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Beyond Passive Learning: Utilizing Active Learning Tools for Engagement, Reflection, and Creation

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Utilizing Active Learning Tools for Engagement, Reflection, and Creation

Teresa E. Maceira and Danitta A. Wong

Introduction

The twenty-first-century student frequently engages with mobile environments to fulfill his or her information needs. Reports from the Pew Research Center (Duggan, 2015) indicate an increasing trend in the use of mobile social media platforms in the US adult population. According to the report *Social Media Usage: 2005–2015 (2015)*, 65 percent of American adults use social networking sites, and young adults (ages 18–29) reported the highest social media usage for all age groups, at 90 percent. Among the young adult age group, social media usage in 2005 was reported to be 12 percent (Perrin, 2015). This sharp 650 percent rise illustrates the increasingly networked environment inhabited by young adults. In an effort to engage students in the online environment they frequent, educators at the University of Massachusetts Boston utilized iPads to integrate mobile technology into library instruction and other teaching initiatives. The impetus for exploring emerging technologies for library instruction was par-

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ticipation in University of Massachusetts Boston's iPads in the Classroom program. As part of this program, the instruction librarians acquired an iPad cart for library instruction in fall 2014 in order to facilitate and create increased and enhanced teaching opportunities. The authors wanted to go beyond substituting the iPads for desktop computers to transforming tasks so that learners could engage in higher order skills of creating and evaluating information, as defined by Puentedura's Substitution Augmentation Modification Redefinition (SAMR) model of technology integration (2014) and incorporate best practices for the use of technology to promote learning.

This chapter will discuss activities that integrate iPads into library instruction and highlight the use of research guides, web-based polling, gaming pedagogy, online surveys, and other web-based applications for academic research that participants directly engage with, reflect upon, and use to create information in transformative ways. Both in course-specific information literacy sessions with students and iPad workshops focusing on educational applications open to the University of Massachusetts Boston community will be discussed. The aim is to address questions such as these: Does integrating iPads into library instruction sessions enhance the experience by adding value or detract by creating obstacles? To what extent are we integrating the technology into our sessions? Is this technology just another tool? How do apps add value to learning? With any teaching innovation, there are lessons to learn. This chapter will discuss the benefits and drawbacks of teaching with technology and provide suggestions on how to integrate emerging technologies into the ever-evolving classroom.

Literature Review
Metaliteracy

Mackey and Jacobson (2011) first popularized the term *metaliteracy* to incorporate changing technologies and different literacy types into library instruction. Acknowledging the centrality of technology, the Association of College and Research Libraries (ACRL) *Framework for Information Literacy for Higher Education* draws upon the concept of metaliteracy in its discussion of the evolving digital environments that impact our understanding of information literacy (Association of College and Research Libraries [ACRL], 2016). Thus the ACRL framework and the concept of metaliteracy provide a foundation for integrating technology with information literacy by recognizing the dynamic and collaborative elements of information creation in a participatory networked environment. Mackey and Jacobson (2011) maintain that metaliterate learners are consumers, producers, and sharers of online information in collaborative spaces, stressing the primary importance of information, whereas the medium is secondary.

Substitution Augmentation Modification Redefinition (SAMR)

The authors used concepts from metaliteracy and the SAMR model to effect a more purposeful and reflective use of technology in the classroom. Puentedura (2014) developed the SAMR model to guide educators with the design, implementation, and assessment of teaching that integrates technology to transform tasks and target increasingly complex learning outcomes. In the initial substitution stage of SAMR, the new technology serves as a direct substitute without a functional change of the task. In the second stage of augmentation, the new technology provides some functional improvement. The first two stages of the model allow for some enhancement of educational tasks and typically target the learning outcomes of remembering, understanding, and applying information. An example of substitution is to have learners do a keyword search for articles using a database app on an iPad rather than on a computer. This involves having learners apply and understand search techniques to find articles much in the same way that it is done on a computer. The last two stages of the model, modification and redefinition, allow for transformation of tasks and the application of more cognitively complex processes of analysis, evaluation, and creation as outlined in the revised Bloom's taxonomy (Heer, 2009). An example of redefinition would be to have learners create and share a video presentation using a screen casting tool such as Educreations instead of giving a presentation in the classroom. The creation of a digital product transforms the task of presenting through the incorporation of an online participatory environment. In this way, the authors used the SAMR model to be selective and goal-focused in using technology to teach, as recommended by Miller (2014). In short, the lesson outcomes incorporated varying levels of technology-integrated tasks so that learners could sequentially develop increasing comfort with the technology and use it to eventually perform more sophisticated cognitive processes such as the creation of products that could be shared online (see table 5.1).

