

**2009**

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# **Document of Innovation**

## **At the University of the Sciences in Philadelphia**

### **2009**

The Teaching and Learning Center of the University of the Sciences in Philadelphia is proud to produce the tenth annual Document of Innovation which contains the Leahy Award and Bright Idea Award. Previous editions of the Document of Innovations have been recognized as one of the best ways to know how faculty are teaching. As in previous years we feature the finalists for the Patricia Leahy Award for Learning Innovations. Now many of these submissions reflect true Scholarship of Teaching and Learning. Some of these faculty are ready to submit or have already submitted their ideas to refereed professional journals. A few years ago we instituted a new award, called the Educational Bright Idea Award. This year we are giving Bright Idea Awards for creative ways to teach, or assess students, including the use of educational technology.

The overall goal of this document is to improve teaching and learning. A compilation of all the teaching practices into a book allows others to learn about these ideas and adapt them. This document provides faculty ideas that have worked with our students.

This document is disseminated on the web throughout the campus and to interested people outside the University to give increased recognition to individual faculty who strive to improve their teaching as well as others who enable students to learn more. Hopefully, this document will help faculty to collaborate on new ideas and will inspire others to try new methods to improve their teaching and learning.

All of the faculty welcome feedback on their ideas. If you use or adapt an innovation, please give the author credit and tell the original instructor how it worked.

To submit a description of an educational practice for next year's edition, please see <http://www.usp.edu/teaching/innovations/InnovationForm/Default.aspx>

Phyllis Blumberg, Ph.D.  
Director of the Teaching and Learning Center  
May 2009

**Title of Innovation: You Expect me to Present at a Meeting? I am only a Student!**

**Name of Innovator: Salar Alsardary**

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**Department: Mathematics, Physics and Computer Science**

**Type of Students: Sophmores, Juniors & Seniors**

**Type of course or activity where implemented: Elective**

**Leahy Innovation Submission: No**

**Course or activity where implemented: Discrete Mathematics**

**Describe rationale or goals of innovative educational activity:**

Describe a successful model of student presentations on campus and at meetings

**Describe the innovation and its implementation:**

Results from 972 colleges and universities surveying more than 844,000 students led the National Survey of Student Engagement researchers to develop five benchmarks of effective educational practices including: raising the level of academic challenge, using active and collaborative learning, fostering meaningful student-faculty interactions, creating enriching educational experiences, and establishing a supportive campus environment (National Survey of Student Engagement (NSSE, 2005). This presentation activity is consistent with all of these effective educational practices.

Students develop a presentation based on their reading, review it with the instructor, present to the class, receive feedback and then present it at a professional meeting.

**Describe any changes in the implementation:**

1. More meetings with students outside the class
2. More practice inside and outside the class

**Reflect on what is working and why it is working:**

This practice is working because:

1. Students gain experience doing a professional presentation
2. Sharpen the students communication skills
3. Instills pride, self-confidence in the students after a successful presentation
4. Is a plus for students in job search
  - a. Builds sense of community among the students
  - b. Increases teacher rapport with students
  - c. Increases rapport among students
5. Good publicity for the college

**Describe student reaction to the innovation:**

1. The students liked the presentation format, although originally they felt apprehension about doing presentations
2. The students learned other trans-disciplinary skills such as how to give presentations, how to give feedback to their peers, how to learn from feedback, and to trust their peers
3. The students enjoyed the additional connection with each other and with the instructor

**Will the innovation be sustained within the course? Yes**  
**If Yes, will you do anything differently?**

When the students come back from the professional presentation, I will let the students to present one of Thursdays to the whole student body at USP to promote this type of practice

**Will you implement this innovation in other courses? Yes**  
**Describe the other courses:**

I will implement this to all upper level Mathematics courses that I teach

**What advice would you give to other people adapting this innovation?**

1. Give guidance to students in selection of topics
2. Importance of 1-1 meetings in advance of presentation
3. Need to model how to give good feedback to students

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Use of Web 2.0 in Webinars**

**Name of Innovator: Danny A. Benau**

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**Department: Biomedical Writing**

**Type of Students: Graduate**

**Type of course or activity where implemented: Required**

**Leahy Innovation Submission: No**

**Course or activity where implemented: BW 860, Research in Biomedical Communication**

**Describe rationale or goals of innovative educational activity:**

All too often, online teaching consists of PowerPoint presentations along with lectures. The use of Webinar software, in this case GoToMeeting (TM), allows the use of Web 2.0 to implement dynamic teaching methods that can be of immediate use in further student projects.

**Describe the innovation and its implementation:**

Three video scenes online are used to prepare students to perform a live ethnography project. Two scenes are from Monty Python and the Holy Grail (Terry Gilliam and Terry Jones, Directors. Michael White Productions, Python (Monty) Pictures, and National Film Trustee Company. 1975): She's a Witch and The Bridge of Death. The other is from Romeo and Juliet (Baz Luhrmann, Director. Bazmark Films. 1996): Party Scene. Students are instructed to find data that can be tabulated within the scenes. The first scene is analyzed online in real time by the instructor so that the students can learn the techniques. The second scene is analyzed as an assignment by the students with an online summary presented by the students with comments from the instructor. The third scene is analyzed as an assignment by the students with summaries graded by the instructor and then reviewed online by the instructor. After these sessions, the students propose an observational ethnography project to be done in person.

**Describe any changes in the implementation:**

Originally, only one scene, The Bridge of Death, was presented. By adding the other two scenes, extra practice in both observation and presentation of data allowed for better understanding of the tasks required for live research and analysis.

**Describe outcomes, and the implications of the innovation:**

Students were engaged by observing and tabulating the onscreen and online interactions of actors and their staged environments rather than by viewing slides and explanations of research methods. Students felt better prepared to perform live observational ethnography. Most students felt that they would not have been able to perform the live project effectively without the online preparation.

The instructor has found that skills in obtaining, organizing, and presenting observational data have improved by these practice sessions.

**Reflect on what is working and why it is working:**

Research, ethnographic or otherwise, is an active endeavor. The use of relatively static teaching methods such as PowerPoint hinders the translation of instructional information to active projects. The availability of the scenes to be replayed in order to understand what can be observed and tabulated in a scene, rather than just looking at a story line, makes the transition from passive observer to active researcher easier.

**Describe student reaction to the innovation:**

Students have reacted positively to the method. As an overall unit, several students have expressed the information and experience gained to be life changing.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

This has been implemented and modified over 4 semesters. The use of Webinar software in conjunction with active material vs. slides will be expanded. This unit will remain at 3 scenes plus a live project for the foreseeable future.

**Will you implement this innovation in other courses? Yes**

**Describe the other courses:**

BW 740, Regulatory Documentation Processes: Demonstrations of how to obtain informed consent.

**What advice would you give to other people adapting this innovation?**

My advice is to be careful to limit the video scene to no more than 5 minutes. The longer the video, the more the storyline intrudes on the learning activity.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Assessing Student Attitudes towards Calculus and Technology**  
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**Department(s): Mathematics/Physics/Computer Science**  
**Type of Students: undergraduate level, any major**  
**Type of course or activity where implemented: Required, Elective, Core Curriculum/General Education**  
**Leahy Innovation Submission: No**  
**Course or activity where implemented: MA102, MA201, MA202**

**Describe rationale or goals of innovative educational activity:**

Assessing the extent of students' appreciation of the material covered in a mathematics class and also the value students find in calculus and the use of technology in calculus could be quite difficult. A calculus-specific survey has been created to assess the following course learning outcomes.

- Students will value the use of calculus.
- Students will learn to value the usage of technology in problem solving.

**Describe the innovation and its implementation:**

In 2001, Barbara Bendl created a survey called SAC4T: STUDENT ATTITUDES TO THE COURSE CALCULATOR COMPONENT as an assessment tool for the affective learning domain in mathematics.

In 2008, Barbara Bendl adapted this survey. In particular, questions on the original survey that referred to "calculator" were updated to refer to "graphing calculator". In Fall 2008, Barbara Bendl used the adapted survey in the pilot MA102 course (Calculus I) in order to assess students' attitudes as part of the overall pilot MA102 course assessment plan. Six students in the pilot MA102 section (the entire class) participated in the survey. In Fall 2008, Lia Vas adapted the survey so that it could be used in MA201 (Calculus II). In particular, 6 questions were deleted from the original survey and 4 new ones introduced to fit the needs of the MA201 course. Also, Part 1 of the survey (general background) was changed. The questions were grouped in 4 categories: attitudes towards mathematics, impact of the course to the attitudes towards mathematics, attitudes towards technology, and course specific questions. Thirty-five students in MA201 participated in the survey. The 35 participants were placed in 4 groups based on the level of their prior experience with the use of technology in calculus and their academic level.

In Spring 2009, Lia Vas again adapted the survey to be used in MA202 (Calculus III) as well. At this time, these student responses have not yet been analyzed or compared to the responses from MA201

**Describe any changes in the implementation:**

This survey was created "in-house" by Barbara Bendl so no major changes were needed. Some terminology was updated by Barbara Bendl. Lia Vas, in consultation with Barbara Bendl, changed some of the sample descriptive categories and modified some questions to be course specific.

## Describe outcomes, and the implications of the innovation:

The following results were obtained for the sample of 6 students in the pilot MA102 course, Fall 2008.

- I. The following survey attitude questions had a mean of 4.0 or above indicating agreement or strong agreement:
- Q2. I find mathematics easy to learn and use.
  - Q4. My experience with a graphing calculator makes me more comfortable with mathematics.
  - Q6. Using a graphing calculator helps me to better understand the concepts covered in class.
  - Q14. A graphing calculator allows a class to look at more difficult or more interesting problems in mathematics.
  - Q15. Using a graphing calculator makes mathematics more interesting for me.
- II. The following survey attitude questions had a mean of 2.0 or below indicating disagreement or strong disagreement:
- Q7. I was often confused and frustrated in this course.
  - Q8. Mathematics is intimidating for me.
- III. The following survey attitude questions had a mean between 2.0 and 4.0 indicating relative neutrality:
- Q9. My experience with a graphing calculator makes me more comfortable with technology.
  - Q16. I intend to continue taking mathematics courses.
  - Q18. Working on graphing calculator assignments is a pleasant experience.
  - Q21. Using a graphing calculator is fun.
  - Q27. This course enhanced my interest in mathematics

The preliminary conclusion from the survey is that, overall, the students in the pilot MA102 program were happy with the course. Most disconcerting, however, from an affective domain point of view is their relative neutrality about such issues as taking additional mathematics courses and having an enhanced interest in mathematics and their inconsistency in their attitude toward the use of technology in the form of a graphing calculator. The extremely small sample size could account for all of this. The plan is to use this adapted survey in the four sections of MA102 taught by Barbara Bendl (131 potential participants) in Spring 2009 to see if the same patterns are seen in a much larger sample.

## Outcomes, Survey used in MA201:

In Fall 2008, the following results were obtained:

1. **After taking MA201**, students are less intimidated by mathematics. The percentage of students that claim not be intimidated by mathematics (86%) is smaller than the percentage of students who claim that this course helped them feel more comfortable with mathematics (91%).
2. **After taking MA201**, a majority of students (86%) claim that learning calculus is "valuable". All of the 9% of students who disagree are in groups that are required to take MA201 by their programs (not taking it as an elective).
3. **All of the students** (100%) claim that they understand mathematics better after completing MA201.
4. **The majority of students** (74%) value the use of technology in class.

5. Students are very comfortable using calculators. Students are less comfortable using computers. A possible explanation for the difference in level of comfort with computers and calculators is that all the students use calculators extensively throughout their earlier mathematics education and 97% of students had either used computers just in MA102 or never used computers before for mathematics. Interestingly, students who are neutral or disagree with the statement that computers help them feel more comfortable have had more prior exposure to computers than the other students. A more detailed analysis of this issue is being planned. Also, future class projects will be further modified with the additional goal of increasing students' level of comfort with computers.

**Reflect on what is working and why it is working:**

Assessing how much students value calculus and the use of technology is quite a challenging task. The survey specifically targets these learning outcomes and seems to be quite effective in doing so.

**Describe student reaction to the innovation:**

Student response to taking the survey was generally positive - they seem to appreciate the chance to make their feelings and opinions known.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

At this stage, while we are getting used to implementing this survey in these courses, we would not do anything differently in the administration of the survey. We will look into other methods for analyzing the data we get from the survey.

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

With some slight changes in wording (for example, to eliminate references to calculus or switching from "calculator" to "computer"), the survey can be given to students in MA101 or any other mathematics course that uses technology.

**What advice would you give to other people adapting this innovation?**

The best advice to anyone developing a survey instrument is to ask the same question in multiple ways in order to check for consistency of response and increase reliability. Validity of the survey questions can be checked through review by your colleagues. Also, in administering the survey, it may be worth the few minutes to give the survey to students in class in order to get a good response rate.

**Additional Comments:**

A select sub-survey of questions could be used to assess affective domain objectives in non-mathematics courses that are calculator or computer intensive.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Computer-Based Instruction on Substance Abuse and Drug Diversion in the Doctor of Pharmacy Student Program**

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**Department(s):** Pharmacy Practice/Pharmacy Administration; Math, Physics and Statistics

**Type of Students:** This project was aimed toward students enrolled in the Doctor of Pharmacy program in the second pre-pharmacy year (U2). One student participated in the project development as part of an independent study course; this student was a member of the P2 class (professional year 2).

**Type of course or activity where implemented:** Other Students enrolled in the U2 year were given a verbal invitation in class and an email invitation to voluntarily participate in an internet-based educational module.

**Leahy Innovation Submission: No**

**Course or activity where implemented:** The computer-based instruction module was not a required component of a course or of the curriculum.

### **Describe rationale or goals of innovative educational activity:**

According to a study by the National Center on Addiction and Substance Abuse (CASA) at Columbia University about 15 million people abuse prescription drugs in the United States (CASA report). A survey of University of the Sciences in Philadelphia faculty conducted in 2005-2006 (Umland EM, Earl GL, Furtaw P) identified that faculty engaged in teaching in this area focused on alcohol and illicit drugs to a great extent while prescription drug abuse, nicotine, and tobacco were underrepresented. Based in part on these findings, opportunities were identified to expand the entry-level Doctor of Pharmacy curriculum by offering computer-based training in drug diversion. The module focused on prescription medications that may be potential targets for abuse and diversion, as well as the role of the pharmacist in identifying and preventing abuse and diversion. We sought to introduce these concepts relatively early in the curriculum and to incorporate multimedia into an internet-based teaching module.

### **Describe the innovation and its implementation:**

Computer-based instruction is an innovative, active teaching method that encourages students to be involved with self-learning and provides an opportunity for self-assessment of knowledge. Learning objectives were created and formed the basis for development of a PowerPoint presentation using audio to deliver material on 4 broad areas: controlled drugs; drug diversion scope and mechanisms; federal regulations; and the pharmacist's role areas. It was expected that the total activity could be completed in 40 minutes.

Students were given instructions during class and via email regarding how to access the module on the internet. An internet webpage was specifically designed for this activity using a Google University platform. Assessment questions were designed to assess 3 specific areas: drug knowledge, method of diversion, and pharmacist responsibilities. Ten assessment questions were designed as multiple choice questions based upon Bloom's Taxonomy. Students completed the assessment questions before and after viewing the PowerPoint presentation. Five of the questions were designed to test knowledge/comprehension and 5 were designed as application questions. In addition, one of the five application questions assessed basic mathematical skills by requiring students to verify a Drug Enforcement Agency (DEA) medical license number. The students also completed a satisfaction survey.

