services for transfer students. However, Gregor and McBridge state that no separate transfer student seminar or course was available at ASU at the time of publication.

A study by Robison focused on connecting transfer student success with information literacy instruction [12]. A survey was conducted with incoming undergraduate transfer students at Valparaiso University. While only 38 students completed the survey, there were many takeaways for librarians on the importance of information literacy instruction aimed at transfer students. The study found that transfer students receiving formal information literacy instruction were significantly more confident conducting research. It is important to note that while transfer students did not mind being singled out as a group, they preferred to learn about the library in a small group setting, rather than in a classroom setting. Further, the results indicated that information literacy instruction did not impact the students' sense of belonging at their new school or connectedness.

The existing literature conveys there is a need for information literacy instruction for transfer students. However, the next logical planning point is determining who in the library would be responsible for this population. Some libraries will have liaison librarians as well as education librarians where the education librarians focus on first-year students. However, transfer students are often not considered to be true first-year students. Therefore, do they fall under the jurisdiction of liaison librarians? Education librarians? Both? Neither? Coats and Pemberton addressed this point of discussion in their paper that focused on the creation of a new Transfer Student Services Librarian at the University of North Carolina Wilmington (UNCW) to specifically focus on transfer students' needs [13]. UNCW also created an optional "Transfer Seminar" for transfer students. The course was also then expanded from 2-credit hours to 3-credit hours to incorporate more information literacy skills instruction. However, without a mandatory course requirement, Coats and Pemberton found that they continued to struggle to reach all transfer students.

Additional literature explores the topic of information literacy instruction specifically for transfer students, such as the Roberts, et al. study that surveyed librarians to determine what institutions were providing targeted information literacy instruction or other outreach efforts for transfer students [14]. Based on their own survey and reviewing previous literature, Roberts, et al. found that transfer students have and continue to be a largely ignored population of students by librarians. Kohout-Tailor and Schlif conducted a study utilizing transfer student focus groups to better understand how the library could support them [15]. They explored various services including information literacy, among others. In the focus groups, students indicated they wanted instruction on using the library, similar to findings from other studies by Tag [16] and Vinyard [17].

Case studies explore specific ways to conduct information literacy instruction for transfer student populations, similar to our work, by making the instruction interactive and gamified. Kearns, Kirsch, and Cononie created a game delivered through their institution's course management system to make information literacy more interactive [18]. Beyond making the instruction interactive through a game, the authors partnered with their Student Success Center and Enrollment Services to create the game to ensure their efforts were properly aligned with the needs of transfer students. While Kearns, Kirsch, and Cononie did not concentrate on the partnership in their paper, but rather mentioned from a historical perspective in the evolution of the information literacy game, this is still an important takeaway. As other literature has suggested, collaborative efforts to support transfer students can be beneficial to both the students and the library.

We feel our case study adds to the scholarly conversation as it highlights two important themes when considered information literacy instruction for transfer students: required course instruction that includes an information literacy/library component and partnering with stakeholders outside of the library. As we will detail, the work we are embarking on at UB has seen initial success due to the buy-in from the engineering faculty that teach the required transfer student seminar course.

Methodology

The first step in adapting library instruction to a new format was to evaluate the learning outcomes and lesson goals in the initial session. EAS198 is a transfer student seminar course geared towards engineering students, though students from other majors/disciplines may be placed in the seminar. Traditionally ten to twelve sections of the seminar are offered in the fall semester, with another four to five in the spring semester. The primary purpose of the library session is to acclimate students new to UB to the library resources that are available to them, along with introducing these students to the UB Libraries Everything Search, which acts as UB's gateway to searching our catalog and databases.

The original assignment, developed by engineering faculty members, asked students to search for resources on their own, following a librarian-led introduction and library overview:

> Use the library resources to locate the following information:
> 1. A recently published (i.e. in the last 5 years) scholarly work of ONE of your faculty members (could be from in your major or intended major or someone you have this semester teaching a course (for example your instructor for EAS 198)) for which the full text is available through the UB Libraries. Create a reference (or use a tool to capture the formatted reference) and include it in the assignment.
> 2. Search for a text (i.e. book) related to the subject matter in one of the classes in your major. OR search out a book related to one of your grand challenges or pathways we've mentioned this semester and for which UB has a physical copy stored in one of the university library spaces. Include the reference AND call number.
>
> Include the two citations AND the book's call number in your submission.