Mobile Information Literacy

The research literature reflects the increasing use and benefits of mobile technology in libraries. Havelka (2013) observed emerging technologies, and in particular mobile technology integration, in many academic library services with the exception of information literacy sessions. Havelka (2013) inferred that students would welcome mobile information literacy instruction because surveys showed that students would consider using iPads as their only research tool for academic purposes. Fabian and MacLean (2014) reported that the use of mobile devices fostered student engagement and collaboration. Furthermore, mobile environments

TABLE 5.1
Tools and activities using technology incorporating the SAMR model.

Functional Category	Tool	Activity	Activity Description	Learning Outcomes	SAMR Model
Presentation & Collaboration	Padlet	Knowledge sharing	Crowdsource the course topic	Evaluating and using appropriate resources for research Contribute to class knowledge	Modification
	Haiku Deck	Presentation	Create of a product	Utilizing technology to express an idea	Modification
	Educreations	Video creation	Present on the paper topic and appropriate resources	Evaluating and using appropriate resources for research	Modification
	Poll Everywhere	Knowledge sharing	Crowdsource the course topic	Evaluating and using appropriate resources for research Contribute to class knowledge	Modification
Feedback, Reflection, Assessment	Research Guide Poll	Voting	Vote on preferred search tool used in the workshop to initiate a discussion of tool features	Evaluating and using appropriate resources for research	Augmentation

TABLE 5.1
Tools and activities using technology incorporating the SAMR model.

Functional Category	Tool	Activity	Activity Description	Learning Outcomes	SAMR Model
Feedback, Reflection, Assessment	Padlet	Brainstorming	Brainstorm and suggest search strategies	Analyze the credibility of search results Refine search strategies	Augmentation
	Answer Garden	Reflection assessment	Identify and share credible resources	Evaluating credible resources	Augmentation
	Kahoot	Assessment game	Answer reflective survey questions and demonstrate understanding of concepts	Evaluating credible resources	Redefinition
	Socrative	Reflection assessment	Answer reflective survey questions	Demonstrate self-reflection & understanding of material	Augmentation
Citation	EasyBib	Citation	Generating citations	Attribution	Augmentation
	RefME	Citation	Generating citations	Attribution	Augmentation

made lessons meaningful, while the apps utilized added value to the instruction. In their experience, the mobile nature of the devices facilitated improved interactions between students and faculty by reconfiguring the physical space and introducing innovative app-specific activities.

Mobile Applications and Librarians

In response to the increasing academic research conducted in mobile environments, the authors developed a series of workshops focusing on apps. The rise in the use of mobile devices has generated an upsurge of associated apps. According to the website Statista (https://www.statista.com), from June 2008 to June 2016 the number of Apple apps grew to 2 million ("Number of available apps", 2016). Recognizing the increasing use of mobile devices and apps, Havelka and Verbovetskaya (2012) make the argument that mobile information literacy is a necessary skill that librarians should introduce into information literacy classes. Spina (2014) states that librarians are well placed to help library users to navigate this constantly evolving environment. Similarly, Hennig (2014) states that with the proliferation of apps, it's incumbent on librarians to be app-literate. Hennig (2014) further reaffirms that librarians need to become more knowledgeable about apps to impart knowledge and create teaching opportunities. Although student interest in utilizing mobile devices for education is evident, the majority lack sufficient skills in evaluating apps and mobile websites (Havelka, 2012; Yarmey, 2011). Canuel and Crichton (2015) and Hennig (2014) state that by providing workshops to disseminate information on apps, librarians address the academic needs of their students. Spina (2014) and Hennig (2014) outline criteria to use when evaluating apps and for sharing the information through various methods.