To evaluate the educational effectiveness of this activity, the primary endpoint was to evaluate the change in the percent of correct responses from the pre- to post-module assessment

questions (gain in knowledge). Student participation in educational activity was voluntary and all subjects remained anonymous. The project was approved by the USP IRB.

**Describe any changes in the implementation:**

This was the second initiative to use computer-based instruction in the pharmacy curriculum on this topic. In 2008, a pilot study was conducted with the U2 class using a slightly longer PowerPoint presentation without audio and utilizing 16 assessment questions. Positive results were observed based on a significant improvement ( $p$ -value  $< 0.0001$ ) in overall mean proportion of questions answered correctly in pre-test (29.51%) versus post-test (46.06%). The new activity was designed to address students requests for more specific information to "help prevent abuse" and "to be alert and on the lookout for potential criminal activities." We speculated that we could increase participation by implementing a financial incentive, and by reducing the time to complete the training module.

**Describe outcomes, and the implications of the innovation:**

Twenty seven students out of 281 students (9.6%) in the U2 class completed the pre- and post-test assessment questions. Sixteen students (59.3%) had previous work experience in a community, hospital, or other pharmacy related area. The results are presented as the median and interquartile range. The overall median percentage of correct responses increased from 60% (20%) for the pre-test to 90% (10%) for the post-test questions. We also evaluated the percent gain in knowledge defined as the difference between the percent of correct answers in the post-test minus the percent of correct answers in the pre-test questions, for each student. The median percent gain in knowledge was 20% (20%) which was statistically significant [Sign Test,  $p < 0.0001$ ]. In addition, we also analyzed the distribution of the G-score (standardized gain) defined as the percent gain relative to the maximum potential gain for the student (calculation is available upon request). The median for the standardized gain was 75% (52%) [Sign Test,  $p < 0.0001$ ].

**Reflect on what is working and why it is working:**

Use of computer-based instruction was an effective means for educating students on substance abuse and drug diversion based on the significant findings for all 3 endpoints. The G Score, or standardized gain, reflected a substantial improvement based on the maximum possible percentage points that could be gained. There were higher pre- and post-test results in 2009 as compared to the 2008 version. This could be due to improvement in the organization of the presentation and alignment between the learning objectives and assessment questions. The 2009 presentation focused on 3 main themes and the test questions were aligned to assess knowledge or application of concepts on these areas. Also, steps were taken to improve validity and reliability of the questions through informal review by the researchers and student volunteers.

**Describe student reaction to the innovation:**

Of those taking the satisfaction survey, all ( $n = 20$ ) agreed or strongly agreed that they were able to identify drugs with a potential for abuse. The majority of students agreed they were able to identify methods for drug diversion ( $n = 20$ ) and understood pharmacists' responsibilities ( $n = 18$ ). Seventeen students agreed or strongly agreed they were satisfied with the internet-based learning module whereas 3 provided a neutral response. The majority of students were pleased with learning how to verify the authenticity of the DEA number. The participation rate was lower than we had expected and this may have been due to the timing of the start of the study (in April).

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

There are several factors promoting change within the pharmacy curriculum. The standards put forth by the American College of Pharmaceutical Education (2007) have resulted in the expansion of the Introduction to Pharmacy Practice Experience (IPPE) rotations and also promotion of active teaching in the curriculum. We have demonstrated that computer-based instruction would be a valuable and practical addition to the curriculum for providing students with foundation skills related to community pharmacy practice experience.

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

Computer-based instruction can be implemented in any course using an internet-based educational system such as Angel. This particular type of presentation would match the educational goals of the Introduction to Pharmacy Practice Experience and Advanced Pharmacy Practice Experience courses. The software features of Angel allow the questions to be set up as quiz or test questions. This type of format could be useful as required or supplemental activity.

**What advice would you give to other people adapting this innovation?**

The project was a team effort developed by three faculty members from different departments along with the input and expertise of a P2 student. The quality and appeal of the presentation was improved by incorporating real experiences that illustrated scenarios that a practicing pharmacist could potentially face. A significant amount of technological expertise was required to design the presentation. Audio was added using a Logitech microphone which connected to the computer. The student made substantial contributions by developing the website on the Google University platform and adapting the presentation for the website.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

## Leahy Finalist

**Title of Innovation: “General Education Writing: Integrating Assessment with Student Assistance Through Faculty Development and Technology”**

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**Department: Writing Programs, Center for Interdisciplinary Studies**

**Type of Students: First Year**

**Type of course or activity where implemented: Required**

**Leahy Innovation: Yes**

**Course or activity where implemented: EN 101 and EN 102**

### **Describe rationale or goals of innovative educational activity:**

Having completed an assessment and strategic plan for the overall improvement of writing skills in all students at University of the Sciences in Philadelphia, we developed a new writing curriculum for the General Education skills and disciplines. While the new curriculum focused initially on improved learning outcomes and more valid and reliable assessments, it also required the complete reeducation of all Writing Program faculty members,  $\frac{3}{4}$  of whom are adjuncts, since all would participate.

Writing courses undertaken as fulfillment of General Education guidelines now work together to focus on research-based writing skills to serve Mission statement goals in “dissemination of knowledge” (research), “student-centered learning,” and “respect and appreciation for diversity among people, cultures, and ideas” ([www.usp.edu](http://www.usp.edu)). Research-based writing also supports the university’s strategic plan’s emphasis on research at all levels, including undergraduate. To support faculty/student research in upper-division courses, research must be well-established in the students’ first year on campus. While disciplinary research is done in courses across campus, the process of proposing, documenting and supporting that research must be engendered in first-year writing.

### **Describe the innovation and its implementation:**

The new curriculum demanded learning-centered and student-centered activities supported by the latest best practices, including those provided by technology. We infused all General Education courses in writing with technology, including electronic portfolios for holistic and long-term demonstration of student learning and two online course management systems, Angel and MyCompLab, to support both a paperless environment and 24 hour access to all materials (including learning videos and “talking” Powerpoints). As we progressed with the development of the new program, it also became evident that many students had schedules that were not conducive to taking their writing courses in traditional ways; therefore, we also developed online sections of these general education courses. General Education curricula are designed to both support the university mission and its goal of providing students with broad exposure to and engagement in interdisciplinary knowledge. By extension, General Education disciplines and outcomes (“skills”) must be clearly and consistently integrated into specific General Education courses and their subsequent assessments. Writing Programs’ first-year courses, therefore, were redesigned to support and direct the General Education’s disciplines and skills expectations as they relate to written communication.

## **Describe any changes in the Implementation**

Changes to the program, particularly to the curriculum in EN 101, EN 102, and its pre-college level support courses (the ESL courses and EN 100, Preparatory English) are made by the Writing Programs faculty on a rolling basis. Each semester, the group scoring sessions for the imbedded assessments in EN 101 and EN 102 permit the faculty to discuss the effectiveness of the curricula for these courses. Because the three imbedded assessments provide the faculty with not only a “snapshot” of a student’s ability at a particular moment, but also provide a longitudinal view of the effectiveness of the course (as well as the effectiveness of EN 101 and EN 102 as a sequence), the faculty can make curricular decisions on a semester-by-semester basis. For example, the final assessments for EN 101 were group scored in a faculty meeting, and the group as a whole discussed how well the students were prepared to meet the objectives specified for EN 102. This conversation has begun for the spring semester, and the curriculum for 101 next fall will be adjusted in order to make certain that the course prepares students well for 102 in the spring of 2010.

## **Reflect on what is working and why it is working:**

Currently, student writing competence is evaluated (via the WPE) at the end of the second year as students prepare to enter the “professional years” of their degree programs. Because of specific programmatic requirements, students endanger their progress in their programs when they do not pass the WPE. By moving writing assessment into the first-year writing program, rather than the former “rising sophomore” exam, we have gained the following advantages: (1) students are assessed earlier (in the first year), giving them the opportunity to receive assistance long before they enter their professional programs or the advanced years of their academic degree programs; (2) because such assessment is integrated into the writing courses instead of exclusive of them, students are assessed on the basis of what they have been taught; (3) students are assessed multiple times, which eliminates the hazard of high-stakes assessment characteristic of exams like the WPE; (4) multiple, in-course assessments (both formative and summative) provide a more comprehensive picture of actual student writing ability and progress over time as opposed to a single snapshot of student work; (5) since multiple assessments are given in 101 and 102, the data provides a means of assessing the success of individual courses (by evaluating all of the scores for 101 and 102 independently); (6) the data helps identify instructors in need of additional training (provided by the Director of Writing Programs via workshops).

Previously, students moved straight through their first year writing courses without consistent assessment (beyond the grades they received in the course) and without reference to assistance until the end of the second year, after they have completed their writing coursework and have taken the writing proficiency examination. The primary weakness of this system was that students are identified as in need of assistance only after they have completed their writing coursework. The new system fully integrates writing instruction, assessment at multiple points, and assistance in the form of Writing Program Seminars operated by the Writing Center. Students in need of additional coursework and assistance are identified in the first year, and assessed at the beginning, middle, and end of each of the two writing courses, which allows them to be referred to assistance in the Writing Center at any one of these six points. As the end of EN 102, students in need of further coursework in writing are identified and their advisors are notified. Using this system of integrated instruction, assessment, and assistance, students are able to receive the help they need to be certain they will be effective written communicators in their chosen disciplines.

## **Integrating Curricula with Student Assessment and Assistance**

With the revision of the first-year writing sequence (EN 101 and EN 102 into WR 101 and WR 102), the program maintains consistency by integrating writing assessments as midterm and final examinations. With the creation of a new standardized curriculum for both of these courses, assessments are both summative and formative. It is summative in the sense that it allows individual instructors to evaluate student progress at two distinct points in the semester. It will be formative in the sense that it will be used to identify students in need of additional assistance. When students are identified, they will be referred to the Writing Center not for a single session for assistance with a particular assignment, but to participate in Writing Program Seminars that are conducted concurrently with enrollment in WR 101, WR 102, or both courses. Once students are referred to the seminar groups, they must continue to participate in them until they have successfully completed WR 102. At the end of the first year, all students have been assessed four times at the course level, providing a roadmap of each individual student's progress and continuing areas of difficulty. The formal assessments are uploaded into an electronic portfolio, at which points students--and faculty--reflect on the learning experiences and demonstrated outcomes of the past year. Also: for those students who have (1) either failed to perform adequately on their assessments (by achieving a score of 3 or less in the scenario presented earlier in this section) or (2) who have failed the curriculum in WR 102, we provide further interdisciplinary academic writing instruction through additional course, EN 305, Argumentation and Critical Thought, which provides these students additional opportunities for development. Students advised into this course have counted this as one of their additional writing courses required by the General Education Curriculum. To ensure that all students can receive this additional instruction, online versions of 305 have been offered multiple times per year. (In future, this course will be WR 305.) This consistent assessment, followed by further instruction when necessary, is providing students with the assistance they need to become the most effective writers possible.

### **Application to Other Courses**

The assessment system here has also been applied also to EN 100, Preparatory English, and EN 305, Argumentation and Critical Thought. With the approval of the new minor in Professional Writing, the system of integrated instruction, assessment, and assistance will be applied to those courses as well. All Writing Programs' courses also emphasize the academic discourse and research skills students will need throughout their university experience and beyond. For example, all courses focus on: thesis statement development, evaluation and integration of secondary source materials to support argument, effective formatting of interdisciplinary documents including emphasis on APA or other style manuals (depending on course), and integration of graphics as necessary.

### **Describe student reaction to the innovation:**

Although initially students reacted negatively to the new innovations (having discussed the changes with older classmates, siblings, etc.) because it appeared to be more difficult, they have responded very positively in the semester end reflections. Some students who went through the pilot courses and are now in their second year have indicated that what they learned in first-year writing has already benefited them in other courses (several of these students are now in Scientific Writing and Argumentative Interdisciplinary Writing. Also: on the NSSE, first-year students identified the collaborative nature of these courses, and there is a marked increase in collaborative learning in the first-year whereas a decrease in the fourth year. Additionally, students who have taken our revised courses are anecdotally indicating relative confidence in the writing they are doing in other classes (several are now peer tutors, others are in 300-level writing courses).

**Will the innovation be sustained in the course? Yes**  
**Will you implement in other courses? Yes**

**Other Comments**

A system of integrated writing instruction, assessment, and assistance could be implemented as a part of a broader writing across the curriculum program or writing in the disciplines program. Additionally, it could be implemented as a part of a course where writing represents a significant portion of course outcomes or provides a mechanism for assessment. The Writing Center can provide Writing Program Seminar support for faculty wishing to implement a similar system within their own courses. When faculty work together to implement uniform instruction, assessment, and assistance, it not only provides a consistent curricular experience for the students and allows them to receive assistance as early as possible in the curriculum, but it also provides an effective means of assessing and revising curriculum on an ongoing basis.

## Leahy Finalist

**Title of Innovation: Into The Woods: Creating Assessment Practices for Experiential Learning in the Humanities**

**Name of Innovator: Christine Flanagan**

**Telephone Number: 215-596-7543 Email Address: [c.flanag@usp.edu](mailto:c.flanag@usp.edu)**

**Department: Humanities**

**Type of Students: Undergraduate**

**Type of course or activity where implemented: Core Curriculum/General Education**

**Leahy Innovation Submission: Winner of 2009 Leahy Award**

**Course or activity where implemented: EN 101, IH 212**

### **Describe rationale or goals of innovative educational activity:**

At USP, experiential education in the sciences is a non-negotiable requirement: students complete labs, work in clinical rotations, and take practical exams. Why not apply experiential learning principles to the Humanities and text-based courses such as EN 101 College Composition and IH 212 Intellectual Heritage: Nature? I asked myself this question in 2000, and began a series of experiments to refine my ideas. By 2008, I realized there were no existing practices that allowed simultaneous assessment of experiential learning (which includes, but is not limited to, service-learning) and Humanities courses (text and writing-based courses).

### **Describe the innovation and its implementation:**

In 2008, I created significantly advanced experiential learning exercises in all of my courses. At the same time, I wanted to clearly connect the experiential learning to course outcomes and develop a methodology for assessing experiential learning in Humanities courses. My task was to fuse assessment practices of two radically different enterprises-writing and experiential learning-and to understand how both, in combination, contributed to achieving course outcomes. I began by meeting with Peter Miller and discussing the various surveys I had been collecting in my classes, then researched assessment practices in writing, service learning, and experiential learning. The most significant part of this innovation is the single assessment rubric I created to analyze a variety of experiential learning and writing assignments for the Humanities.

