

Active Learning in Field-Based Classes Using Tablet PCs for Collaborative Data Collection and Mapping

Vassar College

Meg E. Stewart¹, Lucille L. Johnson², and Robert S. Fritz³
Vassar College, ¹ Academic Computing Services, ² Dept. of Anthropology, ³ Dept. of Biology, Poughkeepsie, NY, 12604
contact: mestewart@vassar.edu, johnsonl@vassar.edu, fritz@vassar.edu

ABSTRACT

Tablet PCs in higher education field courses have changed the way we teach field mapping and data collection concepts. Curriculum redesign and assessment strategies were applied to field archaeology and ecology classes that have effectively and efficiently introducing this emerging mobile technology in order to correct and improve how spatial data are handled.

INTRODUCTION

Many of our classes typically have a field component. We have aimed to bridge the field and the computer classroom, especially in classes for which data collection is routine and is expected by our students. Armstrong and Bennett (2005) argue for the use of mobile technologies in geographic education and Torsney (2008) makes a case for utilizing the outdoors for undergraduate science courses. Tablet PC technology transforms the field-based curriculum (Menking and Stewart, 2007). Evaluating the use of the technology is critical in making certain that



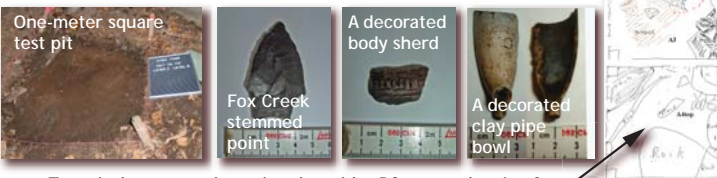
students are confident with the tools, and for documenting student skill acquisition.

We redesigned the curriculum and introduced the use of tablet PCs in two different field-based classes – 1.) Field Archaeology and 2.) Ecology– to address several learning issues. In these classes we wanted to 1) increase consistency in learner observations of the same plot or mapped area, 2) reduce transcription errors from analog field notes to computer, 3) reduce the time spent collecting data, and 4) increase student spatial literacy.



TECHNOLOGY SOLUTION

Anthropology professor, Lucille Johnson, takes advanced anthropology students out into the field to conduct research on an excavation of test pits in Field Archaeology. Detailed and careful documentation is required in the field because, once the test pit is opened and mapped, it is then covered up with soil. Professor Johnson wanted to reduce the number of transcription errors and ease the data collection and mapping process.

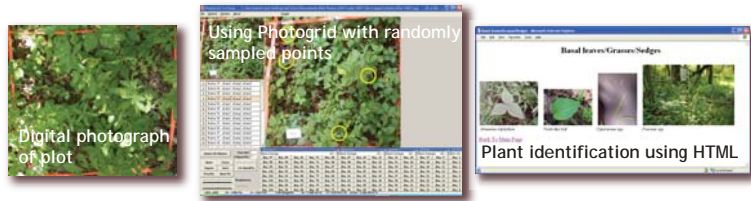


Test pit documentation using the tablet PC's pen, showing four different depths at the same pit.



TECHNOLOGY SOLUTION

Biology professor, Robert Fritz, teaches Ecology on Vassar's Ecological Preserve where the students engage in on-going research by observing and mapping invasive species and analyzing for plant diversity. Estimating plant coverage over a given area is a technique biologists frequently use in studying plant distribution. The results can be subjective and vary by individual. Professor Fritz wanted to reduce bias and increase accuracy by bringing tablet PCs into the field.



Active Learning in Field-Based Classes Using Tablet PCs for Collaborative Data Collection and Mapping - page 2

EVALUATION

We finalized the second year of a rigorous evaluation program to assess the use of tablet PC technology in 1.) Field Archaeology and 2.) Ecology. Through the use of a pre-course and post-course question sheets, anecdotal evidence, written student comments, and in-class observations, we have effectively redesigned two courses. Below are survey results and examples of student's written comments from 1.) Field Archaeology and 2.) Ecology.

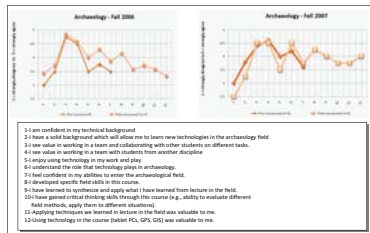


Figure 1: Attitudes and confidence level for Field Archaeology courses taught in Fall 2006 and Fall 2007. The course was taught by Professor Johnson both times. The numbered statements correspond to questions asked of students pre-course and post-course and are shown on the x-axis in the graphs. The range of responses are 1 = I strongly disagree with the statement to 5 = I strongly disagree with the statement, shown on y-axis.

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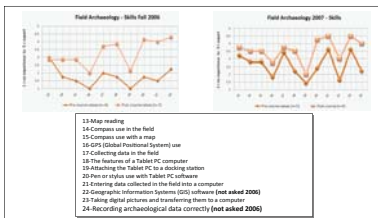
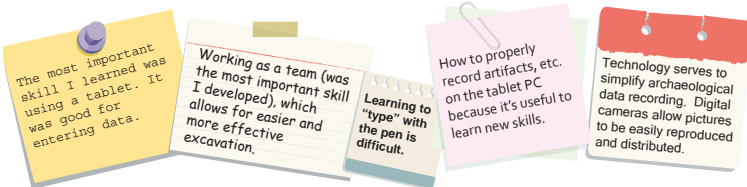


Figure 2: Skills level for Field Archaeology courses taught in Fall 2006 and Fall 2007. The numbered statements correspond to questions asked of students pre-course and post-course and are shown on the x-axis in the graphs. 1 = no experience to 5 = expert.

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EXAMPLES OF ARCHAEOLOGY STUDENT RESPONSES



REFERENCES

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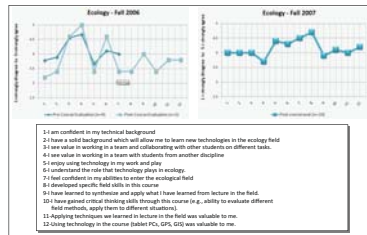


Figure 3: Attitudes and confidence level for Ecology courses taught in Fall 2006 and Fall 2007. The course was taught by Professor Fritz both times. The numbered statements correspond to questions asked of students pre-course and post-course and are shown on the x-axis in the graphs. Note: the pre-course survey was not administered in the Fall 2007 class. The range of responses are 1 = I strongly disagree with the statement to 5 = I strongly disagree with the statement, shown on y-axis.

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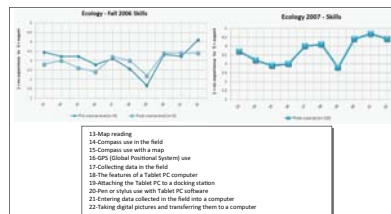


Figure 4: Skills level for Ecology courses taught in Fall 2006 and Fall 2007 referred to in Figure 3. The numbered statements correspond to questions asked of students pre-course and post-course and are shown on the x-axis in the graphs. 1 = no experience to 5 = expert. Note: the pre-course survey was not administered in the Fall 2007 class.

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EXAMPLES OF ECOLOGY STUDENT RESPONSES



SUMMARY

We believe that the introduction of tablet PCs helped our students experience scientific discovery through active, experiential learning. Our learning goals for the students are being met. Mobile tablets bring the classroom into the field and the field into the classroom. Students can more easily discover the interrelatedness of geographic phenomena, thus enhancing their spatial literacy.

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