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In-Class Use of Portable Electronic Devices (Peds)-Faculty and Student Perspectives

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Abstract

Portable Electronic Devices (PEDs) such as laptops, smart phones, tablets etc. have become an integral part of almost every higher education student's learning toolbox. In this study, the faculty and student perspectives on the effectiveness of the use of PEDs during classes are collected and compared using surveys done at Southern Polytechnic State University. Faculty openness and reservations, policies, student temptations and complaints are discussed. While the PEDs can be a source of distraction, they, if used carefully, can also provide an opportunity for engaging students.

Keywords: Portable electronic devices; Laptops; Smart phones; Tablets; Student learning

Introduction

The effectiveness of the use of PEDs in classes is seen with skepticism by some and optimism by others. Like other campuses across the nation, an increase in the use of laptop and other mobile devices is observed in classes across disciplines at the Southern Polytechnic State University (SPSU). The goal of this study is to determine and compare the faculty and student perceptions of the effectiveness of the use of Portable Electronic Devices (PEDs) in classrooms across disciplines. Student and faculty perspectives on the use of PEDs are gathered, analyzed, and compared using Survey Monkey. For the purpose of this study, PEDs include, but are not limited to, laptops, smart phones, tablets, etc. In the survey of 100 students from five different schools, conducted in spring 2012, over 89% of the students reported bringing their PEDs to at least one or more classes. Some faculty see this trend as an opportunity for more innovative teaching, and are exploring ways to leverage this technology to increase student engagement during classes. However, other faculty members worry about potential distractions that PEDs introduce in their classrooms. In a separate survey of faculty members from various disciplines, it was observed that 76% do not permit the use of PEDs in their classes. In this paper the results of the research study are presented that examined the student and faculty perceptions of how PEDs affect attentiveness, engagement, and learning. A few guidelines for using PEDs effectively in the classroom are explored. As discovered by Zhu et al. [1], PEDs can be an effective tool for promoting student learning if faculty plan carefully how and when they will ask students to use their devices, rather than simply allowing students to bring them to class.

The paper is organized as follows: Section 2 contains an RLC survey at Southern Polytechnic State University, Section 3 contains the PEDs and their use for student engagement in classes, section 4 contains the discussion about the distractions caused by the use of PEDs in classrooms, and section 5 contains the opportunities provided by the use of PEDs. In Section 6, improvement student learning is discussed with the use of PEDs. Use of PEDs by faculty is explored in section 7. Section 8 highlights the risks of academic misconduct and section 9 outlines PED policies. Logistical and infrastructure concerns are discussed in section 10, policies and procedures are discussed in section 11, and instructional practices for active engagement are highlighted in section 12. In section 13, ideas are explored for the use of PEDs as tools for reflection and idea generation and finally the paper is concluded in section 13.

RLC Survey at Southern Polytechnic State University

Several studies have been conducted to analyze the effect of PED usage on student learning and engagement. There is some evidence of both positive and negative impacts. On the positive side, when students can pose questions using their PEDs, the number of questions is higher than in traditional classes [2]. Faculty members at SPSU who favor the use of PEDs in classes argue that students can take better notes and can look information up upon the instructor's request. They also believe that it helps them follow along with material that has been posted. A computer science professor notes that some students are quick and they write code on their machines during the lecture, which the professor believes helps them learn and test their learning on the go. One professor noted that PEDs are currently used in the industry, so students should be allowed to use them in class. Some also argue that the use of PEDs facilitates the ready access to information in discussion courses and helps in the reduction of paper use. Studies that correlate final grades with student use of PEDs have been mixed, with some finding that student with PEDs received slightly higher grades [3], and others findings a negative correlation between the use of PEDs and grades [4,5]. On the negative side, students have reported that PEDs, both their own and those of their classmates are a distraction [6-8]. It is important to note that studies showing a positive association between PED usage and student learning or grades involved courses in which the integration of technology had received significant attention from faculty [1].

