Influence of Active Learning Spaces on Teaching & Learning

Use of Technology within Learning Spaces

Active learning is a teaching and learning pedagogy based on student engagement and reflection. Purdue University dedicates resources to design and renovate classroom spaces to accommodate and promote active learning experiences. The purpose of this study is to determine how the features and characteristics of active learning spaces influence student learning. We employed a mixed-method data collection approach for this study. This briefing summarizes select findings related to technology and learning spaces. Specifically:

How do instructors’ and students’ perceptions of technology impact student engagement and learning outcomes?

Instructors’ Plans to Use Technology

Having more information about a learning space is desirable to faculty while planning for the course or adapting their instruction during a semester. Understanding learning space technology options may affect how instructors’ plans to meet learning outcomes for a course, particularly when assigned to teach in a different learning space or when a space contains new or updated features. To obtain the information needed, instructors want access to references materials and human resources.

University websites provide information about learning spaces and technology tools, and staff are available to meet with faculty; however, many interviewees preferred first-hand experiences in a learning space before teaching in it. While teaching, they continue to learn about the uses and limitations of technology within a space, and adapt plans as needed.

Most interviewees need to use the technology in their assigned learning space(s) before they feel comfortable with it. This use helps instructors understand how the technology can or cannot aid their ability to meet planned learning outcomes.

Utility of Technology to Meet Learning Outcomes

While simplifying their use of technology, or avoiding technology, may reduce occurrences of issues, many interviewees believe their use of technology improves students’ ability to meet learning outcomes. For any individual instructor using technology in a specific course, technology use is maximized when the instructor developed their knowledge of available hardware and software during planning for the course. Advance knowledge of and prior experience with technology enable instructors to adapt how they plan for students to meet learning outcomes.

Some interviewees expect students to use their own device in class, typically laptops, tablets, or smart phones. The devices most often appear to be supplemental to a primary facilitation strategy, such as the use of electronic device to look up information during a group discussion. Students’ personal devices also give options to faculty when desired classroom technology is not available or not functioning.

Some interviewees identified a higher time commitment during course planning to integrate technology, such as the time dedicated to developing videos; however, this time may pay off in future semesters when instructors spend less time learning how to use the technology or creating digital content. For example, videos created for use in class can also be used by students outside of class whenever convenient to or needed by them.

BoilerCast was a teaching tool highlighted as a useful by one interviewee, though the instructor did face some difficulty during their transition to using it. Another interviewee instructor integrated use of a smart board into the course, but had to adapt plans with no advance notice when the board was not working. A third interviewed instructor preferred using a learning space with poor Wi-Fi and cell phone service because it minimized technology distractions. The threat of technology failures and limitations requires instructors and students to be flexible. Most interviewees instructors adapted by having alternate plans for instances when technology fails, but some also had alternate plans when technology could support planned activities. The available technology gives instructors pedagogical options, but different uses could enhance or detract from the student learning experience. Having a specific pedagogical purpose increases the utility of technology.

Instructors’ Expectations for Students’ Use of Technology

Briefly, students’ use of technology generally aligns with the expectations set by the interviewed instructors, but also includes use outside of expressed expectations. For example, when students are not told to use electronic devices for personal reasons, they may perceive personal use is allowed. Instructors should explain what use they expect. For example:

- Students can engage with additional content in class through Wi-Fi, mobile devices, and the physical space which accommodates group work.
- Students may not use devices for unrelated uses (ex: social media) regardless of the activity.

Impact of Technology on Students

Some factors mentioned by interviewed instructors, impacting students’ experiences with technology in a learning space, include access to outlets for students using laptops, Wi-Fi strength affecting use of internet access, and the visibility of projection screens relative to each students’ seat. Issues like these may be specific to a

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2. Recommended reference for technology tools available at Purdue: https://www.itap.purdue.edu/learning/tools/index.html
3. For support from various Purdue campus units, consider:
   - One-on-one consultation with Teaching & Learning Technologies: https://www.itap.purdue.edu/learning/services/consultation-requests.html
   - Undergraduate Online Course Development through Digital Education: https://www.digitaleducation.purdue.edu/faculty-resources/course-development/undergraduate/index.html
   - General instructional support through the Center for Instructional Excellence: https://www.purdue.edu/cie/contact/index.html

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learning space, yet it benefits both students and instructors if prospective issues are known in advance. Instructors who consider and implement options may find ways to accommodate every student.

