

Report to the NWACC
Effective Use of ICT in Teaching the Human Genome Project: A National, Regional, and
Local Collaboration
April 14th, 2006

In our case, this “final report” cannot be truly final since the course which the NWACC created is still in progress and the learning modules to be created by students not due until early May. I can, however, summarize what we have done since our initial report to you written in September of 2005 share what we have learned.

Please find, in addition to the progress report, an overview of the NWACC course currently being taught by me with the help of a few colleagues. It will provide you with a clear vision for the course. We would also like you to come to our website and see what we have done to create our own learning management system (LMS) as described in our proposal and initial report.¹

The NWACC course began in January and will come to a close on May 9th. There are 24 students enrolled in this class, most with majors in the natural sciences and some from philosophy or the social sciences. The focus has been, as you can see from the attached course description, on science, philosophy & policy. This is our mantra.... science-philosophy-policy... never teaching the one without attaching it to the others. This has been the philosophy guiding our work for the NIH program as well. It has been a smashing success in the NWACC class with four exams now under our belts. I am told by our molecular biology professor that our students regularly bring up subjects discussed in the NWACC course. We are now in the middle of developing the flash-based learning modules described in our proposal and progress report. I will write more about these modules below.

If it is not too late for NWACC, we would like to send you samples of the learning modules created by students when they are finished in early May. NWACC has made not only this course, but these modules possible. We can continue to develop them, improve them and distribute them in perpetuity. You will see a few (very primitive) examples online that I created, simply to demonstrate the software and hardware to students.²

Moodle was a great discovery for us. It is open source, very flexible and has been the occasion for very deep collaboration with our computer science department in the person of Chris Lane. We originally thought that we would use mediawiki in conjunction with Moodle for our LMS. That was not necessary. Moodle has wiki-like features built in. As an

¹ Please go to <http://faithforum.net>. There you can enroll in either the NIH program or the NWACC course. Select the course entitled Phil 255: The Human Genome Project. You will be asked for an enrollment key. The key is “James Watson” When you go to the site there are two options: 1) Faithforum on Genetics, and 2) Pacific University Courses. Select Pacific University Courses. There is only one course. Select that. You will probably be asked for the enrollment key at that time. If you have any difficulty please call us at 503.352.2296.

² Here are a few VERY primitive examples made by me last fall simply to illustrate how some of the software works. <http://www.faithforum.net/articulate/GattacaClip/player.html> - <http://www.faithforum.net/articulate/JurassicParkDinner/player.html> - <http://www.faithforum.net/articulate/humanembryos/player.html> These URLs will only be good for 30 days as we only have copyright permission for use within the course itself.

educator and technophile I have thought a great deal about web design and education. Our LMS philosophy can be summarized in the following propositions:

1. Less is more. LMS design should be simple and sparse. Our course homepage consists of nothing more than the heading, “What Do you Want to Do” followed by a short list of options. No pictures. No flashing text. No animations. There is a news box and a calendar. That’s it. No bright colors. Nothing extraneous. No diversions.
2. Collaborate with technology colleagues. We were able to leverage the learning made possible by NWACC by using an open source product and allowing faculty and students in our CS department to build the server, develop the database and page server, learn the source code for Moodle and help us develop our vision from the ground floor up rather than adapt to someone else’s LMS vision.³
3. Give students the tools to create high quality online projects. Articulate was expensive, but worth every penny. Purchasing a camera to integrate student created video was expensive, but worth it. Providing all the hardware and software to quickly prepare film clips for use in presentations was expensive, but worth it. Students were clearly engaged and highly stimulated by the challenge.

With help from our IT colleagues and interns we were able to create a website that serves the project well from an educational point of view. I have been particularly impressed with the embedded wiki-like structure of Moodle. For example, we have two very important glossaries. One concerns nothing but genetic science. The other is for terms relevant to genetics from a philosophical, ethical, policy point of view. With the science glossary we were able to create color-coded entries related to three different levels of difficulty. Green indicates terms everyone should know to follow important public debates about genetics. Yellow indicates more difficult terms and assume mastery of the “green” terms. Finally there are red terms... for serious students of genetic science only. Even more importantly we were able to use course-wide referencing capability so that whenever a student comes across an unfamiliar term on any of our web pages they can click on that term and instantly view the glossary entry. This has turned out to be an *extremely* valuable tool, given the large number of scientific and philosophical terms used in this course. We will continue to expand and hone these glossaries for future use.

