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# Interactive Whiteboards and Computerized Assistance in Chemistry

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## The Provost's Grants for the *Thinkfinity* Initiative for Innovative Teaching, Technology and Research Grant Competition

### Interactive Whiteboards and Computerized Assistance in Chemistry

#### Cornerstone III: Interdisciplinary Programs, including Informatics

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DEPARTMENT OF CHEMISTRY AND PHYSICAL SCIENCES

September 14, 2013

#### FINAL Report:

##### A) **Outline of Original Goals.**

This project has two objectives:

- (i) Implement an interactive whiteboard (smartboard) in our science teaching.
- (ii) Develop videos that demonstrate key principles and laboratory techniques in Analytical Chemistry that will be shown to undergraduate students using the interactive whiteboard technology prior to conducting laboratory experiments.

##### B) & C) **Progress Made Towards Original Goals and Activities Completed**

- (i) An interactive whiteboard (complete with the projection audio system and computer connection) has been purchased from Edu Tek Limited and installed in the Department of Chemistry & Physical Sciences (Room 313). We are still awaiting the arrival of a dedicated computer system, which is expected to arrive before the end of September 2013.
- (ii) We have completed videotaping all the experiments (apart from one experiment, which we expect to complete during the Fall 2013 semester). To tape the videos, we used a hard drive (HD) video camera (with accessories) that was signed out from Educational Media at no additional cost.

We have commenced making the videos available to undergraduate students signed up for the Analytical Methods course by posting them on Blackboard. The first video describing Experiment 1 ("Tools of the Trade") was viewed by students before the class and then also in the laboratory class. The initial response has been very positive.

Developing a video (lasting 5 - 10 minutes each) for each experiment has typically required a few days to complete. Each experiment itself takes several hours to complete (one laboratory period is three hours) requiring additional set up time to prepare the equipment and reagents used in the experiment. Following videotaping, several hours are then required to edit the video such that it is condensed to only 5 – 10 minutes but still contains enough annotation to be self explanatory.

The students are required to download the video from Blackboard and to view it before the laboratory class commences. To ensure that they are compliant, the students are tested in the laboratory before they embark on the experiment. The video format is

expected to help prepare the students to spend their time wisely in the laboratory and, thus, enhance the whole laboratory experience.

- (iii) A first draft of the Laboratory manual that is used in conjunction with the laboratory component of the Analytical Chemistry has been completed. As we conduct the laboratory this Fall 2013, we will continue to edit the manual so that it is compatible with the videos.

**D) Activities Not Completed**

All the scheduled activities have been completed, apart from the taping of one of the experiments (as described above), which is expected to take place during Fall 2013.

**E) Outline of Outcomes Received as a Result.**

- (i) The interactive whiteboard will be used for courses held in Room 313 in the Spring 2014.
- (ii) Analytical Chemistry videos have been developed.
- (iii) The laboratory manual describing the Analytical Chemistry Laboratory Experiments has been updated.

**F) Was a Class Created? If so, is the Class Running?**

A class was not created.

Existing classes, and also new classes that are scheduled in Room W313, will use the interactive whiteboard.

The Analytical Chemistry videos were created for an existing class. The class is currently in session (Fall 2013).

**G) Impact of Project on Students**

- (i) The impact of the interactive whiteboard will be assessed during Spring 2014.
- (ii) The impact of the Analytical Chemistry videos on students will be assessed during Fall 2013. The initial feedback is very positive. Students enjoyed the visual impact and being able to take notes on the video before class. 13 students are currently taking the class.

**H) Impact on Other Faculty Members**

- (i) The interactive whiteboard is situated in Room 313 and can be used by faculty teaching classes such as: Analytical Chemistry (CHE 221); Green Chemistry (CHE 310); Instrumental Analysis (CHE 331); Advanced Biochemistry (CHE 328); Environmental Chemistry (ENV 222) and others described in the original application.

- (ii) The Analytical Chemistry videos are currently available to students at the New York City campus and currently there is no impact on other faculty members.

**I) Unintended Outcomes**

There were no unintended outcomes. However, the installation of the interactive whiteboard and computer has taken longer than expected due to circumstances beyond our control. With regard to the videos, significant time was devoted to understanding how to record the videos and then to edit/annotate the videos using different platforms (*i.e.* PC versus Apple technology).

**J) Do Outcomes Reflect the Change or Benefit Hoped to Receive?**

Yes. We expect the interactive whiteboard to help transform learning and instruction.

**K) How has the Project Furthered the Thinkfinity Cornerstone Selected?**

The Thinkfinity Cornerstone selected was the Cornerstone III, which addresses Interdisciplinary programs, including informatics. We believe that the project has furthered the Thinkfinity Cornerstone selected. The interactive whiteboard can be used by a broad range of disciplines. The Analytical Chemistry videos can be regarded as optimizing laboratory operations in the specialized area of information technology known as laboratory informatics.

**L) Future Plans**

- (i) The interactive whiteboard will be used in Spring 2014. We expect to receive and connect the computer for the interactive whiteboard (September 2013). Faculty using the interactive whiteboard will be trained in its use. This effort will be coordinated with the Department of Educational Media.
- (ii) We will continue to make the Analytical Chemistry videos available to students for viewing before the laboratory class.
- (iii) We will continue to edit the preliminary draft of the Analytical Chemistry manual to ensure consistency with the videotapes.