Tools and Learning Activities

The technology integration in information literacy classes at the University of Massachusetts Boston relied mostly on free web-based tools and apps. The authors actively integrated Padlet, AnswerGarden, and Poll Everywhere. The flexibility of these tools made them perfect for a wide variety of activities such as polling, reflection, and assessment. Library subscription–supported apps, such as BrowZine, FT (from *Financial Times*), and LibGuides, were also integrated into the classes for citing, presenting, researching, and collaborating in the information literacy classes, mobile sessions, and workshops. Learning activities included a description of the tools to be utilized and the applicable level of technology integration as defined in the SAMR model, in addition to identified goals for each session.

Presentation, Collaboration, and Assessment Tools

EDUCREATIONS

The Educreations app is a recordable whiteboard that facilitates the creation of short videos. Educreations users can create multiple interactive whiteboards; import videos, links, and images; and share videos with other Educreation users. Educators utilize Educreation videos as vehicles to prompt students to explain a topic or an idea.

Four freshman English (ENGL 101) classes had mobile information literacy sessions utilizing iPads, a research guide, and the Educreations app. In the information literacy session, facilitators measured student knowledge and shifted away from using the iPad as a substitute for computers and moved to the transformative level as defined in the SAMR model. Instead of students searching for information for their papers and e-mailing or creating a Word document on their sources, they created and shared videos documenting their research ideas.

Learning Outcomes

The instruction sessions intended learning outcomes included the following:

1. Identifying key concepts and terms related to a research question
2. Applying keyword and Boolean search techniques
3. Evaluating and using appropriate resources for research

The ENG101 course was part of the iPads in the Classroom program, and therefore the students used iPads weekly and the sessions were designed to integrate information literacy into a mobile environment. Facilitators guided students on the iPads in conducting database searches for scholarly material, identifying relevant keywords and subject terms. As the sessions progressed, students engaged in a continuous dialogue with the librarian and professor, who functioned as co-facilitators and co-learners. Facilitators posed leading questions, such as: "How do I know this is a research article not a literature review?" "What are the differences between conducting a keyword search versus a subject search?" and "How would you cite a YouTube comment?" The collaborative research taking place in the classroom created a social learning environment by changing the students' role from passive receivers of information to active partners in the discovery process utilizing iPads as the medium.

In the second half of the sessions, the students used Educreations to create videos on their chosen topic. The aim of the video creation exercise was to reinforce information literacy skills by conducting academic research, creating a resources list to use for the assignment, and employing an effective and fun tool. The students' Educreations recordings included sketches describing public spaces, images retrieved through Google Images, imported citations from the databases, and website links. According to the SAMR model, the four classes progressed

from the substitution stage with the deployment of the iPads as computer substitutes to the redefinition stage by incorporating the Educreations app because it allows students to create a product that was not possible without the technology.

Challenges

Technical problems such as occasionally spotty Wi-Fi connectivity and limitations of the iPads' microphones hampered the quality of the recordings. Further technical issues arose from the students' lack of experience using the Educreations app and time constraints. Initially, the time allotted for the exercise was twenty-five minutes in a seventy-five-minute class session, including a demonstration on utilizing the app and exercise instructions. Ideally, facilitators should have allocated additional time to explore and practice using the app.

Positive Outcomes

Classroom dynamics changed with the adoption of the iPads into the information literacy sessions. In each case, the interactions between the facilitators and students during the sessions were fluid and spontaneous, while conversations resulted from individual observations and questions. Fabian and MacLean (2014) noted the collaborative aspect and the "seamless workspace" fostered by the mobile environment. For example, during one of the sessions, a student asked how to cite images found on Google. This question resulted in the class searching Google Images, and a discussion about Google's usage rights options developed. The spontaneity of the mobile environment and the sharing of information and ideas cultivated a collaborative atmosphere. The critical evaluation of information in this dynamic environment aligns with the core fundamentals of metaliteracy, where students act as active searchers and evaluators of information. The process of participating in a conversation involving experts and novices reinforced learning concepts where students became active participants in the evaluation of the information sources for validity and reliability.