### **The Courses: EN 101 and IH 212**

In EN 101 College Composition-Service Learning (Fall, 2008), I created my most rigorous experiential and service-learning course to date. First-year students (new to USP) learned about Southwest Philadelphia through a series of experiential (non service-learning) assignments: they interviewed faculty, staff, family, and alumni for anecdotal information about the neighborhood; they took neighborhood walks carrying historic photos of West Philadelphia and took digital photos comparing the present with the past; they toured the neighborhood on a class walk with me. The experiential assignments were balanced by traditional EN 101 research, reading, and writing assignments; however, many of these assignments were specifically directed at understanding Southwest Philadelphia. From the opening diagnostic essay through the final research paper, I asked students to write about our neighborhood. Students completed opening and closing surveys that investigated both their knowledge about our community and their understanding of the value of writing to a science major. Then, I assigned a formal service-learning project: students would provide writing assistance for community partners: The West Philly Tool Library needed a brochure, web text, and an annual giving letter; UC Green needed an updated brochure and an annual report. One team of students documented the work that the entire class completed.

In IH 212 Intellectual Heritage Nature Honors (Fall, 2008), I required students to attend a series of three day-long experiential (non service-learning) classes: a visit to Island Beach State Park (the only undeveloped barrier island in New Jersey); a day exploring the New Jersey Pine Barrens (a hike to the highest point in Wharton State Forest; a visit to see carnivorous plants at Greenwood Forest; and a stop to explore the mysterious pygmy pines at Warren Grove, home also to a military bombing range). We chose three Sundays early in the semester to complete these field trips. Students again completed opening and closing surveys, experiential journals, and reflective writings alongside traditional IH 212 text readings, course writings, and research papers.

Throughout the semester, I collected a wide range of information from students: surveys and questionnaires, class notes, drafts of papers, reflection essays, and more (both graded and ungraded). I began to articulate and standardize goals and objectives for experiential courses in the Humanities, and I created a single assessment strategy. In the process, I learned an immense amount about my own teaching and assessment methods and how to better succeed in the future.

### **Describe any changes in the implementation:**

For over ten years now, I have offered "experiments" in experiential and service learning in my classes: small assignments or sequences designed to allow a student to leave the traditional learning (i.e. text-based) of the English or Humanities classroom and enter a kind of adventure in intellectual development. I have made hundreds of substantial changes and alterations with experiential learning. The most significant changes include:

- Type of experiential task (from neighborhood walk to tutoring youth)
- Preparation for task (pre-writing/thinking)
- Documentation of task (taking observational notes during task)
- Discussion of task (post-thinking and analysis)
- Reflection of task (post-writing/thinking, typically a formal essay)
- Incorporation of experiential task into exams and papers
- Connecting task to traditional course texts
- Grading of task and assignments related to task

The final change, made in the fall of 2008, was the rigorous assigning, collecting, and assessment of writings related to experiential learning in these courses.

### **Describe outcomes, especially learning outcomes, and the implications of the innovation:**

My EN 101 College Composition service-learning course was a part of USP's first comprehensive survey of service-learning coursework at USP in the fall of 2008, which reported that "USP offers several service-learning courses every semester, and these courses can be used as one source of evidence that the University is fulfilling two of its institutional objectives: 1) Our students will embrace the value of service; 2) The University will be an active partner with our local communities to promote the values and practice of responsible citizenship."

In addition to USP's service-learning data, I now have concrete outcomes achieved in experiential learning courses in the Humanities, and this information sheds light on why (and how) experiential learning works best. Experiential learning achieves learning outcomes and allows for a deeper intellectual engagement with key concepts taught in the course because:

- 1) Experiential learning allows for expanded critical thinking skills:
  - a. Students gain a sharper ability to identify and explain issues (sometimes embedded or implicit issues), as well as addressing each issue's relationship to another;
  - b. Students gain the ability to recognize stakeholders (major and minor) and contexts (empirical and theoretical);
  - c. Students are able to evaluate arguments, assumptions, and evidence (even some of the hidden or abstract ones) through experiential learning.
- 2) Experiential learning encourages reflection on experiential and traditional modes of learning (students consider the learning process).
- 3) Experiential learning heightens the awareness of the need for clear oral and written communication, and inherently promotes the value and utility of superior standard written English practices.
- 4) Experiential learning heightens interest in subject matter.
- 5) Experiential learning allows a student to embrace a personal response to key concepts taught in the course.

### **Reflect on what is working and why it is working:**

In his Transcendental philosophy (taught in IH 212), Ralph Waldo Emerson proposes that 1) beauty may be seen everywhere when one has a curious attitude and open mind, and 2) seeing beauty stimulates the intellect. My primary job, then, is to foster curiosity and help students see. All of my experiential assignments begin with this principle.

In EN 101, a formal essay assignment might be, "Write an essay using the rhetorical strategies of descriptive writing." The experiential learning begins with a guided walk around Southwest Philadelphia with notebooks. I ask students to pick a color (blue, red, yellow) and a material (concrete, metal, wood, glass). Then, I instruct them to list every example they see of their color and material (30-50 items during our walk). I also ask them to record any writing they see in the world (ads on billboards, graffiti, bumper stickers). I don't discuss the formal essay assignment. This task allows students to practice close observation skills alongside writing. The concrete assignment ("pick a color and material") is easy and achievable even for those not skilled in writing. It is a deceptively simple exercise. At the end of the walk, we compare lists. Close observation forces students out of superficial analysis. They might see a (blue) Pepsi can in the gutter, but they also see a (wooden) freshly painted porch. What can you say about the neighborhood when you take both details into account? The final descriptive essay contains richer details and embraces complex analysis. Vivid details and astute observation are natural remedies for bad writing. Experience becomes a "text" we read and analyze.

To further understand why experiential learning works-to assess the activity in its various stages, from neighborhood walk to final essay-is a complex undertaking. (See appendix for detailed assessment practices.) I found that

- Experiential learning combines easily with traditional assignments (papers, exams).
- Experiential learning teaches students how to move from direct observation to understanding, analysis, and synthesis of ideas.
- Experiential learning provides more contact hours between individual student and faculty, often fostering a closer connection.
- Experiential learning challenges and expands a student's experience of self-reliance ("What's an annual report?" one service-learning student asked. "Look it up," I said.)
- Experiential learning is fun (there is time for strolling, swimming, laughter, stopping at Jersey diners).

- When well-designed, experiential learning is achievable (my assignments are often deceptively easy, allowing science majors to build confidence in writing and allowing book-smart students to expand their real-world experiences).

**Describe student reaction to the innovation:**

Course evaluations document the reactions students had in these courses.

EN 101 College Composition ("What did you like best about the course?")

- The teaching was so interesting that it made me want to learn and get involved.
- I really like how the instructor interacted with the class, and how it was a hands-on class rather than just a boring regular lecture. I liked the service learning project a lot.
- I like that this course interacted with the community.
- I liked reading interesting stories in class and service learning.
- I loved that this class wasn't all about structure, but was about writing what is "real". I loved that we started the class off with an essay on Southwest Philly because I am not from Philadelphia, and it helped me become comfortable with the city.
- She helped us link our work to real-life situations and made class fun.

IH 212 Nature ("What did you like best about the course?")

- I liked the experiential trips and reading about the different cultural views of nature.
- I liked actually experiencing what we would talk about in class.
- I liked the real life applications of the class material. You literally made Darwin and Emerson come to life!
- The addition of the experiential trips made the class interesting and allowed the integration of class material with stuff experienced.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

Completing assessment taught me much about my teaching successes and limitations, as well as how to improve my assessment practices. The basic changes include

- Expand/provide a more flexible time frame for students to adapt to community partners' needs (EN 101)
- Expand use of experiential text assignments and link them more with traditional IH readings (IH 212)
- Create more balanced assessment practices (for example, allow equal time for opening and closing reflections)

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

Experiential learning may be incorporated into any Humanities or Writing course; assessment may be applied to any course.

**What advice would you give to other people adapting this innovation?**

For assessment: your first call should be to Peter Miller. His assistance allowed me to gain the confidence to evaluate these courses. As a result, I had huge flashes of insight about my teaching and my students-moments where I saw clearly why my work is so gratifying, and how I can improve as a teacher.

## Leahy Finalist

**Title of Innovation: Found Physics: Turning a Campus into a Physics Laboratory**

**Name of Innovator: Paul Halpern**

**Telephone Number: 215 596-8913 Email Address: [p.halper@usp.edu](mailto:p.halper@usp.edu)**

**Department: Mathematics/Physics/Computer Science**

**Type of Students: Second Year PharmD**

**Type of course or activity where implemented: Required**

**Leahy Innovation Submission: Yes**

**Course or activity where implemented: Elements of Physics**

### **Describe rationale or goals of innovative educational activity:**

As Harvard physicist Eric Mazur has shown, classroom demonstrations are most effective when students predict the outcome beforehand and comment about the results. Moreover, as educational research has indicated, factors improving learning from demonstrations include salience and the ability for students to practice the skills. To implement a learner-centered interactive strategy I have developed a sequence of predictions, demonstrations with direct student involvement, the opportunity for student discussion, and finally a re-examination of the predictions.

### **Describe the innovation and its innovation:**

I have developed a teaching strategy for use in the physics classroom that involves identifying objects and situations on campus that incorporate physics principles, much in the manner that the "Found Art" movement of the early 20th century made use of ordinary items as art pieces. Demonstration examples I have tested with groups of physics students including placing a scale on an elevator to show the effect of acceleration on apparent weight and using a pool table to explain energy and momentum conservation during elastic collisions. We compare student predictions before these demonstrations to analysis afterward to gauge what students have learned.

### **Describe any changes in the implementation:**

In implementing our learning strategy for a large lecture class we have had to be creative in dividing up the students into small groups and making sure as many students have turns as possible. For the pool table experiment, we reserved the tables for an hour, allowing students who didn't participate initially to try and reproduce the demonstration informally.

Describe outcomes, especially learning outcomes, and the implications of the innovation: I assessed the efficacy of these methods by using a pre-test and post-test (not for credit). For the elevator example the questions included: Under what circumstances would the scale read the actual weight of the person? Under what circumstances would the scale read more than the actual weight of the person? Under what circumstances would the scale read less than the actual weight of the person? When would the scale remain constant? When would the scale change its reading? For the pre-test, only 5% had the correct answer that the scale would read the actual weight if the elevator were either at rest or moving at a constant velocity. 80% of the students thought that the scale would read the actual weight only if the elevator was at rest and 15% put other assorted answers. After the demonstration and a discussion, 58% put the correct answer-a sizable increase. Similarly, for the scale reading differing from the actual weight I found a large difference. In the pre-test, only 17% recognized that the elevator must be accelerating (either speeding up or slowing down) for the scale to vary. In the post-test, this figure jumped to 76%

Another measure of my effectiveness was documented by the Force Concept Inventory (FCI) Assessment, a standard tool in assessing conceptual learning in physics. The first time I administered the FCI assessment (the first week of Fall 2008), the mean score was 30.9% with a standard deviation of 10.7%. The second time I administered it (the final week of Fall 2008), the mean score was 48.7% with a standard deviation of 15%. The G-score corresponding to this change is .257. According to Hestenes, Wells and Swackhamer, the originators of the test, a 20% gain is significant.

**Reflect on what is working and why it is working:**

The outcomes assessment I conducted was promising. The demonstrations help make the abstract differences between concepts such as velocity and acceleration, actual weight and apparent weight, and elastic versus inelastic collisions far more tangible and comprehensible. I was pleased with the results for student learning.

**Describe student reaction to the innovation:**

I received positive feedback from students taking the course. Comments on my student evaluations included: "Professor Halpern was willing to explain concepts to students. He took us out of the classroom to understand concepts better" and "The thing I liked best about the course was the way Dr. Halpern taught. He was very into the material and tried really hard to teach the material well. I liked that he did demonstrations to try and help teach the material."

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

I will seek other locations on campus that offer opportunities to demonstrate physics concepts.

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

Introduction to Physics

**What advice would you give to other people adapting this innovation?**

I would suggest that instructors allocate enough time to allow students to experience the demonstrations in small groups and in a relaxed, unhurried fashion.

**Title of Innovation: Wiki Article on Scientific Controversies**  
**Name of Innovator: Cristina Hanganu-Bresch**  
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**Department: Humanities**  
**Type of Students: 2nd, 3rd, and 4th year students, various majors**  
**Type of course or activity where implemented: Core Curriculum/General Education**  
**Leahy Innovation Submission: No**  
**Course or activity where implemented: EN 302**

**Describe rationale or goals of innovative educational activity:**

The assignment was developed based on Jim Collier's idea in his Science Writing class (see here: <http://www.faculty.english.vt.edu/Collier/sciwrite/assign/wiki.htm>). I adjusted it for our students (and for a 300, as opposed to an advanced 400 level course), and used the wiki option in Angel as opposed to some other wiki engine

The rationale was to engage students in thinking critically about current controversies in science and technology through research and collaborative writing. Using wikis gives students the opportunity to practice a skill set that is gaining widespread acceptance, as well as to reflect critically about the way the medium influences writing and gain an "insider's" view of how information is created and stored on the web.

**Describe the innovation and its implementation:**

**DESCRIPTION OF THE ASSIGNMENT:**

For this assignment, you will work in groups of five to select a current controversial topic in your field or general science and create a brief, publishable synopsis of the issues surrounding the topic, wiki-style. A few examples are here: <http://scicontroversy.wetpaint.com/>. Your project will be hosted by Angel's wiki feature (we will practice creating a wiki entry in class). Only members of your group and your instructor can see and edit your entry.

**For this project you will:**

1. Brainstorm current controversial issues in science and technology, preferably related to your field of studies.
2. Assemble an annotated bibliography on your topic. You must have at least 12-15 sources, which must be primarily academic (at least 75%). You may be allowed to use news items primarily for informational purposes.
3. Write a 1750-2000-word article on a current controversial topic in the field of science/health sciences. Since this is a controversy, you should be able to explain both sides in an objective fashion. Your article should include:
  - a. an abstract or overview;
  - b. definitions of terms;
  - c. table of contents;
  - d. history or background of the controversy;
  - e. an explanation of each side in the controversy;
  - f. a discussion of the merits of each position;
  - g. possible directions for the future (if applicable);
  - h. a list of references.

**PLEASE NOTE:** While the order abstract-table of contents-content-references is not debatable (abstracts will always come first, TOCs second, and references last), everything else is up to you to decide and organize. You might have many other headings/subheadings stemming from your subject matter. You should make a decision as a group regarding the organization of your article

4 Present your projects in front of your peers (last day of class).

Your audience should be primarily your USP community, and secondarily, the public at large. Adjust your usage and style accordingly.

Since this is a collaborative project, it is up to each group to distribute work fairly to its members-gathering research, preparing the oral presentation, doing the writing and editing, etc. The grade for the project will apply for all members of the team.

Make sure you designate roles for everyone in the group. Everybody is supposed to contribute with the research and the writing of the article. In addition, suggested roles are:

- Leader: makes sure everybody completes their tasks, leads discussions, calls meetings, accounts for the final product
- Accountant: keeps tabs on the progress of the groups, sends out reminders, makes sure everybody is on time and on task
- Editor: responsible for correct formatting, verifies that the links work, that the references are accurate and correctly and consistently formatted in APA
- Presenter: will be responsible with developing presentation materials and with delivering or aiding in the delivery of the presentation in the last class meeting
- Fact-checker: makes sure that the article remains bias-free and has the role to question and verify contributions (legitimacy of sources and reports, etc.)

**PLEASE NOTE:** If one of the members of the group falls short of his/her responsibilities, the other members should make a decision as a group to report that member to the instructor in a brief memo delivered on the last day of class. That memo will count towards the final grade for the course.

