

Contrasting Faculty and Student Expectations in Online Learning and Applying Student Expertise to Bridge the Gap

1. Abstract

Maintaining the NEXUS principle of engaged, active learning is one of the greatest challenge of online course development. This grant will fund three inter-linked activities that harness student and faculty knowledge in support of the creation of online learning modules that support student engagement with course material. The first is the continued development of a series of learning modules. These modules represent a range of approaches to using animations and simulations to increase student engagement with course content delivered online or in a flipped-classroom format. Example modules will be archived in a gallery that faculty can consult when developing their own courses. The second activity will be a research component in which we survey and compare student expectations for online course materials with faculty expectations and competencies. Implementation of the survey will draw on the materials from the gallery and the resulting data will be written up and submitted to the *Journal of College Science Teaching*. The third activity (a byproduct of the first) will be the development of a simple tool that faculty members can use for outlining individual class sessions and that will both allow them to assess their course development needs and provide a template for implementing those changes over time.

2. How the Project Advances Online Learning

Developing online courses is a daunting process. Not only must professors internalize an entirely different form of pedagogy, but they must do so while grappling with complex technological challenges. This complexity makes the adoption of online learning different from past technological shifts. The widespread adoption of slideware, for example, required faculty to learn one new piece of software (e.g. powerpoint) and perhaps to become familiar with a few related technologies (e.g. digital projectors and scanners). In contrast, a faculty member given the assignment to develop an online course faces a bewildering array of options and technologies and no clear pathway to success. When confronted with technological uncertainties, faculty members may revert to more familiar forms (e.g. Skaza et al 2013), as in simply substituting classroom lectures with lecture recordings.

Anecdotal evidence from a trial-run of flipped classroom content delivery, conducted in the DECSYS 206 courses in spring 2014, indicated that there may be a substantial disconnect between what faculty think online content delivery should look like and what students expect from it. We provided lectures in the form of videos lectures constructed from slide shows with professor voice over. Although the initiative was successful in freeing up classroom time for student-teacher interactions, students were critical of the videos themselves. In particular students were much more influenced by the perceived low video and audio quality of the content than instructors expected, and were critical of the fact that the presentations cast the students in a passive role. This is obviously problematic, as increased student engagement in one aspect of the class (per NEXUS principles) should not come at the cost of a loss of engagement in other aspects.

The premise of the work proposed is that PhilaU faculty members want to create high quality course materials that meet the NEXUS learning principle of active, engaged learning, but that they may not possess the knowledge to achieve that goal. A related insight is that some of the best judges of the quality, appropriateness, and effectiveness of courses materials in achieving the goals of NEXUS learning are the students of PhilaU, who navigate the world of online content in a much more native and sophisticated way than their instructors.

3. Specific Project Goals and Learning Outcomes

Goal 1.

For the past year a group of faculty members have been working with students from the animation major to develop modules that could be used in a flipped classroom or online setting (available at <http://www.Vimeo.com/sustainabilityinmotion>). The first products of this work were online narrative-style presentations illustrating particular concepts that related to teaching in both DECSYS and the MSSD program. Current work involves very different types of modules, including dynamic illustrations that can be dropped into existing lectures and animated “story-lets” that integrate with and enrich the interactive simulation activities currently employed in the DECSYS courses.

The funding requested would be used to explore an additional form of video lecture content, involving integrating video of a professor lecturing with supporting materials (newscaster style presentations). Student feedback indicates that these formats may be more effective at maintaining student attention (NCSU 2013). This kind of content can be generated with existing PhilaU computing and software resources, and many of our design students are quite capable of this task.

The new material will be added to the previously produced work to create a **gallery of different approaches** to generating online teaching materials that can be created using in-house resources and by employing the design expertise of PhilaU students.

Goal 2.

Once the gallery has been created, it will be used to develop a survey to help understand student and faculty expectations for online content. The survey will compare responses to the different delivery methods. The survey population will be students enrolled in the DECSYS courses (n = approx. 300, including freshmen and sophomores from all three colleges) in Fall 2014. The survey will ask students to rank the importance of different elements of online content development, such as audio and video resolution, interactivity, and module length, and to self-assess their level of engagement with the different formats. Simultaneously, faculty will be asked what elements they believe are most important to achieving NEXUS goals in the online context and to self-assess their own ability to deliver those elements. If there is a gap between expectation and ability, we will ask faculty to reflect on and enumerate the factors that keep them from closing that gap.

In the analysis phase we will compare student and faculty results. Our interactions with students on this topic have so far been quite surprising to us and we anticipate that the difference in faculty and student perspectives may be quite informative.

Goal 3.

The final deliverable will be a byproduct of our development process for the online modules. Individual course modules can be created and assessed, but it still leaves the open question of how, given limited time and resources, a faculty member might assemble individual modules into a cohesive whole.

In order to support faculty in these efforts we propose to refine the spreadsheet that we are currently using for our own module development and make it generally available for online lesson planning.

