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Multiple Case Study Investigation of E-reader Devices in Academia

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Introduction
E-texts are seen as the new direction for education publishers and education in general. But, before our faculty and administrators commit to technology purchases and policies related to e-readers and e-text use, we want a better understanding of student behaviors and attitudes.

Technology Variety: Many of the earlier e-reader devices (e.g. Sony's e-book Reader, the Kindle) were primarily designed for static, text-only content. Newer versions of these same readers now incorporate annotation tools, pagination, and cloud databases which permit a user to transfer notes to a personal computer. However, the display and interactivity limitations make these readers unappealing for many disciplines, especially many of the sciences and engineering. In contrast, a few of the newer devices (e.g. the iPad, HP Slate, Fujitsu slate), have e-reader applications that are able to display detailed color images and connect to the internet / use applications that will allow users to interact with the material. These also incorporate the annotation tools, pagination, and access to cloud databases. Finally, some textbook publishers make their texts available online through the use of a browser. These e-texts have colored images and some have added links to interactive learning activities (e.g. interactive demonstrations, flash cards, quizzes that tailor questions based a student's errors). Overall, carrying around a laptop (or being restricted to a desktop computer) makes the reading and learning environment much more restricted than with the smaller and more portable e-reader devices.

Previous studies have been limited in that they focused on basic usability features of a single e-reader device (e.g. ease of annotation, ability to look up pages) and only asked very surface level questions related to uses that might impact learning (e.g. “Did you read more/same/less with the e-text?” and “Did you study more / no change / less with the e-text?”) (NW Missouri Initiative, 2009).

Finally, none of the previous studies tracked student use and attitudes over time throughout a semester. For example, it is possible that the “cool factor” might wear off and attitudes become less positive, or attitudes and uses will change in a positive manner as students become more comfortable with the devices.

Methods and Materials: Spring 2011

Multiple case study approach with 24 cadet participants. All had e-texts for at least 2 of their courses.

- 6 iPad participants (no CAC)
- 2 HP Slate participants (CAC via dongle)
- 3 netbook participants (yes CAC)
- 5 Kno slate participants (no CAC)
- 6 laptop participants (yes CAC)

Types of Data:
- In-depth Pre & Post semester surveys
- Weekly surveys via Sharepoint, which inquire about 1) cadet use of the devices both during and outside of class and 2) usability of the device and e-reader applications
- Focus groups at mid-semester and end-of-semester

Results: Spring 2011

Students given HP Slates and netbooks stopped using them (switched to laptop condition) within 2 weeks. Problems with CAC and lack of “added benefit”, i.e. no additional capabilities compared to their laptops combined with less processing power, were the main reasons.

The remaining devices were rated differently on overall portability: iPads (mean = 3.9), Kno slates (mean = 2.2), and laptops (mean = 2.9), with 1 being “very burdensome”, 2 being “somewhat burdensome”, 3 being “not a problem”, and 4 being “great”.

Reported Behaviors Related to Learning & Measures of Device Usability

Discussion: Impact on Learning Behaviors Spring 2011

The above device use differences can be linked to portability, internet connectivity, and ease of text/data input. An appreciated feature of some of the e-readers was the search function (e.g. Control f on laptop).

Several students reported being more likely to take notes in e-texts because they could be erased or modified later (unlike printed texts and when self-back value decreases with the amount of notes or highlighting).

Overall, some decreases in reading behaviors were due to the fact that, by mid-semester, students had finished reading the e-texts and the classes were largely discussion based and/or focused on projects. Importantly, ease of use of the highly portable iPad e-reader led several students to read much longer into the semester than for classes without e-texts, and they reported voluntarily reading non-academic texts for the first time. The ability to synch some texts with their smartphones also increased the likelihood to read across more situations and locations.

Fall 2011: Fujitsu Slate

Spring semester students created a “wish list” for an e-reader device: small size, good input (e.g. stylus / larger virtual keyboard), ports (so that they could use an external keyboard, mouse, large screen), CAC ability so they could access USAFA networked course materials, and ability to use MS Office / Windows platform to facilitate compatibility with laptop files.

The Fujitsu slate addresses the majority of these factors. Five students were given the device to use for the fall semester, and completed online feedback forms every other week.

Over the course of the semester, both academic and non-academic use increased as students became familiar with the device and its capabilities. They rated reading, note-taking, and highlighting as easy or very easy. They liked being able to have multiple texts on a single, small device. Less well rated was the ability to multi-task and interactivity of the resistive touch screen. The biggest drawback was juggling two devices (laptop and slate).

Take home: Different technology characteristics impact user behaviors in different ways, including several behaviors that might impact learning.