### **IMPLEMENTATION:**

Students had about four weeks to complete the assignment, via group work in and outside of class.

### **EXERCISE ONE:**

Wiki Article: Learning Wikis Students were allowed to work in class on several exercises to get them started with this assignment.

I demonstrated the use of wiki syntax in class and had students practice in their groups. Each student had to produce wiki entries containing links, tags, images, lists, and various formatting options.

### **EXERCISE TWO:**

Wiki Article: Brainstorming exercise

Students were required to brainstorm possible topics for their project and write them as a wiki entry. What follows are the detailed instructions:

As a group, brainstorm possible topics for your wiki articles. Remember, the topics have to meet these criteria:

1. they are controversial (there are at least two sides to an issue)
2. they are current
3. they are of a scientific/medical nature

How do you get started? Here are a few places to browse for ideas:

- <http://scienceblogs.com/> (check the blogs as well as the latest items)
- <http://www.thenakedscientists.com>
- <http://www.nytimes.com/pages/science/index.html> (NYTimes Science topics)
- <http://www.nytimes.com/pages/health/index.html> (NYTimes Health topics)
- Recent issues of the journals Science and Nature (available through our library)
- The CQ Researcher database (available through our library)
- Recent issues of journals prominent in your disciplines
  
- Look for editorials, opinions, letters, review articles, etc. that might reveal current tensions and debates in the scientific world. While many science/health topics fall under the purview of the public/political sphere, you must make sure that the issue at the core of the controversy is scientific and not political. You are in charge of creating an objective, informative piece that offers a comprehensive and unbiased view of the debate and favors sound, scientific proof above all.
  
- Example of relatively recent controversial topics:
  - Salmonella outbreaks and FDA's role in regulating the food industry
  - Could the mercury used in certain vaccines cause of autism?
  - Should we allow the use of cognitive-enhancing drugs (e.g., Adderall, Ritalin, modafinil, etc.) by the healthy?
  - Are genetically modified foods safe for consumption?

As a group, collect a pool of topics in one document and create a wiki entry with links for each of them. Over the course of the next week, you can communicate via Angel and decide which of the topics would be the most suitable for your project. You should have your decision made by the next class meeting, when you are going to compile and annotate your sources and decide on the structure of your article. We will do some in-class writing the following week.

### **EXERCISE THREE:**

Students were offered a heuristic exercise to guide them through their chosen topic. They could work on this both in and outside the classroom. Each group's work was displayed on the projector with brief comments from the instructor and the class. What follows are the detailed instructions.

Create a Wiki entry containing answers to the following questions. This entry may be used later as a skeleton to your main article.

- Note 1: The group leader should assign tasks to the group members to increase efficiency. Decisions regarding content should be made as a group.
- Note 2: Each member of the group can edit any entry in this group. You should all work collaboratively to produce one entry per group. I will review your work and offer comments by next week.

1. What is your topic? What is the controversy surrounding the topic?
2. Who are the parties involved? Are there a few key/leading authorities that most people quote/cite/refer to?
3. What are the pro and con arguments? List them in order of importance.
4. What is the evidence presented in favor of the main arguments?
5. What is the history of the controversy? Are there any landmarks?
6. Write one paragraph in which you summarize the topic for a lay audience (i.e., an educated audience who might have heard about the topic but is not familiar with the details). Include a description of the controversy.
7. What are the terms that need to be defined?
8. How can you best break down this topic into relevant sections?
9. Track down the relevant articles and/or books that might help you write this article. Start creating the bibliography. Assign each member of the group a few sources.

PS: Be careful when you evaluate web sources. According to Laura Gurak (2000), one or more of the following characteristics indicate a credible site:

1. It is an online version
  2. of a reputable published source, such as a newspaper, major media source, or an academic or professional journal.
  3. It includes a list of works cited
- It is affiliated with a reputable educational or research institution.

The authors of the site are identified, with information about how to contact them.

## **ORAL PRESENTATION**

On the last day of class, each group will present their entry. Students were encouraged to be creative in their choice of medium for the presentation.

## **FINAL WIKI ARTICLE**

Due on the last day of the semester. Students are encouraged to implement changes based on comments received during their presentations.

### **Describe any changes in the implementation:**

Since this is the first time I have use this exercise, I did not make any changes.

### **Describe outcomes, and the implications of the innovation:**

#### **OUTCOMES:**

- Students researched and learned about current controversies in science and technology
- Students brainstormed topics and outlines and practiced "chunking" information related to their topics
- Students produced a collaborative writing project including an annotated bibliography and an article
- Students collaborated on an innovative group presentation on their topic
- Students learned and practiced with a new writing technology (wikis)
- Students learned and practiced on identifying acceptable information sources on the internet

**IMPACT:**

Wikis are more and more widely used in the classroom today. They facilitate group work and collaborative writing, introduce students to the world of web publishing, allow comments and revisions from group members, and are an appropriate medium for informative writing. Using the available technology (conveniently offered by Angel) in the writing classroom can facilitate collaboration and give students a skill set they will be likely to use in their future jobs. Students are also encouraged to create outlines and organize information with the reader in mind. Using wikis this way also forces students to think critically about the value of internet sources.

**Reflect on what is working and why it is working:**

The new and exciting technology kept students interested and facilitated their online collaboration. Assigning each member of the group a specific role, and dividing the assignment into discrete writing tasks proved helpful. Dividing writing tasks over time and giving students the opportunity to work on the assignment in the classroom with direct feedback from their instructor contributed to the success of the assignment; it also emphasized writing as a process. The topic, in particular, ignited passionate responses: current controversies in science and technology are something our students study or experience first hand, or are likely to be more knowledgeable about given their science backgrounds. The wiki format also allowed students to be more creative than a formal research paper would have allowed them to be.

**Describe student reaction to the innovation:**

None of the students had ever created a wiki before. The novelty of the medium created an initial level of anxiety, which dissipated completely after the brief tutorial into using wikis. After they had a chance to practice creating their first entries, they were very responsive and in fact enthusiastic about the assignment, as it made them feel like they were becoming savvy internet publishers. Many of them could see themselves using these skills outside the writing classroom and for interdisciplinary purposes. They seemed to work well within their groups and chose topics they felt interested and passionate about. This was a complex assignment that required, in addition to the final product (the wiki article), an annotated bibliography and a group presentation, but students seemed to enjoy multitasking.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

I will place more emphasis on narrowing down their topics, and I will provide more feedback in the form of comments on their entries before the next class meeting.

**What advice would you give to other people adapting this innovation?**

Wikis should be used for group work only (blogs should be used for individual responses-any writing that is not a formal research paper, that is); they are particularly useful for expository writing purposes. Each member of the group should be given a very specific role within the group; the instructor should also comment as frequently as possible on the wiki work over the course of the four or more weeks allotted for the assignments. The work needs to be carefully monitored so that the students don't choose topics that are too broad and general (e.g., global warming). The instructor should also emphasize the perils of this technology with a few illustrations of inaccurate information offered by Wikipedia. A discussion of the merits and pitfalls of internet publishing or how to recognize acceptable internet sources should precede the beginning of the assignment.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Pair-Quizzes**  
**Name of Innovator: Amy Kimchuk**  
**Telephone Number: 215-596-8705 Email Address: [a.kimchu@usp.edu](mailto:a.kimchu@usp.edu)**  
**Department: Mathematics, Physics, and Computer Science**  
**Type of Students: First-year students**  
**Type of course or activity where implemented: Required, Core Curriculum/General Education**  
**Leahy Innovation Submission: No**  
**Course or activity where implemented: MA102 - Mathematical Analysis II**

**Describe rationale or goals of innovative educational activity:**

Quizzes are given to assess student understanding of material before each test. In January 2009, I attended a presentation at the Joint Mathematics Meeting on pair-quizzes. Pair-Quizzes allow students to work collaboratively (in groups of two or three) to solve mathematical problems (for a percentage of their grade) together. This concept intrigued me, so I decided to incorporate pair-quizzes this semester into Math 102.

**Describe the innovation and its implementation:**

I gave six quizzes during the semester; only four were pair-quizzes. Since I teach four sections of MA102, and I wanted to have a control and experimental group, I let two of my sections work together on a specific quiz, while the other two sections worked alone. To remain fair, I changed the sections that were allowed to work together for each quiz. For the first two pair quizzes, students select their own partners. For the second two, I assigned partners.

**Describe any changes in the implementation:**

This is the first time I attempted this innovation so no changes have been made.

**Describe outcomes, and the implications of the innovation:**

As of now, I have only compared the average scores of each quiz between pair-quizzes and individual quizzes (see table). Students who were allowed to work together on the quiz performed better than those who worked alone.

**Table for Bright Idea Award:**

QUIZ 2 (15 POINTS)	QUIZ 3 (15 POINTS)	QUIZ 4 (14 POINTS)	QUIZ 5 (16 POINTS)
Pair (n=67) 11.9	Pair (n=61) 13.2	Pair (n=68) 11.82	Pair (n=68) 14.62
Alone (n=68) 11.5	Alone (n=72) 12.2	Alone (n=66) 9.76	Alone (n=68) 13.31

I plan to examine this topic in more depth this summer. Specifically, 1) I will compare questions from each quiz with student performance on exams, and 2) I will compare performance on specific questions from the final exam given in Spring 2008 and Spring 2009.

**Reflect on what is working and why it is working:**

Research has shown that student learn more in a collaborative learning environment. I can see from the scores on quizzes that students perform better when given the opportunity to collaborate with their peers.

**Describe student reaction to the innovation:**

Student reaction was positive, unless the student was paired with someone that was not prepared for the quiz. After each pair-quiz, I asked for reaction. The most positive comments were "Pair-quizzes are good because your partner can catch you mistake" and "It's like having two-brains". Two negative comments were "I was with someone not prepared for the quiz, so I had to do most of the work" and "I did not like the group quiz because I need to work problems out on my own".

All of my MA102 classes told me that pair-quizzes should only be used in MA102, not MA101. They believe that the material in Math 101 is needed for Math 102, and therefore, quizzes should be done individually.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

The only thing I may do differently in Spring 2010 is to make Quiz 4 a pair-quiz for everyone.

**Will you implement this innovation in other courses? No  
Describe the other courses: N/A****What advice would you give to other people adapting this innovation?**

Pair-quizzes take more time than individual quizzes. Students need time to discuss the problem and work out disagreements. Make sure to take that into consideration if you are going to try a pair quiz.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

## Leahy Finalist

**Title of Innovation: Familiarity with Calculations Improves Patient Survival Rates During Mock Advanced Cardiac Life Support Codes**

**Name of Innovators: Laura Mandos, Michael Cawley, Laura Finn, Craig Whitman, Lindsay Palkovic**

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**Department: Department of Pharmacy Practice/Pharmacy Administration**

**Types of Students: Fifth year pharmacy students**

**Name of activity/course: PP555, PP556**

**Type of course: Required fifth year pharmacy course**

**Leahy Innovation Submission: Yes**

### **Describe rationale or goals of innovative educational activity:**

For the past four years, one of the PP556 Pharmacotherapeutics laboratory activities has been a mock Advanced Cardiac Life Support (ACLS) code. During this activity, the fifth year pharmacy students, all Red Cross Certified in Basic Life Support, fulfill the various roles of health care professionals on a rapid response teams. More and more, pharmacists play a critical role as a member of this team in hospitals. During the week of orientation to the mock ACLS code, students are introduced to the mannequin, introduced to the faculty member running the code as the physician (MC, CW, or LP), choose the role they will play on the rapid response team, and become familiar with the treatment algorithms for three arrhythmias: asystole, ventricular tachycardia, and ventricular fibrillation. The students are allowed to bring the American Heart Association algorithms with them when they respond to the mock code. One of the key points during the exercise is to successfully calculate the drip rate of a medication that is critical to the patient's survival. The students assigned the role of the pharmacist have three minutes to successfully complete this calculation. One of the issues that stymied the instructors was the poor overall survival rate during the code despite a week of orientation. The first year the mock ACLS code activity was performed in the laboratory, it occurred right after the cardiology block of Pharmacotherapeutics and had an overall survival rate of 20%. The second year the activity was offered; we moved it towards the end of the year, after the students had more lectures in critical care medicine and had an increase in the survival rate to 33%, which although an improvement, was still pretty poor.

Last year, throughout Pharmacotherapeutics laboratory I and II, students were required to perform calculation drills which were comprised of simple calculations that they could do in their heads or on a sheet of paper. The goal of the calculation drills was to see a gradual decrease in time that it took each student to perform the calculations in their heads. Although that goal was not realized, the instructors (LM, MC, and LF) noted an increase in survival rate during the mock ACLS code to 42%, a number that was approaching "real life" survival. This led to the innovation experiment of this year, with the "Quick Fire Calculations" activity.

### **Describe the innovation and its innovation:**

All six sections of PP555 Pharmacotherapeutics Laboratory I (261 fifth year pharmacy students) performed "Quick fire Calculations" as an activity during the last week of the fall semester. Students were given 15 minutes to perform 13 calculations. In the spring semester, during the ACLS orientation week, three of the laboratory sections (121 students) were given a second drill with the same "Quick fire Calculations". The remaining three laboratory sections (120 students) did not perform the drill as part of the orientation activities. The faculty members playing the role of the physician during the mock ACLS code (MC, CW, and LP) were blinded as to which half of the class had the extra practice time with the calculations. All mock ACLS codes

contained the same three arrhythmias and the students were allowed to bring the treatment algorithms to the code.

**Describe any changes in the implementation:** None this year

**Describe outcomes, especially learning outcomes, and the implications of the innovation:**

The laboratory sections that received the extra session of "Quick fire Calculations" had an overall survival rate of 11 out of 15 codes or 73%. The laboratory sections that did not have the extra calculation drill had an overall survival rate of 5 out of 15 codes or 33%.

**Reflect on what is working and why it is working:**

Please see outcomes.

**Describe student reaction to the innovation:**

Students clearly enjoy the ACLS activity. Out of the 200 students who filled out surveys in the spring of 2008, 96 students or 48% of the class noted that they especially liked the ACLS code activity and wanted it kept as part of the laboratory activities. Forty two students or 21% of those students surveyed stated that they would keep all activities.

**Will the innovation be sustained? Yes**

**Will you implement the innovation in other courses: Yes**

The calculation drill exercise may be added to the Critical Care Therapeutics elective course.

**What advice would you give to other people adapting this innovation:**

None at this time

**Title of Innovation: Geriatric Sensitivity Training Improves Pharmacy Student Knowledge about Counseling the Elderly Successfully**  
**Name of Innovators: Laura Mandos, Laura Finn,**  
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**Department: Department of Pharmacy Practice/Pharmacy Administration**  
**Type of Students: Fifth year pharmacy students**  
**Type of course or activity where implemented: PP556 Principles of Human Diseases and Pharmacotherapeutics Laboratory II**  
**Leahy Innovation Submission: No**

**Describe rationale or goals of innovative educational activity:**

Elderly patients (Individuals aged 65 years or older) represent just over 13% of the population, but consume 40% of prescription medications and 35% of all nonprescription medications. On average, people between the ages of 65-69 years take nearly 14 prescriptions per year, and people between the ages of 80-84 take an average of 18 prescriptions per year. Thirty six percent of all report adverse drug reactions involve an elderly individual. Given these statistics, it is important for pharmacists to be able to counsel geriatric patients effectively and develop ways to improve medication adherence in those patients with impairments - hearing, cognitive, tactile and visual. The goals of this activity were to improve the pharmacy students' understanding of the aging patient and to expand the sensitivity of pharmacy students as they relate to this patient population.

