

Students' Perceptions of the Effectiveness of Technology Use by Professors

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Abstract

The purpose of our research was to understand SUNY Potsdam students' perceptions about the use of technology in the classroom by their professors and students' perceptions of their own use of technology. This study took place over the course of the Fall 2013 semester, with the survey period lasting 4 weeks in late October to early November 2013. The survey questions were created based on the literature review, faculty interviews, and survey pre-tests. The resulting survey consisted of 13 questions. A URL link to access the survey was distributed electronically via email to SUNY Potsdam undergraduate and graduate students who were over the age of 18. A total of 287 students opened the survey, with at least 238 submitting at least one response to questions 4 through 13. Students were asked a series of questions regarding their basic educational information, their opinions about technology usage by professors, and their opinions regarding how they feel about the technology they use on their own. Based on the data collected, the top 5 technologies for professor usage, student desire, and effectiveness include Presentation Software, Moodle, Video Streaming, Digital Media, and Text Processing Software. This means SUNY Potsdam is meeting student expectations with these technologies but students also want to see other technologies used such as Smartboards and Mobile Apps. Participants attributed the absence of technology use in the course to Professors are unable to use technology, The professor has strict preferences about the technology they use, and Lessons are not compatible with the use of technology. Participants also appeared to demonstrate an understanding of what is considered socially acceptable, or appropriate, use of their own devices when in class.

Keywords: education, technology, professor, student, instruction, opinion, course, classroom

Students' Perceptions of the Effectiveness of Technology Use by Professors

Today's technologies, such as digital services and new devices, are becoming the soul of society day by day (Riedl, 1995). Thus, it is no surprise such technologies are being used in college and university classrooms. Many professors use technology in hopes to improve their teaching strategies. Some professors may employ a diverse range of technology such as presentation tools, social networking, and digital media, which have the potential to increase students' attention and participation as well as increase their academic achievement. However, there are also many professors who do not embrace technology in the classroom, whether it is through the lack of technology used in instruction or flat out preventing students from bringing their own technology to class.

All of these factors combined create a very intriguing dynamic. On one hand, students may encounter various technologies, whether it is through the mechanics of the course itself or simply the professors allowing students to utilize their own technology in the classroom or on their own time regarding the course. On the other hand, students may encounter a lack of, or complete absence of, technology due to various circumstances. Factor in the possibility that students may now expect the use of technology in their courses given that students are exposed to technology such as Facebook or Netflix in their non-academic lives. How does this dynamic impact the students?

Our study focuses on students' opinions of the effectiveness of a variety technology used by professors in the classroom at SUNY Potsdam. The goals of this study were to determine whether or not students felt their professors' use of technology in the classroom was effective and to determine if the choice of technology used by professors in the course was similar to what technology students' use on their own for academic purposes. Our hope is that the data we collected can provide CTS (Computing Technology Support), TLTR (Teaching and Learning Technology Roundtable), and LTEC (Learning and Teaching Excellence Center) with information to better support the technological needs and priorities of students and faculty in the context of instruction.

Literature Review

The current trend in teaching and learning in higher education is to incorporate technology into instruction (Weston, 2005). The momentum behind this growing trend is the idea that incoming students are constantly exposed to and interacting with various forms of technology in their personal, academic, and career lives to such an extent that traditional teaching methods might be ineffective (Culp, Honey, & Mandinach, 2005; Kennedy, Judd, Churchward, Gray, & Krause, 2008; Prensky, 2001). For example, according to the 2005 Teens and Technology study by Pew Internet & American Life Project, “87% of American teens aged 12-17 used the Internet” (Lenhart, Madden, & Hitlin, 2005, p. i). However the Teens and Technology study from 2013 shows “teen Internet usage has risen consistently over the years up to 95%” (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013, p. 3). Similarly, the study found that advanced mobile devices such as smartphones have become very popular among teens (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). “Compared to just 23% in 2011, 37% of all teens have smartphones” (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013, p. 3). Given that students are constantly exposed to and interacting with technology in nearly every facet of their lives, and it is unlikely to change, instructors are finding it increasingly difficult to connect with their students because of technology-induced communication and skills gaps (Prensky, 2001).

A lot of literature goes into the reasons why professors need to adapt their teaching methods to their students. Marc Prensky (2001) identifies such students as “digital natives.” These students grew speaking the language of technology in a way which previous generations had not (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Digital natives “think and process information fundamentally differently from their predecessors” due to their constant exposure to and interaction with technology (Prensky, 2001, p. 1). Because of this, “the traditional teaching methods do not take into account the differences in thinking, processing information, and learning” (Prensky, 2001, p. 1). As a result, there is a disconnect between the digital natives – the students – and “digital immigrants”

– the professors (Prensky, 2001). To the students, the professors speak a heavily accented “outdated language of the pre-digital age” (Prensky, 2001, p. 2). This means that educators must find ways to adopt teaching methods that are compatible with such students, including incorporating technology into instruction. Furthermore, it is “unlikely the Digital Natives will go backwards”, making the need to find compatible teaching methods for future students even more necessary (Prensky, 2001, p. 3).

Educators’ attitudes towards technology play a key role in determining whether or not technology will be incorporated into the classroom. Rodney Davis (2011) modified and applied Zur and Zur’s (2011) classification model of digital immigrants to educators and their relationship with incorporating technology into the classroom. According to the classification model, educators and their relationship with incorporating technology into the classroom can fall into any of the four categories: avoidant, reluctant, cautious or enthusiastic (Figure 1).

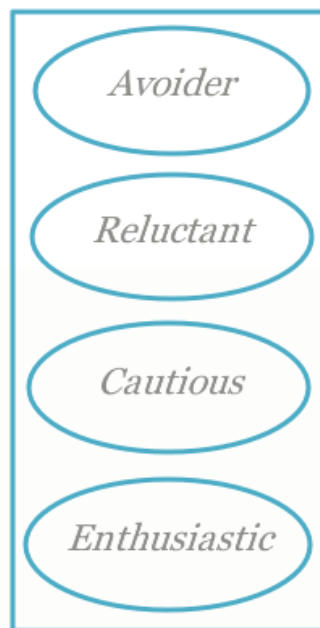


Figure 1: Types of Adopters

Educator attitudes towards technology in the classroom can be impacted by external issues (Chizmar & Williams, 2001; Weston, 2005; Wilson, 2003). For example, Wilson (2003) discovered that “the three most common barriers against educators incorporating technology in the classroom were time, funding, and faculty incentives” (p. 61). Similarly, Chizmar and Williams (2001, p. 24)

found that “lack of time is the most critical barrier” to incorporating technology into the classroom (Chizmar & Williams, 2001). According to Chizmar and Williams, faculty reported that the pressures of university life (publishing, committee work, teaching loads, service, etc.) prevented them from exploring ways to incorporate technology into instruction (Chizmar & Williams, 2001). Chizmar and Williams also suggest that faculty would use more technology if there was sufficient support on campus to help them with the implementation (Chizmar & Williams, 2001).

Numerous studies have examined the impacts of incorporating technology into instruction because of the need to find effective teaching methods for incoming students. The general notion is that incorporating technology into instruction will have “positive impacts” (Jamil & Shah, 2011, p. 39); it is assumed students will have better experiences with technology incorporated into the course because of increased engagement, convenience, relevance to student life, interest in technology itself, and presence of new learning opportunities (Kennedy, Judd, Churchward, Gray, & Krause, 2008; Lay-Hwa Bowden & D'Alessandro, 2011). Some studies support this notion. For example, a survey conducted in one department at Texas A&M University shows that using social media tools had some advantages in helping to “increase quality and efficiency of communication between students and the instructor” (Odom, Jarvis, Sandlin, & Peek, 2013, p. 35). The survey also found social media made it easier to “access class information, collaborate on group projects, and build stronger social connections between classmates” (Odom, Jarvis, Sandlin, & Peek, 2013, p. 35).