PADLET/POLL EVERYWHERE

Padlet is an interactive web-based bulletin board with a variety of uses. Padlet can be used online, embedded into a research guide, shared via social media, or e-mailed. Padlet is ideal for collaboration and posing open-ended questions for reflection and assessment.

The authors used Padlet for identifying source types and sharing search strategies in a workshop for a science seminar. The Padlet in the course guide asked the students to try a web search with specific terms and then to create and post strategies on the Padlet that could improve the quality of results. The class then tried the search strategy recommendations together. This activity reinforced the idea that searching is iterative and allowed the students an opportunity to evaluate strate-

gies based on the results. This activity falls into the augmentation stage of SAMR because having students post suggestions online is a functional improvement over oral responses.

Learning Outcomes

The instruction sessions intended learning outcomes included these:

1. Analyze the credibility of search results.
2. Refine search strategies.

Another Padlet activity for an interdisciplinary seminar workshop included instructor-provided images and text describing potential sources of varying types relevant to the class assignment on wrongful legal convictions (figure 5.1). Each group of students was assigned a source on the Padlet wall and determined if the source was primary or secondary. Then they moved that source to a designated area for either primary or secondary sources on the Padlet wall. Subsequently, they created a citation for the source to add to the Padlet. Here the authors apply the modification stage of SAMR because the technology allows the students to evaluate information and complete tasks without a nontechnical equivalent.

FIGURE 5.1

Screenshot of seminar Padlet.

The freshman English (ENGL 102) classes utilized Poll Everywhere and Padlet in the first visit. Poll Everywhere is a web-based polling tool applied in this particular instance as a collaboration tool. The classes created a class bibliography developed through a crowdsourcing activity focused on the concepts surrounding the individual and society. The integration of Padlet and Poll Everywhere into the information literacy session created a collaborative space via the research guide where all four classes contributed to a single platform. This is an example of applying emerging technologies in collaborative spaces, as discussed by Mackey and Jacobson (2014).

Learning Outcomes
The learning outcomes included these:
1. Evaluate and use appropriate resources for research.
2. Apply keyword and Boolean search techniques.
3. Contribute to class learning and utilize technology to express an idea.
4. Identify the differences between paraphrasing and quoting in MLA.
5. Generate citations.

The sessions addressed information literacy subjects in a mobile environment where each attendee (student, the professor, and the librarian) had iPads. The students posted resources including books, book chapters, articles, and websites. Subsequently, students experiencing technical problems with the tools or the iPads went so far as e-mailing their contributions to the librarian for inclusion in the class bibliography. Consequently, the crowdsourcing exercise developed into an informal assessment gauging student comprehension of concepts discussed during the class sessions.

The use of the iPads and the web-based tools for collaboration created a collegial atmosphere with opportunities to explore learning among class peers in association with the professor and the librarian. The crowdsourcing exercise reflected the heightened level of participation and enthusiasm the students exhibited over the opportunity to share knowledge. Johnston and Marsh (2014) also observed that active participation with technology in information literacy exercises promoted higher student engagement by fostering student collaboration. This is another example of students as creators of information in collaborative environments as outlined by Mackey and Jacobson (2014).

Havelka (2013), Yarmey (2011), and Fabian and MacLean (2014) observed higher levels of engagement and social learning exhibited by students in library instruction sessions incorporating mobile technology. Fabian and MacLean (2014) go further to speculate that the novelty of using a device could have added to the demonstrated enthusiasm, although all agree that technology enabled the students to accomplish tasks that would normally not be feasible without technology integration.

The utilization of the crowdsourcing exercise as an informal assessment to measure student understanding of acceptable sources uncovered students' reflection of the differences between scholarly and popular sources. The prompt asked students to contribute to the class knowledge by including resources they personally found useful or interesting. The majority of students contributed resources from the databases even though they didn't have to. The crowdsourcing activity focused on sharing information through group interactions by disseminating group knowledge through a virtual environment. The four ENGL 102 sections contributed to one guide, making the information available to all users of the class guide and beyond to a wider online audience.