To investigate the views of the SPSU students and faculty about this issue and the possible impact that PEDs may have on teaching and learning, the Research Learning Community (RLC) conducted a study of student and faculty perceptions of how PEDs affect student attentiveness, engagement, and learning. Undergraduate and graduate

students from the schools of sciences, humanities, engineering, computing, business and architecture were surveyed. The majority of the respondents in the campus wide survey were seniors as shown in Figure 1 and most of the responses in this engineering dominated institution came from students majoring in engineering and technology disciplines as shown in Figure 2. The response rate from the 200 faculty members surveyed was over 44% and the response rate was 30% from the 5000 students surveyed.

When asked about the use of PEDs during class, majority (89%) of the student respondents indicated that they used PEDs during one or more classes. Students gave the following reasons for using them during classes:
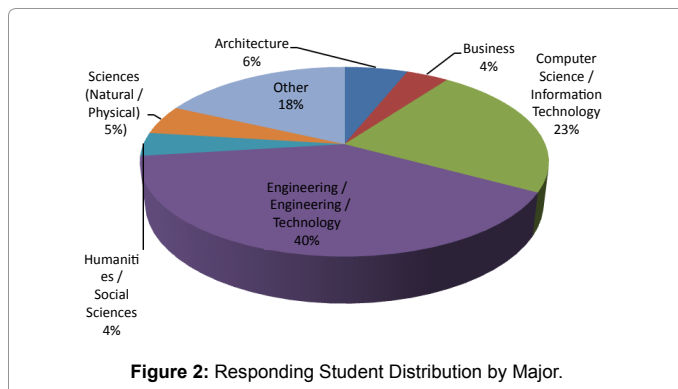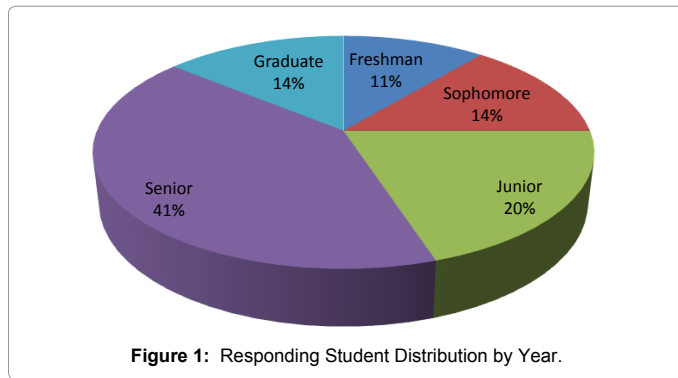
[If] The teacher is doing a poor job of defining or explaining, it is nice to Google along with the lecture to learn on my own

The material called for it: like an interactive type deal b/w[between] teacher and students

When faculty members were asked how they felt about the use of PEDs in classes, 76% indicated that they did not permit the use of PEDs during classes because they saw it as a distraction from lecture or other classroom based learning activities as students used them for everything but class work. It also made it harder for some faculty members to prevent cheating, sharing of information etc. during quizzes and exams as one professor indicated 'if you let them use [PEDs] in class they would say "we learned how to do the class work using it, so we should be able to use [them] for exams, [and] quizzes"'. Some of the other responses obtained from the professors are as follows.

Students routinely use devices [during class] for non-class purposes

Most student[s] have little willpower to stay on task with the class material

Figure 1: Responding Student Distribution by Year.

Figure 2: Responding Student Distribution by Major.

[There is] Limited IT support from the SPSU staff

However a few faculty members were open to the idea of students using PEDs during classes and indicated:

1. [I] couldn't stop them if I wanted to 2. [PEDs are] useful for note taking 3. [and] useful for class activities

[I allow PEDs for] Research and precedent studies

[Student use of PEDs during classes] does not seem to be a problem. [It] may help them learn

I get a great deal of students who need learning accommodations

They can take notes better; they can look stuff up at my request

Students can take notes on any device. My lecture notes are electronic, so they can follow along on a portable device if they like.

More information is better

[…] Because they code on their own machines sometimes

[PEDs are] currently used in industry, so they should use them in class

[PEDs provide] ready access to information in discussion courses; [it helps with the] reduction of paper use

PEDs – Student Engagement during Class?

Students and faculty were asked whether the use of PEDs helped engage students better in class. 52% of the students indicated that they were better engaged due to their use of PEDs during class and 21% disagreed or strongly disagreed with the statement.