The prototype shown below (**Fig 1.**) contains columns representing individual modules of course content, and rows for classifying the kind of material and its state of completion. Moving up the chart represents a progression from passive to active content. The strength of this approach is that it provides a pathway for course development. The faculty member can divide their existing lectures and activities into a number of individual modules and generate a set of voice recordings and activities (such as discussion boards or quizzes) for each unit of course content that are easily converted to online analogs. Once this step has been completed faculty members can use this chart to identify at a glance areas in their lectures where long-stretches of passive elements and thus develop a strategy for the generation of more interactive elements may have the greatest impact.

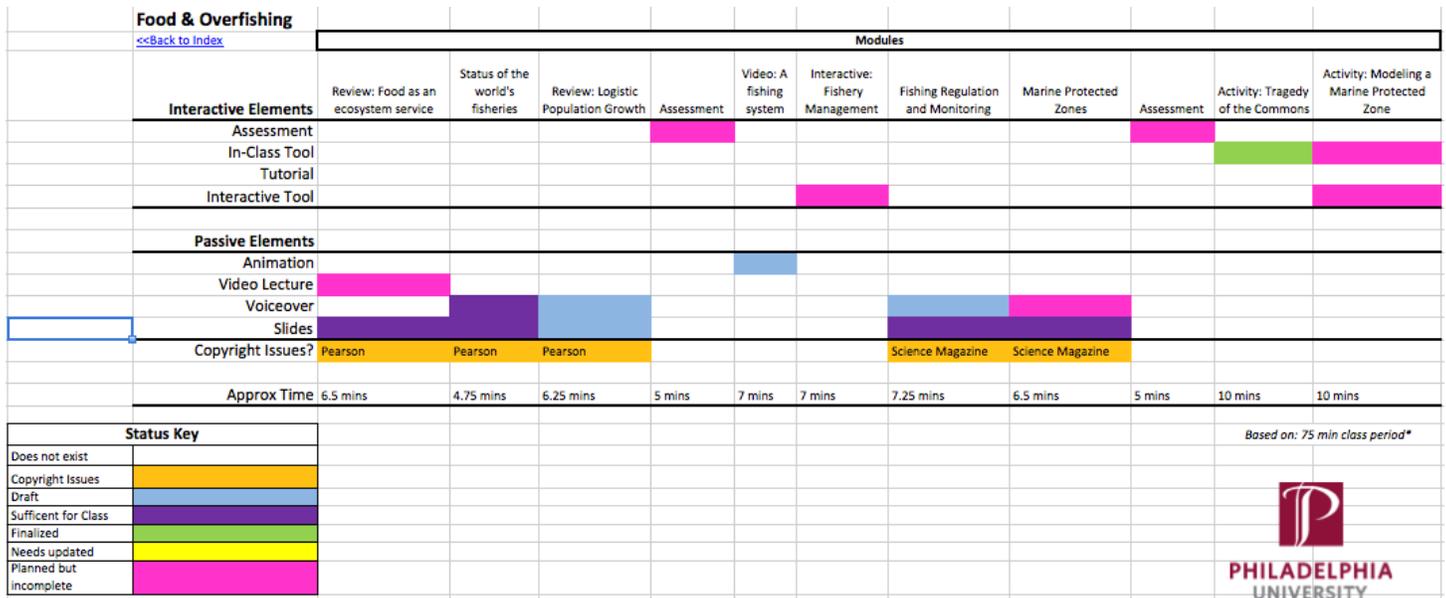


Figure 1. An example lesson containing a mixture of lecture and interactive elements, and some serious copyright issues (orange).

It also includes columns for tracking potential copyright problems (particularly important for courses that will be deployed online) and the time needed for each element.

Project Learning Outcome:

To identify the problem areas that impede faculty enactment of NEXUS learning principle of active, engaged learning in the online environment and to compare, contrast, and evaluate how faculty-student collaboration in course content development may address these problems

4. Description of Activities and Timeframe

Summer 2014 Undergraduate worker and faculty team members will work together to develop content modules in second half of summer 2014. These modules will be uploaded into a publically available online gallery as they become available

Fall 2014 – The survey of DECSYS students and PhilaU faculty will be conducted

Fall 2014 – Modules developed summer 2014 will be deployed in class, student responses collected and recorded for each element using Instructional Design assessment worksheet described below

Spring 2015 – Data analysis, manuscript preparation for data from the student faculty survey (target journal: Journal of College Science Teaching published by NSTA)

Spring 2015 – Assemble version of course preparation worksheet for distribution to faculty

Spring/Summer 2015 – Preparation of a grant submission to the NSF TUES (Transforming Undergraduate Education in STEM) program

5. Project Assessment

Assessment will take place on multiple levels. For Goal 1 modules created will be assessed by individual students using a worksheet that has been created by Philadelphia University's instructional design staff for that purpose.

Goal 2 consists of integrating a self-assessment activity on the part of faculty with a consumer satisfaction survey for students. The evidence to be collected is described in the project goals, above. The success of the survey activity will be determined whether or not the data it generates are of publishable quality.

