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Collaborative Learning Technologies

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Overview and Definition

With an increase in online learning environments, collaborative learning is becoming an increasingly popular method of engaging students. According to the Center for Teaching Excellence at Cornell University, collaborative activities are commonly based on four main principles: "The learner or student is the primary focus of instruction; interaction and 'doing' are of primary importance; working in groups is an important mode of learning; and structured approaches to developing solutions to real-world problems should be incorporated into learning" (2014). Collaborative learning technologies range from communication tools that allow for synchronous and asynchronous text, voice, or video chat to online spaces that facilitate brainstorming, document editing, and remote presentations of topics.

Basis for Current Interest

Providing students with collaborative learning experiences not only promotes critical thinking and reflection but also encourages students to "develop [a] sense of community, thus enabling the creation of an environment in which further collaborative work can happen" (Palloff and Pratt 2005, 5). Studies have also shown that students working in online groups provide mentorship and technical support to their fellow group members, and develop communities that extend beyond the individual learning experience (Stacey 1999). These learning experiences often extend beyond the classroom, and can be particularly beneficial for students working on research projects.

While technologies to facilitate collaborative learning include a range of features and functionalities, this report focuses on three types of tools: idea generation and brainstorming, online group work and document collaboration, and online communication.

Current Applications in Academic Libraries and Higher Education

Lomas, Burke, and Page (2008) explain that collaboration tools, as opposed to online communication tools, should encourage communication among participants, have interfaces that are easy to use, and both expect and be capable of collaboration. There are a wide range of potential tools available, which has prompted some libraries to create guides to quality collaboration tools for their campus communities. These guides, including the University of Queensland Library's Research Collaboration Tools and Harvard Law School Library's Collaboration Tools, suggest tools for a variety of applications.

Idea Generation and Brainstorming

Research in psychology has examined the strengths and weaknesses of face-to-face vs. computer-mediated collaboration. Finholt and Teasey's (1998) review of the literature found that computer-mediated groups generated more ideas during brainstorming tasks, experienced more even participation among group members, and had less "social loafing," where some group members work less hard in a group than they would on their own, perhaps due to the electronic trail of their work. These strengths make online collaboration tools ideal for helping students generate ideas and brainstorm.

Tools like Google Docs, Padlet, Mindmeister, and Lino can be used for group brainstorming, and a

variety of free online whiteboard tools and real-time collaboration tools are also available for teachers (Byrne 2014; Hovious 2013). Features of these tools include space for multiple participants to collaborate in real time, as well as the ability to type, draw, share images, chat or talk with collaborators, and even record work to review or submit to an instructor later.

Online Group Work and Collaboration

Many tools are available for document collaboration in face-to-face classes or online. Rather than sending emails with attachments of different versions of a file back and forth, students can go to a cloud-based document to collaborate. Some document creation tools include Google Drive, Zoho, Etherpad, and Evernote.

These tools have a variety of features to encourage collaboration, such as built-in chat, colors for different authors, tracking changes, playback of writing, ability to insert comments, and different levels of sharing ranging from viewing to editing. With the new tool called Poetica, comments appear in the margins of the page, in a visual style as if you were adding comments to a paper document. The Uberconference add-on for Google Docs, on the other hand, invites users to collaborate through a virtual conference call while viewing a Google Doc (Klosowski 2014). While many of these cloud-based tools are not tied to institutions, it is becoming more common for colleges and universities to implement enterprise cloud storage platforms, which include collaboration features (EDUCAUSE Learning Initiative 2014).

The Center for Research on Learning and Teaching at the University of Michigan (2014) highlights a number of innovative examples of faculty using online collaboration tools for group work. Projects include using Google Docs for group brainstorming, small group responses to discussion questions, and group creation of study guides and exam questions. Brandon Respress, a nursing faculty member, uses Google Docs to have students submit sections of a research assignment on a weekly basis. Peers provide feedback on the assignments and then the professor models giving feedback as well (Hershock and LaVaque-Manty 2012).

Online Communication

Collaboration tools can also be used to support synchronous online communication, including online meetings, office hours, informal chats, guest speakers and webinars. Some synchronous communication tools include Skype, Adobe Connect, Google Hangouts, Vyew, GoToMeeting, and MeetingBurner. Features include audio via webcam or phone, text chat, polling, drawing, and screen sharing. Many of the tools allow recording so that meetings can be archived via a course management system or YouTube to be viewed later.

A recent study comparing fee-based and free web conferencing platforms that support student collaboration recommended Adobe Connect and Google Hangouts due to the range of collaborative features possible with these platforms (McDaniel et al 2013). To use these tools effectively, the Academic Training Group at the University of Kentucky (2015) provides best practice guidelines for Adobe Connect, and a digital marketing media faculty member gives suggestions for how to use Google Hangouts (Floyd 2013). For more tools, see the Winter 2013 edition of Tips and Trends on Web Conferencing Software.