Locating resources was the end goal for the library session, therefore, the instruction focused heavily on navigating the Libraries Everything Search. The librarian would spend much of the lecture time demonstrating to students how to adjust keywords and utilize search filters. Time would also be dedicated to helping students understand the search results and how to locate citations. The original assignment also asked students to understand how to locate physical items, instead of focusing on digital resources. The assignment was becoming difficult for students to complete as more books were purchased in an electronic format, leaving few options for print books published in the past ten years, as the assignment instructed. Further, because these students are relatively new to campus, they often were not very familiar with the faculty in their major, making the question regarding the article published by a professor equally challenging. To best prepare students to complete this assignment, the session was front-loaded with instruction, leaving the last 15 to minutes for students to work individually with a roving librarian in the classroom.

Following the Spring 2022 semester, the decision was made, with the faculty coordinator's permission, to revamp the assignment to allow for more concurrent work along with the library instruction. When evaluating options for this adjustment, the learning platform Nearpod was discussed. Along with acting as a slideshow platform, Nearpod also allows instructors to create activities that integrate with a slideshow presentation. Students can access the slides through a URL and lesson code, and the instructor has control over the slides to move everyone through the presentation simultaneously. This platform allows for synchronous engagement, anonymity in student participation, attendance, and participation reports, as well as an asynchronous version for students who are unable to be at the library session in person.

Lesson Development

While the original assignment was heavily considered when creating the updated Nearpod lesson, we were given free reign by the faculty coordinator to modify the content as we saw fit. The questions used in the Nearpod lesson, increased to four questions compared to the original two, can be found in Appendix A, but we will detail here how the questions were used in the overall lesson delivered to the students. It should be noted, as well, that Nearpod allows for the anonymity of user responses that are displayed on a main display screen. This was an important feature to us and the engineering faculty to implement. Student names were attached to responses in a final participation report emailed to faculty instructors, but student names were never displayed for the entire class to see.

Using Nearpod to achieve the same learning outcomes of the original assignment allowed us to create a few interactive elements in conjunction with the presentation slides. The first was to add a link to the UB Libraries website, ensuring students would be on the same page, literally and figuratively, while going over the website overview.

Following the website overview, students were instructed to use the Everything Search by typing in a phrase relating to a grand challenge of engineering [19]. Once students had a chance to skim the results, we created an activity asking the students to choose which result filter would offer them the best resources to learn *introductory* information about their topic. Students could use a

drawing tool to circle, highlight, or underline the resource choice they felt answered the question [Fig. 1).
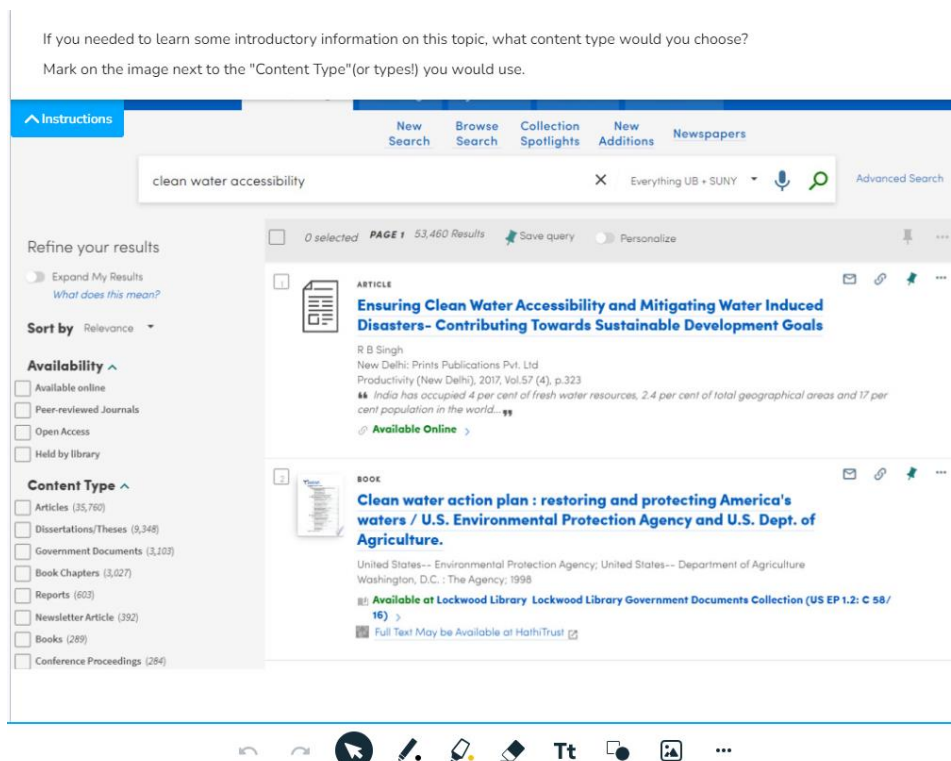

Fig 1. Screenshot of Nearpod screen with the Draw It tool for students to identify the content type they would use.