The heart of the NWACC project is the learning modules developed by students for use in local public schools. Students are working in groups of four or five. One group is working on a program for grade school level kids (5-6th grade). Another group is working on a project for middle school level students (7-8th grade). Three other groups are working on modules for high school students. We have made arrangements with local schools to bring these programs to their schools so my students can make a presentation and talk about our collaboration with NWACC. Students and faculty will evaluate the effectiveness of the

³ An excellent illustration of this collaboration is Chris Lane’s solution to an online educator’s problem. We were looking for a way to create a pool of resources that could be used across all of our courses since the NIH and NWACC programs were intertwined. As we looked into the online Moodle community we discovered others were also looking for this. It was not an easy fix given the way Moodle uses the database. But Chris DID find a fix which benefited not only me and the NWACC program, but the entire community of Moodle-based educators. Now, if I make a change to one of my glossaries, that change automatically appears in every course that uses that glossary.

programs and students will revise and improve them until they are turned in for a grade in mid-May.

These programs are interactive learning modules incorporating film clips, original video, images, .ppt slides (with narration), learning games and interactive quizzes. The final product is something that anyone with an enrollment key can access online. Data from the interactions can be automatically sent to us for analysis. Students will learn about genetic science and the serious social issues and policy questions genetic science raises for us. We have drawn on the expertise of our colleagues in Pacific's School of Education by having them talk to us about educational strategies for each of the three class levels represented by the programs.

The hardware and software products used in this project have been carefully selected and have proven to be exactly what we hoped they would be for our students. We are using the following hardware:

- Web page server designed and built by Chris Lane and CS students.
- Database server designed and built by Chris Lane and CS students.
- Dell D810 Laptop optimized for video with 100 gb drive and DVD burner.
- An external usb DVD burner. (Sony)
- Panasonic DVX 100 video camera with firewire input/output.

Software:

- Microsoft PowerPoint 2003
- Articulate version 5
- QuizMaker version 2
- Adobe Premiere video editing suite
- Sorenson Squeeze (to convert .avi, .mpg, .wmv files to flash)
- Audacity (a free program to record and easily send .mp3 files.)

Using the content resources from our lectures, online notes, articles, books, glossary, etc. and illustrative resources from magazines, online image pools, graphs, drawings, and film clips, students will develop standalone programs that will vary in length from 15 to 45 minutes which any student can use to learn something about genetic science and its social context. There are a number of advantages to using the software and hardware we have selected:

1. Students see older students doing the teaching, using the original video segments actually scripted and shot by our students
2. Using Articulate we are able to put extremely high quality video content online, accessible to anyone, despite bandwidth limitations.⁴
3. Using Quizmaker in conjunction with Articulate we are able to use a variety of techniques to involve the student in providing real time feedback on what

⁴ For example, I have created a module on behavioral genetics using a very humorous clip from the classic comedy "The Thin Man." Students can view the entire clip in great detail on their screen without using up tons of bandwidth. Here is a URL to this simple program I created:
<http://www.faithforum.net/articulate/ThinMan/player.html>

he/she is actually learning. These quizzes might be a few simple questions they can answer two or three times until they get the answers right or a more formal “test” with the results being sent on to us and imported into our LMS. What is nice about these quizzes and learning games is that once they answer a question students can get instant feedback verbally and/or visually. They can even be provided with an embedded link to our glossary or some other module within our site to learn more about some subject... This is a very powerful educational tool.

4. We are able to embed images of our students talking while showing slides at the same time, thus appealing to more than one style of learning at the same time. Some students learn more by seeing someone talk and gesture. Others just need slides. Others still do best with slides and narration. We can easily mix these into the final module.
5. Because the underlying files for the articulate modules are all part of a powerpoint file they are easily revised and re-published.
6. All of these modules will be used indefinitely in many contexts in the future... a permanent reminder of what the NWACC made possible this year.

As stated earlier students are currently in the middle of creating their projects. They will be available in the first week of May.

This collaboration by the NWACC, the NIH and Pacific University is an excellent illustration of what can be done when people who care about education pool their resources and skill sets to promote experimentation with technology in the classroom and on the web. I have been deeply impressed with both the enthusiasm and creativity of my students. I have been equally impressed with the confidence NWACC has shown us in providing us with the resources to make the course possible. From the faculty, students and interns who are working now to bring this course to a close, thank you...

Sincerely,

Marc Marenco, D.Phil.
Professor of Philosophy
Director, Pacific Institute for Ethics & Social Policy