Applications in Academic Library Instruction

Idea Generation and Brainstorming

In library instruction, online mind and concept mapping tools can be used to generate keywords for searches, to narrow down research topics, and for students in groups to give feedback on each other's topics. Fuchs (2014) describes a variety of possible uses of Padlet, including having students post terms they would use to search for their topic at the beginning of an instruction session. She

points out that in addition to serving as a formative assessment, this activity engages students in peer learning and helps them to assess their own skills. The activity could be taken further by having students suggest additional terms for their peers and adding terms to the Padlet after the library instruction session.

Online Group Work and Collaboration

Document collaboration tools are widely used among librarians to work together on presentations and instructional materials, and they can be used in one-shot sessions as well. Bobish (2011) provides creative examples of how Web 2.0 tools can be used in library instruction. Many of his ideas, such as creating a research timeline or a collaborative bibliography or wiki, could easily be adapted for use with Google Docs or Padlet. Bilby (2014) reports on a collaborative student research project developed with the theology librarian at the University of San Diego that required students to create and share annotated bibliographies throughout the semester using Google Drive.

Librarians can also use these tools to facilitate small group discussions about research strategies. For example, groups of students could be assigned websites to evaluate and could then post their evaluations, and review other group's evaluations.

Potential Value

Online collaboration tools are an excellent way to engage students in both virtual and physical classrooms. They not only enable active learning, but also facilitate peer learning. For example, incorporating online brainstorming tools such as Padlet or MindMeister into library instruction allows students to bounce ideas off one another and share their own individual experiences and perspectives, which has been shown to increase cognitive thinking and comprehension (Cooper 2014).

Using online collaborative technologies also allows for more seamless assessment. For example, instructors can collect real-time analytics with open-source tools such as SNAPP (Social Networks Adapting Pedagogical Practice) to monitor and quickly assess students' online discussions (Krongard and McCormick 2013). Librarians can also measure student learning through authentic demonstration of skills. Proposals, online group presentations of research findings, or videocasts allow students to demonstrate their information literacy skills while giving the librarian a chance to provide real-time feedback. Feedback is an important part of the group work process, because it increases learning and promotes creativity (Cooper 2014). As academic librarians are increasingly called upon to prove their relevance, the ability to quickly and succinctly demonstrate the library's impact on student learning is critical.

Collaborative learning tools also have implications for the proposed *Framework for Information Literacy for Higher Education*. Several of the threshold concepts, including "scholarship is a conversation" and "research as inquiry" could be introduced through collaborative activities. For example, students could contribute as a group to a scholarly blog or other academic community in order to further their understanding of the discourse in a particular subject area.

Potential Hurdles

Collaboration tools also have some drawbacks. Some of the tools involve a learning curve, which can be an issue for students and librarians who are resistant to trying new technologies. One strategy for dealing with this challenge is to assign an introductory activity using the technology to help students become more familiar with the tool (Center for Teaching Excellence, Cornell University 2014).

Another barrier to adopting these collaborative technologies is that free tools often disappear or become paid tools. For example, one of the authors of this article previously used Corkboard.me as a collaborative brainstorming tool, but it later

changed names and became a paid tool, Noteapp.com, and the discussion boards she had created were lost.

Librarians may also find it challenging to divide students into groups. They can either allow students to form their own groups or assign students to groups (Center for Teaching Excellence, Cornell University 2014). Tools such as Geddit allow librarians to gauge student understanding and subsequently create groups based on ability to facilitate peer-to-peer coaching.

Finally, tools that offer anonymous participation encourage all to participate; however, anonymity can lead to students starting conversations that are offensive or completely unrelated to the topic. To avoid this problem, ground rules can be set for use and group members could be assigned responsibility for different sections. This solution would allow individual students to still maintain some anonymity, but make all group members feel more responsible for their contributions.

Conclusion

There is great potential for using online collaboration tools to engage students, provide an outlet for creative exploration of ideas, and as a way for librarians to gather valuable assessment data. The variety of tools available means that there is a technology available for almost any classroom application, from idea generation and brainstorming at the beginning of a research project to peer-review of research papers. By providing students with collaborative learning opportunities during information literacy instruction, librarians can facilitate peer learning and receive real time feedback on their teaching.

Tools Discussed

- Adobe Connect: http://www.adobe.com/products/adobeconnect.html
- Etherpad: http://etherpad.org
- Evernote: https://evernote.com
- Google Docs: https://docs.google.com
- Google Hangouts: https://plus.google.com/hangouts
- GoToMeeting: http://www.gotomeeting.com
- Lino: http://en.linoit.com
- MeetingBurner: https://www.meetingburner.com
- Mindmeister: http://www.mindmeister.com
- Padlet: http://padlet.com
- Poetica: https://poetica.com
- Skype: http://www.skype.com
- Uberconference: https://www.uberconference.com
- Vyew: http://vyew.com
- Zoho: http://www.zoho.com

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Further Readings

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