TABLET PCS: AN EDUCATIONAL AID FOR LECTURE-BASED SURVEY METEOROLOGY COURSES

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1. INTRODUCTION

The use of technology and its effectiveness in teaching and learning has been of interest to educators for some time. With each new technological development educators attempt to incorporate it into their classroom with the intent of increasing student learning and achievement. Many large university lectures incorporate PowerPoint into the curriculum. The benefits of using PowerPoint technology in teaching and learning are anything but clear. The pervasive use of PowerPoint in the classroom is viewed by some instructors as an indispensable tool (Anderson & Sommer 1997, Ptaszynski 1997; Grabe et al. 2005; Susskind 2005) while others greet it with great skepticism (Mason & Hlynka, 1998; Tufte, 2003).

The Department of Atmospheric Science (DAS) at the University of Illinois at Urbana-Champaign (UIUC) incorporates the use of technology following best teaching practices. Our most recent innovation includes the incorporation of Tablet PCs into UIUC survey meteorology courses. Our motivation was primarily to promote active learning in the classroom. The Tablet PCs were used by instructors in place of traditional lecture presentation mediums (i.e., blackboard, slides, or transparency overheads). The study examines the effectiveness of the Tablet PC as an educational aid for both the students and instructor.

2. USE OF THE TABLET PC

A Tablet PC is a small laptop computer with full keyboard. The monitor can rotate 180° and lay flat on the keyboard (Figure 1). A stylus is used as a mouse to cycle through programs. In addition, the stylus can be used for drawing directly on the monitor as a pen, highlighter, or eraser. During class the instructor uses the Tablet PC to make hand-written notes, or annotate pictures, figures,

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and diagrams in real-time. The instructor may also create figures and drawings on-the-fly as needed. The electronic document files created during lecture can be saved as a web page or PDF file and posted for students on a course web site.

Figure 1. Tablet PC with full keyboard display and modified to a writing tablet.

During the summer and fall semester, 2005, three different DAS instructors used the Tablet PC in six introductory courses. In each class, the instructor used PowerPoint to create an outline of the lecture. The outline slides contained headings and textbook figures but little text content. Some slides were left blank to allow for additional notes on in-depth topics.

During lecture, the instructor used the Tablet PC to provide notes and annotate figures and diagrams (Figure 2). Many of the schematics were taken from the course textbook. Students had the ability to print notes prior to class. This allowed them to annotate figures on the printed notes while the instructor filled in the notes outline during class on the Tablet.
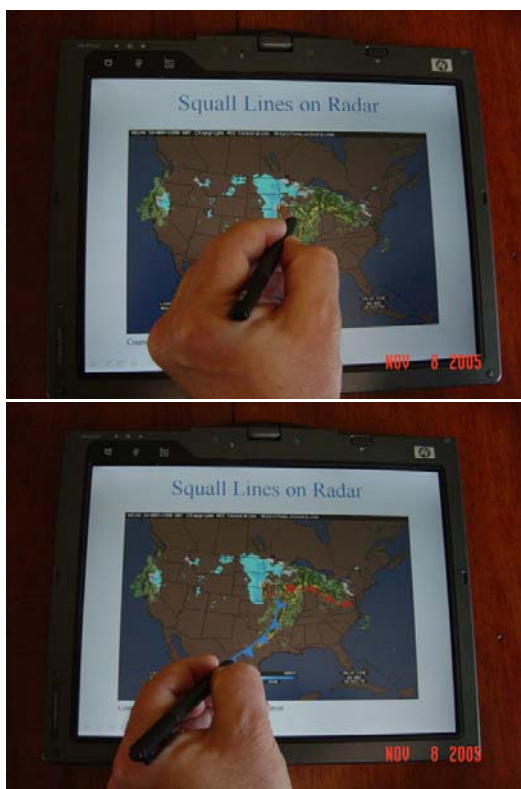

Figure 2. Radar image annotated with fronts using the Tablet PC.

3. PILOT STUDY

DAS courses included in our study include non-major, introductory-level survey courses (*Introduction to Meteorology* and *Severe and Hazardous Weather*). The three DAS instructors of these courses have varying levels of experience teaching the courses. One instructor has ten years experience teaching large, introductory courses using technology. The other two instructors taught the courses for the first time.

Our pilot study was conducted during the eight-week summer session with a small class (18 students) of *Severe and Hazardous Weather* taught by the most experienced instructor. Data collection included two anonymous surveys – one during the fourth week of class and one at week eight. In each survey, students were asked about their familiarity with Tablet PCs, their opinion of the use of the Tablet PC in the course with respect to teaching and learning, and their perception on the overall impact on their learning.

In the pilot study, outlines of lecture slides were posted on the course web site prior to class. Students had the option of printing the slides before class and filling them in during class. After week four, the fully annotated slides were also posted on the class web site after each class was completed. Students had the ability to access, view and print the annotated slides.

Data from the pilot study show that students had a favorable opinion of the use of the Tablet PC in the class and felt that the Tablet PC was beneficial in their understanding course material. Specifically, students found the annotated slides (provided after week four) to be an asset when completing homework assignments or studying for exams. No significant change in attendance was recorded after annotated notes were provided. This may be due, in part, to the nature of the course and the students enrolled. We have found that summer classes are often taken by students who are highly motivated and less likely to skip class. Additionally, students find that a single missed class in summer can be severely detrimental to their keeping up with coursework.

Students also found the use of the Tablet PC prevented the instructor from moving too fast during lecture and getting ahead of the students as they were trying to take notes. In addition, student responses suggested the use of the Tablet PC maintained focus in the classroom, allowing students to more actively take notes and ask questions. Overall, the students found the Tablet PC a useful educational tool and recommended it continue to be used in large lecture courses.

4. LARGE-SCALE STUDY

A similar study is being conducted in Fall 2005 in five survey courses of approximately 150 students each (750 students total). Two different introductory courses are under investigation (see Table 1). The less experienced instructors are each teaching one course (one or two sections). The more experienced instructor is teaching one section of each course.

Data collected includes three surveys: beginning of semester, mid-semester and end of semester. The introductory survey provided information regarding student demographics as well as students' experience with Tablet PCs and their preferences in methods of note-taking. The mid-semester survey included questions on the students' opinions and perceptions of the Tablet PC and its use in the class. The final survey will again query students regarding their opinions and perceptions of the Tablet PC as well as ask them to summarize the overall impact on their learning.

	Intro. to Meteorology course	Severe & Hazardous Weather course
Experienced Instructor	1 section	1 section
New instructor #1	1 section	
New instructor #2		2 sections

Table 1: Summary of teaching assignments and experience for each DAS instructor.

We plan to compile survey statistics for (1) each section of each class, (2) all sections of a single course, and (3) all sections of a single instructor. Data will be examined across courses and across instructors. Results will be presented at the meeting.

5. ACKNOWLEDGEMENTS

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