There are some technologies that have been executed by professors throughout the past decade. However, just within five years there are new technologies, which are being executed in classrooms of colleges and universities: converting from paper books to e-books; from tradition pen-and-paper examinations to online examinations; and from face-to-face discussions to online discussion forums are a result of these technologies. The publishers which were once renowned for their best publication of books have already started saying no to papers and began the publication of e-books and online journals (Johnson, Maddux, & Liu, 1997). Students on their part download the e-

books of their choice and can even buy the original soft copies. They can easily access digital copies of their textbooks from digital laboratories offered by their colleges without the need to hunt for the book at the book shop.

The strategy followed by professors in conducting a test in the classroom is much more interesting when technology is brought into consideration. The questions of the test are shared in the common local area network which is kept secret and can also be viewed within the premises of the college after being unlocked with a password (Lavin, Korte, & Davies, 2010). This password is generally given to the students at the time when the test is started. The answers should be typed and marked via computers and the digital answer sheets will be automatically submitted. On completion of the test, no student will be able to access the link anymore and it will be only open to the professors for checking the answers.

In addition to the mentioned technological based strategies that are discussed above, professors execute many more similar implementations. A classroom web page is administrated by professors which seem to be the common domain for all the students of that class (Wood, et al., 2012). They can find help or report an issue related to any academic problem in the web page. Multimedia presentations are the greatest evidence of digitizing projects. Sometimes professors are unavailable to display the video of the lectures in the classes from LCD or LED screens (Muir-Herzig, 2004). Thus, technology made it possible for the professors to teach classes without their physical presence.

However, incorporating technology into instruction does not come without challenges. Some studies have found that doing so does not have a positive impact on student experiences. For example, Lay-Hwa Bowden and D'Alessandro (2011) found that "technology was not found to be positively related to the student experience" (p. 42). Other studies point out that not all students are comfortable or have knowledge regarding the use of technology (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Another major challenge is that some professors are replacing their physical

presence in classes by digital display of lectures. While this implementation may provide information and lessons to students anytime and anywhere, the students still have immediate doubt about the quality of the course (Johnson, Maddux, & Liu, 1997). Moreover, students may have technical difficulties involving emails and online reports, but in that case they will have to wait for their solution.

Based upon the literature, bringing technology into instruction can have both positive and negative impacts. On one hand, technology can strengthen instruction such as by “translating” the learning process into a language the digital natives can understand. On the other hand, technology in instruction can have negative side effects such as creating distractions from the tasks at hand. Finally, it can be concluded that if the modifications and rectifications in the technological strategies executed by professors are made to minimize the negative outcomes, then this will be the best step for advancement in education.

Research Questions

In an attempt to understand the dynamic between varying levels of exposure to technology between courses alongside the potentially growing expectations of utilizing technology in academics, we wanted to hear from the students themselves. The purpose of our research was to understand SUNY Potsdam students' perceptions about the use of technology by the professors and their own use of technology. We strove to determine the students' feelings toward the effectiveness of the professors' use of technology as well as how closely the technology that professors use reflect the types of technology that students use on their own. We based our survey questions on the following:

1. What are SUNY Potsdam students' perceptions of the effectiveness of technology use by their professors?
2. What are SUNY Potsdam students' perceptions of the effectiveness of the technologies that they (the students themselves) are using?

These research questions served as a base for developing our survey questions (see **Appendix A**).

Methodology

The survey was designed with undergraduate and graduate students of SUNY Potsdam in mind. We created and hosted our survey on the survey website SurveyGizmo. A URL link to access our survey was distributed electronically via an email sent from a researcher's SUNY Potsdam email account to all SUNY Potsdam undergraduate and graduate students over the age of 18 (**Appendix B**). The survey period lasted 4 weeks in late October to early November 2013. A total of 287 students opened the survey, with at least 238 submitting at least one response to questions 4 through 13.

Interviews

The development of the survey questions itself consisted of several phases. After we wrote the literature review, we developed interview questions for specific faculty and staff whose jobs on campus relate to students, professors, and the use of technology (**Appendix C and Appendix D**). The faculty and staff members we interviewed were Romeyn Prescott, Director of CTS and member of TLTR, and Caron L. Collins, the director of LTEC. We interviewed both faculty and staff members in early to mid-September 2013. Through our interviews, we were looking to know what kind of feedback they want to hear from their students about using technology in classroom. We were also interested to get information about which kind of technologies professors used in SUNY Potsdam class. We recorded their answers and we relied on their responses to develop our research and survey questions.

Pre-testing

The next development phase was to do the paper-based pre-test with 6 students. We noticed that the first version took our candidates more than 10 minutes to complete. We decided to reduce the number of questions on the form. Thenceforth, we pre-tested again, and our candidates took less than 6 minutes to complete the survey, which meant we would likely receive an increased response rate. Once we completed our final revision of our survey questions based on the results from our pre-tests, we submitted permission form to distribute Internet survey to students. Submitting a full IRB

form was unnecessary since the research is considered “not subject to IRB review.” Finally, we received approval after two weeks.

Survey Structure

Our survey included three sections. The first section asked students for their basic educational information such as class year, major and minor. The second section asked students for their opinions about technology usage by professors. The last section asked students for their opinions regarding how they feel about the technology they use on their own.

Data Collection

Once the survey participation period was finished, we then exported the results from SurveyGizmo website into Microsoft Excel. We divided the survey questions into separate sheets. The first sheet contains tables of each question documenting total responses and responses categorized according to class year. The remaining sheets are individual questions. For each question, students who did not enter any response were filtered out. After that, remaining students' responses were calculated according to class year and totaled together with other class years.

Results

Percentage of Survey Participants by Class Year

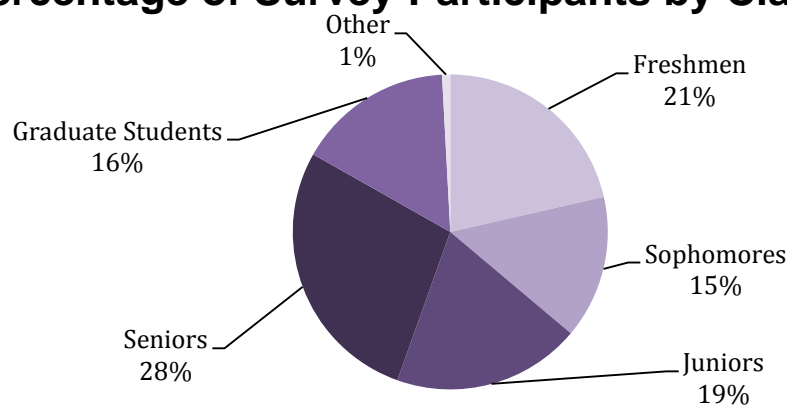


Figure 1. Percentage of Survey Participants by class year (n=238).

Of the 287 students who viewed the study, 238 students responded to at least one question between Question 4 and Question 13. Of the 238 participants, there were 51 Freshmen (21%), 35

Sophomores (15%), 46 Juniors (19%), 66 Seniors (28%), 38 Graduate Students (16%), and 2 Others (1%) (Figure 1). There was not a noticeable difference between the results gathered from each class year so the results provided are of all survey participants who answered the questions as a whole.