This feeds into an open discussion where students can share what they selected and explain their thought processes. There are no wrong answers in this exercise, and it gives librarians a chance to talk about different ways resources can be used for specific information needs.

Another question was created asking students to find and share a citation from an *article* that they found in their search results. This gives students a chance to use the content type filters, as well as explore the tools, like the quick citation button, that are embedded in every item record. As this question was based on the original assignment, it also matched with faculty goals of ensuring engineering students can use the Everything Search to locate articles for other course assignments, outside of the EAS198 transfer seminar.

Because the goal of this one-shot is also to make students aware of additional resources and services available through the Libraries, the next portion of the lesson is spent with an overview of the rest of the Libraries website, highlighting the spaces and equipment available. Students are then asked to use the Libraries website to locate the Equipment Loan webpage and share what types of equipment are available to be checked out. While all questions in the Nearpod lesson, as mentioned previously, were anonymous to the class, this question did require students to engage with a collaborative virtual bulletin board to share their responses [Fig. 2]. Responses could be viewed by the class, but again, no names were visible on the screen shared by the librarian.
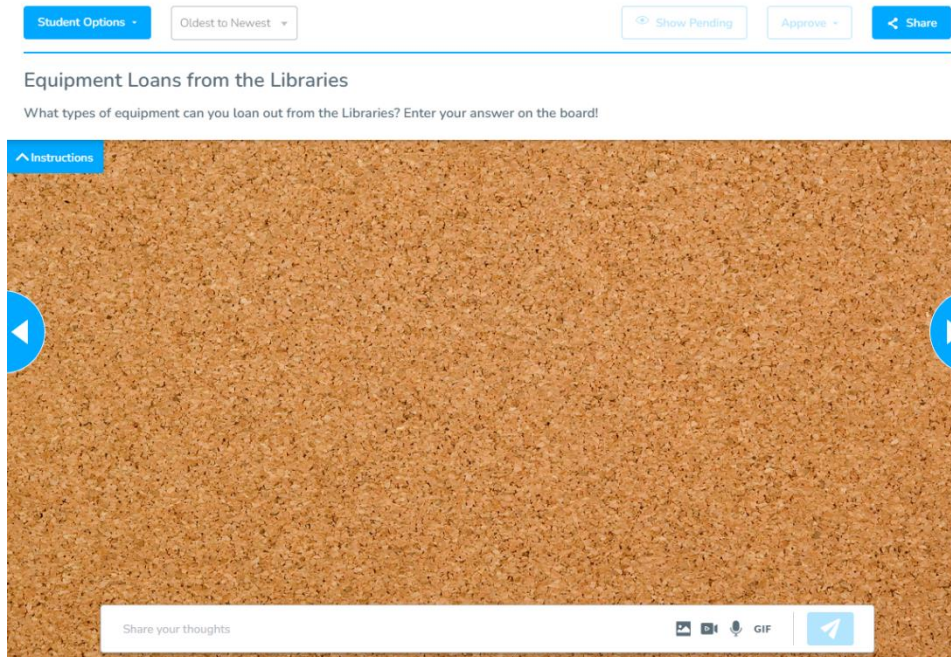
Fig 2. Screenshot of a blank Nearpod Collaborate Board, which allows for synchronous posting and sharing of ideas

The final question is a poll, asking students what their preferred way to ask for help would be, given the options available. This ensures students are aware of the multiple points of access when they require help from the Libraries. As a bonus, it also provides us with anecdotal feedback on how students prefer to interact with librarians.

Nearpod also has the ability to share the lesson separately, so one may review it asynchronously. In this post-Covid-19 pandemic environment, this is especially important for students who are ill and need to miss class. Faculty can contact the librarians for a link to the Nearpod for that semester to share with their student(s). The librarian can then follow up with a report confirming the student's participation. While the previous assignment was on the UB learning management system, it was provided without context. Nearpod allows the lesson slides and questions to be available to the student via the shareable link.

