

**Final Report - April 14, 2008  
2007 NWACC Proof of Concept Grant**

**Expanding Pre-service Teachers Use of Technology:  
Portable Media Devices, Pedagogy  
& Best Practices**



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**Project Website:** <http://www.und.edu/instruct/ksmart/nwacc/index.html>

**Project Goals for the grant pilot project, as stated in the proposal, included:**

- 1) provide ipods (portable media device) for pre-service teachers (students) to enable them to access otherwise potentially unavailable resources and contribute to online resources and learning communities associated with the development of pedagogical knowledge,
- 2) afford pre-service teachers the opportunity to:
  - a. experience and develop instructional resources,
  - b. gain hands-on experience in how to construct knowledge representations,
  - c. amass instructional resources for their students and differentiate instruction,
  - d. understand how to deliver and augment instruction in a more flexible, dynamic, and active manner.
- 3) learning experiences focused on four tracks:
  - a. increased pedagogical skills,
  - b. expanded access to and use of subject matter area material
  - c. increased use and understanding of a (portable media devices) for instructional purposes,
  - d. expanded reflective practice/professional development.

**Project Results:**

This pilot study involved three phases of data collection: pre-test, peer-assessment, and interview/focus group. In the College of Education & Human Development, pre-service teachers during the 2007 fall semester enrolled in required undergraduate courses entitled Technology for Teachers (TT) and Social Studies Secondary Methods and Materials (SS). Grouped within individual courses, each student received an iPod for the first half of the semester. In the TT class, there were 4 males and 24 females (sophomores, juniors, and seniors), whereas in the SS class there were 8 males and 7 females (all seniors). Pre-service teachers completed the Computer Self-Efficacy Scale (CSES) by Murphy, Coover, & Owen, (1989) as a pre-test that solely examined computer self-efficacy. Based upon a five point Likert Scale, pre-service teachers' choices included the following: quite a lot of confidence, high confidence, some confidence, little confidence, and very little confidence. As an assignment, SS pre-service teachers created topical podcasts of interest from economics, geography, history, or political science. During the last week of the semester, pre-service teacher interviews were conducted as was the student focus group meetings in the technology course and the methods course. Learning experiences supporting the students' expertise in pedagogy included the flexible delivery of course related materials (podcasts), critical information from lectures/readings, collaboration, and subject matter information.

During the semester, the teacher educators collaborated with the Apple computer regional educational representatives in delivering two presentations. One was early in the semester and the second later as students finalized their projects in preparation to publish. The first presentation focused on the use of podcasts and video podcasts in education. A portion of the class time was devoted to iTunes U. This was in conjunction with the institution recently launching the UND iTunes U. The pre-service teachers enrolled in the TT

course, evaluated the podcasts published by the SS pre-service teachers. This review was one of the assignments in the TT course.

In the SS course, pre-service teachers created social studies content with technology resulting in the creation of a podcast. Pre-service teachers were free to choose any topic relative to the disciplines found in the social studies (i.e., economics, geography, history, political science, anthropology, psychology, and sociology), but they were encouraged to choose a topic from the core content of their social studies program namely economics, geography, history, and political science. For pre-service teachers working on this project, supplementary class time provided assistance and instruction in creating podcasts. Additionally, a rubric provided guidance for student preparation and project development.

Teacher educators reviewed multiple podcast rubrics. Upon identifying one, the authors received permission to modify and incorporate it into the courses and research (Bell, 2007). Organized by categories, the rubric included the following: (a) introduction; (b) content; (c) delivery; and (d) graphic and music enhancement. Under each category were articulated gradations of quality for each criterion: exemplary, proficient, partially proficient, and incomplete. Total available points ranged from nine at the exemplary benchmark to zero points at the incomplete benchmark. After students constructed their podcasts and submitted them for evaluation, the TT pre-service teachers employed the assessment rubric to evaluate each podcast. Without respect to any particular author, the TT students chose varied podcasts to assess. Additionally, each professor reviewed the submitted podcasts employing the rubric.

At the conclusion of the semester, students participating in the interviews were asked the following questions: (1) What did you like/dislike about the iPod incorporation into the classroom instruction and would you like to learn this way again (why/why not), (2) how will you incorporate this teaching strategy into your teaching, and (3) How could I as the instructor better facilitate your learning of this innovative technology as a teaching strategy? For the focus groups, discourse began with discussions centering upon student responsibility and the importance of technology in the classroom today. Discussions were monitored upon participation with all students being responsible for class participation specifically addressing what would have addressed the facilitation of individual learning and how that could be addressed in their social studies classroom.