	Total		Total
Anthropology	6	French	3
Archaeological Studies	1	Geology	1
Archaeology	9	History	13
Art Education	1	History Education	2
Art History	2	Literacy	2
Art Studio	9	Literature/Writing	1
Biochemistry	3	Mathematics	9
Biology	19	Mathematics (GRAD)	1
Business Administration	16	MST	5
Business Economics	1	Music	4
Chemistry	4	Music Composition	2
Childhood Education	4	Music Education	20
Childhood Education (GRAD)	8	OPLT	12
Communications	5	Performance Music	8
Community Health	9	Physics	4
Computer Science	9	Politics	5
Creative Writing	7	Psychology	30
Criminal Justice	8	Secondary Education	4
Criminal Justice Studies	1	Sociology	6
Curriculum & Instruction	3	Spanish	2
Early Childhood	9	Special Education (GRAD)	1
Economics	2	Speech Communication	2
Education	2	Student Initiated Interdepartmental Major	1
Educational Technology Specialist	10	Theater	6
English	3	Visual Arts	2
English & Communication (GRAD)	1	Women's Studies	1
English Education	1	Undecided	11
Environmental Studies	3	Did Not Indicate	4
n=287			

Table 1. Survey Participants Majors (n=287).

We asked participants their major and field of study. Of the 287 participants who replied to with their major, we received responses from at least 54 different majors as well as those who were Undecided or Did Not Indicate (Table 1). The top 5 majors of those who replied include Psychology (30), Music Education (20), Biology (19), Business Administration (16), and History (13).

Kinds of technology students want that would better support the curriculum/course material compared with technology use by professors in class

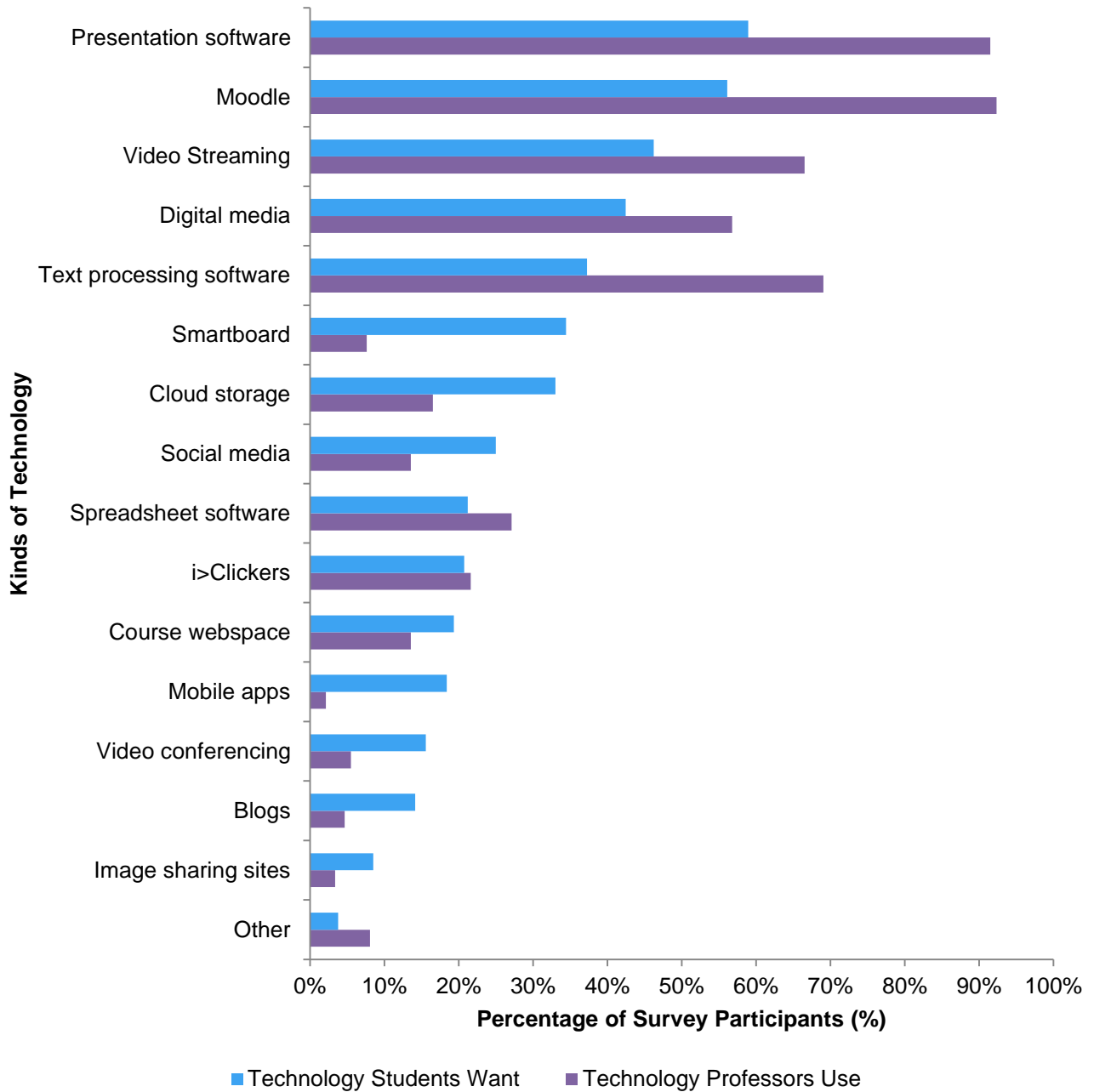


Figure 2. Comparing two questions: For this semester, in general, what kinds of technology do your professors use in your class? (n=236) and What kinds of technology would you like your professors to use that would better support the curriculum/course material? (n=212).

We also asked participants to identify technologies that they want their professors to use that would support the course (Figure 2, purple bars). Surprisingly, the top 5 included Presentation

Software (59%), Moodle (56%), Video Streaming (46%), Digital Media (42%), and Text Processing Software (37%). These technologies happen to be the same most commonly used technologies used in class by their professors (Figure 2, blue bars). According to the data, the most commonly used technology reported by survey participants to be used in the classroom includes Moodle (92%), Presentation Software (92%), Text Processing Software (69%), and Video Streaming (67%). When comparing the percentages of technology students want with the percentages of technology professors use, the percentage of professor usage of these technologies exceeded student expectations. This might mean that SUNY Potsdam is meeting student expectations when it comes to Presentation Software, Moodle, Video Streaming, Digital Media, and Text Processing Software.

We also notice that for technologies such as Smartboard and Mobile apps, the data shows that the students' expectations obviously exceed the professors' usage rate. It means there is a big gap for CTS to find a way to improve the usage of these technologies in classroom. It is also important to note that students tend to expect the technologies that other classes are using. For example, if a student sees that Moodle is being used in two of their classes, they might expect their other classes to use Moodle. It is possible that the reason why these 5 are the most expected is because they are the ones that they have the most exposure to. Perhaps if more professors incorporated the other kinds of technology, we would see both student desire and incorporation increase for each of these technologies. It is difficult to tell if professor usage drives student want or if student want drives professor usage. It would be worth investigating whether a large group of professors starting to use a new technology causes more students to want to use that new technology.

The least commonly used technology reported by survey participants includes Mobile Apps (2%), Image Sharing Sites (3%), Blogs (5%), and Video Conferencing (6%). There were several Other responses such as ArcMap, GIS, Overhead Projector, and UNIX Lab Filesystem, among others. It is important to note that not all students may have had experience with these technologies. Thus, lack of exposure could explain the low student want and professor usage rates of these technologies.

Possibly further training and increased exposure to these technologies would help these technologies become more common and more highly desired.

