Cracking the code: Building an assessment plan with student discussion boards

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Abstract

Library instruction sessions offer students a chance to learn a variety of information literacy skills and often give them a chance to apply these abilities with a librarian close by for assistance. But how can the librarian be sure the tips and tricks being taught are retained beyond the classroom? In the Fall of 2019, librarians at the University of Missouri-Kansas City recognized an assessment gap in their library instruction program. Undergraduate student responses to source evaluations were assessed after completing the program's flipped classroom educational module but not after in-person instruction sessions—a pre-test without a post-test. In an effort to measure the effectiveness of classroom instruction, librarians created an assessment plan and tool to capture results post-instruction. Students were asked to respond to information literacy questions in a Canvas discussion board within 24 hours of receiving instruction regarding sources found. A total of 231 students reported 411 sources on the discussion board. The posts were extracted from Canvas and imported into OpenRefine, where the data was anonymized, organized, and generally cleaned up. Data was then coded by the librarians using Google Forms, replicating the assessment process for each source presented by the students, both scholarly and popular in type. With a new data set, the librarians were able to create visualizations and identify trends from the student responses. After analyzing the coded information, librarians were able to then alter lesson plans with the intention of better meeting the student learning outcomes for undergraduate library instruction.

Introduction

Beginning in the Spring of 2019, librarians at the University of Missouri-Kansas City (UMKC) adapted a face-to-face library instruction lesson plan to help reach and accommodate underserved online students enrolled in a required undergraduate course (Hartwell et al., 2020). The online workshop delivery model was piloted during the Summer of 2019. Post-pilot, the UMKC Libraries general education team identified an internal assessment gap and a need for a new assessment tool to evaluate the effectiveness of library instruction sessions based upon the

modifications made. The team, consisting of instruction librarians and academic library fellows, designed an assessment process to evaluate student work submitted to discussion boards in the Canvas learning management system (LMS) in order to identify changes needed to achieve established student learning outcomes for both face-to-face and synchronous online library instruction sessions.

Literature Review

Although representing early scholarship into synchronous, remote online information literacy instruction, Buchanan, Luck, and Jones (2002) mirror current concerns reflected in information literacy instruction. The researchers focus upon the need for online instruction as a way to meet the needs of diverse learners, especially those who are underserved in synchronous classroom-style sessions. More recently, Kvenild, Eastman, Davis, and Conerton (2018) touch upon the continued need for librarians to support diverse learners as electronic resource delivery grows and university coursework moves toward distance education. Both articles further explore the importance of collaboration between librarians and instructors to tailor the learning experience for students. Bolstered by the support of the field to create the online synchronous workshop model, it became even more apparent that assessment, and the documentation of that assessment, would be key to the project.

Both daunting and liberating at once, there are as many assessment tools and methods as there are programs to be assessed. To further complicate matters, as Henrich and Attebury (2012) point out, there is a deep asymmetry between the growth of online library instruction sessions offered and the available literature on assessment of these programs. The latter is not surprising considering that the majority of assessment results are disseminated as internal reports rather than being made available through conferences and journal articles (Sobel & Sugimoto, 2012). As the team embarked upon their journey to define and create an assessment method for the new online workshop, it was imperative to match student learning outcomes with a constructive way for analyzing the effectiveness of instruction. Gilchrist and Zald (2002) figured heavily into the team's exploration of assessment methods. Perhaps the authors' greatest contribution to the discussion of assessment not only highlights the many types and ways with which the assessment types may be used throughout a program analysis, but they also make the distinction that well-defined and carried-out assessment measures the effectiveness of both the teaching and the program. While student learning outcomes are vital to instructional design and assessment, a reflective process is necessary to focus analysis on the effectiveness of instruction and instructor alike.

