



2014a Departmental Impact Grant Final Report

School of Environment and Natural Resources

Prompt, Authentic, and Clear: Improving Assessment in a Student Research Poster Event with an Online e-Review System



2013 Environmental Science Student Symposium, November 12, 2013, Archie Griffin Grand Ballroom, Ohio Union, The Ohio State University (OSU). The symposium consisted of over 625 poster presentations by undergraduate students enrolled in the class “Introduction to Environmental Science” during the autumn 2013 semester at OSU. This photograph shows approximately 250 of the 625 posters that were on display that day as well as students, staff and faculty who were participating in the symposium.

Effective instructor assessments and peer reviews teach students how to become better writers and speakers by focusing their attention on particular details and considering the input of an actual audience. Dr. Lower and team will adapt an online mobile-friendly system to improve the impact of peer-review by providing an anywhere/anytime platform that students can use to effectively evaluate a large number of posters in an organized, thorough and timely fashion.

Executive Summary

Goals

This project aimed to improve the 2014 Science Symposium, an event where 700-plus students of SENR 2100 present and peer-review scientific posters. We built an online system to manage the peer-review process, thereby making the process more engaging for students and saving hundreds of hours of instructor time, which was put to better use teaching and talking with students about their projects.

Outcomes

The system was built on time, it worked well, students and faculty loved it, and we are working to adapt the system for use in a wide range of student poster events.

Process Analysis

Following one major obstacle – the team who had originally signed on to develop the system was disbanded – the project was a model collaboration. The project ran smoothly and with minimal error, despite necessarily operating on a much abbreviated timeline.

What We Learned, in a Sentence

User-friendly, mobile peer-review technology helps students to think critically, synthesize information and communicate successfully by (1) improving the quality and breadth of evaluations, (2) providing real-time feedback to students, (3) guiding the review process in an orderly fashion, (4) providing a convenient platform that is easily adaptable and (5) preventing errors.

5 Talking Points

- Efficiency gains are pedagogical gains. Instructors can spend time freed to teach and coach students. The system reduced instructor time on this event by about 80%.
- ODEE can build high-quality online systems in-house. 98% of students agreed or strongly agreed that "I was able to accomplish every task that I attempted," and 92% agreed that it was "easy" to do so. Cost was half of one professional estimate.
- Students like using technology, especially when they see value in it. 97% of students agreed that "Instructional technology used in this course helped me learn"; 95% that it "increased my satisfaction with the course."
- System testing and training are important. User-testing identified crucial errors and doubled as preparation for the assignment. 92% of students agreed that "The training and information provided about the system during the semester helped me understand what was expected of me as a presenter," 93% as a reviewer."
- Peer-feedback remains viable at this scale. Students will comment about each others' work, albeit not very deeply: 7725 comments, average 12 words, median 9.

Table of Contents

Executive Summary.....	2
Table of Contents.....	3
Project Committee	4
Project Goals and Objectives	5
Project Implementation	8
Project Assessment	11
Experience of Teaching with Learning Technology	19
Impact Grant Experience	23
Department Chair Statement of Impact	25
By ODEE Team:	25

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Project Goals and Objectives

Overview

Introduction to Environmental Science (ENR2100) is a GE natural science, biological science course. It is required by all students earning a degree from the School of Environment & Natural Resources (SENR) at OSU. As a GE course, ENR2100 is also taken by students from many different departments, schools and colleges at OSU, with 1,000+ students enrolled in ENR2100 each year.

Since ENR2100 is an introductory class for both science and non-science majors, one of the major goals of the class is to give our students the chance to experience the scientific process. Each autumn semester, the 600+ students enrolled in the Drs. Lowers' sections take part in a Poster Day event, where each student presents a scientific poster on a topic of their choice. Those posters are evaluated by faculty and TAs and also peer-reviewed by fellow students.

In previous years, those evaluations and peer-reviews were conducted on paper. Conducting, compiling, and analyzing those evaluations took a long time, meaning both that instructor resources are occupied with paperwork and that students do not receive timely feedback.

The goal of this project was to develop an online application that students could use to conduct their peer-reviews and access the feedback from fellow students.

This goal was achieved. Students in the Fall 2014 Poster Day event made use of an ODEE-built online system to record and receive peer-feedback, and the system worked well.

Goals achieved

- Create and disseminate an online system to facilitate the submission, judging, and coordination of the Autumn 2014 Student Symposium. More detail about the features to be provided is in Appendix A. The system will be developed by ODEE Learning Systems development team.
 - Created a new online system in <https://alpha.osu.edu> called Poster Day that facilitated the scheduling, submission, judging, and coordination of the 2014 Environmental Science Student Symposium that was held on November 25, 2014 in the Ohio Union. Details about the features that are provided by this online system are contained in Appendix A. The system was developed in collaboration with the ODEE Learning Systems development team.
- Improve Student Learning:

