BENEFITS OF TABLET-BASED LEARNING AND TEACHING

There is a growing body of research on the impact of tablet-based teaching and learning. Listed below are benefits of tablet-based learning supported by research.

Learning outcomes & changes in teaching approaches

- o Improved learning outcomes (Hojjatie et al. 2008; Tilbrook et al. 2010)
- o Increased engagement in classroom (Anderson et al. 2006; Logan et al. 2009)
- o Encourage shift away from content-driven approaches to discovery learning or inquiry-based learning through collaborative ink-based software (MeTL: spontaneously inked questions, quizzes, sketched feedback)
- o Encourage development of non-linear thinking (virtual whiteboards)
- o Allow teachers to focus on essence of concepts by using ink-based delivery and content and conceptual exploration (more focus on concept, less distraction on overwhelming, static, polished content) (e.g. Franke 2011 – under review)
- o Increase use of peer-based learning approaches through planned and spontaneous interaction
- o Allows whole class collaboration over content or shared virtual whiteboards (e.g. in MeTL, the whole class or groups can annotate over content or create content from scratch in real-time)

Note-taking

- o Note-taking with a pen has different cognitive effects on retention than note-taking on a laptop (typing); pen-based note-taking has stronger effect on retention, tablets encourage that process (e.g. McKenzie 2010)
  - ▪ Tablets make organising notes and other material easier (as compared to paper handouts, paper notebooks and electronic material)
- o Support natural note-taking (e.g. in OneNote), drawing and intuitive, free-style annotation on (imported or newly created) content (using a pen rather than typing)
- o Seamlessly support the use of non-Latin scripts (e.g. Chinese characters, Arabic script); allow recording/replay of students practising writing scripts (e.g. Itho 2006)
- o Note-taking and informal sketching crucial for ideas development and discussion > communicating ideas and concepts form the core (essence), not polished, or linear, organisation of content/ideas (e.g. Li et al. 2003) > tablets can facilitate a low-tech approach
- o Allow sketching of observations or taking of field notes in the field, e.g. annotating Google topographical maps while surveying in the field
- o Sketched, inked or drawn content can be saved, printed, or stored for later usage/further exploration

Collaboration

- o Support real-time collaborative learning using virtual whiteboards (no page/slide size constrains in e.g. MeTL)
- o Allow spontaneous and flexible discussion, feedback and collaboration over content
  - ▪ MeTL facilitates anonymous discussion and feedback (less threatening)

     o Easily facilitate spontaneous pen-based brainstorming, concept mapping or mind mapping without specialised software (using standard MS Office product, e.g. Word) or using by software such as MeTL (virtual whiteboard)

SAMPLE STUDIES

Hojjatie, Hooshmand, Leader, Brevik & Grosvos (2008)

- Study in Engineering; students used tablet PCs for note-taking (in the field) and activities (problem solving, drawings)
- Results indicate improved student satisfaction and learning outcomes: mean student test grades higher when TPCs were used
- Tablets facilitated greater interaction and mobility among students (student learning through collaborative interaction)

Tilbrook, Logan & Franke (2010)

- Longitudinal study (2008-2010) in a 2nd year physiology unit; involved three lecturers (three different modules) and different tools for delivering lectures
- Two of the lecturers delivered their module using standard (static) PowerPoint in 2008 and 2009, and switched to tablet-based delivery in 2010
- The third lecturer used pen-based teaching for all his lectures throughout the study, starting off with overhead transparencies in 2008 before employing a Tablet PC in 2009 and 2010
- Student learning outcomes across the three years were compared so as to quantify the effectiveness of tablet-based lecturing approach as compared to traditional pen-based (OHP) and standard PowerPoint delivery modes
- Results indicate a significant impact of delivery mode on learning outcomes; students performed significantly better for the module based on pen-based delivery than on the modules delivered through traditional PowerPoint lectures (2008-2009)
- Effects are mitigated in 2010 when all lecturers had switched to tablet-based delivery