The integration of library instruction and even assessment tools into an LMS like Canvas or BlackBoard has proven effective. Henrich and Attebury (2012), discussed earlier, prove the benefits of this delivery method; however, of potentially greater note, Lowe, Booth, Tagge, and Stone (2014) discuss the benefits of course-based assessments in the LMS. Despite the many

challenges presented by LMS integration of assessments, the authors explain that these tools not only reinforce student learning but also provide a means of assessment that is highly usable by both librarians and instructors. Haber (2020) offers one of few available assessment projects utilizing LMS discussion boards as assessment tools. In a poster presentation, Haber outlines a four-semester assessment period in which undergraduates responded to post-instruction discussion board questions on topics such as source evaluation and bias. And with a similar approach, the team from UMKC enters the ongoing conversation involving the use of LMS and assessment for library instruction.

Methodology

Background

Prior to the synchronous online workshop trial in the Summer of 2019, the team assessed classroom library instruction with a rubric developed and created by a previous iteration of the general education team. The rubric primarily assessed student responses from a synchronous in-class group activity regarding the credibility and relevance of resources. Although the rubric was an effective assessment tool, it became clear early in the planning process that it would not adequately accommodate the online workshop with regard to both format and content. With the student learning outcomes and online workshop lesson plan in mind, the team developed a post-session activity involving a discussion board that would be delivered to students inside their Canvas course.

The discussion board (Figure 1) prompted students to locate one scholarly and one popular source, provide information regarding the methods used to find the sources, and include additional feedback regarding the credibility of the sources and their relevance to the students' research topics. The team's initial assessment timeline included data collection during the Summer of 2019 with full assessment and analysis in the Fall of 2019.

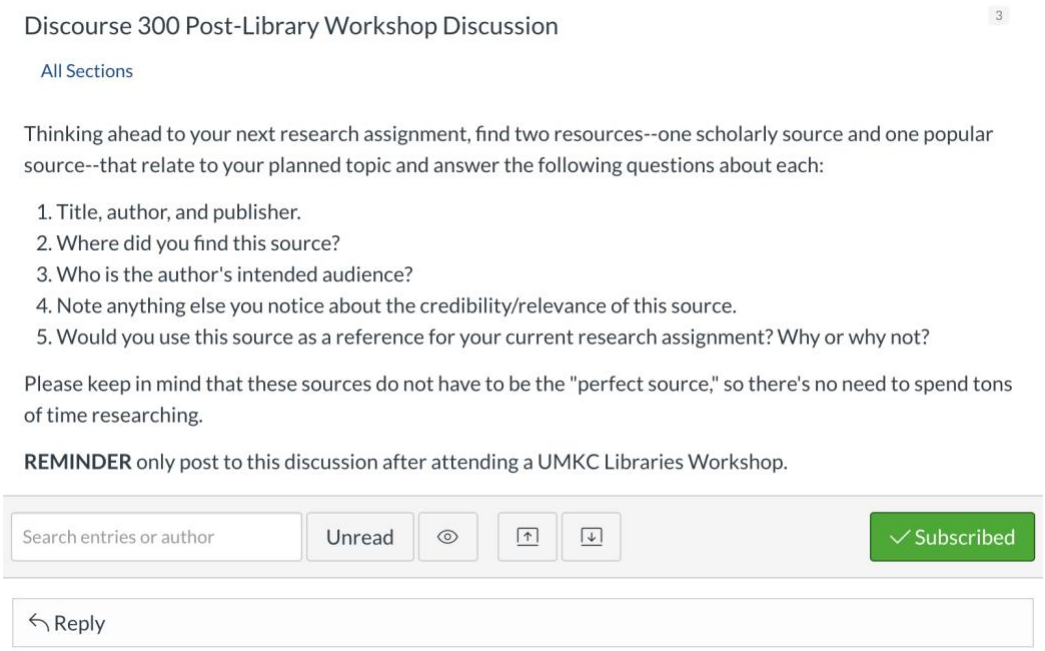

Figure 1. Discussion board for post-library instruction session, showing prompts for students to answer after finding requested sources.