**Describe the innovation and its implementation:**

Project SECURE is an aging sensitization program that was integrated into PP556 Pharmacotherapeutics Laboratory II two years ago. This program allows students to develop their appreciation for geriatric specific limitations and how to modify their counseling skills. Project SECURE materials simulate a variety of impairments such as arthritis, peripheral neuropathy, glaucoma, macular degeneration, cataracts, stroke, and yellowing of the eye lenses.

The first part of the laboratory period was spent attempting to perform specific home health activities while having a geriatric impairment. With tactile impairment gloves on, the students attempted to fill pillboxes with M&Ms, use a glucometer, self-administer a placebo inhaler, self-administer an eye drop, and write a sentence. While wearing visual impairment glasses to simulate a number of different eye conditions (glaucoma, macular degeneration, stroke, cataracts, and yellowing of the lenses) the students looked a prescription, attempted to pick out a specific M&M out of a pill bottle, use a glucometer, self-administer a placebo inhaler, and write a sentence.

After this discovery period, the pharmacy students engaged in a group discussion with their laboratory instructor to evaluate ways to help patients with these conditions to navigate these everyday disease specific tasks.

**Describe any changes in the implementation:**

This year, we added a pre-activity and post-activity assessment to monitor whether or not we were achieving the desired learning outcomes. For the discussion period, specific talking points were developed by Professor Laura Finn, Adjunct Assistant Professor of Clinical Pharmacy, who has a long term care consulting practice.

**Describe outcomes, and the implications of the innovation:**

Prior to using the Project Secure Equipment, 238 pharmacy students were assessed by survey about their knowledge in counseling patients over the age of 65. Fifty percent of the students agreed or strongly agreed with the statement that they were confident in their ability to counsel geriatric patients on medication. When examining how to help geriatric patients with specific impairments, only 18% of the students agreed or strongly agreed with the statement that they knew three ways to help memory impaired geriatric patients take their medications correctly, 30% of the students knew how to improve counseling with the hearing impaired geriatric patient, 24% of the students agreed or strongly agreed with the statement they knew how to help a geriatric patient with tactile impairment and 18% of the students agreed or strongly agreed with the statement that they were knowledgeable in ways to counsel visually impaired geriatric patients. After the project SECURE activities, the same survey was administered. After using the gloves and the glasses and discussing strategies to improve medication adherence in these patients, 90% of the students agreed or strongly with the statement that they were confident in their ability to counsel geriatric patients on medication use. When examining how to help geriatric patients with specific impairments, 90% of the students agreed or strongly agreed with the statement that they knew three ways to help memory impaired geriatric patients take their medications correctly, 92% of the students knew how to improve counseling with the hearing impaired geriatric patient, 99.5% of the students agreed or strongly agreed with the statement they knew how to help a geriatric patient with tactile impairment and 87% of the students agreed or strongly agreed with the statement that they were knowledgeable in ways to counsel visually impaired geriatric patients.

**Reflect on what is working and why it is working:**

Each group of four students were able to interact with all of the equipment. The laboratory instructors were able to work in small enough discussion groups to maximize the impart of the discussion on each student. Having specific talking points, developed by a pharmacist whose practice is specific to geriatric patients, provided the students with concrete strategies to improve medication adherence.

**Describe student reaction to the innovation:**

Prior to the activity, 71% of the pharmacy students surveyed agreed or strongly agreed with the statement that they were sensitive to issues that are specific to the geriatric population. After the activity, 97% of the pharmacy students surveyed agreed or strongly agreed with the statement that they were sensitive to issues that are specific to the geriatric population.

**Will the innovation be sustained within the course? Yes****Will you implement in other courses? Yes**

Could be used in any course that requires students to treat the elderly.

**What advice would you give to other people adapting this innovation?**

There is a need for health care professionals to become more familiar with the limitations that affect the elderly. A pharmacist's knowledge must reach beyond the pharmacotherapeutics of the disease state to also include an appreciation of how a health care provider must alter their patient counseling skills to help patients comply with their medication regimen.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Jigsaw Teaching in a Large Class**  
**Name of Innovator: Lauren McCluggage**  
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**Department: Pharmacy Practice/Pharmacy Administration**  
**Type of Students: 5th year pharmacy students**  
**Type of course or activity where implemented: Professional or Advanced**  
**Leahy Innovation Submission: No**  
**Course or activity where implemented: PP554**

**Describe rationale or goals of innovative educational activity:**

There are many active learning methods that have been described that tend to focus on smaller groups. Being one of the largest pharmacy schools in the country, we do not have the luxury of teaching therapeutics in small groups. Therefore, the rationale for this innovation was to adapt a small group method of teaching, jigsaw method, to a class of approximately 250 students. The goal was to engage the students and have them take responsibility for their learning while integrating critical thinking.

**Describe the innovation and its implementation:**

Prior to the lecture, the course roster was downloaded from Angel and the students were sorted by their source ID to ensure random assignment of groups. (See Excel seating chart which follows) The list was then split into quadrants (A, B, C, D) which correlate to a section of the classroom (left lower, left upper, right lower, right upper). Then within each quadrant, students were assigned a group (1-8). This equated to 7-8 students in each group within the quadrant. Lastly, the students were assigned a color (red, blue, green, yellow, purple, orange, grey, brown) so that each color section had one member from each of the groups. For example, the quadrant A color red section consisted of 8 members one from each of the numbered groups. In order to reduce the chaos associated with maneuvering students into the classroom, students were assigned seats that placed them in their quadrant and group.

The numbered groups were then assigned a medication class. One page worksheets were developed that focused on key information for that class of medications including items like mechanism of action, contraindications, adverse effects and indication for headaches. The students were emailed the document that listed their name, quadrant, group, color, and seat assignment. (See PowerPoint sitting chart for STC 145 which follows) They were also informed that the worksheet corresponding to their number was posted on Angel and it was their responsibility to complete this. The email emphasized that the worksheet should not take more than 15-20 minutes, their classmates would be depending on them to complete it, and the exact answers would not be taught in class. A seating chart with all of the seat numbers was also posted for them to review prior to coming into class.

The first twenty minutes of the class was spent reviewing the types of headaches, pathophysiology, and some treatment considerations. None of the medication classes that the students had been assigned were discussed. The students were then given a handout that had six case vignettes. They worked within their number group to decide if the medication class they had been assigned should be used in the patient described. Instructors circulated through the room to answer questions and ensure students were working in groups on the assigned task. The students were given approximately 20 minutes to complete this.

When the groups wrapped up, the cases were reviewed with the whole class. For each case, the instructor called on one of the groups and had them explain what their group decided. Using their rationale, the instructor either asked further questions of the class or that group or explained in more detail. After all of the drug classes had been discussed, the choice of therapy for the specific patient was reviewed. All of the cases were designed to emphasize key

therapeutic parameters for the medications. During this section of the class, students were encouraged to ask questions to the instructor and their classmates.

After a ten minute break, students were instructed to sit in their quadrant in groups of the same color assignment. A diagram of the room was displayed showing the proximity of each group. These groups then consisted of students who had researched different medication classes. One member from each group picked up a Turning Point device. Questions about therapeutic decisions were displayed including cases, and students worked in their group to pick the best option. After all groups submitted their answers in Turning Point, the question was discussed and key points emphasized.

Since many students were concerned about not getting the information from the medication classes they were not assigned, answer keys to the worksheets and in class cases were posted on Angel for them to review after the end of class.

**Describe any changes in the implementation:**

Not applicable since only done 1 time thus far

**Describe outcomes, and the implications of the innovation:**

Currently no outcomes have been assessed for this innovation.

**Reflect on what is working and why it is working:**

There was concern that students would not be receptive to this learning technique especially in a large class and that they would not complete the pre-class assignment. Although, the exact percent of students who completed the pre-class assignment is unknown, during the group discussions it was apparent that the majority of students had completed it. This is probably due to the fact that they were given a specific task that was not meant to take much time. By only asking them to read 1-2 pages and answer specific questions, students may have felt this was more attainable than reading 20 pages without guidance.

Also, by not discussing the answers during the class period, students became very engaged in the discussions and asked multiple thought provoking questions. They realized that the instructor was not going to tell them everything they needed to know but they would have to solve it themselves.

**Describe student reaction to the innovation:**

There was mixed reaction to the implementation of this innovation. First, students were hesitant to sit in their assigned seat at the start because it was not their routine. However, after the class students said it was nice to interact with other classmates and sit somewhere new. Secondly, many students were concerned that they did not learn everything they should about the different medication classes and only knew the one they worked on. When asking these students questions about information, they tended to know it and they just didn't realize what they had learned. I encourage students to email me with any comments about the learning experience and these are the comments that I received.

"I just wanted to thank you for trying something new and stepping outside of the box to teach us! I really enjoyed it, it made the class go by A LOT faster. Now, I know a lot of people I go to school with are very Left brained and don't embrace change. They like EVERYTHING spelled out for them and don't like to think for themselves, etc...You are posting all your material so that's the only thing I would have suggested."

"Although I welcomed the change in the structure of the class for the day, I ultimately left with an understanding of the particular class of drugs that I was assigned to research prior to class."  
"I liked the set up of your migraine lecture but I wish we could have learned about the drugs before we did cases. It did make class more interesting."

**Will the innovation be sustained within the course? Yes**  
**If Yes, will you do anything differently?**

I will suggest that the headache lecture occur later since some of the medications will be reviewed in other topics. Also, I would plan the timing better to allow for more time in the second part. I would also not review the pathophysiology but post guiding reading for the students to review on their own.

**Will you implement this innovation in other courses? Yes**  
**Describe the other courses:**

I will try to implement this in other P&T lectures as well as electives.

**What advice would you give to other people adapting this innovation?**

One problem was that things took longer than I was expecting. If you are to implement this, be sure to add extra time to your plan. I was not able to get through all of the cases in the Turning Point section.

Also, check the color selection you use on the actual screens in the classroom. I had created the diagram with the color coded group locations in my office. Then when it was projected in the large room, the colors did not appear the same and some confusion resulted as to where the students were supposed to sit.

The last part of the class when the students were in groups by colors was not as successful as the prior part. This may be due to the students being tired or anxious to be out of class. Also, there was less time for this part than I expected so that left less time for discussions.

I did spend about 20 minutes explaining basic disease pathophysiology at the beginning which I would consider cutting out in the future. All of the information presented was factually based and from their textbook. I would consider posting this type of information for them to review prior to class and then start immediately with the groups to allow more time for discussions.

Lastly, be sure to have a wrap-up or overview at the end. I had planned to review the medication classes and their uses but ran out of time. If I had time to do this, I think the students would have felt more closure with the lecture and more confident when leaving.

**Do you want this abstract to be considered for a Bright Idea Award: Yes**

## Leahy Finalist

**Title of Innovation: Concept Maps: Beyond a Study Tool! CMaps as the Primary Organizing Structure for Two Courses**

**Name of Innovator: Alison M. Mostrom**

**Telephone Number: 215-895-1137 Email Address: [a.mostro@usp.edu](mailto:a.mostro@usp.edu)**

**Department: Biological Sciences**

**Type of Students: Junior, Senior Biology Majors**

**Type of course or activity where implemented: Elective, Professional or Advanced**

**Leahy Innovation Submission: Yes**

**Course or activity where implemented: BS305, BS377**

### **Describe rationale or goals of innovative educational activity:**

1. Provide students with a "Learning-Centered" environment (for each class meeting) in which they develop Cognitive Process Skills (especially Apply; Analyze; Evaluate; and Create) in all Knowledge Dimensions (Factual; Conceptual; Procedural; and Metacognitive) embedded in course content.
2. Develop collaborative skills.
3. Improve students' metacognitive skills
4. Develop students' presentation skills.

### **Describe the innovation and its innovation:**

Students work collaboratively (with one other student) to construct Concept Maps (CMaps) in all class meetings using CMap Tools™ computer software ([www.ihmc.us](http://www.ihmc.us)). CMaps are visual representations of knowledge that show the interrelationships between concepts. Students construct CMaps on topics for which I used to provide lectures or discussions; therefore, I have not sacrificed content coverage by implementing this innovation. Source material includes the textbook, primary literature, and secondary literature. My role in the classroom is to serve as a guide in the students' construction of CMaps, and to guide presentations of these CMaps. Therefore, these courses provide students with continuous "guided inquiry" experiences. My role outside of the classroom is to prepare all materials necessary to make this innovation flow smoothly and to review students' products and their self-evaluations. All course material is posted electronically using Angel as an electronic platform.

Each completed CMap is imported into a Power Point™ slide presentation that includes one slide for each of the following: the CMap; a congruent written summary of the CMap; references / authorship; and two slides for self-evaluation of the Concept Map (based on published scales). Students also self-evaluate their final Power Point™ product using a grading rubric I generated that evaluates all components of their product.

### **Describe any changes in the implementation:**

This innovation is a complete departure from earlier renditions of these courses. In the 2006-2007 iteration of this innovation 16 students were enrolled in my CMaps courses. In the 2008-2009 iteration an additional 16 students were / are enrolled. Prior to implementing CMaps courses, the courses were (most recently) discussion- based, using guided inquiry of readings from the textbook and primary and secondary literature. Early renditions of these courses were traditional lecture format (with discussion of primary and secondary literature).

**Describe outcomes, especially learning outcomes, and the implications of the innovation:**

Note: Listed in an order that is congruent with Goals listed above.

1. Students construct Concept Maps in every class meeting based on readings from the textbook and/or primary and secondary literature. Embedded within the final Power Point™ slide presentation are:

- a) two "higher level thinking skills" requirements:
  - (i) "cross-linkages" that represent relationships between somewhat disparate concepts; or "cycles" that represent either positive or negative feedback loops;
  - (ii) an analysis and evaluation of at least 1 data figure
- b) a written summary that is congruent with the visual concept map;
- c) a self-evaluation of the concept map

Note: This learning outcome addresses the following:

Knowledge Dimensions: Factual; Conceptual; Procedural; Metacognitive;

Cognitive Process Dimensions: Understand; Apply; Analyze; Evaluate; Create.

2. Students develop collaborative skills by working with other students in order to complete their final product for each topic. In the first iteration of this innovation (2006-2007) I allowed students to choose groups and remain in the same group throughout the semester. In the second iteration of this innovation (2008-2009) I assigned groups and rotated membership with every CMap

Note: This learning outcome addresses the need for students to develop collaborative working skills for use in their professional lives.

3. Students develop metacognitive skills by completing self-evaluations of: (a) each of their CMaps; and (b) their improvement in their ability to construct CMaps by completing a Mid-Semester and End-of-Semester "Concept Mapping Metacognition Log".

Note: This learning outcome addresses the following:

Knowledge Dimension: Metacognitive;

Cognitive Process Dimension: Analyze; Evaluate.

4. Students develop their presentation skills by presenting each of their final Concept Maps to the class.

Note: This learning outcome addresses the need for students to be cogent speakers in their professional lives and to appreciate diverse interpretations of course material.