Students' Opinions on Effectiveness of Professors' Technology Use

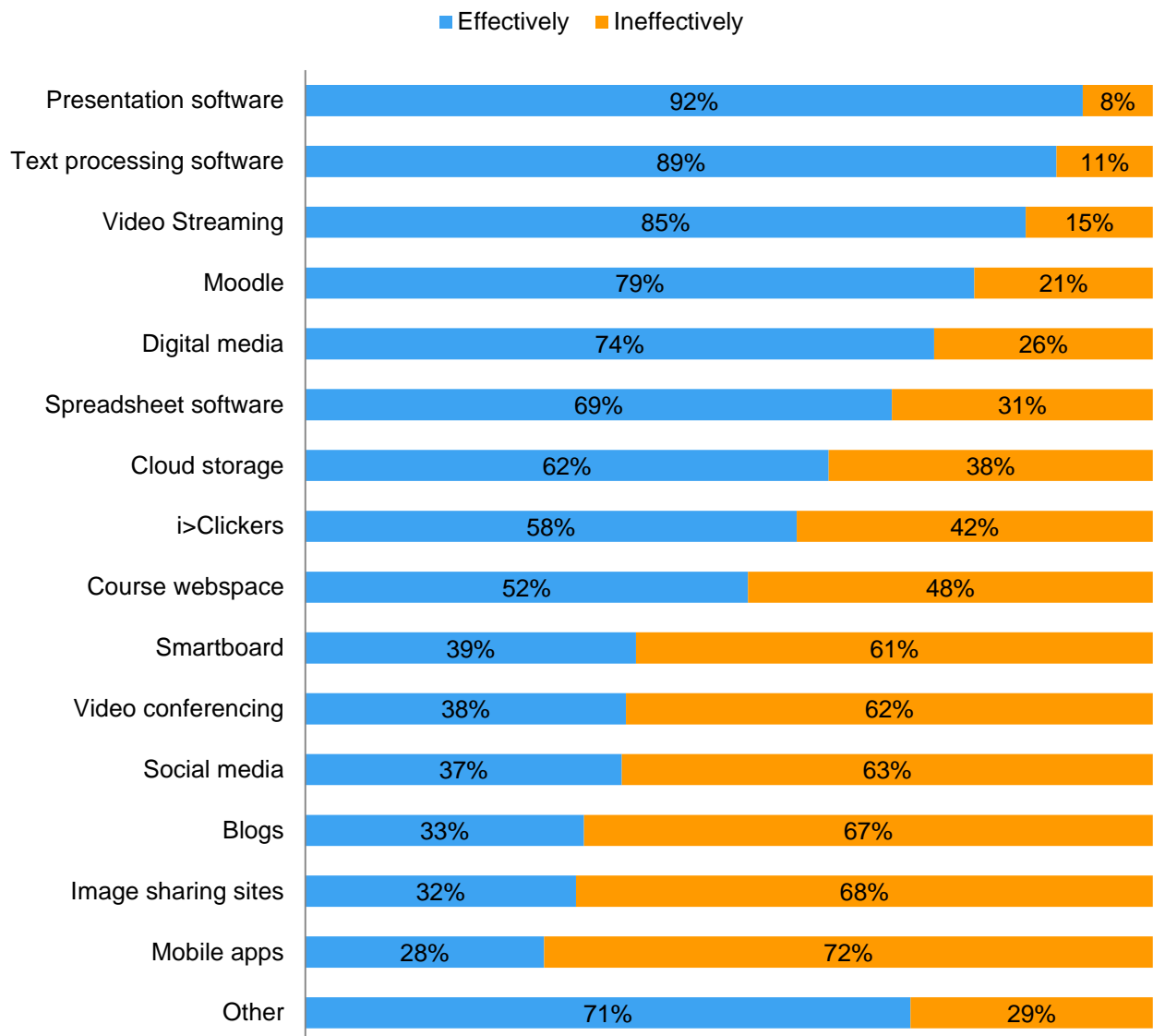


Figure 3. For this semester, in general, based upon your experiences, do your professors use the following? (n=230).

In order to get an idea of whether or not participants find the technology their professors' use in the course beneficial, we asked participants to choose whether or not their professors use a technology effectively or ineffectively (Figure 3). The technologies that 50% students or more said professors use effectively include Presentation Software (92%), Moodle (79%), Text Processing

Software (89%), Video Streaming (85%), Digital Media (74%), Spreadsheet Software (69%), Cloud Storage (62%), iClickers (58%), Course Webspaces (52%), and Other (71%). It is important to note that the technologies that students find most effective tend to correlate with those that they desire most and that professors commonly use. The data seems to suggest a positive connection between effectiveness of technology, its desire to be used, and its overall use.

The technologies that 50% or more students said professors use ineffectively include Smartboard (39%), Social Media (37%), Video Conferencing (38%), Blogs (33%), Image Sharing Sites (32%), and Mobile Apps (28%). These technologies that students find less effective tend to be the technologies that fewer students are using in their courses, but are also the ones where student want is much higher than professor usage. Without a lot of exposure and practice, it is expected that students will have more challenges and find these technologies difficult, but it is interesting that there is still a high level of desire for these technologies. The results seem to indicate that students want to see increased use in these technologies, specifically those listed above, but due to professors' ineffective use of these technologies they are not being adopted into classes and fewer students are seeing the effectiveness of the technology's use. For instance, 34% of students reported that they want to see Smartboards used in the classroom but only 8% of professors were reported as using Smartboards and 61% of students reported the use as ineffective. It is possible that with more practice and training, students might start to find these technologies just as effective and desirable as the top 5.

Students Opinions on the Reasons Behind Professors' Use of No Technology

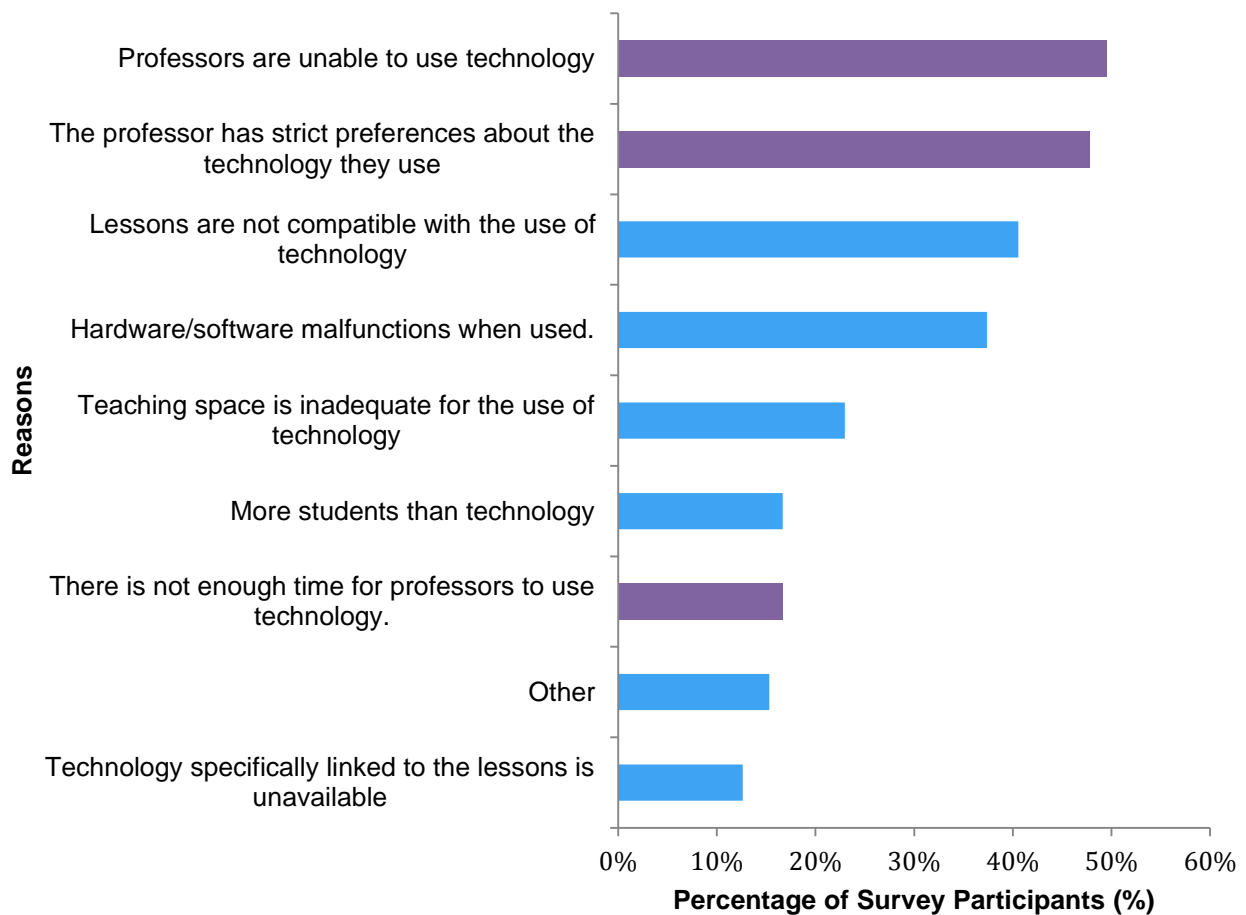


Figure 4. In general, what do you think are the reasons behind the professor's use of no technology? (n=222).