I often will read a book or surf the Internet with it during lectures where the teacher is not very good but requires attendance

[It is] No more or less [engaging] than any other form of note taking

I have to force myself to not stray from the topic at hand. If I fail at that, then the device becomes a distraction and not another tool for well-rounded learning.

Some students admitted that PEDs were useful sometimes and a distraction at others.

It has allowed me to quickly research terms relevant to class lectures and guest speakers. While doing said research, you aren't able to pay full attention to the lecture though

It depends on the class; for the most part, no, they are a distraction. However, they are very engaging and nearly a necessity for me in a couple classes, like my programming classes

Only 7% of the faculty members agreed or strongly agreed that students were better engaged during class when they had a PED open in front of them. Over 55% of the respondents indicated that they disagreed or strongly disagreed with the statement. The response trends received from the students were opposite to those received from the faculty members. Few of the faculty comments are as follows:

These kids are easily distracted and rowdier than any first-grader

I don't wish to feed their gaming desires

A comparison of the difference of opinion is shown in Figure 3.

PEDs – A Distraction during Class?

Students and faculty were asked whether the use of PEDs was a

distraction during class. 27% of the student respondents either agreed or strongly agreed with PEDs being a distraction during classes. But 45% of the students either disagreed or strongly disagreed with the statement. The response trend was opposite from the faculty perspective as shown in Figure 4.

Faculty

It has been my experience that many students who use PEDs in the classroom rarely use them for the purpose of educational advancement. They are generally used to check facebook, emails, and I find that after giving a lecture on a subject in which students have spent the entire class using their PED's that they fail the pop quiz because they have not paid attention

Student

I believe PEDs can be a distraction if the student using it is not responsible enough to only use it for learning. Most of the time the teacher already uses the projector. But in a lot of cases PEDs are great tools to learn

People who listen to music, text, play games seem to lack respect and consideration to, not just the teacher, but nearby students. Why are they even there? Are they expressing a need for attention, ill-will for bad grades, and or just completely oblivious to their environment? A suggestion that students have the resources of electronics as supplementary learning devices rather than tools of distraction and ultimately inconsiderate in nature, is altruistic and ideal, but can't be regulated except by the individual. So let them waste their attention on slashing fruit or looking at pictures, or playing solitaire, it's their education.

Figure 3: PEDs Help Engage Students during Class.

Figure 4: PEDs Cause Distractions during Class.

As long as a good Student: Professor relationship is founded, the use of PED's would be a great asset within the classroom environment. Personally, I utilize Khan Academy and Brightstorm for mathematics during study sessions (not during lectures, until it becomes acceptable). While at home I am constantly on specific YouTube channels dedicated to the household education/online learning (mostly computer related materials though: Java, C++, & Khan Academy). If this method could be implemented, it would throw a wide curve-ball to the learning community, but over time, I think SPSU would begin to hit homeruns one after another!

I have found having access to the Internet gives me the advantage over other students, because I can check other sources or find visualizations or other explanations of complex topics. Books can achieve the same thing, but it is not searchable easily and operates on a different timescale.

Competent professors can tell the difference between the student who is wasting time and the student who is engaged. Electronic devices are no more of a distraction for me than a pen and paper.

By restricting the use of PED's in class you will only hurt those who would benefit from their use. If someone is going to abuse their PED during class then chances are they wouldn't pay attention without it. This is college and if a student doesn't want to come to class then they have that option but they pay the price with grades if they want to bring their laptop to class and screw around on it, then let them, they will suffer just like the kid that cut class. But I know I used mine in class many times to help me take better notes or access other tools that I had stored there. Having access to a PowerPoint presentation was also helpful in that I could make note on each slide as the professor covered it and I didn't have to take time writing down something that was already on the screen.

PEDs – Opportunities for Innovative Teaching?

Faculty members were asked if the use of PEDs during classes provided an opportunity for more innovative teaching. Mixed responses were received, with 36% either agreeing or strongly agreeing with the statement and 26% either disagreeing or strongly dis-agreeing with it. Some faculty members believed that PEDs work better in some classes than others. One professor questioned the need for coming to the class if students were going to use PEDs. In another professor's experience, teaching with the PEDs as an experiment ended up in a disaster. They found out that students wanted to surf the internet instead of attending the class. Some were concerned that not everyone in the class would have access to the PEDs, so some students might have an edge over the others in the class.