**Reflect on what is working and why it is working:**

All four Goals and Learning Outcomes are currently being achieved. I believe this is due to the careful planning and implementation I put into these courses, the modifications that I make between courses and years based on careful analysis of surveys, and the communication that I have with students concerning why I am implementing this innovation. Additionally, students seem to be really excited that I am publishing this innovation and presenting it at regional, national, and international teaching conferences. When I came back from the International Conference on Concept Mapping (Fall 2008) Animal Behavior students were eager to hear about the reception of this innovation and were willing to immediately integrate a new CMap grading scale that was presented at that meeting.

## **Describe student reaction to the innovation:**

Very positive! Data presented below are from the first implementation (see Mostrom 2008 publication for further detail; electronically attached and available on the internet, see "other comments").

Based on Attitudinal Survey #1: A traditional questionnaire written in "neutral language" (which I believe allows students to respond honestly, without a "leading direction" from me).

16/16 students responded that CMaps were either "very helpful" or "helpful" in facilitating their understanding of course material.

12/16 students responded that CMaps allowed them to develop their thinking skills much more (N=6) or more (N=6) than traditional classroom techniques (lecture / discussion). Four students responded that the two formats provided equal development.

14/16 students envisioned constructing CMaps for other courses. Two of the 16 students did not envision doing this, but did see the value of constructing CMaps.

12/16 students preferred that Animal Behavior and my ½ of Ecology continue to be a CMaps format, while 4/16 prefer a hybrid format with use of both CMaps and some lecture on textbook material / guided discussions based on primary or secondary literature. No one preferred exclusively traditional lecture format.

Based on Attitudinal Survey #2: Novak's 1998 "5 Elements of Teaching" CMap:  
I asked students to use Novak's 1998 CMap to compare two teaching styles: My CMaps format vs. Traditional Lecture format. Students visually highlighted components they felt each format emphasized.

Based on the response of the 13 students who voluntarily completed this survey (2007-2008):  
There was a statistically significant difference between students' perceptions of my CMaps course vs. Traditional Lecture course formats.

Students' maps showed that they perceive my CMaps courses to highlight (in descending order from element most frequently highlighted by students): "Learner"; "Empowering"; "Interact"; "Knowledge". These elements were statistically significantly overemphasized.  
Students perceived that Traditional Lecture courses highlight (in descending order from element most frequently highlighted by students): "Teacher"; "Knowledge"; "Disempower". These elements were statistically significantly overemphasized.  
For further detail about this survey and results, please see Mostrom 2008.

## **Will the innovation be sustained within the course? Yes If Yes, will you do anything differently?**

I will sustain this innovation for years to come (with modifications deemed beneficial for student learning and cognitive skill development). I will not be making any significant changes until my fourth iteration of the courses because I am looking forward to publishing the results of the first 3 iterations once the number of students involved approaches 50. This larger sample size will allow for a more robust interpretation of the knowledge gain and attitudinal data.

## **Will you implement this innovation in other courses? Yes**

### **Describe the other courses:**

I am contemplating using CMaps as a tool from which I lecture in my two sophomore level courses. I will provide students a CMap that I construct as an organizing tool for the synthesis of each major topic. I will then provide lectures, but these will be organized around the graphic CMap. I may leave parts of the CMap blank and have students fill these in as I lecture. This would provide students that take my upper-level courses with a good introduction into CMaps prior to taking my "all CMaps" courses.

### **What advice would you give to other people adapting this innovation?**

Take time to organize the course and base it in sound pedagogy.

This innovation benefited tremendously from an NSF workshop on implementing innovative teaching that I attended for one week (at USP) during the summer of 2006 (see other comments for citation).

Have a professional evaluator of teaching and learning critique your plan (and be willing to modify according to her/his suggestions).

"Then dive in!"

Carefully explain to the students why you are doing something that they may at first find uncomfortable. Listen carefully to their feedback and constructive criticism and modify the innovation according to sound pedagogy.

### **Additional Comments:**

This innovation was awarded USP's Teaching and Learning Center's 2007 Educational Bright Idea Award and a poster was presented highlighting the 2007 CMaps Project at "Talk about Teaching" Day.

This innovation has been presented at the 3rd International Conference on Concept Mapping (Tallinn, Estonia and Helsinki Finland; September 22-25, 2008). Presentation at the meeting was peer-reviewed

As part of the International Conference, this innovation was also published as a paper prior to the conference. Because invitation to the meeting involved a peer-reviewed process, the publication is also considered peer-reviewed.

#### **Citation**

Mostrom, A. M. 2008. A unique use of Concept Maps as the primary organizing structure in two upper-level undergraduate Biology courses: results from the first implementation Proc. of the Third Int. Conference on Concept Mapping 1: 76-83. (Editors: A.J. Canas, P. Reiska, M. Ahlberg, and J.D. Novak; Location: Tallinn, Estonia & Helsinki Finland Sept. 22-25, 2008) (this may have to be accessed electronically by going to [cmc.ihmc.us](http://cmc.ihmc.us) then going to "online" link under Academic Program & Proceedings; then 2008 Proceedings, then Paper B7, Tuesday September 23, 2008, 10:00-10:30).

This innovation was also presented at the large Midwest / NE regional National Science Teachers' Association Meeting (October 2007; Detroit, MI) and at two regional Lilly-East Conferences on Innovative Teaching (April 2007 as a presenter, Newark, DE; April 2008 as an invited presenter; Newark DE).

This innovation was positively impacted due to my attendance at:

NSF "On the Cutting Edge Workshop: Designing Effective and Innovative Courses"; June 26 - 29, 2006; Leader: Barbara J. Tewksbury; Sponsored by NSF & USP's Teaching and Learning Center. Philadelphia, PA.

#### Learning-Centered Teaching references

Anderson, L. W., D. R., Krathwohl, P. W. Airasian, K. A. Cruikshank, R. E. Mayer, P. R. Pintrich, J. Raths, and M. C. Wittrock. 2001. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman Publishers.

Blumberg, P. 2008. *Developing Learner-Centered Teaching Practices: A Guide for Faculty*. San Francisco, CA: Jossey-Bass.

Novak, J. D. 1998. *Learning, Creating, and Using Knowledge: Concept Maps™ as Facilitative Tools in Schools and Corporations*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

**Title of Innovation: Viral Marketing of PMM**

**Name of Innovator: Melanie Oates**

**Telephone Number: 215-895-1182 Email Address: [m.oates@usp.edu](mailto:m.oates@usp.edu)**

**Department: The Undergraduate Pharmaceutical Marketing and Management Program in the Mayes College**

**Type of Students: undergraduate year 3 and 4**

**Type of course or activity where implemented: Required**

**Leahy Innovation Submission: No**

**Course or activity where implemented: PB 429 and PB 435**

**Describe rationale or goals of innovative educational activity:**

The project extended over three semesters, beginning with an independent study in viral marketing, and continuing with the courses in Product Management and Advertising and Promotion. The students were asked to implement cutting edge media tactics to support their own program at USP. The rationale for the project was to harness the students' creativity for a project with which they could identify. Identification (in this case, with their own degree program) increases engagement (in this case, engagement with the educational program). If an educational project appears relevant to the students, enthusiasm and greater participation may result.

**Goals were:**

- to learn to use 21st century media for advertising and promotion
- to learn to apply "buzz marketing" tactics for promotion of a real world product
- to demonstrate the power of the internet and "word of mouth" marketing
- to prepare students for careers in the 21st century marketing field

**Describe the innovation and its implementation:**

The project extended over three semesters, beginning with an independent study in viral marketing, and continuing with the courses in Product Management and Advertising and Promotion. The students were asked to implement cutting edge media tactics to support their own program at USP.

In the first semester, they took classes online using the virtual world Second Life. They learned to create blogs, build websites, and implement "buzz marketing" tactics. In the second semester, the same group of students wrote a full marketing plan for the "viral marketing" project. In the third semester, the group actually created the tactical elements, including a blog, two YouTube videos, and a website. They also hosted events with high school students and conducted market research to determine the impact of their promotional elements.

**Describe any changes in the implementation:**

The use of the Second Life virtual environment was an experiment. Second Life was only used for the first semester of this project. Although I am using Second Life in future classes for viral marketing, Second Life was not an element of the final viral marketing plan for the PMM program.

**Describe outcomes, and the implications of the innovation:**

The viral marketing effort generated enthusiasm, not only among the students engaged in the work, but also among their peers in the PMM program. For example, The project will continue into a 4th semester next fall (in PB 425 Consumer Behavior). The students from this semester are already recruiting underclassmen to head up the project.

**Reflect on what is working and why it is working:**

This worked because the students felt that it was "real" and that it touched their lives. The success of the PMM program may directly impact their career prospects. In addition, the use of cutting edge media such as Second Life, Facebook and YouTube is timely and reflects the real activities of today's youth.

**Describe student reaction to the innovation:**

The use of viral marketing actually spread virally throughout the PMM program! Students told students. The tactics (YouTube, Facebook, web links, word-of-mouth) began to appear in other students' projects across the program. Essentially, most of the students in the major are now familiar with viral marketing tactics and are using cutting edge media in their course projects.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

I may apply the idea of viral marketing to other types of projects

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

PB 425, Consumer Behavior

**What advice would you give to other people adapting this innovation?**

The use of new media requires an investment of time and has a steep learning curve for the instructor. However, it was well worth the investment.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Problem Based Learning Using Popular Media**

**Name of Innovator: Jennifer S. Pitonyak**

**Telephone Number: 215-596-8694 Email Address [j.pitonyak@usp.edu](mailto:j.pitonyak@usp.edu)**

**Department: Occupational Therapy**

**Type of Students: P2**

**Type of course or activity where implemented: Required**

**Leahy Innovation Submission: No**

**Course or activity where implemented: OT 443/642: Occupational Therapy Interventions III: Psychosocial Issues**

**Describe rationale or goals of innovative educational activity:**

Problem-based learning provides the opportunity for students to develop essential skills of critical thinking, locating and evaluating resources, and working collaboratively. Occupational therapy students will be required to use innovative problem-solving in a variety of settings and situations. This educational activity of problem-based learning allows students to engage in the layered process of critical thinking in a manner consistent with what will be encountered in clinical practice. This learning activity is also successful in addressing the objectives of this course, such as applying theoretical concepts to intervention planning and using professional literature to make informed practice decisions.

**Describe the innovation and its implementation:**

The students were assigned to PBL teams of 4-5 students by the course instructor at the start of the semester. Each team developed group expectations for collaboration and completing assignments given instructor input about the PBL process. Teams were assigned a first case or problem based on a character from the book, "Crazy" by Pete Earley. The instructor provided a framework of areas to address in researching this problem and developing an occupational therapy intervention plan for the client. Students had two lecture and one lab session to work together on locating resources and developing an occupational therapy plan. Each team presented their problem solving process and intervention plan outcome as a 25-30 minute oral presentation to the class. Required documentation to support the oral presentation included a description or map of the problem-solving process, demonstration of one of the developed intervention techniques, and documentation of the search for evidence. Students completed self and peer assessments of participation in the PBL process. The process was repeated for a second case/problem based on news stories of individuals with specific health conditions.

**Describe any changes in the implementation:**

The fall semester 2008 was the first time this innovation was implemented in the OT 443/642 course. In addition to the book, "Crazy", I plan on using popular movies that address psychosocial health conditions as the source for problem material for fall 2009. I also plan on including either a midterm or final exam covering material from the PBL presentations in the course the next time, in order to reinforce with students that they are learning new content through this process.

**Describe outcomes, and the implications of the innovation:**

Although this was the first time this instructor taught this course, the quality of student work and student assessment of satisfaction with this course was greater than expected. One significant outcome was that several students commented that this course had stimulated their interest in practicing OT in a psychosocial practice setting--something they had not previously considered. Based on the presentation assignment grades, students were successful in meeting the objective of the course for assessment and intervention planning with clients with psychosocial needs. Beyond gaining experience with this process, assignment grades reflected students'

increased awareness of issues such as cultural competence, ethics, and policy/legal considerations in relation to the case. Also based on instructor observation and assignment performance, students demonstrated greater respect and value for telling a client's story as part of the intervention process.

The instructor plans on assessing outcomes based on key learning assignments from year to year.

**Reflect on what is working and why it is working:**

This innovation was well received by the students and worked for several reasons. First, it incorporates the students' consistent preference for active learning experiences in their OT coursework. This learning activity also worked because it used popular media sources as the basis for case/problem information, allowing the students to engage in the clinical reasoning process of learning and telling a client's story.

**Describe student reaction to the innovation:**

Students completed a survey assessing the PBL process within this course in addition to the standard course evaluation. Student ratings and comments reflected a preference for active learning over more traditional lecture or discussion. Several students commented on the value of searching beyond their textbooks in order to solve problems.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

In the fall of 2009, I plan on implementing a midterm or final exam to further measure student learning of content from the PBL presentations. I also plan on looking for new sources of popular media, including movies that may be appropriate.

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

I teach OT 488/615: Therapeutic Activity Groups, which the students take in the spring semester of the P1 year. I have added several problem-based learning experiences to this course on a smaller scale, including the format of the final exam. Being a course on group process and a major foundational course for OT 443/642, I have implemented a final exam that uses the format of solving a problem depicted in a video clip on health disparities through team planning of a group protocol for this population.

**What advice would you give to other people adapting this innovation?**

In adapting this innovation, I was apprehensive that this learning activity would allow for adequate exposure to course content and fully address the course objectives. In assessing the student presentations of each case/problem, I found that student learning likely exceeded the course content. Students had the opportunity to become experts on a particular problem area while demonstrating competence with all other course objectives.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

## Leahy Finalist

**Title of Innovation: SMILE (Scientific Method and Information Literacy Exercise)**

**Name of Innovator(s): Jason A. Porter; Alison M. Mostrom; Kevin C. Wolbach;**

**Catherine B. Purzycki; Leslie A. Bowman; Eva Agbada**

**Telephone Number(s): 215-895-3157(jap); 215-895-1137 (amm); 215- 895-3129 (kcw); 215-596-8498 (cbp);215-596-8964 (lab); 215-596-8962 (ea)**

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**Department(s): Biological Sciences, Information Science**

**Type of Students: Primarily 1st year (PharmD and most other majors) and 2nd year Physical Therapy**

**Type of course or activity where implemented: Required, Core Curriculum/General Education**

**Leahy Innovation Submission: Yes**

**Course or activity where implemented: Activity: SMILE; part of course (17.71 % of grade) BS104: General Biology II.**

### **Describe rationale or goals of innovative educational activity:**

#### **Goals:**

1. Further develop students' understanding of the scientific method through reading primary scientific literature.
2. Develop students' information literacy skills of searching for and accessing scientific literature.
3. Provide a "learning-centered" activity in a large enrollment course. This activity develops students' conceptual and procedural knowledge dimensions (Anderson et al. 2001) by requiring application, analysis, and evaluation of the Scientific Method and creation of an experimental design based on a hypothetical future research question.

### **Describe the innovation and its innovation:**

SMILE is an information literacy exercise that leads approximately 400 students in BS104 (General Biology II) on a non-linear path to experience the scientific method as it is used by scientists in the presentation of their research. This path helps debunk the myth that the scientific method is a lock-step, linear process. This innovation has multiple steps that are accomplished over a one-month period at the beginning of the Spring Semester. SMILE has been implemented in Spring 2008 and Spring 2009 and represents a major revision to the former "Library Project" (assigned in General Biology II BS104 from 1994-2007).