- Improved student learning by providing constructive feedback to the students regarding their posters and presentation without any lag between the event and the time that each student received their peer-review feedback. This quick turn around had a positive impact on the success of a students by engaging them in the learning process and encouraging them to think analytically about their work while it is fresh in their minds.
- Improve Student Experience:
 - Improved the students' experience at the symposium by providing an easy to use, mobile-friendly peer-review system that allowed for a more enjoyable and more authentic experience for the students. The students preferred to conduct peer reviews using the new and more efficient technology. Furthermore, professional peer-review is increasingly conducted via online systems, while paper-based evaluation is becoming increasingly obsolete.
- Increase Instructor Efficiency:
 - Increased instructor efficiency by greatly reducing the amount of time that the instructor spends assigning, collecting, and organizing poster reviews and assigning scores to each poster. This allowed the instructor to spend more time meeting with the students prior to, during and after the symposium to provide instruction and insight into how to prepare for and give a professional and well-received presentation. The electronic review system also decreased the number of mistakes made by the instructor as she/he assigns scores to each poster based on the reviews.
- Re-design the poster presentation assignment to make maximum benefit of the online review system.
 - Re-designed the poster presentation assignment to make maximum benefit of the online review system. These changes included the assignment materials and instructions, student training, and presentation rehearsals before the symposium. Three events were held where students could come and preview the peer-review experience of the assignment.
- Build the online system for adaptability for other student assessment and peer-review situations (e.g., manuscript reviews).
- Document a standard procedure and cost-recovery support model for adopting this online system to other departments, courses and university activities (e.g., undergraduate research poster presentations).
 - Collaborations were established during the pilot for two partners to use the system for in-person poster events at OSU (State Science Day and the College of Medicine's Poster Day). Since the pilot ended, a charter has been

composed to develop the system for use in fully online courses in partnership with Digital Scholarship and the College of Nursing.

Goals partially achieved

- Collaboration with ODEE's Digital First team enabled all students to participate with mobile devices, whether or not they have their own.
 - We provided devices, but students did not use them. The Digital First team provided a kit of 12 iPad Airs to be used by students who did not have their own devices; however, zero students requested to use these devices. This was because nearly all students had their own personal mobile phone, tablet or laptop that they used to conduct their peer reviews during the event. A small number preferred to complete reviews on paper.
- Reduce Waste:
 - Reduced waste by using a paperless online review system that totally eliminated the need to use paper, ink and toner for the review process. However, some paper was wasted as we produced copies of review documents, etc., as a backup in case of catastrophe. Those copies were not needed, thus waste was only partially reduced.

Goals not achieved

- None

Goals not actively pursued

- None

Project Implementation

Students affected by pilot

721 students took part in Poster Day

A few thousand student participants in the Ohio Academy of Science's State Science day and the OSU College of Medicine's Poster Day will also soon use the system.

Approximate time spent by SENR faculty and staff on the project

Team Member	Hours
Brian Lower	160
Kylien Clark	40
Total	200

Approximate total cost (not including staff time)

Resources	Cost
None	
Total	\$0

Project Implementation Process/Timeline, aka, Steps Taken to Accomplish Project Goals and Objectives

Milestone/Deliverable	Due	Completed	Responsible
Project Plan drafted	1/31/2014	8/4/2014	Henry, Brian
Feature set defined	3/7/2014	5/1/2014	Henry, Brian, Vedu, Tammy
Development plan approved	7/1/2014	6/19/2014	Henry, Brian, ODEE SLT
DEV: Development scrums	Weekly beginning Fri 7/11/2014	Held as scheduled	Vedu, Henry, Brian, et al.
DEV: Wireframes designed	7/20/2014	7/27/2014	All
IRB Application submitted	7/31/2014	7/21/2014	Brian, Henry
Course materials revised	8/1/2014	8/1/2014	Brian,

			Kylienue, Henry
DEV: Roles administration built	8/15/2014	8/1/2014	ODEE VLS
Pilot Begins (First day of classes)	8/28/2014	n/a	n/a
Course materials (syllabus, assignments, etc.) updated to reflect Poster Day system	8/21/2014	8/21/2014	Brian, Kylienue, Henry
Plans made with Digital First to provide supplemental devices for student use	8/31/2014	8/1/2014	Henry, Steve Lieb
Media Plan complete (MarCom): event promotion + video capture	9/1/2014	9/1/2014	Henry, Justin Troyer, David
DEV: Submissions with metadata	9/1/2014	9/1/2014	ODEE VLS
TAs trained on system use and ready to support students	9/14/2014	8/15/2014	Brian, Kylienue
DEV: Submissions with file upload	9/15/2014	9/8/2014	ODEE VLS
Online web presence for event built (prob in u.osu.edu)	9/30/2014	9/1/2014	Kylienue
Rehearsal planned and materials made	9/30/2014	9/30/2014	Henry, Brian, Kylieene, ODEE VLS
Estimates/calculations of paper-based system complete	10/2/2014	10/1/2014	Brian, Kylienue
DEV: Event administration features built	10/15/2014	10/8/2014	ODEE VLS
DEV: Evaluation and display features built	10/25/2014	10/18/2014	ODEE VLS
DEV: System built	10/31/2014	10/24/2014	ODEE VLS
DEV: Internal testing complete	10/31/2014	10/31/2014	ODEE VLS, Henry
Student poster rehearsals held	11/5/2014	11/20/2014	Henry, Brian, Kylienue, ODEE VLS
DEV: Data export and event materials features built	11/5/2014	11/12/2014	ODEE VLS
System documentation drafted	11/1/2014	N/A	All
Estimates/calculations of online Poster Day system completed	11/10/2014	11/10/2014	Vedu
Posters submitted for printing	11/18/2014	11/1/2014	Brian, Kylienue