HAIKU DECK

In the second visits to the freshman English (ENGL 102) classes, the activity focused on the creation of a product for the final assignment. The app Haiku Deck provides a simplified process for creation of slides and the incorporation of images to create a visually appealing and impactful presentation. The activity asked students to introduce the rest of the class to their topic by creating three slides on Haiku Deck. Instead of submitting a written proposal on their topics, the students created a visual presentation.

The presentations in the second information literacy sessions included the sophisticated use of images to represent the students' research topics. Students exhibited a high level of interest and personal investment in representing their topics visually. One student, for example, imported his personal images to Haiku Deck to create his own deck containing six slides. However, it was evident that other students lacked comfort with technology and did not complete the activity.

The emphasis of metaliteracy on the production and contribution to the scholarly conversation influenced the development of the lesson plans for these classes (ACRL, 2016) as did the ideas of active engagement reinforced throughout metaliteracy; the notion of students as contributors to knowledge, not as passive consumers; and the realization that information creation can take place in different formats and environments (Mackey & Jacobson, 2014). Producing a product—an Educreations video, or a Haiku Deck presentation—involved a discussion of the value and purpose of the tools for content creation. Essential for the information-literate student is an understanding of differing formats and when to use a particular tool for online creation and collaboration (Mackey & Jacobson, 2011). Correspondingly, as stated by Mackey and Jacobson (2014), the information-literate individual needs to develop the understanding and awareness of the impact and layers of knowledge creation.

The incorporation of iPads in the ENGL 102 classes provided the motivation to use the iPads not as a tool for substitution, as identified in the SAMR Model (Puentedura, 2014), but to move toward the transformative level of modification

and redefinition, where the use of iPads promotes student collaborations and social learning.

ANSWERGARDEN

AnswerGarden is a web-based feedback tool. The authors used the tool to solicit feedback to reflective questions and assessment. The tool AnswerGarden provided assessments that identified knowledge gaps or concepts that needed further reinforcement from the librarians. Questions such as "How do you start your research?" or "Identify primary versus secondary sources." provided instructional opportunities for the librarian to follow up on a misconception or to clarify a concept.

SOCRATIVE/KAHOOT/LIBGUIDE POLL

The authors used LibGuide surveys and the free assessment platforms Socrative and Kahoot! to administer assessment and reflective survey questions to learners. Miller (2014) points out that the wide availability of online quizzing tools allows instructors to take advantage of the testing effect. The testing effect, reported in numerous studies, finds that testing strongly promotes memory of material (Miller, 2014). Socrative is particularly optimal for formative assessment because it allows the instructor to pose extemporaneous questions. Additionally, online technology allows for immediate autograding and rapid feedback with explanations of answers. Information literacy instructors can create their own tests or reuse free quizzes found in MERLOT, Kahoot!, or other open educational resources.

The authors used Socrative to have students answer questions individually and display answers anonymously as discussion starters, or the answers were used as feedback for instructors to see what the students understood. In a graduate chemistry workshop, students answered reflective survey questions via Socrative such as "Reflect on the different databases and/or tools you have explored in the workshops (Web of Science, Google Scholar, citation managers, bibliometric tools, and social networking tools). Identify one and describe how it could be beneficial in your research or studies." Much in the same way, the LibGuide poll was used to solicit student feedback on favorite tools (see figure 5.2).

Kahoot! has an added advantage of maximizing motivation through the use of game-like elements. Miller (2014) identified many of these elements, including multiple sources of feedback, such as music, sound effects, and points. With Kahoot! you can create a quiz or choose from a variety of freely available prewritten quizzes. The quizzes are played in a group setting. Players answer on their own devices, while the quiz questions are displayed on a projected shared display. Throughout the quiz, players receive points for answering quickly, and the names of the top scorers are displayed in a leaderboard. The authors also used LibGuide polls to stimulate reflection and to assess the students' understanding of tool features. These assessment tools represent the modification stage of SAMR, as these

activities could be done orally. However, the autograding, rapid feedback, and game-like features serve to redesign these tasks.
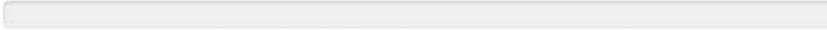

FIGURE 5.2
Screenshot of poll.