1. One week prior to assigning SMILE:
  - A. students:
    - I. complete VARK: a learning style inventory, in order to determine the extent to which they are Visual, Aural, Read/Write, and Kinesthetic learners;
    - II. complete a knowledge and attitudinal pre-test.
  - B. Leslie Bowman: provides a 50-minute class on: (i) discerning primary and secondary literature; (ii) summarizing scientific literature while avoiding plagiarism; (iii) using databases (ProQuest and Google Scholar) to find additional relevant resources for a research project. The class includes an exercise on paraphrasing while avoiding plagiarism. During this session, students are assigned a volume and issue of the journal Animal Behavior from which they choose one article to use in completing SMILE.

- C. faculty of BS104 General Biology II (Porter; Mostrom; Wolbach): provide a 50-minute in-class seminar reviewing a model of the SMILE exercise including the analysis of the journal article. This model is available to students electronically as a reference for the duration of the project.
2. SMILE: students are provided three weeks to complete and submit the project including the primary journal article that they have chosen. During this time, students are encouraged to seek guidance from faculty in both departments (Biological Sciences and Information Science). Students are assigned a volume and issue of the journal *Animal Behavior* from which they choose one article to assess. The main goal of SMILE is for students to better understand the scientific method by reading a primary literature article (these are largely first year undergraduates). SMILE requires students to analyze and evaluate a data figure and to relate the data therein to the broader question posed by the primary article. Their careful evaluation of a primary article introduces students to the process by which scientists critique scientific literature, and helps students realize that the scientific method is not a linear process. After analyzing and understanding the details of the data embedded within one figure related the broad research question of the article, students pose their own, related research question and experimental design. Finally, students use ProQuest and Google Scholar to find additional references related to the journal article. Through these steps, this project develops students' information literacy skills and serves as a foundation upon which future exercises can build.
  3. After completing SMILE students repeat the attitudinal and knowledge survey as a post-test. The comparison of the pre-test (given prior to any information about SMILE) and post-test (given at the completion of the exercise) data provides the faculty with an understanding of the knowledge acquired and any attitudinal changes occurring due to the SMILE innovation.

**Describe any changes in the implementation:**

This implementation of what was formerly known as the "Library Project" (which has been in existence for at least 13 years) has been dramatically revised to reflect current technology. Instead of submitting paper copies, students now use the course management software Angel to complete and submit SMILE and the accompanying file of their primary article. This rendition of this project also better reflects how scientists critique papers by requiring students to analyze and evaluate data represented by figures and requiring students pose hypothetical experiments to further investigate the broad research question proposed by the scientific paper. Additionally this version of the project measures knowledge gain and attitudinal response to this innovation.

**Describe outcomes, especially learning outcomes, and the implications of the innovation:**

Note: Listed in an order that is congruent with Goals listed above.

Those students who successfully completed SMILE achieved the following learning outcomes

- 1a. Students applied principles of the scientific method.
- 1b. Students analyzed and evaluated primary scientific literature.
- 2a. Students differentiated between primary and secondary scientific literature.
- 2b. Students appropriately interpreted and paraphrased scientific literature while avoiding plagiarism, demonstrating ethical use of scientific information.
- 2c. Students demonstrated their ability to retrieve scientific literature from electronic databases effectively and efficiently (which satisfies USP's Information Literacy General Education Skill)
3. Based on their analysis and evaluation of a scientific research question and experimental protocol, students created a future research question and an accompanying experimental design.

## **Analysis of the data:**

2008 results: Due to the take-home nature of this assignment, the mean grade on SMILE was 87 with a range of 38-100. This grade does not seem to be correlated with exam or final grades in the course, but might be correlated with ability to follow directions.

Knowledge Gain: A comparison of the pre- and post-tests revealed knowledge areas that increased through the completion of this assignment. Students were clear on the definition of a primary article with the percent who responded correctly increasing from 83% to 94% on the pre- and post-test, respectively. However, only 39% of students correctly identified the correct definition of a secondary article on the pre-test while 80% responded correctly on the post-test (showing an improvement of 41%). This represents a significant increase in knowledge through the completion of this assignment and shows an increase in information literacy. Finally, only 32% of students correctly identified the proper use of Science Direct for accessing a specific journal article on the pre-test and 45% responded correctly on the post-test (showing an increase of 13%). While there was some knowledge gained, more than half of the students still did not increase their awareness of this use of a commonly used database for accessing scientific journals. This is interesting in light of the fact that students used Science Direct to access their primary literature articles. Further investigation is warranted to determine why, after using Science Direct, students are still unaware of its primary function.

Attitudinal Change: In the pre- and post-tests, students were asked about the relevancy of understanding the scientific method, accessing primary literature and analyzing primary literature to their careers at USP. Here we present the data for responses of "extremely relevant" by students on pre- versus post-test. "Extremely relevant" was one of five possible responses, with the four other possible responses being "very relevant"; "relevant"; "not relevant"; and "not at all relevant"; the "extremely relevant" response is a good sentinel of the trend in the data for all of the possible responses. Forty percent of students responded that the scientific method was extremely relevant on the pre-test and 45% on the post-test representing little change due to the innovation. However, only 10% of students responded that accessing primary literature is extremely relevant on the pre-test while 22% responded that it is extremely relevant on the post-test (showing a 12% increase). Likewise, 15% of students felt analyzing primary literature was extremely relevant on the pre-test, while 29% responded extremely relevant on the post-test (showing a 14% increase).

Students already had an appreciation for the importance of the scientific method prior to the SMILE pre-test; therefore SMILE itself did not increase their perception of the high relevance of the scientific method. In contrast to this, SMILE did increase students' understanding of the relevance of information literacy to their academic careers. These students are exposed to the scientific method multiple times throughout their first academic year and this exposure may reflect their appreciation for its relevance. However, this is likely their first explicit exposure to information literacy and thus justifies exposing students to this exercise early in their academic careers.

## **Reflect on what is working and why it is working:**

Information Literacy Skills Foundation:

This project is a collaboration between faculty in the Departments of Biological Sciences and Information Science. The participating faculty recognize the vital importance to the success of USP students of understanding the scientific method and acquiring good information literacy skills.

**Describe student reaction to the innovation:**

Based on student comments on the post-test, some students' felt the innovation was tedious and time consuming, but many commented (including those that felt it tedious) that it is useful for teaching information literacy and is a relevant topic to their future careers. Several students appreciated being taught how to avoid plagiarism while paraphrasing scientific literature.

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

It has already been implemented in 2009. We deleted redundant sections of the 2008 SMILE in the 2009 SMILE in response to students' constructive criticism. We will continue to implement SMILE (with revisions made as deemed relevant to student learning).

**Will you implement this innovation in other courses? No  
Describe the other courses:**

N/A

**What advice would you give to other people adapting this innovation?**

When asking students to complete an assignment that is at a higher cognitive skill level than is used within the rest of the course, provide a model and spend time reviewing the model. Within the model, provide a Likert grading scale that explicitly states how the project will be graded. This not only helps students, but it helps faculty grading the project. If using a 100% electronic platform, have at least one team member who is knowledgeable of that platform and who will field questions from students.

**Additional Comments:**

This innovation was awarded USP's Teaching and Learning Center's 2008 Educational Bright Idea Award and a poster was presented highlighting the 2008 SMILE Project. Kenneth Leibowitz and Phyllis Blumberg provided valuable guidance on the pre- and post test.

This innovation has been accepted at two peer-reviewed educational meetings:

1. The National Teaching Professor Conference (June 5-7, 2009; Washington, DC)
2. The Regional Lilly-East Conference on College and University Teaching (April 16-17, 2009; Newark, DE)

The "Library Project" from which this project emerged was presented previously: Pearson's Strategies for Success Workshop series (March 27, 2004; Montgomery County Community College, Blue Bell, PA)

Learning-Centered Teaching references:

Anderson, L. W., D. R., Krathwohl, P. W. Airasian, K. A. Cruikshank, R. E. Mayer, P. R. Pintrich, J. Raths, and M. C. Wittrock. 2001. A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman Publishers.

Blumberg, P. 2008. Developing Learner-Centered Teaching Practices: A Guide for Faculty. San Francisco, CA: Jossey-Bass.

Fleming, N. 2001. VARK: a guide to learning styles. <http://www.vark-learn.com>

**Title of Innovation: Instilling Principles of Population Growth Using an Ecological Footprint Assignment.**

**Name of Innovator: Jason A. Porter**

**Telephone Number: 267-295-3157 Email Address: [ja.porter@usp.edu](mailto:ja.porter@usp.edu)**

**Department: Biological Sciences**

**Type of Students: First and Second Year General Education Students.**

**Type of course or activity where implemented: Required, Core Curriculum, General Education**

**Leahy Innovation Submission: No**

**Course or activity where implemented: General Biology II**

**Describe rationale or goals of innovative educational activity:**

Students often have difficulty understanding the relevancy of basic, yet fundamental concepts in biology. One of these concepts is population growth and demographics. All populations of organisms grow and are restrained by similar factors. Students do not always understand how a bacterium and a human can grow in fundamentally the same way. To illustrate the fundamentals and importance of population growth, students were asked to calculate ecological footprints, or the amount of land in global acres it takes to sustain one daily living activity. This applied example is one the students can understand and makes evident that as populations of organisms grow, they become limited by available resources and this in turn, increases competition among the members of this and other populations. Understanding this concept is important for understanding evolution through natural selection and patterns of diversity, so an application to make this concept readily available to General Biology II students is necessary.

**Describe the innovation and its implementation:**

Students were asked to take a pre-test concerning the issues of population growth and sustainability. Once the pre-test and a modeling session on the exercise were completed (students were given one week to complete the pre-test), students were instructed to go to the website [www.ecofoot.org](http://www.ecofoot.org) maintained by the Ecological Footprint Network. This site contains an ecological footprint calculator. Students are asked a series of questions about their lifestyle habits and these answers are used to calculate the number of acres it takes to support this lifestyle. Students were then instructed to pick up to three categories and make changes to their lifestyle that they would be willing to sustain. The categories in which students can make changes are: services, shelter, food, mobility and goods. The calculator then returns a new ecological footprint value. Students are instructed to record the data for their original and edited footprint in an angel assessment. This data is compiled and presented in a lecture to show students how resources limit growth of populations and how overuse of resources is not sustainable. Finally, students took a post-test to assess knowledge and attitudinal adjustments concerning these topics. This was given as an extra credit assignment in BS104-03 worth 3 points towards their final grade.

**Describe any changes in the implementation:**

I implemented a similar innovation in a non-major biology course at Lehigh University, but this was a smaller class (approximately 60 students) as opposed to the approximately 100 students in BS 104-03. The footprint calculator maintained by the Ecological Footprint Network has been updated since I first implemented this innovation to be more user-friendly.

**Describe outcomes, and the implications of the innovation:**

1. Students understand the biological principles that govern population growth.
2. Students understand how the growth of populations impacts the availability and sustainability of resources.
3. Students increase their awareness of environmental stewardship and become increasingly interested in doing their part to promote sustainability.

**Reflect on what is working and why it is working:**

This innovation is an effective application to teach fundamental principles of population growth and sustainability. Students are more willing to learn about population growth when they understand that the supply of natural resources available to the human population is strongly tied to this principle. This innovation has also instilled a greater interest in environmental stewardship among of the participating students.

**Describe student reaction to the innovation:**

Many students were excited to take this quiz and see how their lifestyles impact the use of natural resources. These students were surprised that their footprint was so high and were interested in implementing changes in their lifestyle to minimize their footprint. Other students felt their footprint was the unavoidable consequence of living in an industrialized country and did not plan to implement any changes to their lifestyle.

**Will the innovation be sustained within the course? Yes**

**If Yes, will you do anything differently?**

I plan on making this assignment a regular part of the course as opposed to an extra credit assignment.

**Will you implement this innovation in other courses? No**

**Describe the other courses:** N/A

**What advice would you give to other people adapting this innovation?**

This innovation requires three weeks for implementation. One week for the pre-test, one week for the students to take the assignment and one week for the instructor to present the data to the class and the students to complete the pre-test.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Cognitive Learning Approach to Lectures**  
**Name of Innovator: Allison E. Radwick**  
**Telephone Number(s): 610-888-2114 Email Address: [a.radwick@usp.edu](mailto:a.radwick@usp.edu)**  
**Department: Pharmaceutical Sciences Department**  
**Type of Students: All**  
**Type of course or activity where implemented: Other lecture, seminar/discussion**  
**Leahy Innovation Submission: No**  
**Course or activity where implemented: Pharmacology and Medicinal Chemistry**

**Describe rationale or goals of innovative educational activity:**

Learning is a complex procedure that overwhelms most people especially with a large amount of material. The "intended learning outcomes" should be defined prior to teaching and an effective teacher must understand the subject being taught, the student in the class, the learning process, and the interrelationships that exist in the components of education. An effective teacher assists students in reaching the learning outcome while the student builds self-esteem and confidence. True learning is based on relationships: teacher with student, student with subject, and learning with memory. Memory is an important link between the student learning and retaining information and the cognitive process of applying that which is learned. Memory links can only be reached only after the student is encouraged to put the curriculum into a perspective that can be entered into memory. Organization of material into long-term memory involves sorting, relating, arranging, and grouping information so that it can be remembered. Most students have more trouble remembering than they do learning. Therefore, to help the memory process, the students were introduced to various organizational techniques by the question and answer sessions during lecture, in class quizzes to begin review for exam and CNS Jeopardy review.

**Describe the innovation and its innovation:**

- Question and answer sessions during lecture
- Just so you know slide to put the material into perspective in terms of pharmacotherapeutics and other current information You tube Gave 4 optional assignments to help students gain points on the final exam as well as help them study
- Case studies in recitation Last week of class - in class quizzes to begin review for exam Review of material for exam was CNS Jeopardy

**Describe any changes in the implementation:**

Just so you know, Questions slides about just learned material and case studies in recitation were used last block. Next block used Just so you know, Questions slides about just learned material, optional assignments, Case studies in recitation, Last week of class - in class quizzes to begin review for exam and Review of material for exam was CNS Jeopardy.

**Describe outcomes, especially learning outcomes, and the implications of the innovation:**

Class average for this exam was much higher and most students turned in optional assignments. Many students were appreciative in this change in approach and felt they learned more than in other blocks. Material learned was able to be applied from one block to the other.

**Reflect on what is working and why it is working:**

The class average was higher for the second block and most students were able to problem solve and link information from one topic to another

**Describe student reaction to the innovation:**

Some students did not like the amount of information (or rather additional information). Most students were appreciative with assignments not just for the extra points but in helping to understand the material, in class quizzes and jeopardy session.

**Will the innovation be sustained within the course? No  
If Yes, will you do anything differently?**

N/A

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

There are 4 instructors in this course and each has a different teaching style.