Purple bars indicate aspects that professors can control .

We asked the participants what they think are the reasons behind the use of no technology. Survey participants reported that the top reasons for professors' use of no technology were Professors are unable to use technology (50%), The professor has strict preferences about the technology they use (48%), and Lessons are not compatible with the use of technology (41%). In the "other" response, a number of participants feel like professors think technology can be a distraction. Likewise, a participant said "I believe that there are certain aspects that professors don't understand how certain technology could enrich their course."

The selections highlighted in purple, Professors are unable to use technology, Professor has strict preferences about the technology they use, and There is not enough time for professors to use technology, are all selections that are attributed to the professor. The ones in purple suggest that professors might not be aware of the demand for technology in the classroom. Perhaps the university should spend more time and resources in training their faculty on the new technologies that can be used in their fields and their teaching. This survey has clearly shown that students want more technology in the classrooms. Knowing that technology is in higher and higher demand in the post-graduate world, it is clear that there is a necessity for professors to reevaluate the use and adoption of technology in their teaching practices.

The other sections in blue are attributed to external circumstances primarily out of the professors' control. Of these, some are unavoidable but there are still aspects that the university and CTS can strive to address. Further time and resources can and should always be spent on expanding and advancing the amount of technology and spaces for technology. Doing this will also aid professors goals for improving their own technology use.

Students' Opinions about appropriate uses of electronic devices in the classroom

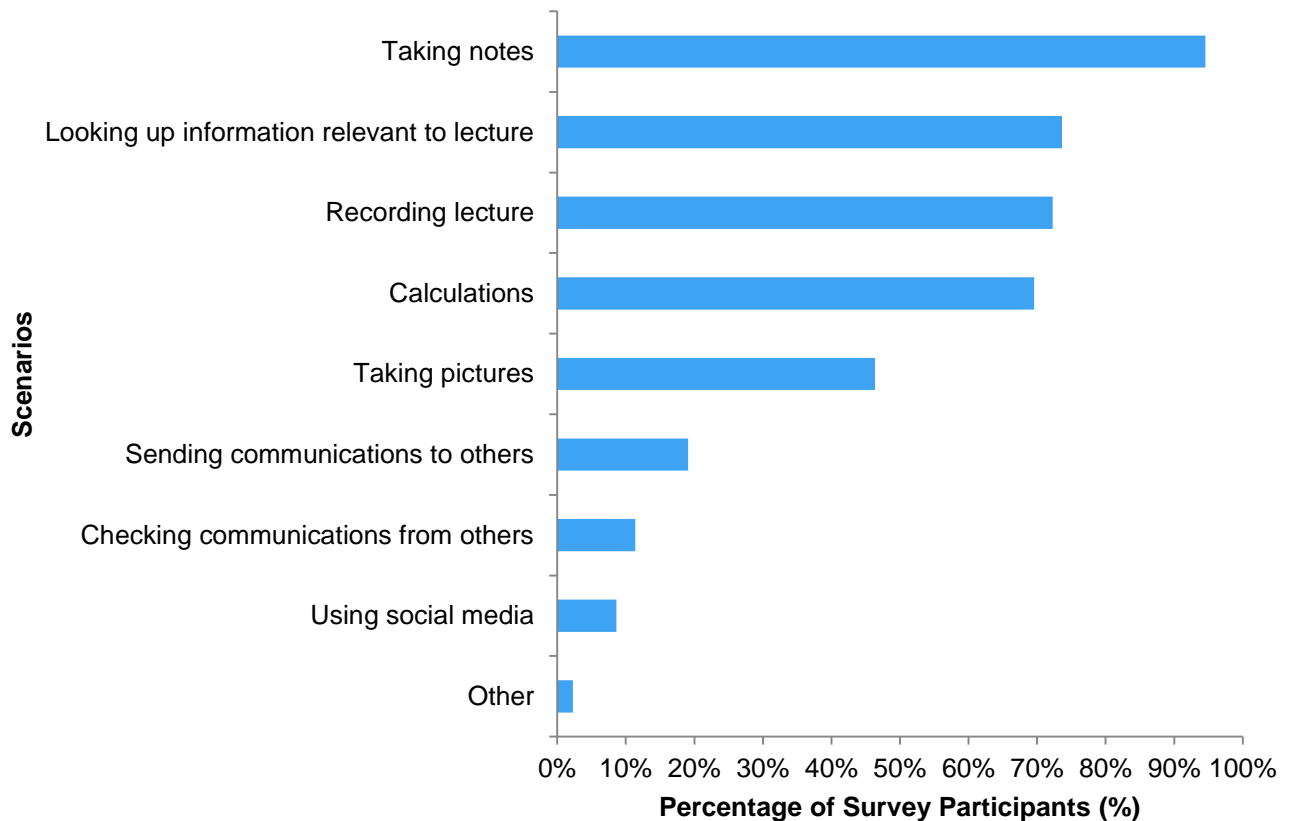


Figure 5. What do you feel are the appropriate uses of electronic devices in the classroom? (n=220).

We also asked participants what they feel are appropriate uses of their own technology in the classroom. Participants reported that the top 3 appropriate uses of students' own electronic devices in the classroom are Taking notes (95%), Looking up information relevant to lecture (74%), and Recording lecture (72%). Perhaps this is because now students are getting used to using devices such as laptops and tablets for taking notes. Similarly, two Other responses indicated that some students might want to read the textbook and other materials using their tablets and other devices. Interestingly enough, very few participants reported that Using social media (9%) and Checking communications from others (11%) were appropriate uses of their technology in class. This tends to make sense due to these items being commonly thought of as leisure time activities. These results

seem to indicate that students have an understanding of what sorts of uses are socially acceptable in a classroom setting.