A composition professor indicated that 'the students may use the [class] computers for research and writing or use their own devices.' However if students use their own devices, some of them may have invested in the necessary software and / or have suitable technological literacy and others may not. Some professors argued that there was no evidence that using PEDs was better than taking notes by hand; and others were more open to the idea of learning how these electronic devices would help them improve their teaching. One faculty indicated that they used webpages projected for the whole class to see and felt that there was no legitimate need for PEDs in their classes.

The faculty members who support the idea of using PEDs in classes indicated that in most cases, these devices provided new opportunities for innovative teaching. Sometimes students can look up information related to class topics. It can also be used as a device to provide feedback to the instructor or encourage the class discussion. Others who support the use of PEDs indicated:
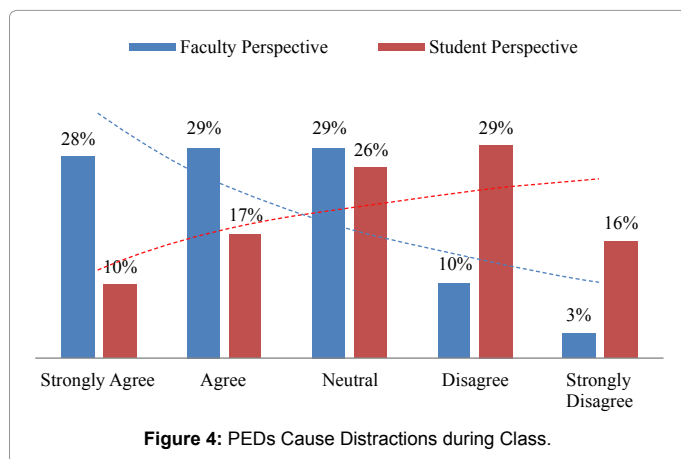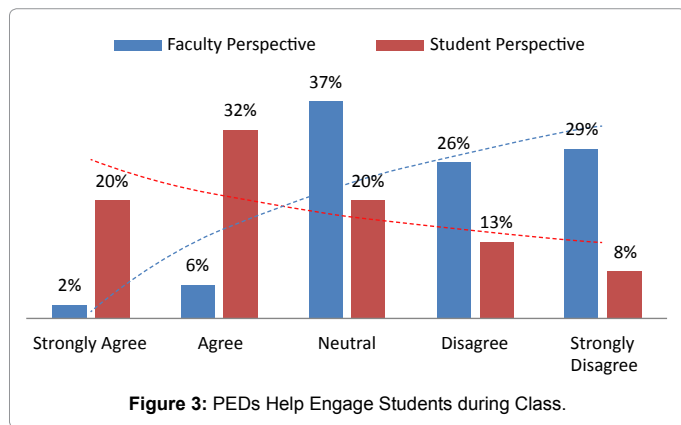
…The use [of PEDs] by instructors has a greater opportunity for innovation. If not the focus of instruction they can be a distraction

I find them to be helpful when we want "on the spot" clarification of an issue. Students like to look info up and let the rest of the class know what they have found

Sometimes students can look up things related to the class topics.

It sometimes provides interesting feedback and/or augments the discussion in progress.

I have used software to allow students to submit answers online but it "dis-engages" students without appropriate devices. Unless all students have a device and are required to have one I think it does a disservice to students.

PEDs – Improved Student Learning?

Students were asked if they learned more due to the use of their PEDs during classes. Over 54% of the respondents agree or strongly agree that their learning improved due to the use of PEDs during classes and 20% disagreed or strongly disagreed with the statement. Students indicated that the use of PEDs greatly increased their education when they used them outside the classrooms. One student indicated that 'One class almost requires it so we can follow along with the professor.' Another student reported that:

It has assisted me on a few occasions, especially when I only have an electronic copy of a book