## **Assessment**

### **Student Pre-Assessment: Knowledge of Technology & Skill Level**

Students in the TT and SS course participated in the pre-test aimed at providing the authors with a baseline to determine student efficacy in using computers. In analyzing the data, the TT and SS pre-service students respectively shared similarities and differences.

### **Post-Assessment: Knowledge of Technology & Skill Level**

#### *Peer/Professor*

Pre-service SS teachers submitted podcasts for both peer and professor evaluation based upon the provided rubric that categorized the use of technology: (a) introduction; (b) content; (c) delivery; and (d) graphic and music enhancement. Each category contained degrees of achievement (e.g., exemplary, proficient, partially proficient, and incomplete).

The TT pre-service teachers rated the SS pre-service teachers' introductions as 80% proficient and exemplary; content with distinctions of creativity as 100% proficient and exemplary with variety and research as 93% proficient and exemplary; delivery subdivided into well rehearsed and effective enunciation was both assessed at 93% proficient and exemplary. Graphic and music enhancement subdivided into individual categories was assessed at 73% proficient and exemplary and 100% proficient and exemplary respectively. Lastly, subdivided between recording presentation and length, technical production was both scored by the TT pre-service students as 80% proficient and exemplary. Scoring by the professors ranged from proficient to exemplary and very closely resembled the pre-service teacher scoring. Evident in both pre-service teacher and professor assessments were podcasts that received all exemplary marks and those that received only proficient. A proficiency expectation from the SS professor was established as a guideline for the pre-service SS teachers.

### *Interview/Focus Groups*

The individual interviews and focus groups revealed that all students enjoyed the experience of creating and publishing content. Students were positively surprised after they "got it" how easy the mechanics of creating a podcast were, and students reported the experience of working with another course was somewhat novel. The SS pre-service teachers reported that they believed classroom student would be excited to use and create podcasts. Pre-service teachers recognized that using iPods and podcasts could be an effective tool for differentiated instruction. Further, many viewed podcasts as a vehicle for their future students seeing content as more relevant given the richness and variety of media. Integrating the use of iPods and podcasts into lesson plans were cited as an additional tool for teaching social studies. For the pre-service teachers, critical reflection was not perceived to be part of the project at the onset, but became integral during the planning and preparation of the scripts for podcasts. Finally, pre-service teacher experienced a sense of a learning community in working across the curriculum, some even receiving recognition as the author of a particular podcast. Working together, both in their individual course and outside of the normal boundary spurred significant enthusiasm. Pre-service teachers suggested setting aside additional time to complete the study.

### **Outcomes**

#### *Overall*

Findings indicated that students feel confident in using the computer. On an average, 54% and greater expressed quite a lot of confidence and high confidence in many areas, but specifically understanding words and terms associated with hardware and software were notable as technology pre-service teachers scored slightly higher than SS pre-service teachers. Ironically, SS pre-service teachers expressed more confidence as higher scores indicated than TT pre-service teachers did in seeking out the user's guide as a reference to problem solve. Yet, there were specific instances where more questions regarding use and assistance arose that indicated gaps existed in several pre-service students' learning. While we as teacher educators expected the students to be more technologically savvy, this was not the case in some instances. As indicated in our findings and the ECAR report (Carousa & Salaway, 2007) instructors tend to overestimate student comfort with technology. Additionally, the literature indicated that although there may be planning and technology awareness, pre-service teachers often

move the technology responsibility to the teacher educator rather than accepting responsibility of not being technologically aware themselves. For teacher educators, this is of great importance when planning and structuring technology integration and in conducting research. The results of the peer TT pre-service teacher assessment of the SS pre-service podcasts were not notable in that the scores were quite similar to the teacher educator's scores. This speaks well of the podcast creativity and the adherence to the rubric that the SS pre-service teachers closely followed. At minimum, 73% were proficient to exemplary in graphic and music enhancement and all other categories were 80% and better in addressing all aspects. Pre-service students were exceptionally considerate of the objectives for this research assessment. This type of reflection on ones' teaching and on technology is one aim of this pilot study. As stated earlier, the teacher educators wanted the focus to be on teaching and for pre-service teachers to develop a sense of decision-making about integrating technology.

- Students enrolled in the Higher Education Administration course were to be interviewed and surveyed on the "case study" of the multifunction portable media device (iphone) implementation and policy development

The iPhone component of the project was intended for the faculty member(s) to begin exploring the multifunction handheld devices' potential use in instruction with a focus on development of policies and practices that should be considered prior to implementation at the department, college or institutional level. This part of the project could not be implemented due to the lack of service for the area we are located in. During the process a valuable lesson was learned. The lesson learned, with the honest and forth-right position of Apple Computer, was that there was not in fact coverage for our area. As indicated on the AT&T coverage map that Apple website links to, the coverage was a "partner" category. This however, was misleading in that the coverage would be automatically disconnected with use that would have been significantly less than average. In fact, Apple did not ship the iphone, as ordered, because in their opinion, in our area we would not have been able to even activate it. We appreciated Apples forthright and helpful disposition and were reminded of their commitment to education through this episode (attachment of area map). Attachment 1 and 2 are captures of the coverage map.