			Students
THE SYMPOSIUM	11/25/2014	11/25/2014	Everyone
System documentation complete	12/1/2014	N/A	All
Pilot Complete (Last day of classes)	12/9/2014	12/9/2014	All
DEV: Requirements for additional Science Day development composed	12/25/2014	12/21/2014	Angela, Steve, Vedu
Project Charter for development of system for use in fully online courses	1/31/2015	1/24/2015	Henry, Vedu, Brian

Relation of Charter Timeline to Project Timeline

The Project Timeline was severely impacted by the closure of Digital Solutions. For months past when development work had been scheduled to begin, project leads needed to research and recruit alternative development resources.

Once ODEE's Virtual Learning Systems development team was approved to do the work, the work proceeded at or ahead of the revised, greatly shortened schedule. Using a modified project management method based on agile practices, the team held weekly scrums that ensured that detail-oriented work proceeded at the necessarily brisk pace.

One demonstration how well the timeline operated in this project is that the failure of the Carmen LMS files server, which occurred about three weeks before the Poster Day event and which effectively halted all ODEE development work on the system for two weeks, did not result in a delay in delivering a working product. Even the fore-shortened plan had budgeted time for such contingencies. We also held a final user testing between the restoration of the files server and before the Poster Day event.

Outcome summary

The project was a success. Students loved the course, its use of technology, and reported that the Poster Day system improved the poster event. A strong collaboration among the department, ODEE, and other partners built an online system that improved the student experience of a very effective assignment. With minimal additional work, this system will similarly improve learning for thousands of additional students in traditional, hybrid, and online courses.

Overview of Assessment Plan and Methods

This project incorporated a substantial research component, with the application development, testing, and deployment designed not only to result in a functional application but to produce meaningful research data. Students completed surveys before, during, and after their use of the application. Logs were generated during user testing and the use of the system during the Poster Day event. Processes were timed with and without the system to gauge efficiency gains. As a result, the project has generated a dataset that couples analytic/behavioral data with subjective reports.

Highlights from Assessments

- Students were enthusiastic about the use of technology in the course and the Poster Day event.
 - 90% of students agreed or strongly agreed with 30+ positive statements about online technology and its role in the course.
 - 90% of students agreed that "The system helped me become a better student by providing me access to constructive feedback regarding my presentation skills"
 - 96% of students agreed that "The system provided timely feedback."
- The system provided great efficiency improvements, saving time and material.
 - System efficiencies saved ~60 instructor hours.
 - System efficiencies saved ~1.25 hours per student, or 900 student-hours.
- The system development process was a model for collaborative, iterative process, providing a superior app for half the cost estimated by a professional firm.

Details from Assessments

Research Questions

- Does timely and comprehensive feedback develop better oral and written communication skills and encourage students to think more analytically about their work?

Yes. While difficult to support with data, the central benefit of Poster Day as an event seems to derive from students getting immediate feedback from peers and professionals about their presentation of research. The online peer-review system accelerates availability of more formal feedback, so extends these benefits. In addition:

- 90% of students agreed that "The system helped me become a better student by providing me access to constructive feedback regarding my presentation skills"
 - 96% of students agreed that "The system provided timely feedback."
 - 94% of students agreed that "The system made it easier for me to provide effective feedback to student presenters."
- Does an anytime/anywhere app encourage students to be more accountable for their work (e.g., meet course expectations, requirements and deadlines)?

There is not comparative data with previous years, but students participated enthusiastically and the vast majority completed assignments by deadlines. About 10% showed up to each user-testing/rehearsal event, further indicating commitment.

- Does the system allow instructors to more effectively interact with students to deliver and reinforce course material and concepts?
- 83% of students agreed that "Instructional technology helped me engage with the instructor of this course."
 - 90% of students agreed that "The system helped me become a better student by providing me access to constructive feedback regarding my presentation skills"
- Does the system allow the students to better understand their responsibilities as a presenter and reviewer?
- 92% of students agreed that "The training and information provided about the system during the semester helped me understand what was expected of me as a presenter."
 - 93% of students agreed that "The training and information provided about the system during the semester helped me understand what was expected of me as a reviewer."
 - 97% of students agreed that "The questions in the rubric guided me to provide a thorough evaluation of the presentation."