Poll

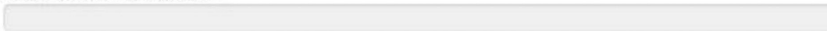What was your favorite research tool that you used today?
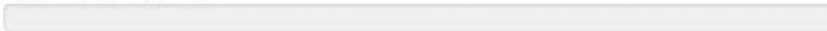
Credo Reference: 0 votes (0%)
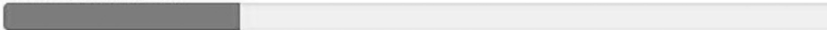
Web of Science: 3 votes (60%)
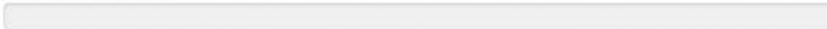
ScienceDirect: 0 votes (0%)
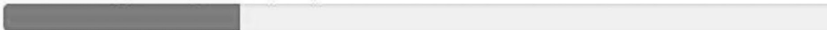
Google Scholar: 0 votes (0%)

PubMed: 1 votes (20%)

CINAHL: 0 votes (0%)

IEEE XPlore Digital Library: 1 votes (20%)

Total Votes: 5

Citation Tools—EasyBib/RefME

Mackey and Jacobson (2014) indicate that in digital environments, attribution can be confusing and challenging; thus, the information-literate student needs to understand the shifting environment and how to cite correctly. Discussions on ethical attribution occurred when using Haiku Deck images and when searching Google Images to include in Educreations videos. Practical application of citation-generating apps EasyBib and RefME in the information literacy classes created learning opportunities on ethical attribution.

Apps Workshops

The objective of the app workshops is to communicate the added value that specialized program applications (apps) bring as tools for academic research. The literature on mobile technology advocates for librarians taking an active role in

imparting knowledge associated with apps (Hennig, 2014; Canuel & Crichton, 2015; Havelka & Verbovetskaya, 2012). The ubiquity of apps in present-day society spans all aspects of an individual's life. Apps used in social interactions, reading, shopping, travel, and business grows more pronounced every day, yet educational applications were not widely known by our students. A search in iTunes for education-related apps reveals a bewildering list of apps, offering little guidance on the app relevance. The goals of the workshops are to augment the academic abilities of the information-literate individual through the enhancement of app literacy.

The designated apps for the workshops address specific aspects of scholarly research. The applicable educational categories targeted included conducting research, file sharing, productivity, accessibility, citing, collaboration, and presentation. The criteria for identifying apps with educational applications included free apps or apps obtained through database subscriptions, apps available in multiple platforms, and ease of use.

Students, faculty, and staff who attended the workshops expressed an increased awareness of education apps and furthermore affirmed that going forward, education apps would be a part of their research skill set. This survey remark exemplified the typical feedback received: "I didn't know there were apps out there that can help me with my research." The apps workshops continually evolve; therefore, changes in the rotation of the featured apps is ongoing. The development and implementation of the workshops address the knowledge gap regarding mobile educational technology. Librarians are well positioned to evaluate and introduce apps that have educational functionality.

The mobile information literacy sessions featuring mobile sites and apps provided the impetus for the development of further outreach in mobile instruction. Canuel and Crichton (2015) observed the increased merging of mobile technology into information literacy classes. The mobile information literacy sessions feature subject-specific apps for business and nursing classes featuring the Financial Times app FT, the Census Bureau economic indicators app, the US National Library of Medicine app PubMed for Handhelds (PubMed4Hh), citation apps EasyBib and RefME, the EBSCOhost app, and the Gale database app AccessMyLibrary. The mobile workshops generated a proactive integration of apps into information literacy sessions. The workshops provide another venue to promote and enhance the academic skill set of students, faculty, and staff through the dissemination of apps with educational applications.