Similar to any other individual teaching and learning activity, how the technology is used within the context of a learning environment matters more than what technology is available. For example, iClickers can be beneficial if intentionally integrated within an activity or lecture; however, students might use iClickers as an excuse to disengage from course content due a lack of perceived relevance or misuse of time. Cell phones can enable students to access information in support of a learning activity aimed at achieving higher order thinking skills, or they can become a distraction.

Within the student survey, 84.1% of students reported “using technology” as a facilitation strategy that had a positive effect on their academic success. Using technology is also perceived to have a significant positive association with those who have the stronger preference for visual learning experiences.

Students were also asked to identify the extent to which technology positively affected learning and success, and the extent to which it accommodated their preferences, and responses are shown in Table 1.

Table 1. Rate of Students Indicating Technology was Somewhat Positive or Very Positive

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<thead>
<tr>
<th></th>
<th>Accommodates Preferences</th>
<th>Impacts Learning &amp; Success</th>
</tr>
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<tbody>
<tr>
<td>Technology used by my instructor</td>
<td>86.6%</td>
<td>82.5%</td>
</tr>
<tr>
<td>Technology I use</td>
<td>76.7%</td>
<td>74.9%</td>
</tr>
<tr>
<td>Technology used by other students</td>
<td>60.7%</td>
<td>54.8%</td>
</tr>
</tbody>
</table>

| Scale: 1=Very negative; 2=Somewhat negative; 3=Neither negative or positive; 4=Somewhat positive; 5=Very positive |

Some interviewed instructors also use technology tools (ex: Hotseat discussions) to obtain feedback from a greater number of students than what is possible by listening and observing. Technology integrated into a classroom gives students more of a voice regarding their learning experiences, and provides immediate feedback to an instructor who can use the information to adapt to students’ needs.

Conclusions

Instructors and students use a variety of technology hardware and applications in-class and outside of class. Any prior experience affects their perceptions of and skills to use technology in class. Presumptions about prior use may be inaccurate.

Since Purdue learning spaces are diverse, and diversely managed, faculty are uncertain who provides supporting resources, like markers or microphones. While providing every possible resource or reference about technology to faculty may be perceived as information overload, the best strategy may be a collection of references that allow relevant information to be obtained by space, by discipline, or pedagogy. Faculty need the general information (such as How do I connect my device to the projector?), but also need best practices for utilizing technology effectively in support of student learning (such as How can a team of students effectively share one computer?).

Faculty use technology for specific pedagogical purposes, such as assessing student learning quickly in a large class using Hotseat. Accordingly, they want technology in the classroom that enables students to meet learning outcomes. Technology may improve learning experiences, and provide instructors with better opportunities to assess learning and to engage with students. Thus, instructors want technology in learning spaces that maximizes learning experiences and minimizes time and energy spent wasted resolving technology issues.

Spotlight on: How Changing Learning Spaces Impacts Instructors

Perhaps coincidentally, many of the interviewed instructors previously used learning spaces in HIKS, and commonly complained about the columns within HIKS obstructing views; however, the Libraries also offered resources to faculty using the HIKS spaces that were not present in the STEW learning spaces featured in this study. While these interviewed instructors moving from HIKS to STEW adapted their course pedagogy to fit the obvious changes in spaces, some were not prepared to:

- Provide their own markers,
- Use only fixed white boards, and
- Provide their own wireless microphone.

In HIKS, markers, mobile whiteboards, and wireless microphones were provided, none of which are available in STEW spaces. While these unanticipated differences sent some interviewed instructors scrambling to obtain resources, they also affected how instructors adapted their use of technology resources in STEW. These instructors’ transitions from HIKS to STEW learning spaces typifies how prior experiences in a learning space affects their expectations about a different learning space, including misperceptions about the available resources in the new space.

“I saw that there was technology for microphones but no microphones provided. It was hard to find out how to get one, how to order one, and [hard to know] what's compatible.”

Availability of resources within a learning space may affect the quality of students’ learning experiences when instructors must spend class time resolving technology issues, finding resources, or waiting for technology to start up. Instructors’ incorrect presumptions about technology may be addressed by better communicating to faculty what resources are and are not available, best practices to use technology resources, and educational alternatives to accommodate technology failures. Interviewed instructors want updates to learning spaces to adapt to the most recent technology. For example, some personal devices cannot be connected to existing wiring for projectors. While costly to adapt all learning spaces to new technology, not staying updated may have a costly effect on students’ learning experiences.

“I think at some point in time, we’re probably gonna get to the stage, as a university, where everybody’s gonna have a device of some sort, whether it be a laptop or a tablet.”