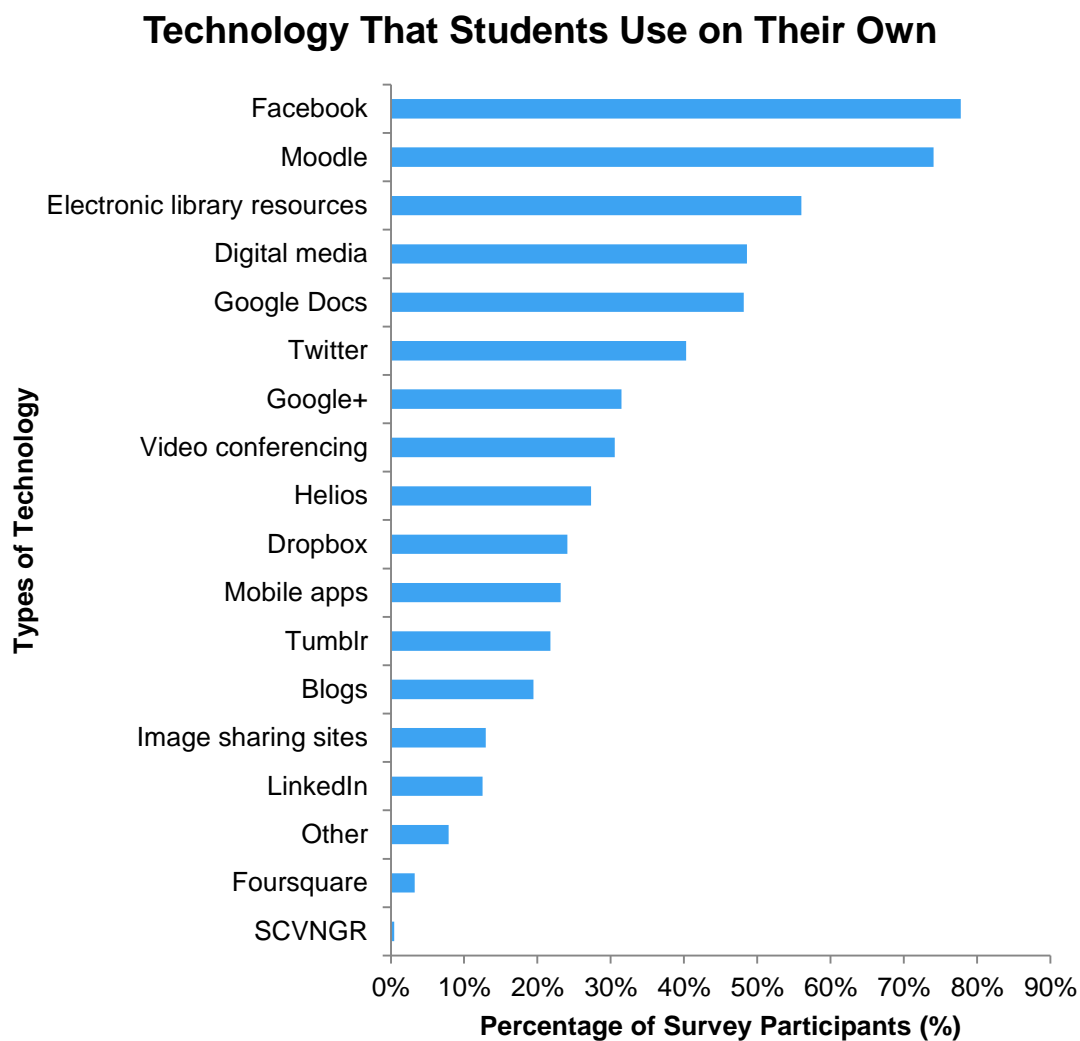


Figure 6. Do you yourself (without initiative of the professor) use the following? (n=216).

We also wanted to get an idea of what technology the students use themselves so we asked participants what technologies they use on their own. Participants reported that the top 3 technology they use on their own are Facebook (78%), Moodle (74%), and Electronic library resources (56%).

Students' Opinions About Their Improvement with Technology

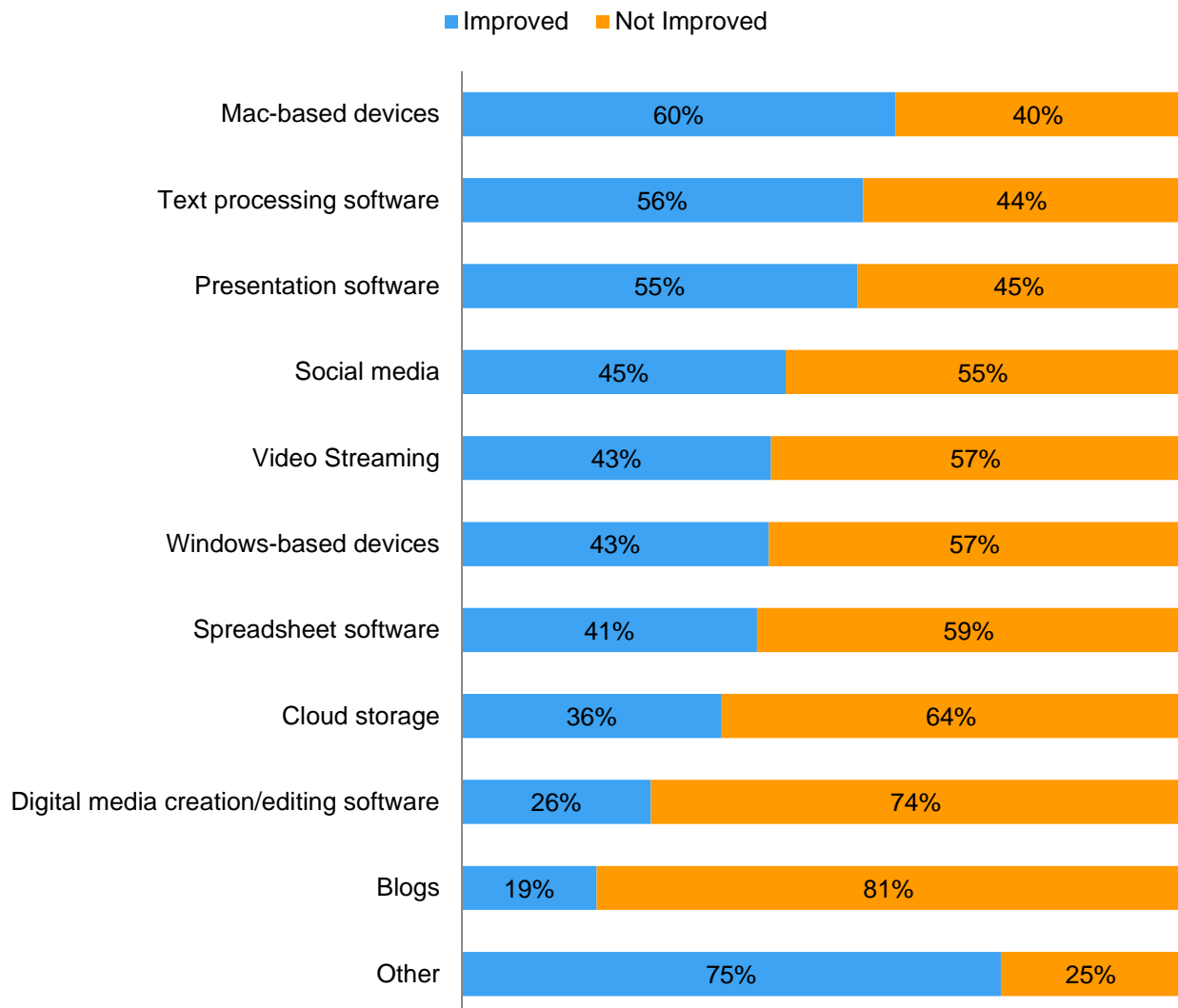


Figure 7. Since taking classes at SUNY Potsdam, do you feel your skills in the following technology have improved? (n=208).

Finally, we wanted to know whether or not participants feel like their skills with certain technology have improved while taking classes at SUNY Potsdam. Participants reported improvement in Mac-based devices (60%), Text processing software (56%), and Presentation software (55%). However, for all other choices, more participants reported that their skills did not improve. Perhaps this is because students have high expectations about what they consider to be improvement.

Conclusion

Based upon the research, we can infer several things. Firstly, SUNY Potsdam professors are effectively using the most popular and most desired technologies in their classes. The top 5 technologies the students want to see in classrooms, Presentation Software (59%), Moodle (56%), Video Streaming (46%), Digital Media (42%), and Text Processing Software (37%), are also the reported top 5 most used technologies in classrooms (Figure 2). These technologies are also reported as being the most effectively used technologies used by their professors (Figure 3).

