CTTL Mini-Grant

2015 Spring Final Report

Project Title: Expressing new forms of creativity and collaborative learning and teaching through pen tablets in graduate statistics courses.

Faculty Names:	1.	Lisa Willoughby, 2. Srikanth Mudigonda, 3. Hisako Matsuo, 4. Lauren Arend
Colleges / Schools:	1.	Arts and Sciences, 2. Professional Studies, 3. Arts and Sciences, 4. Education and Public Service
Departments:	1.	Psychology, 2. Computer Information Systems, 3. Sociology and Anthropology, 4. Educational Studies

Courses where the tablet was utilized:

Willoughby:
- Fall 2014 (Applied Univariate Statistics in Behavioral Science, PSY579)
- Spring 2015 (Applied Multivariable and Multivariate Statistics in Behavioral Science, PSY650)

Mudigonda:
- Fall 2014 (Applied Research Methods, ORLD502)
- Spring 2015 (Applied Analytics, ORLD 503)

Matsuo:
- Fall 2014 (Survey Design and Sampling, SOC580)
- Fall 2014 (Intermediate Qualitative Analysis, SOC575)

Arend:
- Fall 2014 (Introduction to Inferential Statistics, EDR 510)
- Summer 2015 (Introduction to Inferential Statistics, EDR 510)

Introduction This was a two-semester project with an overarching goal to examine the utility of a wireless pen tablet to supplement graduate statistics courses. There were several outcomes that we had hoped to achieve, including improving the quality of the learning and teaching experience by being able to produce equations and drawings in real-time (as opposed to simply presenting static objects on a PowerPoint slide), producing electronic documents that can be shared with the students (as opposed to writing on a blackboard or chalkboard and requiring students to copy what is written, which might lead to errors), and to give students an alternative means to participating by passing around the tablet to share answers and ideas in written form (as opposed to asking students to simply step up to the front of the class, which might be considered stressful to some). Some of these desired outcomes were appropriate for the in-person class formats whereas for online classes, the instructor may utilize the pen tablet during lecture recordings. While the empirical evidence is scant, there is some suggestion that information learned under rich contexts (e.g., seeing an equation being written out or a figure being drawn out) are likely to be more memorable than under less-rich contexts (e.g., seeing static information that is simply displayed on an electronic slide).

What Worked and What Did Not

Overall, there was considerable variability in the level of utility of the tablet across instructors. Key drawbacks for their usage was that that installation of the tablet was not without problems for some instructors and seamless implementation was difficult to achieve. The experiences from specific instructors are noted next.

Lisa Willoughby was able to implement the tablet most successfully in her graduate univariate statistics course (PSY579) during the Fall 2014 semester due to the fact that the course involved considerably more hand-calculations (equations) and orientation to computer outputs. It was used during her multivariate statistics course (PSY650) but far less frequently. The primary use was to supplement lecture notes on PowerPoint slides with handwritten notes,

equations, and figures. By writing on the PowerPoint slides during lecture and being able to write clearly where needed, the benefits – from the instructor's perspective – were very high. Previously, the instructor used a mouse to mark-up slides, but the clarity of the markings and utility was highly limited. Initial implementation in the classroom was challenging because it required writing while looking at the projector and improved over time. The major problem, however, was that the pen tablet would occasionally cause PowerPoint to freeze, resulting in lost class time and lost notes. Despite the challenges, the greatest success was posting and sharing notes generated in real-time during class. As a result, this instructor felt that the positive benefits significantly outweighed the negative issues. Far less successful was using the tablet to allow students to provide electronic responses because of the learning curve involved with using a pen tablet as most students had no prior experience with a Wacom tablet.

Hisako Matsuo utilized the tablet in her Fall 2014 courses and noted that her laptop, which had the tablet software installed, required to be connected to the projector with a cable that she provided. Due to the design of the room, the furniture was required to be moved to enable this to occur. Additionally, like Willoughby, Matsuo found that writing while looking at the projector was a challenge and the poor quality of the images and notes produced required re-drawing on the classroom whiteboard. These issues led to her finding that the whiteboard to be a more effective means of creating classroom dynamics and connections with the students. In Spring of 2015, she continued to experience technical issues and found the tablet to not be as useful as other methods of electronic capture of written information, such as taking screen shots.

Srikanth Mudigonda utilized the tablet for an online course and thus used it along with a "whiteboard" program during his recorded lectures and live Fuze meeting sessions. He found the tablet to be useful in a couple of ways: the wireless nature of the tablet reduced clutter on his limited desk space, allowing for free movement during the lecture recordings and live sessions between keyboard, and the tablet (which also worked as a mouse to some extent).

Secondly, the ability to write in the “whiteboard” applications (MS One Note on the Windows operating system, and Xournal of Ubuntu Linux) helped with a free flow of, and explanation of, ideas, in contrast to highlighting text/images in pre-created documents. Similar to Willoughby and Matsuo, he initially experienced installation-related issues but was able to sort them out. Overall he found the implantation of the tablet in his course to have been a good experience and a positive supplement to his instruction.

Lauren Arend unexpectedly encountered logistical issues that included a classroom change that interfered with its implementation during the Fall 2014 semester. Arend found using the tablet to be somewhat cumbersome which led to additional prep time to use the tablet. Ultimately, she found for in-class lectures, writing on the board to be more effective and efficient. For Arend, taking photos of work on the board and uploading it to Blackboard was a better way to capture written work that was done in class. For a fully online course in Summer 2015, Arend used the tablet to create demonstrate solutions to worksheet problems. This was useful as it allowed students to “view” the solving of problems. However, she still found using the tablet to be somewhat cumbersome and the quality of the drawings was not as good if they had been drawn without the tablet. More practice with the tablet may have helped with this, but ultimately Arend found the tablet cumbersome.

Lessons and Possible Applications The lessons learned is that there are technical issues with the Wacom and thus should not be considered a full substitute for notes (i.e., should be considered a supplement) and considerable practice, both in the office and in the classroom, can facilitate smoother implementation. The key recommendation is to consider the tablet as substitute for whiteboards/chalkboards because, with practice, the tablet can be used to produce, in real-time, sharable electronic notes. It is not recommended that a peripheral pen-tablet be used with students who have little experience with the technology unless there is class time to spare for learning.

Future Plans It appears that Willoughby and Mudigonda are likely to continue implementing the tablet in our graduate statistics courses. Willoughby also explored the use of the writable tablet in her Psychology of Aging course. It was more of a hindrance, primarily because the heavy emphasis on classroom discussion (and lecture) in that course.

Additionally, we have data from the Fall 2014 and Spring 2015 semesters and expect to examine and analyze those data to explore students' experiences with the tablet. We have obtained IRB approval for the survey data and in the event that the results are informative, we will submit present them to a wider audience (e.g., CTTL report update, scientific conference, etc.).