Technical Issues

The challenges in integrating technology into the authors' information literacy classes echo similar observations made by Havelka (2013) and by Fabian and MacLean (2014). Wi-Fi connectivity, browser issues, and database functionality were

the biggest stumbling blocks. Miller (2014) recommends having a contingency plan in case the technology fails. One example of such a plan would be to use non-technical tools such as paper for conducting a survey or have a spoken discussion.

Wi-Fi proved problematic, especially for mobile instruction sessions outside of the library. Bandwidth could also be a problem in the library instruction room when many individuals log in to some of the web-based tools such as Kahoot! or Answer-Garden. Technical proficiency of the attendees at times presented problems. Information literacy classes and the workshops could be derailed by the participants' comfort level with devices and technology. It must be noted that given a choice, a marked number of students opted for using their laptops because of connectivity problems and lack of full functionality found in mobile applications. Canuel and Crichton (2015) also commented on this issue regarding functionality: while the mobile searching experience is beneficial for short-term research, performing rigorous research on an iPad has the potential to become a frustrating experience.

Database apps such as EBSCOhost and Gale required authentication. The process of authenticating an app is a disruption to an information literacy session. IT authenticates the apps prior to the session to remediate this problem. The survey results from the workshops indicated that users preferred apps that could be directly and immediately employed. The need for accounts for some of the apps presented an obstacle, hence the creation of library e-mail accounts for this purpose. Created accounts made accessing the technology a seamless process in information literacy classes and workshops.

Issues with the internal library website and database functionality presented themselves as the authors moved more of the instruction onto the iPads. For example, the library database A–Z list did not work on the iPads. Databases lacking mobile websites do not display well in iPads, which is problematic.

The time constraints experienced in information literacy sessions factored into the use of technology. The implementation of a tool and its effectiveness can be compromised in fifty- to seventy-five-minute classes. One-shot sessions required careful time allocation because of the added elements of distributing and collecting iPads and providing instruction on the tools and tasks. Keeping up with the literature on education tools is a constant challenge. Tools evolve and features change, which makes it necessary to continually keep up-to-date with the literature. Furthermore, web-based tools and apps require testing and evaluation.

Conclusion

The acquisition of an iPad cart provided the motivation to move toward further integrating technology into information literacy classes and the opportunity to launch app workshops in the library. Prior to acquiring the cart, the authors used technology in a fragmented manner. The growing pedagogical literature on the

overlap between mobile technology and information literacy inspired the authors to actively use these tools (iPads, research guides, web-based tools, and apps), to empower the information-literate individual to produce information. The authors noted the beneficial outcomes in integrating technology into information literacy classes with regard to the level of engagement, creativity, and reflection from the participants in active learning scenarios. First, the tools engage students in active learning tasks so that more time is spent practicing skills than passively receiving information in lectures. Like Johnston and Marsh (2014) and Havelka (2013), the authors reported enthusiastic responses from students towards technology integration in information literacy classes. Being mobile impacted the level of engagement, as Havelka (2013) observed that the realignment of the physical space while using an iPad allowed for more face-to-face interactions among students, faculty, and librarians while they shared devices in a collaborative and synchronous environment. Moreover, reticent students, who would normally be slow or unresponsive to oral queries from librarians, had an opportunity to engage through written responses using technology. Secondly, the authors observed evidence of creativity in the students' products and in the thoughtful integration of different applications in information literacy classes. Finally, the benefit of increased reflection resulted from the process of students responding to questions via AnswerGarden, Socrative, and Padlet in parallel to the participatory digital environments in their daily lives. Using these tools, the students read, created, and commented on other students' responses about the classroom concepts and activities in the same way that they regularly interact with user-generated content in the form of *Wikipedia*, Facebook, Twitter, and comments at the end of online articles. Overall, the benefits of increased engagement, creativity, and reflection outweighed the technical drawbacks of integrating mobile technologies in library instruction.

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