Goal #1: Improve Student Learning

- The impact that the system has on the development of a student's oral and written communication skills will be assessed by comparing a student's pre-symposium reviews to their symposium reviews.
- A numeric review system (e.g., scale 1-10, with 10 being best score) will be used to quantify and compare a student's pre-symposium to symposium reviews. Pre-symposium reviews will be conducted 2-3 weeks prior to the environmental science symposium.

Pre-symposium reviews and scoring were not conducted due to a combination of shortened development timeline and lack of tools to arrange pre-symposium peer reviews. We cannot thus provide evidence for improvement in student learning. Anecdotally, however, the project team's perception was that user testing and the scaffolded nature of the assignment improved student performance compared to previous years.

Goal #2: Improve Student Experience

- We will assess improvement in student presentation skills (e.g., poster design, writing skills, oral communication) by comparing student reviews and presentation grades to previous years when we did not employ this system.

Data from previous years was not available in a form comparable to the data gathered as part of this project, so the comparison could not be made as planned.

- We will estimate the average time that it takes to complete electronic reviews and return these reviews to student authors. This will be compared to previous years when we used paper reviews to determine if the new technology permits more timely feedback to our student authors.

During the design process, it was decided not to gather this analytic data because of limited usefulness and unclear meaning. Based on observations of users, students completed peer reviews in the system marginally quicker than paper rubrics, but paper rubrics were not time-intensive.

- We will assess improvements in the poster submission and review process by comparing the number of students who meet deadlines (e.g., abstract submission deadline) to the number of students who met our deadlines from previous years when the online system was not used in our class.

Data from previous years was not available in a form comparable to the data gathered as part of this project, so the comparison could not be made as planned.

- We will determine if the system permits more instructor-student and student-student interactions at the symposium by counting the number of reviews that each

instructor, or student, completed and comparing this to previous years when we did not use the system.

In previous years when the system was not in use, an instructor (or teaching assistant) could interact with approximately 6 students per hour. During the 2014 Environmental Science Symposium when the system was in use, an instructor (or teaching assistant) could interact with approximately 12 students per hour. Throughout the entire 8-hour symposium an instructor (or teaching assistant) could interact with twice as many students (i.e., 48 students without the system versus 96 students using the system) when the system was in use.

- Surveys will be used to assess student satisfaction with the electronic peer review process and impacts on student learning. These results will be compared to previous years in which we utilized paper and pencil reviews.

Student assessment of the system was enthusiastic, confirming observational and anecdotal data that students enjoyed using their devices to take part.

- 97% of students agreed that "Instructional technology used in this course helped me learn."
- 95% of students agreed that "Instructional technology used in this course increased my satisfaction with the course."
- 98% of students agreed that "I was comfortable using technology used in this course" and that "I was comfortable working with online tools used in this course."

Student assessments of the peer-review system specifically were also quite positive.

- 89% of students agreed that "It was easier to accomplish these tasks in this system than equivalent tasks with pen and paper."
- 85% of students agreed that "I enjoyed using this system more than other educational apps I have used."
- 88% of students agreed that "All parts of the system are easy to see and/or read."
- 90% of students agreed that "It is obvious at every point what I should do next."
- 98% of students agreed that "I was able to accomplish every task that I attempted," and 92% agreed that it was "easy" to do so.

Goal #3: Increase efficiency

- The time required by the instructor to complete, catalog and return reviews to each student will be compared to the time that it took to complete these same tasks using the previous paper and pencil method.

Great efficiencies were achieved at almost every stage. The instructor time saved will be greater than the developer time spent within about 4 events of this scale.

Task	Time Without Technology (hours)	Time Using Technology (hours)	Total Time Saved Using Technology (hours)
Write and Distribute Instructions on how to Design and Construct Poster	4	4	0
Present Lecture on How to Design, Construct, Present Poster	2	2	0
Assign Poster Numbers & Notify Students	4	0.5	3.5
Assign Reviews to Students	8	0.5	7.5
Write and Distribute Instructions for Reviewers	4	0.5	3.5
Oversee Poster Printing	4	0.5	3.5
Answer Student Questions by Email and Twitter	8	4	4
Collect Reviews	2	0	2
Inspect Reviews to Determine if Review is Complete	10	1	9
Organize Reviews by Poster Number	12	0	12
Sum Review Scores for Each Poster	8	1	7
Record Scores in Gradebook	6	1	5
Return Reviews to Students	4	0	4
Total	76	15	61

- The time it takes each student to complete a peer review using this new system will be compared to the time it took a student to complete a peer review using the old system.

Efficiency gains for students were smaller. The most significant advantage was that the time savings for instructors made it possible to inform students about results in hours instead of weeks. With the review process itself, efficiencies in the system saved each student about 75 minutes

Task	Time (pre-online)	Time (online)	Iterations	Total time saved (min)
Provide poster information to instructor	30	15	1	15
Receive rubrics	30	5	1	25
Complete rubrics	7	5	3	6
Submit rubrics	30	1	1	29
Receive	weeks	hours	1	--

feedback				
Totals	97	26	--	75

Goal #4: Reduce Waste

- The amount of paper waste that is generated using this new electronic system will be compared to the amount of waste using the previous paper and pencil method.