After its pilot launch during Summer of 2019, the online workshops were again offered in the Fall of 2019. For all face-to-face and online sections of this course, a little more than 52% of the instructors requested library instruction. A questionnaire was created in Google Forms and sent to instructors to gather specific information for scheduling purposes. Part of this form involved agreements to be approved by instructors through the checking of boxes, including one by which they would agree to assign library course materials through Canvas to be completed before arriving at the library, and for students to come to the session with a topic prepared for activities. Unfortunately, this was neither enforceable by the library nor, in many cases, required by students for a grade, an element left to the discretion of the instructor. As both transparency and trust were valued by the team, another box to be checked noted the instructors' agreement to allow librarian enrollment in the Canvas space for the purpose of providing support and gathering Research Essentials assessment data. The allowance of a librarian in the course was imperative to accessing the discussion board assigned among the library course materials.

In addition to instructor buy-in for the program, the team found it necessary to address inter-departmental workflow and capacity issues with regard to the discussion board posts. Although the posts ultimately allowed the team to assess the quality of instruction, librarians carefully considered the benefits and challenges of adding a more formalized dimension to the reading and analysis of posts, including replying to students to offer feedback and guidance when responses were incorrect or incomplete. For the Summer pilot, the team assigned a subgroup of three librarians to respond to each discussion board post. From a capacity standpoint, it was quickly apparent that the department would not be able to adequately add the task of responding to posts

to the workload, especially with the volume of students expected in busier Fall and Spring semesters. Based on lessons learned during the Summer pilot, librarians removed the step of responding to discussion board posts from the workflow, opting to only use responses internally for the assessment process.

Extracting student responses

In order to examine the student posts made on the discussion boards, the team needed to extract the data from Canvas while ensuring that no student information was retained for reasons of security and anonymity. Because of the LMS design, embedding a librarian in a single discussion was not possible. Ultimately, two librarians were embedded in all of the Canvas sections participating in the program, allowing access to the discussion boards assigned by the library. In order to allow discussion post visibility for the rest of the librarians on the team, the student responses had to be extracted. The Canvas LMS possessed no inherent way to extract material, and copying and pasting all the responses was simply going to be too much work. Combing through community forums on the Canvas website, it was clear that there was a significant desire for such a feature to be added to the LMS. Librarians eventually located the link to a Python script available in GitHub which would facilitate this extraction (dsp444, 2019). This script allowed for a user with Bearer authentication through an institution to convert Canvas discussion board posts and save them as a single file in JSON format. An embedded librarian was able to input three arguments—institution name, course ID, and discussion ID—from the discussion board's web address and use the Python script to generate results to be saved as a text file.

Because the generated text files contained student identifying information, the team had to consider security for transferring and storing the data. Using a proxied cloud storage system approved for use through the University of Missouri system, the text files were stored until the discussion posts had been stripped of student information before deletion from the cloud.

To remove unnecessary information from the text file, the data was copied and pasted into OpenRefine, "a free, open source, powerful tool for working with messy data" (OpenRefine, n.d.). The authors of these proceedings were introduced to OpenRefine during a records management course as part of their MLIS program and were eager to apply a budding familiarity with the tool to this new assessment project. Because the data in the instruction assessment setting was structured differently than that of the messy data cleaned in the classroom, there was a significant learning curve that had to be overcome with trial and error, particularly involving the writing of expressions using General Refine Expression Language (GREL). A GREL script was then developed in OpenRefine that, when applied to the data imported from the text file, would remove unnecessary information, including leftover HTML elements from Canvas, and leave only the text from the discussion board.

Downloading OpenRefine to network computers, the team was reassured of security concerns by the open-source tool that all data would remain privately stored on a small, local server through the application until deleted by the user. There were issues encountered in receiving permissions from the University's tech services department to download an updated version of Java, which is required to run OpenRefine, and only one librarian was allowed to operate the full installation when the time came to extract and clean up data. Because of this, all development and testing of GREL scripts in OpenRefine was completed on personal computers using discussion boards created for this project in a Canvas sandbox.

Once the data was imported and cleaned, librarians downloaded an Excel spreadsheet containing only unidentified discussion posts. The process of extracting discussion board data and cleaning in OpenRefine was completed for each participating course, and the data in individual spreadsheets was combined into a master document. After dividing the number of total posts by the number of those librarians assessing the data, separate sheets were created in the master Excel file to contain the posts to be assessed by each team member. A sheet in the master file was created to include all of the discussion posts divided by course number and instructor name for easy identification in case there was a need to recover the original posting in Canvas.