Goal 3 will be the hardest to assess, downloads of the worksheet can be tracked as an imperfect measure of uptake by faculty. Any uptake by PhilaU faculty beyond the project group will be taken as evidence of successful deployment. We will solicit feedback from users within the worksheet itself as an attempt to acquire this evidence.

The project learning outcome will have been successfully addressed if the project gallery and survey data together provide the faculty currently involved with online course development with a better sense of what strategies are likely to be successful as PhilaU moves forward with online course development. We anticipate that the data and experience garnered from this study will form the backbone for grant applications to support further course development. Attracting outside funds to future iterations of this project would be a strong signal that the project was successful in achieving this outcome.

6. Documentation and Dissemination

Video content will be disseminated through the Vimeo site that has already been established for the project. Simulation activities will be distributed through Klemens Forio Simulate site.

The gallery created to host the modules created will be made available to faculty and the public, and faculty will be made aware of its existence in the context of the faculty survey. The planning worksheets will be made available to faculty for download from the gallery site.

The faculty-student survey is novel and will be of high interest to other professionals in the field. It is expected that the results of this survey will be published in a teaching journal.

Finally, the involvement of students will begin the process of building up a base of institutional knowledge on this topic. There are several animation students who are interested in working on content development in the future.

7. Project Personnel

Mike Hudson is an undergraduate animation major scheduled to graduate in Spring 2015. He has served as a student mentor for the systems thinking classes and has been involved in the animation project since the beginning.

Jeff Klemens is coordinator of the DECSYS courses and will be the project leader.

Chris Pastore is professor of engineering.

Rob Fleming is director of the MSSD program.

Klemens, Pastore, and Fleming will provide the content, based on their existing courses, that will be used to create the learning modules. Klemens will directly supervise the student work and the creation and administration of the survey described in this proposal.

8. Budget Narrative

Because the work described will support the development and evaluation of curriculum that will be employed by the professors involved we are not requesting any faculty stipends or course releases for this project.

Especially for the intense content-generation phase of the project in Summer 2014 it will be important to have project-dedicated equipment. The faculty and student worker will be experimenting with lighting and filming techniques on a day to day basis, so switching between devices would be problematic. It is understood that all equipment purchased with this grant will support continuing course development efforts. As one outcome of this grant is the uptake of online and interactive modules by faculty, we plan to make the equipment available for other faculty to use to generate course modules (perhaps based on our gallery templates). The equipment we are requesting is “consumer level,” however it is sufficient for establishing proof of concept.

Equipment - \$1179

HD video camera, full HD. Project-dedicated camera with case and extra battery. \$500

Shotgun Mic, Camera Mounted. Best bang for the buck for improved audio quality. \$229

Three-point Lighting System. Necessary to generate green-screened videos, improves quality of speaker image in video lectures \$180

Tripod. Talking head videos require repeatable static shots. \$100

Green screen backdrop and Frame. Necessary for green-screen videos. Frame allows for portable setup. \$170

Supplies – \$250

2 -1 TB external hard-drives. Project-dedicated backup and archiving. \$150

2 - 64 GB SD cards \$100

Undergraduate Student (Michael Hudson) labor - \$1450 for **200 hours of work**, summer 2014

9. Budget

Philadelphia University					
Nexus Learning Grant Budget Form					
I. Personnel	Comp.	# of Personnel	# of Hours	Totals	Notes1
Faculty Wages					
Principle Investigator (PI) Stipend:	\$2,000	0		\$0	Subject to FICA
Co-PI stipend:		0		\$0	Subject to FICA
Secondary Investigator		0		\$0.00	Subject to FICA
Other Faculty Participants		0		\$0.00	Subject to FICA
Student Wages					
Undergraduate student workers (summer)	\$7.25	1	200	\$1,450.00	Subject to FICA
Undergraduate student workers (academic year)	\$7.25	0		\$0.00	
Graduate student workers (summer)	\$9.25	0		\$0.00	Subject to FICA
Graduate student workers (academic year)	\$9.25	0		\$0.00	
			Subtotal:	\$1,450.00	
Employer-Provided FICA on Wages	7.65%			\$110.93	
			Subtotal:	\$1,560.93	
II. Non-Personnel Expenditures					
	Total Budget				
Equipment:	\$ 1,179.00			\$ 1,179.00	
Entertainment:	\$ -			\$ -	
Supplies, software, other:	\$ 250.00			\$ 250.00	
Travel (Transportation, Lodging, and Meals):	\$ -			\$ -	
			Subtotal:	\$ 1,429.00	
			Grand Total:	\$ 2,989.93	Grant Budget not to exceed \$3,000

10. References

North Carolina State University. (2013). Research-Based Best Practices for Teaching Online: Recorded Lectures.

DELTA. Retrieved April 4, 2014, from <http://delta.ncsu.edu/knowledgebase/research-based-best-practices-for-teaching-online-recorded-lectures/>

Skaza, H., Crippen, K. J., & Carroll, K. R. (2013). Teachers' barriers to introducing system dynamics in K-12 STEM curriculum. *System Dynamics Review*, 29(3), 157–169. doi:10.1002/sdr.1500