Task	Material (pre-online)	Material (online)	Savings	Comment
Rubrics	2100+	600	600 copies	Printed for backup and not needed
Posters	700+	700+	0	Not a goal for this project, but easy to extend system for fully online events. Also, a deal with Uniprint saved students about 50% on poster cost.
Posterboard	700+	0	700+	Unrelated to the online system, but backing and display materials were re-used from previous events

Objective #1: Build the System

The team effort to build the Poster Day system was impressive. Staff from three areas collaborated with the SENR project team and representatives from the Ohio State Science Symposium through a series of weekly "scrums" to refine and implement the pre-existing plans for the system. The final result debuted with no significant errors or inconveniences and is suitable for future development in several directions.

- Progress of the system will be tracked and documented through a series of meetings between developers and stakeholders. Appropriate experts will be consulted for relevant aspects of the system, such as accessibility.

App development unfolded as planned and was a model for effective collaboration. Developer work took place with frequent input from both stakeholders and relevant campus experts, including the Web Accessibility Center. The process was sufficiently robust to suffer minimal disruption from the LMS system failure that took place just a few weeks before the scheduled launch. Two user testing sessions proved very helpful in tailoring the system to students' devices and work habits.

Based on TERA time tracking, about 1,000 hours of ODEE time were directed to development of the Poster Day app. Some of these hours were focused on elements of the app that also improved other ODEE services, such as the Event Management system and the Alpha platform. Setting those dual-benefits aside, the total ODEE cost for development may be estimated at \$100,000.

This cost is larger than had been originally budgeted when the project was selected as an Impact Grant. That estimate depended, however, on the head start provided by the former Digital Solutions unit of the Prior Health Sciences Library. Following the closure of that unit, development needed to begin from scratch. An estimate for this work by the for-profit firm Clutch was \$200,000. When assessed against the market cost of such a system, rather than the optimal cost, the development team delivered a superior system for well below reasonably expected cost.

- We will determine if the technology is fully functional by testing the system during a poster session rehearsal. The students will upload their poster as a PDF file to the system and receive both peer and instructor feedback using the system. This will allow the student a chance to practice using the system and serve as a system test before the full-class poster event. Following this test, we will use the system during the 2014 Environmental Science Student Symposium, which will be held at the Ohio Union.

Two user testing events were held, with data about system functionality gathered in the form of both system data and user surveys.

Objective #2: Adapt the Assignment around the System

- Successful adaptation of the assignment and assignment materials will be gauged with questions in student surveys. Patterns in student requests for assistance (or lack thereof) will also indicate success or failure in this objective.

The SENR project team enhanced the Poster Day event in the course of incorporating the online system into it.

- A Poster Day site was created and developed in u.osu.edu
- Relevant training and system materials were uploaded to Carmen
- Demos and trainings were provided during class time
- User-testing sessions doubled as opportunities for students to receive instructor and peer-feedback on their work in progress

Process Goal #1: Build for Adaptability

- To determine if the system can be used for reviewing more than just scientific posters, we will use its mobile scoring tools to conduct peer reviews of manuscripts that the students write as part of the ENR 2100 class.

It was decided not to employ the online system for manuscripts during the scope of this project. However, the system was developed for use in several other contexts with minimal additional development.

- State Science Day 2015
- College of Medicine {event name}
- Fully online courses

Process Goal #2: Document Standard Procedure

- We will assess the success of our implementation of this objective by asking another professor from the School of Environment & Natural Resources (SENR) to follow our procedure for used in their course that they teach at OSU. SENR professors Hanselmann, Toman and Pintor hold poster sessions for the classes that they teach at OSU and they would be ideal candidates to test our standard procedure.

Conversations with other department members are underway, as well as instructors in other programs. There is widespread interest in this tool. The administrative staff for the OSU Denman Forum has been in discussions with us to use this system for their annual poster day forum. In addition, professors from Virginia Tech who are also interested in using this system for classes at Virginia Tech recently contacted Dr. Lower. They learned about the system from discussions with Dr. Nicholas Wigginton, who is a senior editor at Science/AAAS.

Experience of Teaching with Learning Technology

Survey

Please indicate how strongly you agree or disagree with the following statements:
(Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)

- 1) The use of technology improved student learning in my course.

Strongly Agree

- 2) The use of instructional technology improved my teaching.

Strongly Agree

- 3) My students had the technology skills needed to succeed in my courses.

Agree

- 4) My students had adequate access to hardware and software.

Strongly Agree

- 5) There was adequate network access for all on-campus activities.

Strongly Agree

- 6) I spent too much class time teaching technology to my students.

Strongly Disagree

- 7) Additional comments or feedback:

The use of this technology in my classroom allowed me to spend the vast majority of my time teaching my students how to prepare well-designed posters and how to give a professional presentation. This had a positive impact in terms of the quality of the posters and the quality of the student presentations. Before I had this technology I spent the vast majority of my time organizing paper review forms, assigning poster numbers, assigning reviews, and sorting and grading posters (i.e., things that were not teaching). In addition, the poster day app allowed students to obtain timely feedback in the form of peer reviews. This was not something that I was able to accomplish for my students using the “old fashion” paper-pencil system, which I was using prior to the development of this system. The system was simple for my students to use on their individual smart phones, which is by far the

preferred technology for my students (i.e., >99% of all my students used a smart phone to access and use the poster day app).