Secondly, it is possible training could help improve the effectiveness and adoption of many technologies in the classroom. Many technologies that are reported as used little by professors happen to be those that students feel are being used ineffectively. Likewise, a lot of the technologies that are seen as ineffectively used still have a good number of students wanting to see them in the classroom. These technologies include Mobile Apps, Image Sharing Sites, Blogs, and Video Conferencing. Students tend to blame the lack of technology use on professors not being comfortable with technology and this could be remedied with training since training could teach professors how to effectively use these technologies. It is important to consider adopting training for these technologies because they are tied to a number of skills that many students feel like they haven't improved.

Thirdly, it appears as though students do not feel they are improving with regards to certain technology. According to Figure 8, more students reported they felt they had not improved than improved in Social Media, Video Streaming, Windows-based devices, Spreadsheet software, Cloud Storage, Digital media creating/editing software, and Blogs. This could be the case because students might find few resources in their courses or on campus that could help students improve their skills with these technologies. However, a good number of students felt like their skills improved for each other category surveyed. Over half of the students surveyed felt that they have improved their presentation technology ability, which is also a technology that 92% of student reported as being

effectively utilized by professors. Technologies that students felt that they improved on the most seem to correlate with the technologies that they rated their professors effectively using.

Finally, based on our results from Figure 6, it appears as though students already acknowledge what could be considered “appropriate” uses of their own technology in the classroom. It appears that students feel the most appropriate uses of their own technology in the classroom should relate to whatever is going on in the class, such as Taking Notes (95%) or Looking up information relevant to the lecture (74%). Based on this data, it is possible that students already use their devices in the classroom for these purposes. This means that professors who do not allow students to bring their devices to class might not have to worry that students just want to bring their own devices to do other things unrelated to the class. Perhaps those professors can allow students to bring in their own devices to class and remind students of the appropriate uses of their devices.

Based upon the data, it appears that SUNY Potsdam is meeting student expectations for common technologies. However, students do not see improvement with less commonly used technology. Part of the sense of lack of improvement could be due to the fact that students are exposed to fewer less commonly used technologies. Providing additional support and training to faculty for less commonly used technologies could eventually lead to increases in student improvement. As for students being allowed to bring their own technology to the classroom, it appears that students understand appropriate usage of their technology in the classroom.

Limitations

Because so few of the student body at SUNY Potsdam participated in the survey, our results might not be completely representative of the student body as a whole. For example, it could be possible that those who participated in the survey are already quite passionate about technology use and were enthusiastic when they saw the Subject Line of the survey solicitation email. Similarly, according to Figure 1, 28% of participants were Seniors. Compared to other class years, Seniors

might check their SUNY Potsdam email account more frequently because they need to keep up with emails from potential employers or other post-graduation opportunities.

The next limitations are within the questions themselves. Our goal was to keep the survey simple and within an estimated completion time-frame of at most 6 minutes. Because of this, we could not ensure that our questions were getting as much clear details as possible from the participants. For example, we originally wanted to ask participants what technologies their professors use in the class, if the participants wanted their professors to *not* use that technology (for example, students might be tired of “Death by PowerPoint”), if the participants were surprised that their professors were not using a certain technology, and if they wanted their professors to use that technology. However, because we wanted to make our survey simple, we could not ask that question.

Suggestions for Future Research

Suggestions for future research could be to generate a more in-depth survey regarding students' expectations about what technologies they think professors should be using in their courses. Such a survey could be general or could go deeper into technology use by specific academic departments.

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Appendix A

Students' Perceptions of the Effectiveness of Technology Use by Professors

About the Participant

1) What is your class year?

- First Year
- Sophomore
- Junior
- Senior
- Graduate Student
- Other: _____

2) What is your major?

3) What is your minor?

Professors & Technology

4) For this semester, in general, what kinds of technology do your professors use in your class?:

- Presentation software (e.g., PowerPoint)
- Text processing software (e.g., Word)
- Spreadsheet software (e.g., Excel)
- Digital media (e.g., playing an audio or video clip through VLC Player)
- Cloud storage (e.g., Google Docs)
- Video Streaming (e.g., Youtube)
- Moodle
- Course webspace (e.g., course info hosted on Helios)
- i>Clickers
- Blogs
- Social media (e.g., Facebook)
- Smartboard
- Mobile apps (e.g., Evernote)

- Image sharing sites (e.g., Flickr)
- Video conferencing (e.g., Skype)
- Other
- Other
- Other

5) For this semester, in general, based upon your experiences, do your professors use the following:

	Effectively	Ineffectively
Presentation software (e.g., PowerPoint)	()	()
Text processing software (e.g., Word)	()	()
Spreadsheet software (e.g., Excel)	()	()
Digital media (e.g., playing an audio or video clip through VLC Player)	()	()
Cloud storage (e.g., Google Docs)	()	()
Video Streaming (e.g., Youtube)	()	()
Moodle	()	()
Course webspace (e.g., course info hosted on Helios)	()	()
i>Clickers	()	()
Blogs	()	()
Smartboard	()	()
Social media (e.g., Facebook)	()	()
Mobile apps (e.g., Evernote)	()	()
Image sharing sites (e.g., Flickr)	()	()
Video conferencing (e.g., Skype)	()	()

6) What kinds of technology would you like your professors to use that would better support the curriculum/course material (Check all that apply):

- Presentation software (e.g., Powerpoint)
- Text processing software (e.g., Word)
- Spreadsheet software (e.g., Excel)
- Digital media (e.g., playing an audio or video clip through VLC Player)

- Cloud storage (e.g., Google Docs)
- Video Streaming (e.g., Youtube)
- Moodle
- Course webspace (e.g., course info hosted on Helios)
- i>Clickers
- Image sharing sites (e.g., Flickr)
- Social media (e.g., Facebook)
- Blogs
- Smartboard
- Mobile apps (e.g., Evernote)
- Video conferencing (e.g., Skype)
- Other
- Other
- Other

7) In general, of the total number of professors you have this semester, how many professors allow you to bring your own devices (e.g., laptop, tablet, smartphone, cellphone...) to class?

Example: 3 of my 5 professors allow me to bring my devices to class.

Number of professors who allow you to bring your devices to class:

Total number of professors you have this semester: _____

8) In general, what do you think are the reasons behind the professor's use of no technology (Check all that apply):

- Professors are unable to use technology (e.g., professors do not have the skills to use).
- Lessons are not compatible with the use of technology(e.g., lesson is outdoors).
- There is not enough time for professors to use technology.
- Teaching space is inadequate for the use of technology (e.g., not enough electrical outlets).
- Hardware/software malfunctions when used.
- Technology specifically linked to the lessons is unavailable (e.g., specific hardware/software is unavailable).
- More students than technology (e.g., not enough wireless access).
- The professor has strict preferences about the technology they use (e.g., prefers to stick with using only whiteboard)
- Other

Students & Technology

9) What do you feel are the appropriate uses of electronic devices in the classroom (Check all that apply):

- Taking notes (e.g., typing notes into a Word document)

- Recording lecture (e.g., recording lecture using record function of Evernote)
- Taking pictures (e.g., taking a picture of a diagram written on the board)
- Using social media (e.g., posting to Twitter)
- Looking up information relevant to lecture (e.g., search for a definition)
- Calculations (e.g., calculating a formula)
- Sending communications to others (e.g., sending an email)
- Checking communications from others (e.g., checking text messages)
- Other

10) Do you yourself (without initiative of the professor) use the following? (Check all that apply):

- Blogs
- Moodle
- Electronic library resources (e.g., JSTOR)
- Digital media (e.g., audio/video)
- Dropbox
- Google Docs
- Helios
- Video conferencing (e.g., Skype)
- Facebook
- Twitter
- Google+
- LinkedIn
- Tumblr
- Foursquare
- SCVNGR
- Image sharing sites (e.g., Flickr)
- Mobile apps (e.g., Evernote)
- Other
- Other

11) Since taking classes at SUNY Potsdam, do you feel your skills in the following technology have improved ?