Over 81% of the students indicated that having Power Point slides and other notes available on their PEDs were helpful during classes. 'It is also nice to type notes directly on the Power Point slides while the teacher is talking. It makes for well-organized notes' remarked one student. Students can follow at their own speed rather than trying to keep up with the professor. But 'it comes with a cost of not being able to pay full attention to the lecture, which is sometimes more important' remarked one student. Sometimes professors strictly enforce the no-electronic devices during class policy and students come up with other ways to keep up with the classes as one student objected 'I often have to copy mine and bring them to class because I am not allowed to use my PED in class.' In today's multi-tasking age, some students think that it is almost necessary to have a PED to get the full benefit of attending a face to face on campus class. *The Professor sets the speed of the presentation. If he goes too fast, I can go back and review. This is essential so that I don't trip during the presentation and get lost. It is very hard to regain a foothold, especially during a very technical talk that builds upon itself*

Summary of the student responses in terms of improved student learning due to the PED use in classes is shown in Figure 5.

One faculty member pointed out:

… In my courses the need for a mobile learning tool and demonstration aid is becoming more and more critical. I have to rely on student computers and laptops to search for references of detailing, inspiring volumes, and other multiple references (landscaping, material research, code research, etc.). A mobile device like an iPad or similar with browsing capabilities and a more robust wifi signal in all campus areas would help TREMENDOUSLY to have more fluid and effective learning opportunities for our students.

Students were asked to indicate how much time they spent using PEDs during a class. Less than 8% of the students admitted that they spent more than 10 minutes using a PED during class. The responses are shown in Figure 6.
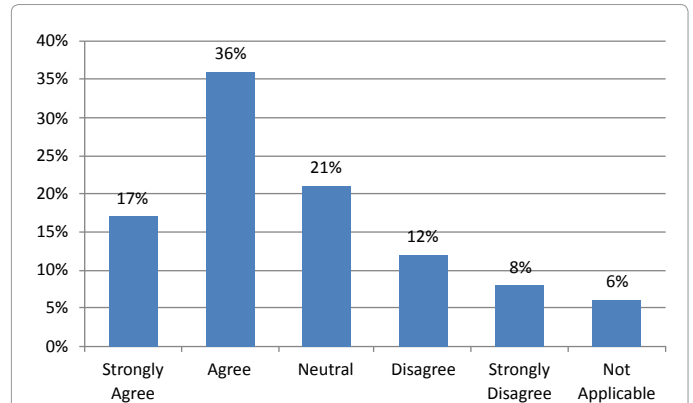

Figure 5: I learn more because of the use of PEDs during class (student responses).
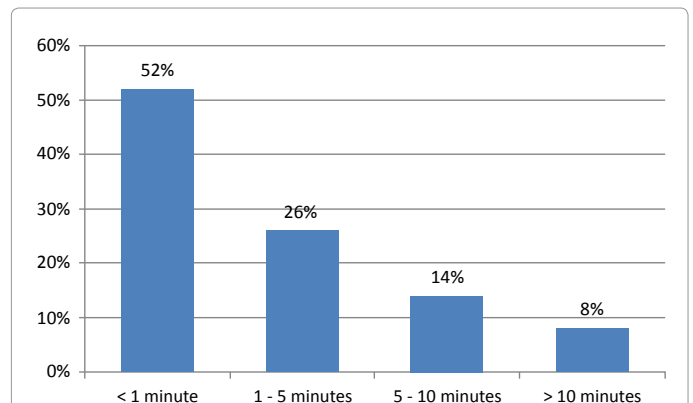

Figure 6: I use _____ minutes on non-course related work on my PED during class (student responses).

Use of PEDs by Faculty

In the survey, less than 14% of the faculty respondents reported using the PEDs on regular basis. Of these, some strongly believed that a tablet device would work perfectly for their course instruction and allow the ideal flexibility for the presentation. These were generally the professor who themselves used the PEDs extensively but cautioned about their careful use during classes. One professor indicated:

As much as I'm all but tethered to my own macbook and iphone, I make sure to not use them inappropriately in the classroom and expect the same from my students. I notice that the students who are pulling out their phones are fragmented in their attention and unengaged.

Some of the faculty members were open but hesitant to use it. One professor hesitated 'I would use it more often if there were a prescribed methodology that requires PED use and has been demonstrated to enhance student learning.' But majority of the professors were reluctant and rarely or never used it. One faculty indicated '…but I am teaching, why would I be on a smart phone or a tablet?'