Effect of Learning Technologies on Instruction

Increased instructor efficiency by greatly reducing the amount of time that the instructor spends assigning, collecting, and organizing poster reviews and assigning scores to each poster. This allowed the instructor to spend more time meeting with the students prior to, during and after the symposium to provide instruction and insight into how to prepare for and give a professional and well-received presentation. The electronic review system also decreased the number of mistakes made by the instructor as she/he assigned scores to each poster based on the reviews.

Effect of Learning Technologies on Learning Outcomes

The ability to conduct reviews on phones and other devices seemed to have the most immediate impact on learning outcomes. Students seemed more engaged in the review process because of the convenience of using a phone and because interacting with the app using this device that they spend so much time using helped make the academic review seem more like a normal activity. The app also provided a good scaffolding system for the assignment. We already do this, requiring that students submit abstracts, works cited, and drafts throughout the process, but having them submit those drafts via the Poster Day app, rather than Carmen, streamlined the process and helped them see the various steps as part of one assignment, rather than a bunch of unrelated chores.

From an instructor perspective, the rapid turnaround on feedback probably had the biggest impact. There is a lot of research demonstrating that timeliness is one of the most crucial aspects of effective feedback, so being able to provide feedback by the end of the day could only improve its role in students' learning. Second to this, the hours freed up from logistics (managing paper, data-entry, etc.) were hours I and my team could spend making this a better event and helping students make better posters.

Best Examples of Effect of Technology on Teaching

Using the online peer review system saved approximately 70 hours of work that would have been required to manage 721 student poster presentations. The online system automated the following steps: poster number assignment, poster review assignments, collection and organization of reviews, average of poster scores, real-time inspection of scores, assignment of grades, distribution of poster grades and distribution of peer reviews.

The online system allowed students to receive their peer reviews immediately after the poster symposium rather than waiting 2 weeks for the instructor to collect the paper reviews, organize the reviews, average the scores, record the scores and then return the peer reviews to the students.

The instructor was able to participate in the symposium during the poster day event and interact (i.e., listen, learn, question, discuss) with the students rather than spending all the time assigning, distributing, collecting and organizing paper reviews.

Challenges

We had minor problems throughout the design of the peer-review application, however, our team would meet every other week to work through and resolve these issues. These regularly scheduled meetings kept our team on track and allowed us to reach our goal of creating a well-designed online peer-review platform. One unexpected positive outcome that we had while implementing this new technology was that by using this electronic system (rather than our old paper and pencil method) students were able to finish their assigned peer reviews approximately 50 percent quicker, which allowed them more time to visit additional posters and learn about more projects and have more engaging interactions with their classmates. We attribute this outcome to the fact that the online system provided one seamless process for each student to find her/his assigned poster, complete the review and submit the review to the instructor.

Assessment of Assessment Plan

The assessment plan provided excellent data and information to guide and assess app development. We believe we built a solid app that users liked using, and we have a lot of feedback from students to confirm that belief. The user testing we conducted during the development process was valuable for course-correction design decisions and in a couple of cases helped identify bugs that might have escaped otherwise.

We are still processing data about the learning impact of the system, but early indications are that they will provide a reliable, if rough, support for claims that the system benefited specific aspects of student learning. Going forward, it will be possible to refine measures of impact for interventions that target limited aspects of a course.

Experience of Tech-enhanced Teaching

I always incorporate a range of technology in my teaching, so introducing the Poster Day app was not wildly different from a normal course.

One difference: the Poster Day app frees up time, while most technologies require more time for preparation and building stuff. While the development process took several hours, those were not many more than the system ultimately saved. And in future semesters, the app will provide a pure saving of time, which I can use to focus on other parts of the course.

Moving Forward

I will be using the OSU Alpha Poster Day Application for my class in the future. I have already scheduled a poster day event for Nov. 24, 2015 and we will be using this same online system again. I have been in contact with the ODEE staff on how we can improve this system and we have decided to include some upgrades to the new system that we use. These upgrades will include:

1. The ability to store a PDF of each poster on the application so that it can be viewed by anyone at the symposium, anytime during the symposium.
2. The ability to link an audio and/or video to the poster so that as they use the online application they can hear and/or see the presenter as she/he presents the poster.
3. The ability to provide feedback to the reviewer on how helpful the review was to the presenter.

Impact Grant Experience

Survey

Please indicate how strongly you agree or disagree with the following statements:
(Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)

- 1) I am satisfied with the communication I received from the ODEE staff.

Strongly Agree

- 2) I am satisfied with the grant project contributions I received from the ODEE staff.

Strongly Agree

- 3) I have learned the skills necessary to continue related work on my own.

Strongly Agree

- 4) I found the ODEE staff approachable.

