Running Head: Single Tablet Use

ETEC 533 Framing Assignment: Analysis of Current Use of a Single Tablet within Learning Environments.

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Introduction

Today's educators are continually inundated with new technologies. Many of these educators do not know how these technologies will enhance student learning of course content. Currently, Tablet PC's (tablets) are appearing more frequently in the K-12 and post-secondary learning environments to support students learning of course outcomes. They are pen-based computers where the user can handwrite, annotate, and clarify points on computer generated documents that are projected for the class to see (Anderson, 2004). Pryor and Bauer (2008) noted that the tablet could "enliven the classroom environment" (pg. 44) as it is dynamic and interactive when compared to static presentation mediums of the chalkboard, whiteboard, and PowerPoint presentations.

This is, of course, a quantum breakout of the "traditional" classroom presentation styles, and still in infant phases. It is therefore invaluable to develop a technology-opinion framework to analyze current technology practices for student benefits. My framework is based on the activities of an auto-eography; writing about personal beliefs about good use of technology in a science or math classroom; analysis of video case studies; interview of a colleague. This leads me to question if my current classroom tablet pc (tablet) use is benefitting my science students?

My paper discusses how my framing activities brought me to examine my current tablet use. Contemporary literature on the subject is than examined to determine academics believes and findings on the use of a single tablet within educational situations. The paper concludes with how my understanding of my current tablet use has deepened and what new tablet directions I may take.

The Auto-eography – Framing Activity #1

My auto-eography involved recognizing my “technology-eureka moment”. It was in my undergraduate years when professors were first placing PowerPoint slides on the internet. I was able to download and annotate the course content – an invaluable feature. Fast-forward a few years to my teaching practicum. I wanted my high school students to have the same benefits of having web access to teacher notes. I created and posted my notes on a website. Providing teacher notes to high school students was not a good idea. They tended to not pay attention as all of the work had been done for them; thus, the creation of skeleton notes (wherein key points and mathematical equation editors created problem solutions were removed from the teachers version of the notes and posted onto the web). With the advent of the tablet, I wondered if there was an advantage to handwriting mathematical solutions versus using the “old” equation editor. Unable to afford one personally, I was elated when, last year, our school provided computer immersion teachers each a tablet. Since then I have progressed from using it for lesson preparation to a marking and presentation tool. The auto-eography activity forced me to examine my current education technology practices. The aforementioned second and third framing activities made me think about what represented good use of technology within a math/science class.

Beliefs – Framing Activity #2

Framing activity two asked to outline beliefs as to what good use of technology represented. The activity allowed me to see that good use of technology within the classroom is when technology enhances students’ learning experiences; it provides deeper understanding of course concepts with opportunities for critical thinking. It also provides them with the chance to “figure out how they learn”.

Video Case- Framing Activity #3

Framing activity three (video case analysis) allowed me to examine how technology enhances students' comprehension of math/science concepts in other teacher's classrooms. The two videos I watched (and I agree) stress that technology is most beneficial to student learning when the instructor has a good understanding of the technology itself, and knows how to properly use it in the classroom.

Colleague Interview – Framing Activity #4

The fourth and final framing activity introduces my issue of interest. My interviewee is a colleague currently teaching Chemistry 11and 12. He has been at my school for the last nine years. Like me, he uses a tablet for the creation and presentation of class notes. I asked him if the benefits of using technology was worth the time he invested in learning the "how-to's", relative to the benefits to his students. He indicated he didn't know. He questioned his current technology practices, which are the same as mine. I began wondering if my use of the tablet in my classroom benefitted my students.

Literature framing and perspectives

An analysis of contemporary discourse, literature, occurred. I read a number of papers on single tablet use in the classroom. They approached the issue with similarity (benefits of a single tablet use) but had the following notable differences:

- Mock's (2004) paper was based on a lecturer's desire to find a different method of presenting information.
- Rogers and Cox (2008) were illustrating a way to keep/enhance the lecture style of teaching.

- Weitz, Wachsmuth, and Mirliss (2006) were determining if professors would rather use tablets instead of laptops for personal and professional purposes.
- Mathews and Khoie (2007) compared the learning benefits of tablet versus non-tablet based instruction.
- Clark, Taylor, and Pickering (2007) evaluated the benefit to students in using the tablet as a presentation medium.

Literatures framing of the issue was similar, but had subtle differences. They framed the issue, with the exception of Rogers and Cox (2008), from an idea of whether or not a single tablet use within the classroom would be beneficial to student learning. All but Rogers and Cox (2008) then proceeded to use and then determine the benefits of the tablet on learning. Rogers and Cox (2008) framed their issue as the single use of the tablet could save the lecture style of teaching. My framing of the issue was different then literature. I did not seek out to determine if the idea of using a tablet was beneficial or trying to save the lecture style of teaching with a tablet. My issue was framed on whether or not my current practices with a tablet benefited student learning.

