

MEMORANDUM

To: Mark A. Schlesinger, Associate Vice President for Academic Technology,
Office of the President, University of Massachusetts
From: Adam Elbirt, Assistant Professor, Department of Computer Science
Subject: Strategic Initiative Grant – Final Status Report
Date: May 18, 2007

Dr. Schlesinger,

The following is the final status report of the funded proposal *Tablets at the Bedside: Accuracy Testing of Secure Wireless-Based Data Entry in a Nursing Education Laboratory*, funded as a Strategic Initiative Grant by the Information Technology Council's Subcommittee on Academic Technology for the 2006-2007 academic year.

Regards,

Dr. Adam J. Elbirt

1.0 Accomplished Milestones

The following milestones have been achieved by the grant investigators as specified in the proposal *Tablets at the Bedside: Accuracy Testing of Secure Wireless-Based Data Entry in a Nursing Education Laboratory*:

- August 3, 2006 – Last of ordered equipment received.
 - **Budgeted time – 1 month**
 - **Actual time– 2.5 months**

We experienced a significant delay in receiving the tablets from Gateway due to a supply shortage of Tablet PCs.

- August 18, 2006 – Case studies for test patient data provided.
- August 20, 2006 – Database specification provided.
- August 30, 2006 – Hardware set-up completed.
- September 13, 2006 – Database set-up completed.
 - **Budgeted time – 2 months**
 - **Actual time – 1.5 months**

Due to the delay in receiving the ordered equipment, Dr. Kelly Fisher moving to Endicott College, and the grant investigators from the Department of Nursing requiring additional time to generate the database requirements specification, system deployment was moved from the Fall 2006 semester to the Spring 2007 semester. Based on this change, the *33.315 Health Promotion and Risk Reduction of Families II Practicum* course was targeted for system deployment instead of the *33.311 Health Promotion and Risk Reduction of Families Practicum I* and *33.411 Nursing Care of Clients with Acute and Life Threatening Illnesses Practicum* courses. System set-up of the hardware and initial electronic medical record database was completed ahead of schedule, reducing the impact of the aforementioned delays. The database was demonstrated to the grant investigators from the Department of Nursing for the first time and initial feedback was received.

- September 14, 2006 – Begin development of web interface for wireless access, integration and testing of database access with barcode printing, update of course curricula, training of faculty.
- October 12, 2006 – *33.315 Health Promotion and Risk Reduction of Families II Practicum* course curricula integration completed.
- October 17, 2006 – Alpha 1 initial demonstration to grant investigators from the Department of Nursing.
- November 28, 2006 – Alpha 2 follow-up demonstration to grant investigators from the Department of Nursing.
- December 12, 2006 – Beta demonstration to grant investigators
 - **Budgeted time – 3 months**
 - **Actual time – 3 months**

As a result of Dr. Kelly Fisher moving to Endicott College, Dr. Lisa Abdallah agreed to assist the grant investigators with the integration of the system into the laboratory schedule for *33.315 Health Promotion and Risk Reduction of Families II Practicum*. Dr. Celeste Campbell and Dr. Jennifer Wilber, instructors in this clinical course last year who will likely teach the course again, will also be involved with system integration. There will be two clinical groups for the semester of approximately 35 students (70 in total), half in the beginning of the semester and half about mid-semester. This split will allow us to fine tune the application experience.

- January 12, 2007 – Alpha training of grant investigators and laboratory staff from the Department of Nursing in preparation for system deployment.
- January 22-23, 2007 – Beta training of Joan Ashlock, Weed 201 laboratory manager, in preparation for system deployment.
- January 24, 2007 – System deployment for first half of Spring 2007 semester.
 - **Budgeted time – 2.5 months**
 - **Actual time – 1.5 months**

Successful system deployment occurred on January 24, 2007. Media coverage included *UML in the News* and the *UML Shuttle*. The article is available at <http://www.uml.edu/Media/eNews/nursing%20students%202-16.html>. The system met all requirements set out in the original grant proposal. Moreover, the scope of the development work was greatly expanded to include numerous additional features based on feedback from the co-investigators that resulted in modifications to the system requirements. These features include significant expansion of the electronic medical record, question and answer fields to evaluate student knowledge, and the ability to print the saved student work to facilitate grading by the grant investigators from the Department of Nursing. Dr. Patrick Scollin was able to locate an unused laser printer that has now been dedicated to the Weed 201 laboratory and attached to the server used to communicate with the Tablet PCs. A web site was set up by Dr. Adam Elbirt to provide technical specifications/product documentation, technical support, and investigator contact information – <http://faculty.uml.edu/aelbirt/SIG2006.htm>. A formal procedure that details appropriate student use of the Tablet PCs when performing the laboratory experiment integrated into *33.315 Health Promotion and Risk Reduction of Families II Practicum* was developed by Dr. Adam Elbirt and Peter Gamache, the graduate student researcher assigned to the grant. A similar procedure was developed that details faculty use of the system so that student work may be printed and graded. These procedures have been posted on the web site.

- February 15, 2007 – System suspension for first half of Spring 2007 semester.
 - **Budgeted time – 0 months**
 - **Actual time – 1 month**

After students experienced wireless connectivity issues that worsened over the course of the three weeks following initial system deployment, it was determined that the wireless router was not functioning properly and a replacement was ordered. This experience seriously hampered the acceptance of the system by the students and the Department of Nursing faculty, who became frustrated with the system's failure to function as expected. Much of this frustration is attributed to expectations by nursing faculty of a flawless proof-of-concept initial system deployment, and these expectations were passed to the nursing students.

- March 21, 2007 – System deployment for second half of Spring 2007 semester.
- April 5, 2007 – Results of the grant research presented at the University of Massachusetts Instructional Technology Conference.
- May 2007 – Hand-off of system maintenance/support and hardware maintenance to the School of Health and Environment.
 - **Budgeted time – 4 months**
 - **Actual time – 2.5 months**

The findings of the grant research were presented at the University of Massachusetts Instructional Technology Conference. Technical support has been provided over the course of the Spring 2007 semester by Dr. Adam Elbirt and Peter Gamache (who has now supported the grant development efforts for three semesters, including the Summer 2006, while being funded out of Dr. Elbirt's overhead funds for two of the three semesters). Matthew Gordon, Network Administrator for the School of Health and Environment, has taken over system maintenance/support and hardware maintenance/support now that the grant work has been completed. Final feedback will be gathered from students via course evaluations in regards to using the system. Feedback will be used to evaluate the student perceptions of the use of technology in a nursing environment. Verbal feedback received from students over the course of the final months of the system's use has been extremely positive in regards to the integration and use of technology.

2.0 Additional Accomplishments

The paper “Tablets At the Bedside: Accuracy Testing of Secure Wireless-Based Data Entry in a Nursing Education Laboratory”, authored by the grant investigators, has been accepted for publication and presentation at the Twenty-Fifth Annual International Nursing Computer and Technology Conference, June 14-17 2007, San Francisco, California.

The paper “Tablets At the Bedside: Accuracy Testing of Secure Wireless-Based Data Entry in a Nursing Education Laboratory”, presented at the 2007 University of Massachusetts Instructional Technology Conference, April 5 2007.