Strongly Agree

- 5) The lessons learned during this pilot will guide future course design.

Strongly Agree

- 6) Additional comments or feedback

Reflections on the grant process—what went well

The development process with Vedu's Carmen team and Angela and Steve was a lot of fun and also productive. It was revealing to see how much thinking goes into building an application, and it was really impressive to see how Mohsen and the other developers would take the ideas we talked about each week and make them work as parts of the system. And the app that was built worked well.

The support during the event was amazing, as ODEE staff of all kinds attended not only to be ready to help if something went wrong, but also to see how students were learning at the event. They talked with students and helped make the event a success.

The communications around the event were also exceptional. Winning the 2015 Educause video contest and a 2015 Bronze Telly Award were welcome surprises.

Reflections on the grant process—what did not go well

The administrative side got off to a rocky start. There were challenges getting up to speed with what was expected to put together the charter and other planning. (This was complicated by putting together my tenure dossier around the same time.) Once we got started, however, the process went smoothly, and we were able to complete a solid project plan.

The other big challenge in the grant process was the loss of Digital Solutions as a partner, which almost ended the project. Fortunately, ODEE leadership was supportive and made it possible to develop the app with the Carmen team. It was also helpful to have a good project plan, which made it possible to change course without having to start over from scratch.

Key lessons learned

It is possible to bring a lot of people together to do something really cool with technology.

Suggestions for future recipients

Be ready to change direction and be persistent to keep the project alive.

Three words to describe working with the ODEE Team

1. Engaging
2. Productive
3. Rewarding

Ah-ha moment of the grant process

The first hour of the poster day event when the first hundred peer reviews successfully went through the online system and our students had smiles on their faces, enjoying themselves and their interactions with their classmates. I knew we had accomplished our goal of making the poster day event about the posters and students and interactions and not about the process. The peer review process is extremely important, but it is now seamless in its design and ease of use.

Department Chair Statement of Impact



THE OHIO STATE UNIVERSITY

College of Food, Agricultural, and Environmental Sciences

School of Environment and Natural Resources

June 4, 2015

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Re: 2014 Impact Grant to Brian H. Lower for Poster Day App

Dear Dr. Griffiths,

The School of Environment & Natural Resources (SENR) at OSU has been pleased to partner with the Office of Distance Education and eLearning (ODEE) as part of a 2014 Impact grant to Dr. Brian Lower. Our school is extremely supportive of ODEE's efforts to enhance the educational experiences of our students through the use of technology.

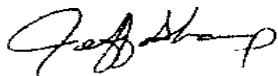
Dr. Lower's grant was focused on developing an on-line peer review app that could be used by our students during SENR's annual Environmental Science Student Symposium (es³). This annual symposium consists of posters presentations by OSU students enrolled in Introduction to Environmental Science Class (ENR2100). This symposium is a popular event for our students and is well attended (e.g., our 2014 symposium was attended by about approximately 1,000 students, faculty and staff).

The on-line peer review app that Dr. Lower and ODEE developed was used at the 2014 es³. This system performed flawlessly for the ~725 students who used this app to conduct poster reviews for ~725 posters that were presented at the symposium. I was particularly impressed by the way our students seamlessly used the app on their smart phones to conduct and submit their reviews and then read their reviews after the symposium. The system was simple, easy to use and facilitated the review process in an extremely well organized manner. The students enjoyed using the app, particularly on their smart phones and were able to focus their attention on the educational value of the presentations. This technology is an absolutely essential tool for our annual symposium and we will continue to use this system for all future symposiums, including the 2015 es³, which will take place on November 24, 2015.

I am also excited to hear that the organizers of the OSU Denman Forum have been in discussions with Dr. Lower and your team to use this system for their annual poster day forum. In addition, Dr. Lower recently informed me that professors from Virginia Tech have heard good things about this smart-phone app and have contacted him about using this system for classes at Virginia Tech. This type of interest demonstrates the value of using this type of technology to enhance the educational experiences of students and prepare them for jobs after graduation.

Finally, ODEE's dedication to Dr. Lower's grant was second to none. The staff at ODEE, particularly Vedu Hariths's team and Henry Griffy, worked tirelessly to ensure that this project was a success. They functioned exceptionally well as a team to ensure that the final product was the best product available to our students. Because of your dedication to our success, I will continue to encourage interactions between our faculty and the faculty and staff at ODEE.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Jeff Sharp". The signature is written in a cursive, flowing style.

Dr. Jeff Sharp, PhD.
Director
School of Environment and Natural Resources

By ODEE Team:

This project was a model for collaboration among multiple partners to achieve clear goals with obvious and valuable benefits. There were significant obstacles along the way, but persistence, patience, and support made it possible to overcome them. Most notably, the closure of HSL Digital Solutions changed the nature of the project. Rather than enhancing an existing product, it became necessary to build a new system. ODEE leadership was very supportive in the team's effort to identify and assess various ways to do so and generously provided the human resources to build the system in-house.