	Improved	Not Improved
Presentation software (e.g., PowerPoint)	()	()
Text processing software (e.g., Word)	()	()
Spreadsheet software (e.g., Excel)	()	()

Digital media creation/editing software (e.g., Photoshop)	()	()
Cloud storage (e.g., Google Docs)	()	()
Video Streaming (e.g., Youtube)	()	()
Social media (e.g., Facebook)	()	()
Windows-based devices (e.g., desktop or laptop with a Windows operating system)	()	()
Mac-based devices (e.g., desktop or laptop with a Mac operating system)	()	()
Blogs	()	()

Final Thoughts

12) Would you like to share a time where technology was used effectively in the classroom?

13) Would you like to share a time where technology was not used effectively in the classroom?

Thank You!

Appendix B

Natalie K. M. Cainaru

From: Natalie K. M. Cainaru <cainarnk197@potdam.edu>
Sent: Friday, October 25, 2013 9:47 AM
To: undisclosed-recipients :
Subject: Students and Technology Survey

Congratulations! You are invited take a voluntary survey of students' perceptions of the effectiveness of technology use by professors. You were selected as a possible participant because you are a SUNY Potsdam student.

This survey is being conducted by Dr. Anthony Betrus, Alaa Alfarooqi, Natalie Cainaru, and Hong Yang of the Organizational Leadership & Technology Program of SUNY Potsdam.

The records of this survey will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject.

Contacts and Questions:

If you have questions, feel free to contact Dr. Anthony Betrus, by telephone (315 -267-2670), email (betrusak@potdam.edu), or mail (Dunn Hall 393, Potsdam, NY, 13676).

If you have any questions or concerns regarding this survey and would like to talk to someone other than the researcher(s), you are encouraged to contact Johanne Sullivan, Chair of the SUNY Potsdam Institutional Review Board by mail (Raymond Hall 203, Potsdam, NY, 13676), telephone (315-267-2688) or email (SUNYPotsdamIRB@potdam.edu).

By clicking the following URL, you consent to participate in the survey.
<http://www.surveygizmo.com/s3/1399220/Students-Perceptions-of-the-Effectiveness-of-Technology-Use-by-Professors>

Appendix C

1. Does your particular teaching area/subject allow for technology to be used in your courses?
2. Do you use any of the following in your courses?
 - a. University's Learning Management System
 - b. Blogs
 - c. Social media
 - d. Digital media creation
 - e. Cloud storage (including University's network storage)
 - f. Video conferencing tools (for example Skype or Google Hangouts)
 - g. Video games
3. How do you determine what software/devices/services are best for your course?
 - a. Do you request the university provide particular software/devices/services for your course?
 - b. Do you try to use certain software/devices/services to accommodate for various types of learning styles?
 - c. Do you want the students to have access to the software/devices/services outside of the classroom (for example having access to software used in class on their personal computer)
4. Do you allow students to bring their own devices to class?
 - a. If so, about how many would you say bring their own devices?
 - i. Why or why wouldn't students bring their own devices to class?
5. How much time do you spend using a software/device/service in your course?
6. How do you deal with differences in comfort and experience with technology?
 - a. If students come to you with questions regarding the software/device/service, do you answer the question or do you refer them to someone else (for example CTS)?
7. How do you determine if the technology you're using does any of the following?
 - a. Supports your instructional method
 - b. Provides effective results
 - c. Keeps students engaged
 - d. Makes learning "fun"
8. When it comes to the students, are there any positive or negative aspects of the software/device/service you use?
9. Have students expressed wanting to learn more about the software/device/service you use in your courses?
10. Has your usage of technology in the classroom influenced your colleagues to use or to not use tech in their courses?

Appendix D

About the Students:

1. Do students normally bring their own personal computers to campus?
 - a. For those that do bring their own personal computers to campus, do you notice a preference towards certain operating systems?
 - i. If there's a growing or decreasing preference for certain operating systems, how do you reflect these preferences in campus computer labs?
 - b. Would you say these students still use campus computer labs? If so, why?
 - i. Have you seen any changes in computer lab usage over the years since there are students bringing their own devices to campus?
2. For the students that do not bring their own personal computers to campus, do they have access to campus computer labs?
 - a. Do they have access to any at any time of the day (for example if a student is up late finishing an assignment)?
3. Do you know if students bring other devices to campus (cell phone, smart phone, eReaders/tablet, entertainment technology, printer, etc.)?
 - a. Would you say more, less, or the same number of students compared to previous years are bringing these technologies?
4. How do you determine what software to have on campus computers?
 - a. Does the selection of software reflect the types of software professors introduce to students in their courses?
 - i. Do students have access to the software that professors might use in their courses through another means besides using a campus lab computer (for example through a university network drive)?
5. Do students bring their devices with them around campus (beyond their dorm room)?
 - a. What might be reasons for why students bring devices around campus?
 - b. What might be reasons for why students would not bring devices around campus?
6. How many students would you say use any of the following in their courses?
 - a. Blogs
 - b. Social media
 - c. Digital media creation
 - d. Cloud storage
 - e. Video conferencing tools (for example Skype or Google Hangouts)

- f. Video games
- 7. Do you feel students want more, less, or the same amount of exposure to technology in their courses?
- 8. Do you feel students in certain departments, certain courses, or even with certain professors get more exposure to technology than others?
- 9. What things have you done across campus to accommodate for increased or decreased need for students to use technology (for example increasing wireless access points or availability of electrical outlets)?
- 10. Has CTS made any changes to accommodate for more/less student devices coming in for repairs?
- 11. Has CTS made any changes to accommodate for current patterns of student technology usage (for example hire more/less Helpdesk students, increase/decrease CTS staff availability, expand/reduce CTS hours, etc.)?

About the Faculty:

- 1. Do faculty members bring their own personal computers or devices to campus?
 - a. If so, what might be some of the reasons why?
 - b. Do they use their own devices in their courses?
- 2. Is there a growing or decreasing preference for certain operating systems?
 - a. How do you reflect these preferences in distributing university-owned computers to faculty?
- 3. Do faculty request for the university to have certain software? If so, why (for example Minitab for a biology course)?
 - a. Are these requests for using the software in courses?
 - i. Would they use the software each time they taught the course?
 - b. How common is it for faculty to make such requests?
- 4. Do faculty request campus computer labs to be reserved for their courses?
 - a. Compared to previous years, would you say these requests are increasing, decreasing, or staying the same?
- 5. Do faculty allow students to bring their own devices to class?
 - a. Why or why not?
 - b. Compared to previous years, would you say the number of faculty allowing students to bring their own devices to class has increased, decreased, or stayed the same?
- 6. How many faculty use the university's learning management system?

- a. Compared to previous years, has this number changed?
7. How many faculty would you say use any of the following in their courses?
 - a. Blogs
 - b. Social media
 - c. Digital media creation
 - d. Cloud storage
 - e. Video conferencing tools (for example Skype or Google Hangouts)
 - f. Video games
 - g. Compared to previous years, has this number changed?
 - h. Do faculty integrate themes concerning technology into their courses (for example, a political science professor teaching a course on cyber politics)?
 - i. If so, how many do and has this number increased, decreased, or stayed the same compared to previous years?
8. What things have you done across campus to accommodate for increased or decreased need for faculty to use technology (for example increasing wireless access points or availability of electrical outlets)?
 - a. Have you brought in specific devices for faculty for instructional purposes (for example Smartboards)?
 - b. Have you brought in specific devices that normally might not appear to have an instructional purpose but does (for example Apple TV)?
9. Has CTS made any changes to accommodate for more/less faculty devices coming in for repairs?
10. Has CTS made any changes to accommodate for current patterns of faculty technology usage (for example hire more/less Helpdesk students, increase/decrease CTS staff availability, expand/reduce CTS hours, etc.)?