**What advice would you give to other people adapting this innovation?**

The assignments and Jeopardy can easily be adapted to any class. Helping students understand where and why the information is important helps them to become more interested in learning the material.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Building Pharmacy Student Cultural Competency Through Learner-Centered Teaching**

**Name of Innovator: Karen J. Tietze**

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**Department: Pharmacy Practice/Pharmacy Administration**

**Type of Students: Doctor of Pharmacy**

**Type of course or activity where implemented: Elective**

**Leahy Innovation Submission: No**

**Course or activity where implemented: PP340 Cultures and Therapeutics**

**Describe rationale or goals of innovative educational activity:**

The 2006 American College of Pharmaceutical Education (ACPE) accreditation standards and guidelines for the professional programs in pharmacy leading to the doctor of pharmacy degree include a requirement that the curriculum addresses cultural competency. However, there is a paucity of published literature regarding cultural competency education in Colleges of Pharmacy. The only two contemporary reports of cultural competency coursework for pharmacists are from the University of Minnesota and the University of California at San Francisco (Westbert AJPE 2005; Assemi Ann Pharmacother 2004). The University of Minnesota College of Pharmacy report described the addition of 2-4 hours of cultural competency enhancements to a pharmaceutical care laboratory course (readings, role playing, videos, case discussions and reflective writings) (Westbert AJPE 2005). The University of California San Francisco described an 8-hour didactic-based cultural competency training elective course for pharmacy students (Assemi Ann Pharmacother 2004). More typically, cultural competency experiences in pharmacy curricula consist of presentations of cultural competency topics and sensitivity training at faculty meetings, student orientations, student professional organizations, preceptor training sessions and staff meetings (Onyoni EM et al. AJPE 2007). The Cultures and Therapeutics course was developed to give students an opportunity to take a unique two-credit, learner-centered, cultural competency course designed specifically for pharmacy students.

**Describe the innovation and its implementation:**

The innovations associated with the Cultures and Therapeutics course include the course content and the learner-centered teaching methods. The course content was designed to progressively build the skills necessary for pharmacists to successfully interact with patients from diverse cultures. At the start of the semester, students completed several individual self-reflection surveys and in-class group activities designed to increase self-awareness of cultural biases and issues. Students were given a variety of tools (e.g., the LEARN model and the ESFT patient-based model) for interacting with patients from diverse cultures. To build student understanding of the impact of culture on health, several class periods were devoted to discussions that culminated in characterizing the U.S. Healthcare system culture. Several more class periods were devoted to discussions of Fadiman's book "The Spirit Catches You and You Fall Down", the true story of the clash between a Hmong patient and family and the US Healthcare system. Discussions centered around understanding the differences between the Hmong culture and the US Healthcare system culture with a specific focus on the management of the patient's difficult-to-control epilepsy. The final discussion about the book involved brainstorming ways that pharmacists could have better handled the challenges with the patient situation described in the book. Students were then randomly assigned to teams of four students per team to complete a project culminating in a poster presentation characterizing a unique culture (Tlinget, Appalachian, Somalian, Albanian, Marshallese) with an emphasis on the differences between the culture and the US Healthcare culture in terms of pharmacy-related issues. The teams also completed a cultural resources project consisting of identifying a comprehensive set of resources (textbooks, journal articles, websites, organizations etc) for pharmacists interacting with patients from their assigned culture. With the exception of the introductory lecture and a lecture on the characteristics, etiology, and pharmacotherapeutics of

Lennox-Gastaut Syndrome (an unusual form of severe epilepsy), all class time was devoted to active learning exercises, group work, and group discussions of pre-class assignments. Rubrics were developed to assess class participation (25% of the course grade), the cultural characteristics poster presentation (50% of the course grade), and the cultural resources project (25% of the course grade). Peer evaluations were used to assess individual contributions to the team projects.

**Describe any changes in the implementation:**

A one-hour class period was not enough time for the poster presentations. The faculty assessing the presentations felt rushed and the students did not have time to see each other's presentations. More class time needs to be devoted to the presentations.

**Describe outcomes, and the implications of the innovation:**

The students clearly experienced a shift in their beliefs about other cultures and have changed their view of how pharmacists can and should interact with patients from other cultures. At the end of the class discussions of Fadiman's book, many of the students felt that the solution to the Hmong-US Healthcare system clash was to simply impose the US Healthcare system culture on the patient. The student posters demonstrated that the students now have an awareness of how different other cultures are compared to the US Healthcare system culture. Many of the recommendations for pharmacist-patient interactions made by the students included recommendations changing the behavior of US health care professionals. Students will be surveyed at the end of the semester to assess their perceptions regarding their cultural competency. The data will be compared to previously data. Student evaluation of teaching response will be used to modify the course as needed.

**Reflect on what is working and why it is working:**

The course design, content, activities and learner-centered teaching methodologies all seem to be working to achieve the goals of the course.

**Describe student reaction to the innovation:**

The students accepted their responsibilities with a great deal of enthusiasm and seemed to enjoy working on the team-based activities. The students understand that cultural competency is an important issue for pharmacists

**Will the innovation be sustained within the course? Yes  
If Yes, will you do anything differently?**

I will allocate more time to the poster presentations.

**Will you implement this innovation in other courses? Yes  
Describe the other courses:**

I will continue to utilize learner-centered teaching, team-based learning, and peer evaluations in other courses.

**What advice would you give to other people adapting this innovation?**

The students embrace the responsibilities given them in learner-centered teaching.

**Do you want this abstract to be considered for a Bright Idea Award? Yes**

**Title of Innovation: Development and Integration of Learning Portfolios Across a Curriculum**

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**Department: Physical Therapy**

**Type of Students: Students in professional years of the DPT program**

**Type of course or activity where implemented: Required**

**Leahy Innovation Submission: No**

**Course or activity where implemented: PT 425 – Neuroscience, PT 486 – Pathophysiology II, PT 527 – Neuromuscular I, PT 529 – Neuromuscular II**

**Describe rationale or goals of innovative educational activity:**

Acquisition and retention of foundational science content and integration into upper division course work often challenges students. Through a process of developing course portfolios, tied to curricular objectives over a four course sequence, students created, revised, applied and integrated knowledge to meet learning goals for knowledge acquisition and application.

**Describe the innovation and its implementation:**

The purpose of this pedagogical research was to enhance the depth and breadth of student's learning across a sequence of courses spanning four semesters through the development and use of portfolios. Using Schön's Model of Technical Rationality as a framework, <sup>1</sup> basic science coursework provided a foundation upon which applied clinical sciences inclusive of affective and psychomotor skills were built. Consistent with the Clinical Learning Spiral curricular model <sup>2</sup> students engaged in an active, reflective learning process, evolving from simple to complex and related to knowledge and professional growth. Classroom and experiential learning activities were blended to provide a broad learning experience for students. Students integrated these learning portfolios into examinations, classroom and hands-on learning activities. Portfolio contents were revised as students gained more knowledge and experience through this sequence of coursework.

**Describe any changes in the implementation:**

Faculty has met annually to review the effectiveness of these course portfolios in attaining established course learning objectives. The portfolio assignments have been revised to comprehensively address the breadth of material covered across these courses. Faculty has developed specific assignments in the upper courses that integrate the portfolios into the classroom.

**Describe outcomes, and the implications of the innovation:**

Student feedback on utility of the instructional activities and assignments was solicited annually via survey that included a 5 point Likert scale, as well as the opportunity for open ended comments. Quantitative data analysis indicated that 100% of students from two cohorts agreed that the portfolios helped them learn material in foundational coursework. The agreement for the utility of the portfolios in subsequent courses ranged from 64% - 83% across these cohorts.

Completion of these portfolios allowed students the opportunity to look forward to see how foundational material would be integrated with subsequent higher level coursework. For the students in the higher level courses, these portfolios served as a resource as they grappled with more complex material. Effective utility of the portfolios was best achieved when faculty were explicit about how students could best use the portfolios for newer learning activities.

**Reflect on what is working and why it is working:**

These portfolios are working because they provide a foundation that facilitates student to student collaborative interaction for solving complex clinical dilemmas. Faculty across the courses used the portfolios to identify, plan and assess attainment of instructional and course objectives. Development of this learning portfolio has met the goal of enhancing student's acquisition and retention of knowledge across an integrated curriculum.

**Describe student reaction to the innovation:**

Students report that they use these portfolios well beyond classroom assignments including clinical affiliations and to prepare for national licensure examination.

**Will the innovation be sustained within the course? No**

**If Yes, will you do anything differently?**

N/A

**Will you implement this innovation in other courses? No**

**Describe the other courses:**

**What advice would you give to other people adapting this innovation?**

- Keep the assignments grounded in course objectives.
- Developing clinically relevant assignments maximized student engagement in the assignments and facilitated their utility upon completion of the course.

**Do you want this abstract to be considered for a Bright Idea? Yes**

**Title of Innovation: On-Line Quizzes: A Useful Tool for Students to Self-Assess Their Knowledge of Statistics**

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**Department(s): Mathematics, Physics and Statistics**

**Type of Students: This innovation involves students enrolled in ST310. The typical ST310 students are third year students in the Doctor of Pharmacy program, and second year students in the Physical Therapy and Occupational Therapy program.**

**Type of course or activity where implemented: Required, Core Curriculum/General Education**

**Leahy Innovation Submission: No**

**Course or activity where implemented: ST310 - Introduction to Biostatistics**

**Describe rationale or goals of innovative educational activity:**

Engaging the student in self-assessment is a critical and early part of the assessment process (Wiggins, 1992 and Garfield, 1994). Many instructors believe that the purpose of assessment is to assign grades to students. We would like to argue that the purpose of assessment should be to improve learning and teaching. In particular, students need to learn how to take a critical look at their own knowledge, skills, and applications of their knowledge and skills. Self-assessment can help students understand their strengths and weaknesses and become more aware of their own success in learning without an impact on their grades.

Online quizzes are a good self-assessment tool since students' skills and knowledge level can easily be measured and students can receive immediate feedback for each question. At the same time, the online quizzes offer us a way to identify and reflect on what is working and what is not working in our classes.

**The goals of this activity are:**

1. to improve student's problem solving skills in statistics;
2. to improve understanding of statistical concepts;
3. to give students immediate feedback on their statistics knowledge;
4. to enable students to develop self-assessment skills;
5. to encourage students to be involved with self-learning.

**Describe the innovation and its implementation:**

In the spring semester of 2008, we started using online quizzes as a form of students' self-assessment in ST310-Intro to Biostatistics and, because of their educational value, we are still using them. The quizzes were not counted toward the students' grade, but they were offered as a tool for the student to self-evaluate their understanding of the material. However, in Fall 2008 and Spring 2009, some of the ST310 sections counted the quizzes as a minimal part of the students' grade.

The quizzes are made available to the students on Angel immediately after the material is covered in class. Each quiz focuses on a specific statistical concept or methodology. The quiz questions are designed as multiple choice questions or true/false questions. Some of the questions test knowledge or comprehension (conceptual and procedural knowledge), while other questions are designed as application questions. After the students complete the quiz, they receive immediate feedback on their overall performance and on their performance on each specific question.

Currently we have a databank with more than 200 questions available. The topic or methodology tested by each question is specified by using keywords. Based on the keywords specified by the instructor, a specific number of questions (also specified by the instructor) would be randomly selected from the databank each time a student starts the quiz. Thus, a student can take the quiz on the same topic several times and, most likely, would get different questions every time. The number of quiz submissions and the maximum time allowed for each quiz can be specified by the instructor.

For each quiz, Angel records the name of the students that accessed it, their scores, and their number of submissions. This information can be used by faculty to monitor the level of the students' understanding, immediately after a concept or methodology is introduced.

### **Describe any changes in the implementation:**

In Spring 2008, since it was the first time that we were using this tool, we did not have too many questions included in the databank, therefore a student taking the same quiz several times would most likely get the same questions.

In Fall 2008, we increased the number of questions included in the databank. In addition, when a wrong answer was given a more detailed feedback was provided to the student. Also, in Fall 2008 and Spring 2009, in an effort to encourage students to take full advantage of the activity, some of the ST310 sections counted the quizzes as a minimal part of the students' grade. For these sections, the students were allowed to take each quiz up to 5 times. All quizzes were graded on a pass/fail basis. In order to receive a passing grade for a quiz, the student had to score at least 70% on one of the five quizzes. This minimum score was deemed high enough to force students to study the material before attempting the quiz, while at the same time it was low enough that the students would not have a problem in achieving the required score. This way, the students would not feel too stressed about the activity and focus on learning the material. The second semester this policy was implemented, the minimum score was dropped to 50%, as 70% proved to be harder to achieve than originally thought.

However, in view of the fact that wanting to learn is considered one of the primary factors in successful learning, in the other sections of ST310 the online quizzes were used entirely as a self-assessment tool. The students were given the freedom to choose if they wanted to take advantage of the online quizzes, the freedom to choose to learn, and once they made that decision, we believe that their motivation was enhanced, and their learning was deeper.

### **Describe outcomes, and the implications of the innovation:**

Based on the access log we were able to determine that every student enrolled in ST310 accessed the online quizzes at least once during the semester. The benefit of the online quizzes is also supported by the fact that the overall average gain in the standardized assessment test, Statistics Concept Inventory (SCI), increased by 50% relative to the overall average gain over the past three semesters. Furthermore, there is an indication that students in sections where the quizzes were part of their course evaluation tended to demonstrate higher scores in the gain in the standardized assessment test, in some cases, reaching an 80% increase relative to previous years. Thus, this further demonstrates the utility of the online quizzes as a means of enhancing understanding of the concepts taught in the class. However, in the sections in which the quizzes counted toward the students' grade, the intrinsic motivation to learn was no longer a component of the learning process. Hence, students may not have perceived this tool as any different from any other course assessment tool, such as exams and projects.

### **Reflect on what is working and why it is working:**

The educational benefit of a self-assessment tool, such as our online quizzes, is based on these four important factors:

- Wanting to learn (intrinsic motivation): in some of the ST310 sections the students were not required to take the quizzes as part of their grade, therefore it was entirely their choice if they wanted to take them and how many times they wanted to take them;
- Needing to learn (extrinsic motivation): students are aware of the fact that the material included in the quizzes is also the material that they need to learn for the exams; setting relatively low minimum thresholds for scores on the quizzes can encourage the students to attempt the quizzes, while at the same time it reduces the stress related to the impact of these quizzes on the students' grades in the class.
- Learning by doing (practice, trial and error): students can take a quiz several times; in this way they practice and they can learn from their mistakes without being severely penalized or not penalized at all;
- Learning through feedback (praise, constructive criticism): students who do well in the quizzes will build confidence, and students who do not do well can learn through the immediate feedback.

### **Describe student reaction to the innovation:**

The majority of the students in ST310 recognized that the online quizzes helped them in their learning process. In particular, they appreciated the possibility to self-assess their knowledge prior to an exam. Students who intensively used the online quizzes felt more comfortable with the material and improved their performance on the exams.

### **Will the innovation be sustained within the course? Yes If Yes, will you do anything differently?**

We plan to design questions in such a way that if students give the wrong answer they will be asked follow-up questions that will guide them toward the correct answer.

### **Will you implement this innovation in other courses? Yes Describe the other courses:**

We are considering the possibility to use this self-assessment tool also in introductory graduate courses, and in advanced undergraduate/graduate courses.

### **What advice would you give to other people adapting this innovation?**

We would advise other people who want to adopt this innovation to start creating the databank well in advance, to include a large variety of problems, and to include feedback.

### **Do you want this abstract to be considered for a Bright Idea Award? Yes**