A commonality within literature did emerge - a single tablet classroom benefitted student learning. Materials could be produced “on the fly” (Mock, 2004) or prepared notes could be annotated (Mock, 2004; Weitz, Wachsmuth, & Mirliss, 2006; Rogers & Cox, 2008; Clark, Taylor, & Pickering, 2007; Mathews & Khoie, 2007). Presentation of materials took less time, resulting in more material being taught (increased presentation efficiency) or more student practice time in class (Mathews & Khoie, 2007). Students were able to supplement personal notes with teacher annotated digital inked notes (posted onto the web). And, finally, instructors

found the use of the tablet to be more personable and interactive as they were facing the class rather than the board (Clark, Taylor, & Pickering, 2007).

Student surveys indicated teacher-tablet use benefitted their learning (Mock, 2004; Rogers & Cox, 2008; Clark, Taylor, & Pickering, 2007). Rogers and Cox (2008) surveyed physics and biochemistry students, asking if they found a tablet affected their professors' teaching effectiveness. A one to five point Likert scale (with 1 being strongly disagree and 5 being strongly agree) was used and a 4.71 ± 0.06 response resulted. Clark, Taylor, and Pickering (2007) noted student feedback was similarly positive, favouring tablet use. Some student comments were "'I thought the tablet was a really effective medium for teaching', 'Definitely helped me learn the course content more easily'" (pg. 3). Students liked being able to annotate PowerPoint slides, and appreciated explanations of concepts in a step-by-step process with digital ink (Clark, Taylor, & Pickering, 2007). It is evident from the papers that the majority of students surveyed found teacher-tablet use supported or enhanced their learning of course concepts, while helping them actively engage within the lesson. Moreover, student achievement was noted to increase when in a single tablet supported a learning environment.

Mathew's and Khoie (2007) compared marks of students in two different sections of the same engineering course. One section was taught with the use of a tablet as a presentation medium, the other without. Their prerequisite calculus mark was used to rank ability and evenly distribute them between the sections. Students with lower-average to mid-average marks, in their calculus class, showed no measurable improvement in either engineering section. However, those who had higher average marks (A's and B's), in their calculus class, performed some 4-5% better in the tablet-based engineering section.

Negative perspectives on tablet use arose. Weitz, Wachsmuth, and Mirliss (2006) noted that 7 of the 59 professors who participated in their tablet study wanted to return to a notebook because of tablet technical issues. Additionally they found that of those professors eligible for a computer replacement, only 30% wanted to try a tablet – the rest saw no value in it. Clark, Taylor, and Pickering (2007) found that a lecturer was frustrated with the tablet as they felt they were given insufficient training in its effective use; thus, they stopped using it.

Literature Critique

Closer examination of some of the papers being analyzed suggests their results are not as positive as portrayed. Many surveys were conducted on small populations, or a small portion of a population participated (reducing statistical relevance). For example, Mock's (2004) student survey involved 16 of a possible 21 students. A larger population of students would have made the results appear to be more credible. Likewise, Clark, Taylor, and Pickering (2007) conducted three studies on tablet use as a presentation medium. In one of these studies 17 of 500 students participating within the tablet supported class responded to the researcher's survey. Such a low participation rate indicates the majority of the 500 students did not care one way or the other about tablet use. The authors justify the survey results by noting that 75 students observed the discussion points made within the blackboard learning management system. It was assumed that if students did not add comments to the survey they most likely agreed with what others said. The authors may be correct; however, the 75 students may only have read the comments for they were curious about other students' responses. It is unknown why these students did not comment, so it cannot be assumed they agreed with what was written. They could easily have seen no tablet value. Obviously, a far larger population survey would bear more statistical weight in this issue.

Rogers and Cox's (2008) conducted a student survey where results were similar. However, the paper did not appear to be about discovering whether or not a single tablet within the class was beneficial to student learning. The paper appeared to be propaganda in support of the lecture style of instructing. They peppered the paper with positive student comments and result, apparently not so much as a discovery aspect as simply support for their lecture-style stance. In order to obtain a clear understanding of whether a single tablet benefits student learning the researchers were actively collecting data on direct learning gains. Collection of this data would have given this paper more credibility as a research paper.

Clark, Taylor, and Pickering's (2007) first study on classroom (Economics) tablet use involved the instructor presenting information with overhead and PowerPoint for the first half of the semester; midway the instructor switched to a tablet. Of some 600 students, 91% indicated the new technology (tablet) improved the lecture. However, there is no indication whether or not the tablet affected student achievement. All the papers being analyzed, with the exception of Mathews and Khoi's (2007), relied solely on surveys to determine if use of a single tablet was beneficial to student learning. Clark, Taylor, and Pickering's (2007) subjected the same class to non-tablet and tablet use and collected student opinions. They should have taken the opportunity to compare student achievement pre- and post-tablet use. Unfortunately, they indicate their future research will concentrate on more focused survey questions.