Assessment form

To create the assessment form used, the team formulated a list of expected answers for each of the discussion board prompts given to the students based on experiences in the classroom. These lists were then entered as a multiple-choice response in Google Forms, where the assessment form was designed. Because students were asked to find both a scholarly and a popular source, the assessment form was set up to repeat the questions so each source description could be separately assessed. A question was also included for the assessor to indicate whether the source discovered by the student was either scholarly or popular. For each discussion post, the assessor was also asked to indicate which numbered row from the Excel spreadsheet was being assessed to ensure all posts were examined and for easy identification in case there was a need to recover the original post in Canvas.

Understanding that student responses would not always match the predictions of the team, an "Other" category was provided as part of each list in the assessment form with the instructions to provide clarification for any outliers in a free-response paragraph section at the end of each page. A failsafe option was included in case the assessor found themselves unable to assess the responses for any reason. This section was thoughtfully titled "I can't even!!" Only this section and the one for clarification of "Other" were indicated as not required for submission of the form.

The assessment period

The team adhered to the practice of assessment calibration through inter-rater reliability upon the commencement of the assessment period. For the inaugural period, inter-rater reliability testing began in November 2019 and included five discussion board posts that were randomly selected from the Fall of 2019. Team members were given one week to code and submit the test posts, then they met to view results and discuss any refinements and calibrations necessary to move forward for the full assessment.

While there was a great deal of inter-rater consistency for student responses related to resource type, the variety of answers from students on questions related to audience and relevance to their assignment required lengthy discussions in an effort to refine the assessment form and rater expectations. The team found it necessary to greatly expand upon the assessment form options for coding relevance-related discussion post answers.

Upon the completion of the necessary edits to the assessment form, including the addition of the "Other" and "I Can't Even!!" sections, the team conducted two additional rounds of coding practice for inter-rater reliability calibration. By late November 2019, the team felt comfortable enough with the form and process to collectively decide that the assessment period could commence. With the discussion posts divided among the five team members, a deadline was set for early January 2020 for coding and submission with the assessment form. In hindsight, one month proved to be more time than necessary. Although everyone managed their coding and time differently, about two weeks was deemed the ideal amount of time for discussion board coding going forward.

Results

Using Google Forms to create the assessment form meant data visualizations could also be viewed in bar and pie graphs based on the coding responses. Unfortunately, the team had not considered that the coding conducted as part of the inter-rater reliability testing would also be included in the results within Google Forms. With this in mind, the results were downloaded as an Excel file and imported into OpenRefine (Figure 2). Here, multi-value cells were split, which allowed for each coded answer to be seen and counted as an individual cell in cases when multiple answers were selected for some responses on the assessment form. In some instances, the same answer would register as slightly different in various iterations, and text facets made it easy to identify and adjust these incongruencies through the clustering feature. Text facets also provided counts for the number of times each coded response was made for each question on the assessment form.

210 records

Extensions: Wikidata

Show as: rows records Show: 5 10 25 50 records

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	12.	15	Yes	Title	UMKC Libraries / main search box	Specified group of general public	Author credentials	Yes for core argument	Yes	Title	Website
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				Author				Yes (relevance)		Author	Google / Internet
				Publication title						Website title / URL	
	15.	18	No	Title	Database (named)	Specified group of general public	Currency	Maybe (relevance)	Yes	Title	No response
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				Publication title						Publication title	
										Website title / URL	
	16.	19	Yes	Title	Database (named)	Experts / Researchers	Author credentials	Yes for core argument	Yes	Title	Google / Internet
				Author		Practitioners / Professionals	Author experience	Yes (credibility)		Author	
				Publishing company			Authority	Yes (relevance)		Publication title	

Figure 2. Sample of coded responses from assessment form submissions in OpenRefine after data cleanup.