Integrating this information into the courses was important. It also offered the opportunity for the Higher Education Administration courses to operate a multifunction portable media device and contribute to identifying issues that should be considered when establishing policies at the department, college, or campus level. As with any device, particularly hand held multifunction devices, the ability to connect and communicate anytime, anywhere may incur unanticipated costs, liabilities, or unintended consequences. This aspect of the project attempted to examine and document the critical and non-critical considerations.

### **Recommendations**

The teacher educators learned multiple lessons through and from this pilot study. Recommendations include: designing a new pre-test to include a specific focus on podcasting, designing a post-test to address podcasts, identifying and providing podcasts for students early in the semester, taking class time to complete pre- and post-tests, identifying particular trends emerging from the second phase of the study, assigning

podcasts blindly to technology pres-service students, formalizing the learning communities between the SS methods class and the TT class, organizing a college podcast showcase initiating outreach efforts with local and rural communities, and identifying funding sources to secure more iPods. Grades should be associated with this evaluation activity in that students can analyze others as they prepare to create their own podcast. This will integrate/add critical thinking skill development and deepen dimension of additional viewpoints. Another approach would be incorporating blogging on podcasts and having them listen to podcasts and blog back.

Unexpected outcomes of the pilot study included the TT students gaining exposure to SS content. Well over 60% of SS students owned an iPod and felt comfortable with using this technology. The iPod may not only be a flexible tool for teaching, learning, and self reflection, but also given its ubiquitous nature, it is timely to have a meaningful exploration of the array of pre-service teacher program related experiences it may augment or enhance. Use of iPods will increase student access to existing resources for teaching and other course related materials. Additionally, it will provide an opportunity for pre-service teachers to construct their own instructional materials using media related technologies for integration into their teaching. As such, as innovations are available and integrated into the curriculum, one is required to rethink the framework and its influence on not only pre-service teachers, but also students in the classrooms. This is not an option, but a must in an effort to remain attuned to societal demands and needs.

### **Budget**

The budget includes three areas – hardware, peripherals and faculty stipends.

*TOTAL BUDGET Expenses (for ipods and personnel)* \$9,277.00

*Remaining funds to be returned for the iphone that was not purchased per advisement from APPLE \$ 723.00*

### **Publicity**

Sent to alumni, the college newsletter will include a feature article on the pilot project as well as reporting at local and regional conferences. The Investigators presented at the NWACC project at the International meeting of the Society of Information Technology in Education in March 2008. A brief paper on the project was also published in the proceedings. More importantly, students had an opportunity to experience and develop materials they may use when student teaching, and ultimately contribute to their professional lives. Students also provided word-of-mouth publicity through conversations and conveying excitement about their projects.

### **Innovation**

The pilot project was innovative as it provided portable media devices to students who did not have them, focused its use on academic context, encouraged experimentation with technology normally not available, and integrated technology curriculum changes as part of a course component. Pre-service teachers had integrative technological opportunities not otherwise available to them. Exploring the capabilities of the ipod demonstrated that pre-service teachers used them to enhance their own learning and that of their future students.

### **Technology Transfer and Outreach**

All project information will reside on the website and workshops will be offered to faculty in the college on integrating hand-held technology into their curriculum. The first pilot workshops were held in March 2008 for two doctoral faculty in Educational Leadership and Teaching & Learning. The two faculty members integrated the production of podcasts into two courses taught during the spring 2008 semester: Assessment in Higher Education and Personnel, Supervision, and Staff Development. The Personnel course, many students of whom are already principals, reported learning this technology was helpful and positive. Reflecting on these experiences will aid them in the future in decision-making regarding policy and practices in using this kind of technology in their schools and with their staff. The Assessment course developed a rubric for the podcasts. The rubric was utilized by a third course, Technology in Higher Education to listen to and provide feedback to the Personnel course podcast creators. This authentic learning experience for students across courses was valuable for both them and the faculty. This will be continued as the collaboration between the faculty and graduate students was an added dimension to the courses.

The departmental website will be linked as the project website is completed in the next month. The spring semester at UND will not be complete for another three weeks, making the data for this semester available at that time. UND has a regional technology conference and a proposal will be submitted to present. An invitation for a seminar for K-12 teachers in the local community will be offered and that increases the likelihood of additional research projects for teachers in a Master's degree program in the College.