Discussion

While our initial findings are anecdotal, they will shape the future research we plan to conduct in these transfer seminar courses. The takeaways we have observed thus far pertain to two groups: the transfer engineering students who participated in the Nearpod lessons and the faculty instructors who teach the various sections of the course. We will discuss both groups below. Adjusting the format from a front-loaded library overview to a session with active learning allowed for greater student engagement and discussion throughout the one-shot, similar to what Romero Rodriguez experienced in her case study [8]. As previously mentioned, we consider this to be work-in-progress research, so information gleaned at this juncture is informal, but some takeaways will ultimately drive future tweaks to the Nearpod lesson and questions to improve the students' overall experience.

In some sessions, a fruitful discussion was had when students shared what "content type" (based on the available filter option in the search results) they thought would give them the best introductory information. As librarians, it is easy to come into a class with preconceived ideas about correct answers. To have the reminder from students that they use resources in ways we might not initially think about is as helpful to us as it is to the larger class. Just as much as we are helping students become acclimated to the library and our resources, it is useful to know what resources students gravitate toward, as well as what is being taught at other institutions. This can ultimately help our instruction practice grow and evolve to meet students' where they are. In addition, this question will be a key question we plan to examine when we pursue institutional review board (IRB)-approved research to include pre-tests for assessment purposes.

While the discussion around content type was successful, an instance of where future improvements may be needed is the question regarding equipment loans from the Libraries. This question asked students to view the Equipment Loans page on the website and enter an item that could be loaned on the collaborative bulletin board. Answers could be viewed by everyone in the class as they were displayed, in real time, on the screen. However, we found that students needed to be continually reminded and prompted on where to look since many responses did not relate to equipment loans. It is possible that we were only aware of students requiring additional guidance on this question because this was the only question where answers, while anonymous, could be seen by all on the screen (and thereby by the librarian as well). Ultimately, our initial observations have provided additional information on how students navigate the Libraries website and its overall ease of use. It also demonstrates that the session is a valuable one, as it acts as a guide to the resources students might not otherwise find on their own. A possible solution to reducing the amount of time needed to explain where students should go on the website is to include a direct link to the appropriate webpage in the Nearpod lesson itself.

We were also able to gain anecdotal data on students' preference for contacting a librarian using the final poll question. This was not an original question that engineering faculty included in the participation assignment before Nearpod was implemented, however, we felt we had a unique opportunity to learn more about our patrons and how they would like to contact us if they need assistance. We were surprised to observe that generally, apart from making a phone call to the library services desk (which very few students seemed to select), the preferred method of contact was fairly evenly spread across chat/text reference, in-person reference, and email. The variety of answers we witnessed was intriguing and could be worth pursuing further, even beyond just engineering transfer students, but transfer students at UB more broadly.

Additionally, but important to note, is the faculty instructors' response to the updated library instruction session. Overwhelmingly the response has been positive, especially accounting for students who may have to miss class due to illness or other reasons. Many have remarked, similar to McMonigle's experience, that they have learned about additional resources or services offered by UB Libraries that they were not previously aware of, despite being at UB for many years [6]. It was with the faculty coordinator's support that we will move forward with this research in conducting IRB-approved surveys to assess what students learn through the library instruction session. It is clear from the existing literature examining information literacy instruction with transfer students that assessment is needed to tailor the information to this

specific audience [9-17]. We strive to add to this scholarly conversation with information specific to engineering transfer students in the EAS198 seminar course.

Conclusion and Next Steps

The 2022-2023 and 2023-2024 academic years have served as a pilot project using Nearpod for this transfer engineering student seminar, in an attempt to create a higher-impact instruction session for transfer students. In total, twenty-four sections have received library instruction with the new Nearpod lesson format. We feel it has been a successful endeavor, with active learning and an interactive instruction platform helping with engagement in the one-shot classroom. As mentioned, moving forward, we aim to assess library impact more concretely, using our learning management system to distribute pre- and post-test surveys to students to gain a fuller awareness of the effect that our library session has on these students. We aim to assess the key takeaways from the lesson, such as using the Everything Search, getting citations from item records, and the resources and services available from UB Libraries. We would also like to ensure the asynchronous Nearpod sent to absent students can be as effective as the in-person session.

Our goal is to create a meaningful one-shot instruction session for transfer students in engineering, to help acclimate them to our campus and ensure they are aware of the librarians and the resources available to help them as they continue their academic careers.

References

[1]   S. Dauterive, J. Bourgeois, and S. Simms, "How little is too little? An examination of information literacy instruction duration for freshmen," *Journal of Information Literacy,* Article vol. 11, no. 1, pp. 204-219, 2017, doi: 10.11645/11.1.2161.