Mathew's and Khoi's (2007) analysis of benefits of a single tablet class was limited to examining a single learning situation. Again, the statistical merit leaves much to be desired; they have noted, and I strongly agree, that more studies need to be conducted and on larger populations.

Literature support of current practices and New Directions

The studies analyzed all support my current method of presenting course material with use of a single tablet. More specifically in regards to skeleton notes, Mathews and Khoi (2007) indicated that skeleton notes (provided to students prior to the course) freed students to spend more time concentrating on course concepts. The notes contained strategically placed blank sections that the students had to "fill in" themselves, forcing the students to engage with the lessons. Moreover, skeleton notes saved instructor time, allowed more time to be spent on working through problems, and created a more interactive learning environment. Clark, Taylor, and Pickering (2007) indicated the fact that the lecturer faced the class (to present information using a tablet) created a more comfortable interaction between the lecturer and the class.

Mathews and Khoi's (2007) study closely emulates my current practices with skeleton notes and single tablet. It uses academic achievement indicators to analyze and support the benefits of a single tablet on student learning. Through student/professor surveys, the remaining studies also support the single tablet presentation method. Based on this literature I would like to conclude that my single tablet instruction method helps student learn my course concepts. However, some literature indicated different methods/applications of the single tablet that are also beneficial and might be worth considering.

Mock (2004) as well as Rogers and Cox (2007) indicated they placed annotated class notes onto the web for students to download and use as supporting study material. Mock (2004) noted a reduction in attendance as students felt they need not attend class to obtain notes. Unlike Mock (2004), Rogers and Cox (2007) found no attendance drop. However, I did notice that when I placed teacher version of notes on the web (prior to class) many students were inattentive, or

simply did not attend class. From my experience I do not believe that high school students would be mature enough to use post class teacher annotated notes as a beneficial tool to support their learning.

Mock (2004) and Rogers/Cox (2007) progressed from placing annotated notes onto the web to placing screen casts of the entire lecture, or key aspects of the lecture, onto the web. I have toiled with the idea of creating screen casts to place onto my class websites of key concepts; however, I wonder if this would be as detrimental to student learning in a face-to-face environment as I found with placing pre-class teacher notes onto the web. As I am curious to the benefits of screen cast video's I believe that some of my time may be required surveying my own classes to determine whether or not they would find access to such video's as being beneficial to their learning.

Mock (2004) mentions the benefits of tablet created screen cast videos in distance-ed programs. He mentions the creation of these videos would mimic real classroom environments and help students' learn. I agree with Mock (2004) that screen cast videos have the potential to mimic some aspects of a real class and help students learn. If I were to ever teach an online math or math based science course I would put in the time to create screen casts of sample problems.

Mathew's and Khoie (2007) found that the time the tablet saved was allotted for student groups working on course problems. Rogers and Cox (2008) noted that the groups wrote their problems on the tablet and subsequently discussed them in front of the class. I am planning on altering my current tablet practices to allow group or single student time to work on problems in class. Students will have the opportunity to place their answers on the tablet and discuss their findings with the rest of the class, forcing them to think critically about the material being taught. Moreover, the learning environment becomes more collaborative and less teacher- centered.

I believe that technology is beneficial when it helps students learn course material, helps them think critically, and helps them learn how to learn. It is evident that my current tablet use helps students learn course concepts and by altering current practices I can help them think critically; however, I am still considering how the single use of a tablet pc in the class can be beneficial to students learning how to learn. Interestingly, because of research for this paper, I have come across articles that discuss the use of multiple tablets in classrooms (student tablet use). From my personal experience, using a tablet as a teacher and as a Master's student, I believe that student use of tablets may be beneficial to their learning. Future personal research/paper reading would need to be conducted to confirm this.

Conclusion

While actively framing, an obvious, important issue arose regarding my current use of technology - how is the use of a single tablet within the learning environment beneficial to student learning? Literature seems to agree that my current practice of posting skeleton notes for student downloading, and the use of a tablet to fill in the blanks with the students, is beneficial to their learning course concepts. The literature also gave me perspective on new venues I might attempt, to enhance student learning. These include screen-casts for e-learning situations; allowing students time to work on problems and then present them in class with the use of the tablet; and multiple student tablet use within the class.

The act of writing the paper made it evident that a lot of time is required to learn how to effectively use technology within the classroom to benefit student learning. More resources are required to instruct teachers on how to use technology (specific examples to their learning areas), so technologies such as the tablet can be beneficially used to help students learn. The literature

reviewed and my personal experience with the use of a tablet illustrates how technology can be used to increase student's comprehension of course material and increase critical thinking skills.

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