### **Sustainability**

- In completing an online survey regarding their experiences participating in the pilot, students provided important data for the professors to access their preferences and learning styles.
- Immediate positive feedback led to the incorporation of podcasts in additional educational courses as appropriate to the curriculum. Future integration is currently being planned upon both student and professor recommendations.

Therefore, using technology to teach pre-service teachers about technology adds a dimension to a practical approach that is theoretically based (Clifford, Friesen, and Lock, 2004). According to Clifford, Friesen, and Lock, thinking about teaching and instruction focuses on meeting specific needs of learners allowing teacher educators to progress from a singular perspective to a multi-faceted perspective in teaching with technology. For teacher educators, essential is the need to progress beyond believing they must become a computer expert or technology guru. In addition, pre-service teachers must focus on developing thought processes about student learning that enables them to think through the integration of any technology. We think this can and should be done to perpetuate the integration of technology into the curriculum and more importantly in the all classroom!

### **References**

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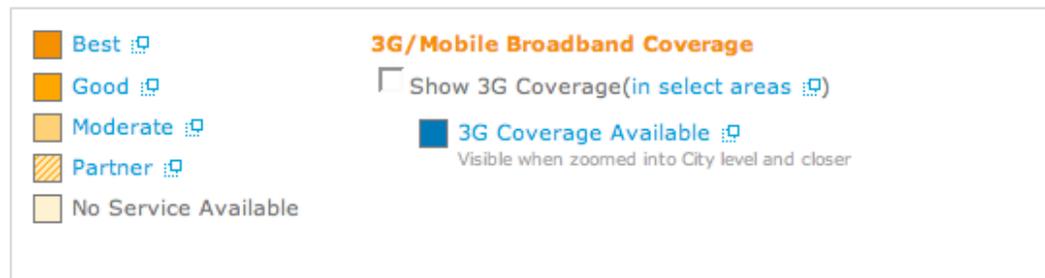
**Attachment 1**  
**iPhone Voice Coverage Map for Grand Forks, ND**

### Coverage Type

Voice | Data | GoPhone | Smart Limits



### Voice Coverage Legend



**Attachment 2**  
**Voice Coverage Legend Definitions**

**BEST:** In general, the areas shown in dark orange should have the strongest signal strength and be sufficient for most in-building coverage. However, in-building coverage can and will be adversely affected by the thickness/construction type of walls, or your location in the building (i.e., in the basement, in the middle of the building with multiple walls, etc.) This AT&T owned network provides GSM, GPRS, and EDGE service. [Learn more about our technology.](#)

**GOOD:** The areas shown in the medium orange should be sufficient for on-street or in-the-open coverage, most in-vehicle coverage and possibly some in-building coverage. This AT&T owned network provides GSM, GPRS, and EDGE service. [Learn more about our technology.](#)

**MODERATE:** The areas shown in the light orange should have sufficient signal strength for on-street or in-the-open coverage, but may not have it for in-vehicle coverage or in-building coverage. This AT&T owned network provides GSM, GPRS, and EDGE service. [Learn more about our technology.](#)

**PARTNER:** The areas shown as an orange striped pattern represent the coverage of unaffiliated carriers and should have sufficient signal strength for on-street or in-the-open coverage, but may not have it for in-vehicle coverage or in-building coverage. Excessive use of Partner coverage may subject your service to early termination, in accordance with your service terms. Data services may not be available.

**3G/Mobile Broadband:** 3G coverage is available in select metropolitan areas. 3G capable device and eligible rate plan required. However like all coverage it can and will be adversely affected by distance from cell site, weather, foliage, tower congestion and other factors. You'll know you're in our 3G coverage area when the 3G network indicator appears beside the signal bars on your phone. If you are outside our 3G coverage area, you can still access services using our EDGE network. [Learn more about 3G.](#)

**EDGE/GPRS:** The areas shown in the medium blue represent AT&T owned GSM network providing Enhanced Data rates for GSM Evolution with typical speeds of 75 to 135 kbps, advanced mobile services like video and music clips, full picture & video messaging, high-speed color Internet access, and email on the move are possible. [Learn more about our technology.](#)

**Partner EDGE:** The areas shown in the medium blue striped pattern represent unaffiliated partner network providing Enhanced Data rates for GSM Evolution with typical speeds of 75 to 135 kbps, advanced mobile services like video and music clips, full picture & video messaging, high-speed color Internet access, and email on the move are possible. Excessive use of Partner service may result in the loss of coverage in Partner areas as provided in your service terms. [Learn more about our technology.](#)