[2]   N. Fawley, A. Marshall, and M. Robison, "Successful Landings: The Impact of Information Literacy Instruction on Transfer Student Success," presented at the LOEX 2018, Houston, Texas, 2018.

[3]   P. L. Nuhn and K. F. Kaufmann, "The Essential Role of College and University Librarians in Supporting Transfer Student Success," in *Georgia International Conference on Information Literacy*, February 21 2020.

[4]   J. C. Phillips and T. A. Atwood, "Transferring skills, transferring students: a call to academic libraries," *College & Undergraduate Libraries,* vol. 17, no. 4, pp. 331-348, 2010.

[5]   V. Yeager and A. E. Pemberton, "Ensuring a level playing field: creating an information literacy exam for transfer students," *Reference Services Review,* Article vol. 45, no. 3, pp. 454-471, 07// 2017, doi: 10.1108/RSR-10-2016-0077.

[6]   P. McMonigle, "Engaging Engineering Students with Mobile Learning Technologies," in *2022 ASEE Annual Conference & Exposition*, 2022.

[7]   Association of College and Research Libraries. "Framework for Information Literacy for Higher Education." https://www.ala.org/acrl/standards/ilframework (accessed February 1, 2024).

[8]   L. Romero Rodríguez, "Using Nearpod for Reviewing Lessons to Increase Motivation and Academic Performance: A Case Study with Engineering Students," in *International Conference in Methodologies and intelligent Systems for Techhnology Enhanced Learning*, 2023: Springer, pp. 199-206.

[9]   K. S. Grigg and J. Dale, "Assessing and meeting the information literacy needs of incoming transfer students: Implementing ACRL's assessment in action program," *Reference Services Review,* vol. 45, no. 3, pp. 527-539, 2017.

[10]   K. S. Grigg, "Assessing Information Literacy for Transfer Student Success," in *Shaping the Campus Conversation on Student Learning and Experience: Activating the Results of Assessment in Action*, K. Malenfant Ed. Chicago, Illinois: ACRL/American Library Association, 2017, ch. 14.

[11]   M. N. Gregor and K. R. McBride, "Bridge to Success: Developing Library Services for Transfer Students," *LOEX Quarterly,* vol. 43, no. 4, p. 5, 2017.

[12]   M. Robison, "Connecting information literacy instruction with transfer student success," *Reference Services Review,* vol. 45, no. 3, pp. 511-526, 2017.

[13]   L. R. Coats and A. E. Pemberton, "Transforming for our transfers: the creation of a transfer student services librarian," *Reference Services Review,* vol. 45, no. 3, pp. 485-497, 2017.

[14]   L. W. Roberts, M. E. Welsh, and B. Dudek, "Instruction and outreach for transfer students: A Colorado case study," *College & Research Libraries,* vol. 80, no. 1, p. 94, 2019.

[15]   J. Kohout-Tailor and S. R. Schilf, "Residential transfer students and the university library: A needs assessment," *Journal of Academic Librarianship,* Article vol. 49, no. 3, pp. N.PAG-N.PAG, 2023, doi: 10.1016/j.acalib.2022.102660.

[16]   S. G. Tag, "A Library Instruction Survey for Transfer Students: Implications for Library Services," *Journal of Academic Librarianship,* Article vol. 30, no. 2, pp. 102-108, 2004, doi: 10.1016/j.acalib.2004.01.001.

[17]   M. Vinyard, "The Kids Are All Right: How Libraries Can Best Serve Transfer Students," *Portal: Libraries & the Academy,* Article vol. 20, no. 2, pp. 339-360, 04// 2020, doi: 10.1353/pla.2020.0017.

[18]   A. Kearns, B. A. Kirsch, and V. Cononie, "Agoge: an information literacy game for transfer students," *Reference Services Review,* Article vol. 45, no. 2, pp. 314-331, 04// 2017, doi: 10.1108/RSR-09-2016-0054.

[19]   National Academy of Engineering. "14 Grand Challenges for Engineering in the 21st Century." https://www.engineeringchallenges.org/challenges.aspx (accessed February 1, 2024).

Appendix A

Questions integrated into Nearpod:

1. If you needed to learn some introductory information on this topic, what content type would you choose? Mark the image next to the "Content Type"(or types!) you would use.

2. Find the citation of an **ARTICLE** from the results. (HINT: Use the left side menu to filter your results!) Copy the citation and paste it into the box.
3. What types of equipment can you loan out from the Libraries? Enter your answer on the board!
4. Librarians are here to help you! If you had a question, what would your preferred way be to ask for help? HINT: There is no wrong answer!