The results were collected and used to create visualizations, all of which were examined and discussed by the team over multiple meetings. While the team was pleased with the overall results, there were some issues that needed to be addressed, both regarding the assessment process and student responses. While 231 students were asked to participate, 210 discussion board posts were submitted to assess, and a total of 411 sources were reported. From this amount, 179 responses correctly identified and described scholarly sources, and 169 responses did so with popular sources. In some cases, students did not provide more than one source, as the discussion board prompted them to do, while some students reported more than the requested amount. There was additional concern that only articles were being considered as scholarly, specifically categorizing all books as popular sources.

A few other results were of particular interest to the team. From the options for coding responses regarding the audience of scholarly sources, 38% fell into the category of "Specified group of general public," which led the team to consider the description of scholarly audiences as not adequately addressed in the lesson plan. Select examples of responses for audiences of scholarly sources include, "people of the United States," "mothers of children that [eat] cereal for breakfast," and "normal people." The frequency of such widely varying answers for scholarly sources reaffirmed that this area needed to be addressed in the lesson plan.

There was further discrepancy found in the identification of publishers based on the coding results. Overall, 85% of responses provided the name of the publication, often the journal title, which was the anticipated response, and 58% named the publication company, including Sage and Taylor & Francis. Looking closer at the responses, the team realized the vagueness of the discussion board prompt which simply asks for "publisher." Additional concern came from a particular expectation of the team. In the final discussion board question, students were asked whether they would consider using the found source for their current research assignment. For those that responded affirmatively, the team expected that students would indicate whether the source would be used as supplemental material or for the core argument, considering that this is addressed in the lesson plan. Discussion around this question highlighted how, in its format at the time of assignment, the discussion board did not prompt students to identify their research topic, leaving members of the team often curious as to what various couplings of sources could be used for in research together.

Although OpenRefine facilitated the cleaning and ordering of data for a large portion of the coding, the "Other" category on the assessment form and subsequent notes of clarification as provided by the assessor proved too challenging for data work in the software. The content pulled from this section was placed in an Excel spreadsheet for analysis. The creation of simple visualizations was found to be possible; however, the visualizations were largely unhelpful in analyzing the data. These visualizations were followed by verbatim data and phrases taken from each response in the assessment form. The analysis of this data by the larger group was more time consuming and labor intensive, yet yielded results that led to decisions and changes for future assessment.

Future

Looking toward the Spring of 2020, the team decided to continue this assessment process with some changes made to the discussion board. The prompts largely remained the same, although clarification was added to include the expressed option for students to provide either the publisher or publication for each source. The updated discussion board also requests that students indicate their research topic, the reason for this primarily being so the team will be able to internally assess the relevance of sources being selected for the discussion board responses.

Changes were also made to the lesson plan. For an in-session activity, during which students are asked to examine two sources and identify a potential audience for each, a definition of audience is provided on the worksheet and emphasized during full-group discussion. An additional element added to the lesson plan involves encouraging students to view the discussion board as more of an opportunity to advance their research rather than merely seeing the assignment as a chore. The hypothesis for this modification is that students may find more relevant and worthwhile sources in their search, resulting in more information provided in the discussion board posts, or at least the minimum of two sources to be discussed.

The general education program at UMKC will implement an entirely new set of courses beginning in the Fall of 2020, and the library has been invited to be present in every required course. The course assessed this year will be phased out, though there will be a few offerings during the next academic year for current students finishing the requirements of the current program. While there are many adjustments being made for future library instruction sessions, there is not a broad change in the planned curriculum; there will still be instruction of information literacy with emphasis on credibility, relevance, and authority in sources. Assessment for the new program will need to change and the role of the discussion board assignment will have to be adjusted for implementation in future library instruction sessions.

Conclusion

After modifying the lesson plan based on results from a new assessment process, the general education team will consider additional changes to be made for the limited continuation of this course after a similar assessment of the Spring 2020 discussion board posts. The efforts made and both successes and shortcomings realized through this assessment project will undoubtedly benefit all library instruction lessons, assignments, and assessments going forward at the UMKC Libraries. As a greater number of courses move to a total or hybrid online delivery system due to the coronavirus pandemic, a sound method of online information literacy assessment will be necessary, and the consistency discovered and hoped for through the use of discussion boards will allow for more uniform experiences for students and librarians alike.

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