Risk of Academic Misconduct

Several of the faculty members were concerned that if PEDs were allowed in the classroom, they would provide another opportunity for academic mis-conduct. They were convinced that PEDs were not good 'because students can easily text each other without the knowledge of the proctor.' Some of the faculty responses are listed as follows.

I've had a student use the Wolfram Alpha phone app on my Diff. Eq. quizzes. I know what the software can do. I couldn't care less! I wanted to know what the student could do. Not only had she not mastered the material, she lacked the mathematical competence to distinguish between a human generated and a machine generated expression. After all, someone has to understand the mathematics well enough to build the apps of tomorrow!

Texting opens up a whole new field of cheating. Off-campus "helpers" are as guilty as the student in class and should be subject to penalties. How can we catch them?

We don't allow the use of PEDs on exams. We've found that academically dishonest students "beam" exam problems to awaiting "experts" who solve and return the problems to the waiting examinee

PED Policy

When asked if they had a clear policy on their syllabus about the use of PEDs in classes, over 55% indicated that they did not. Some professors assumed that '...students know the restriction' and while others were of the opinion that 'but I generally get asked this question on the first day of class and explain my policy verbally.' One professor admitted that 'obviously this new cultural activity will require [me to put] one [policy in my syllabus] going forward.' Some of the other responses are as follows: *I physically let my students see me put my cell phone on silent each day as an example*

I'm working to be more flexible with these since it's obvious many students use them for a good purpose. It's just the texting that gets on my nerves

When I used to teach a history class, I had to ban calculators. Students were doing their math and science homework in history class. Banning calculators pretty much took care of it.

A PED, like any tool, can be used for both good and bad. A hammer can build a home or be used in an act of violence. Policies should not relate to tools, but rather student behavior. Any student causing a distraction in the classroom should promptly be removed from the learning environment; the tools used during the distraction are largely irrelevant.

Logistical and Infrastructure Concerns

Several faculty members, more than the students, highlighted that they did not encourage or allow the use of PEDs in their classes due to the inadequate infrastructure. They were concerned that if they used it as part of their instruction, then the system might fail causing them to lose the precious time of instruction. They were also sometimes hesitant to require the use of PEDs in classes, because not all students might be able to take advantage of it because not everyone has the same gadgets or same updated software for it. The results of our study confirm findings from other similar studies. Zhu et al. [1] assert that when PEDs are used for specific pedagogical purposes, they can have significant benefits for student learning. At the same time, as both subsets of faculty and students confirm, they are also a potential distraction in the classroom. Given that the number of students who own PEDs is increasing steadily, faculty will need to think carefully about their approach to student PED use and how they can maximize the benefits while minimizing the distractions. Options for faculty range from banning the PEDs in class where everyone is required to have and use the PED for class participation, to adopting an intensive approach, or using a variety of intermediate solutions [1].

Policies and Procedures

Over 76% of the faculty members who responded to the survey indicated that they did not allow the use of PEDs in the class. Over 56% said that they did not have a clear policy in their syllabus about the use of PEDs in class. Whether faculty decide to encourage or discourage student use of PEDs, it is often helpful to have a clear policy statement in the course syllabus about expectations for how and when PEDs are permitted. Such a statement will help manage the use of PEDs in class, and it will act as a guideline to students regarding their expectations. It is not enough to assume that students know by default what the expectations are, or telling them verbally is enough, as some of the responses suggested:

But I generally get asked this question on the first day of class and explain my policy verbally

Students know the restrictions

[I have a] verbal policy that cell phones must be put on silent with an exception for emergencies

These days, with PEDs as ubiquitous as pen and paper, not having a policy is an implied understanding that PEDs are permitted in class. Following are samples of statements that faculty use to set boundaries for PEDs in their classrooms [1,8].