Goals and objectives pre and post relation/connection

This project met or exceeded expectations. The charter underwent significant change as a result of the HSL Digital Solutions dissolution. The final product more than fulfilled the requirements described in those plans.

Project Charter to Analysis relation

This project achieved more than had originally been set out in the application and early drafts of the charter. This expansion was not the result of internally driven scope creep. Rather, the shift from enhancing an existing system to building a new system created opportunities to accomplish more with the same amount of work. Thus, the final system is adaptable to a wider range of research-presentation events and will more easily be adapted to fully online events than had been our original goal.

Number and roles of ODEE individuals involved in the grant project

5 ODEE staff played major roles in this project, while another 3 provided limited support.

- Henry Griffy was project lead
- Learning Systems eLearning Application Development:
 - Vedu Hariths led the development team
 - Mohsen Zoofan. primary developer
 - Joan Qin, primary on event management component
 - Bryce Bate, primary on analytics and display
 - David Lindberg, assisted with algorithm design
 - John Wilkins, assisted with development
- Other Learning Systems:
 - Mark Herriott and Valerie Rake assisted with design for user experience
 - Mike Groeniger assisted with application security and hosting

- Events Coordination:
 - Angela Davis participated in app development and design in order to make app compatible with State Science Day events
- Web Design and Innovation:
 - Joe Bondra consulted on front-end design and style
- Marketing and Communications:
 - David Gerad and Hannah Brokenshire coordinated communications
 - Jason Hazel coordinated and edited video production
 - Jason Johns and Matt Carter captured video
- Learning Programs:
 - Cory Tressler provided iPads for students without devices
- Program Mangement and Leadership:
 - David Lindstedt provided guidance on project management and tracking
 - Liv Gjestvang assisted with researching alternative development solutions

Approximate number of ODEE people-hours spent on the grant project

500-1000 hours. The precise number is difficult to establish, because a significant number of hours were also necessary for other ODEE work, especially the development of the event management system for workshops and the Alpha platform.

Even at the maximum number of hours, it should be noted that ODEE was able to develop this application for less than half of the \$200,000 estimate provided by a professional design shop. Also, because we developed the work in-house, we only disbursed \$5,000 of the normal \$15,000 Impact Grant award.

Reflection of what aspects of the grant process, procedures, and collaboration worked at or above expectations.

This project brought out and demonstrated several of the best qualities of ODEE:

- Cross-unit collaboration among colleagues with a wide array of skills:
As the above roll-call indicates, staff from several areas of ODEE successfully collaborated to make this project succeed, bringing all necessary skills as a sort of human resources equivalent of making stone soup.

- Ability to pivot to accomplish unexpected work: HSL Digital Solutions' dissolution jeopardized this project, especially when professional design shops' estimates were beyond any conceivable budget. ODEE colleagues stepped up and took on the development with minimal impact on other projects.
- Identifying and maximizing alignments among distinct projects (aka, maximizing the bird-to-stone ratio): the Poster Day app might have been built as an isolated tool; however, ODEE was able to identify alignments with the Alpha project, State Science Day, events management, and distance education, among other initiatives.
- Promotion of both instructor's successes and ODEE successes. In this case, the video made about the project won the 2015 NMC Horizon Report video competition.

Reflection of what aspects of the grant process, procedures, and collaboration were below expectations.

Nothing went very badly on this project. There are always opportunities for improvement:

- The HSL Digital Solutions dissolution had greatest impact on this project. While ultimately the final product was arguably better than originally planned, the change shortened the development timeline drastically and required additional planning and management time to make the project succeed. It was a disruption. However, based on previous experience, we were ready to deal with this contingency.
- In the early phases of the project, the grant planning process did not go smoothly. Henry has modified the process accordingly, and subsequent planning phases have worked more effectively. The key changes have involved better communication about expectations and what need to be done, as well as streamlining the process itself so that alignments with the work of the work are more direct.
- Development efficiency. In retrospect, it would have been possible to build the app with fewer ODEE hours. (In real time, attempts to economize more than were already taken would likely have endangered success and resulted in a less effective product). In future development projects, it should be possible to implement lessons learned in order to maximize efficiency.

Three words to describe working with the recipients.

- Exemplary
- Rewarding
- Optimistic

Describe an “ah-ha” moment during the grant project.

The experience of the Science Symposium and seeing how technology affected how it played out. To see hundreds of students communicating at impressive levels about their research into environmental problems – and solutions – is an impressive and hope-

producing experience. Seeing how the Poster Day application deepened those conversations and knowing that it would help students follow up on their conversations

Changes to our processes from this grant experience

Promotional opportunities for this grant were obvious early on, and we made good use of them. The successes in this area encourage redoubling similar efforts going forward.

No effort spent preparing for contingencies is wasted, so we will intensify efforts to predict and be ready to respond to disruptions.

We have already worked to simplify the planning process and improve the process of guiding faculty through the processes and activities required to plan effectively.

Building for the future is important but difficult. We have been able to build the Poster Day system in a way that others can easily adopt it. The more that grants projects can feed directly into other projects, the more effective our efforts will prove to have been.