"Students are not encouraged to bring laptops [or other PEDs] to class. A closed laptop rule during lecture will be enforced and other communication devices will need to be on 'silent' during lecture." (U-M Syllabus)

"When you use laptops [or other PEDs] during class, do not use laptops for entertainment during class and do not display any material on the laptop which may be distracting or offensive to your fellow students." (Northern Michigan University, 2010)

As indicated by Zhu et al. [1], such policies need not entail all-or-nothing approaches. Faculty can specify in the syllabus when PEDs will be permitted in class (e.g. for specific activities, note taking, or research), as well as times when students will not be able to use PEDs because their distracting presences would create problems. During a single class session, an instructor might plan out times when PEDs can and cannot be used and clearly communicate that to students. A simple phrase, such as 'Screens closed, please, for this discussion so I have everyone's full attention' conveys both the policy on the use of PEDs for the activity and a rationale for why the faculty wants the screens closed [1].

Instructors can implement a PED-free zone, reserving the first or first few rows of the classroom for students who do not use laptops. This creates an area where students who are distracted by neighboring screens and nearby typing are free from those distractions [9].

Some classroom structures are better suited for PED use than others. Before telling students to bring their PEDs to class, an instructor should check to see whether the classroom infrastructure and the IT would support their use. For example Zhu et al. [1] suggest that when planning an activity that requires PEDs for entire class, the instructor needs to ensure that the classroom has enough power outlets, or plan to remind students to charge their batteries in advance. If students need to work in groups doing classroom research, the instructor should check to make sure the furniture allows them enough space for typing without having to balance their computers or keyboards on their laps. Similarly the instructor should ensure that the students have the right hardware and software capabilities to connect their equipment to the projector for peer review work. When asking students to view media or download files, the instructor should find out if there are bandwidth limitations

that might prevent all students from going online simultaneously. The instructional technology department of the school or college in charge of a classroom building will usually be able to answer these questions [1].

In addition, faculty should consider how they will accommodate students who do not own PEDs so that they are not excluded from important learning activities. One option is to have students work with partners or in teams so that they can participate even if they do not have a PED.

Instructional Practices and Active Engagement

Instructors can take advantage of PEDs that students already have to encourage active participation and engagement in classes. This is especially useful for large classes. For example, Zhu et al. [1] suggest that students can participate in class polls and answer questions using either a web browser on their laptops or their cell phones text messaging capability via web based polling software (e.g. Poll Everywhere). Student answers and opinions can help the professor pace the lecture and shape the class discussion. During lecture, students can also access programs such as Google Moderator or Live Question Tool to post questions and vote on them. Students can even post questions while they are doing the reading (both inside and outside of class). Once a question is posted, other students can vote on the question to indicate that there is more than one person interested in it. PEDs can also allow students to engage in non-graded assignments. Using PEDs based tools allows for faster instructor response. The instructor does not need to wait for the next class to hand back hard copies. It also provides a convenient way to maintain a permanent electronic record of student's in-class writing [1].

PEDs as Tools for Reflection and Idea Generation

Faculty may choose to turn some part of their course into studio or laboratory, during which time, students engage in experiential learning with their PEDs. A few Architecture professors in the author's home institution have adopted this methodology and it is also applicable in other disciplines. Students can participate in reflective activities and problem-solving sessions. They can work on design projects as part of larger course assignments e.g. research projects, presentations, papers etc. Such activities can be created in class or the faculty member can state explicitly that students will need to finish part of the task outside of class, where students are allowed the open use of PEDs. Ideally, Zhu et. Al. [1] assert, tasks build on ideas presented earlier in that class session, so that students are applying, practicing, or reflecting on important topics from material introduced on that day.

Conclusions

As the Portable Electronic Devices (PEDs) become more common, the issues raised with their presence and use during classes will increase. This study confirms that PEDs are like any other classroom tool. They function best when they fulfill a clear instructional goal and when they are used in specific ways that support student learning. Teaching and learning are human efforts. Technology is an excellent supplement to learning and teaching, but should not replace the very valuable direct interaction methods of teaching. From the faculty perspective, it comes down to each individual student and circumstance to how helpful a PED can be. The individual has to be disciplined enough to use it for the appropriate avenues. They must also balance using the PED and listening to the lecture, or participating in other classroom based activities. And while some faculty may decide either to ban such devices or make full use of them during classes, there are intermediate steps that they can use to take advantage of the potential power of PEDs while minimizing their distracting effects. A careful use of PEDs can enrich opportunities for interaction with peers and instructors, as well as with course materials, increasing student engagement and learning. It is clear that this issue invites further investigation.

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