



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

The Virtual Poster Symposium

Transforming the In-Person student
experience to the Online Classroom



Objectives

- Describe what a virtual poster assignment is and how two online classes in SENR implemented it
- Identify the successes and challenges of virtual poster assignments



What is a virtual poster?

Carbon Based Nanotechnology Environmental Impact

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Abstract

With the development of novel nanotechnologies, the environmental impact is uncertain. Production and development of technologies often creates harmful byproducts. The development of new technologies adds value to society and can help to minimize many environmental issues. This project is an environmental analysis of the impact of carbon-based nanoparticles. While organic life is primarily carbon, the chemicals used in carbon nanoparticle production can have adverse health and environmental impacts. Potential environmental benefits of novel carbon nanocomposites are compared to the environmental impact in terms of energy, air pollution, material toxicity and hazardous byproduct production.

This analysis consisted of comparisons of the thermodynamics and stoichiometry of researched carbon nanocomposite producing reactions. The toxicity of the feed materials and byproducts is compared. The environmental benefit of the novel technology is discussed relative to negative environmental factors (harmful byproducts and greenhouse gasses). The results of this analysis are potentially beneficial applications of carbon nanotechnology. The potential applications still require more development, but the application of nanoparticles is more efficient at causing reactions over identical bulk compounds because of surface-volume ratios. The use of polymers using multiwalled carbon nanotubes have a higher stress strain relation than other polymers, and carbon based super capacitors have a value in hybrid electric vehicles. The use and development of new technology often means more efficient use of materials, higher efficiency and more economical implementation of electric vehicle technology.

Introduction

New technologies can have issues. While the life on earth is carbon based. Carbon dioxide in the air, and airborne solid carbon can both cause significant health and environmental impacts. The development and implementation of carbon based nano materials can positively and negatively affect the environment.

Scope

The focus of this study is on the net change in air based pollution from the advancement of nanotechnology. Human impact is the focus. Toxicity of single walled carbon nanotubes on were studied using human epithelial cells. The impact on global warming was observed in a way relevant to humans. The thermodynamics of reaction, and scaling of production are included in the study, as toxicity pollution and energy of production are all interrelated to the technologies of production.

Methods

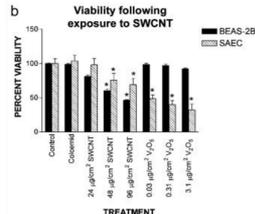


Figure 1 response of BEAS-2B and SAEC in vitro cell to SWCNT.

A major health concern with carbon nanotechnology is the impact on lung health. In a paper by Sargent et al, the effect of single walled carbon nanotubes was studied with in vitro SAEC and BEAS-2B cells. These are cells types found in lung tissue. The results indicate cell death with medium or high concentrations of single walled carbon nanotubes. This is result is consistent with the dangers of carbon black, which have demonstrated respiratory risks.

In the event of large scale production, any unintentional release can be hazardous to human workers and to any animals close by. The reason why nano scaled materials need additional research in their health and environmental impact is due to the nature of nano scale reactions. The surface area to mass ratio of nano particles is higher than traditional bulk materials which necessitates additional examination.¹ The use of nanotech has additional toxicity risks and benefits.⁸

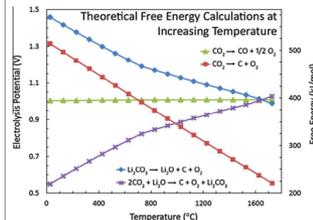


Figure 2: Thermodynamics of Carbon sourcing reactions²

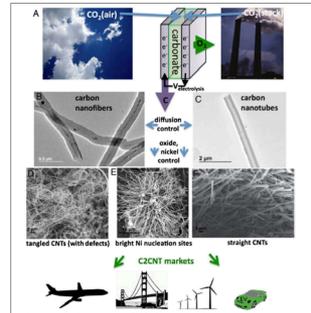


Figure 3 Diagram of CO₂ Sourcing to material production³

With novel technologies there exist novel production methods. Figure 3 shows possible production sources and applications for carbon nanotubes. The methods outlined use electrolysis to extract the carbon feedstock from either CO₂ in the air or the CO₂ from a smoke stack. In Figure 2 other possible feed sources of carbon are shown. Electrolysis of straight CO₂ is around 1.27 volts at room temperature, but is lowered using Li₂O or by raising the operating temperature. However either way requires a lithium source of substantial energy inputs

Results

The industrial methods mentioned are beneficial to the environment because they either remediate CO₂ (a prominent greenhouse gas) in the air or reduce the amount of CO₂ released from other industrial processes. This is particularly exciting because carbon nanotubes are currently valued at \$300,000 per ton⁴, and the economic incentive should encourage technology growth.

The applications of carbon nano technology range from hybrid and electric vehicles⁵ 6 7 as well as materials for more efficient aircraft, wind turbines and other structures⁶. These technologies all have the potential to aid the environment by providing more economically viable alternatives to CO₂ emitting fuel systems. The benefits or carbon nano technology outweigh the respiratory risks to humans, especially with proper safety protocol.

Discussion

The environmental cost is expected to be relatively reduced reduces as the processes are scaled up and produced in novel ways.^{8 10}

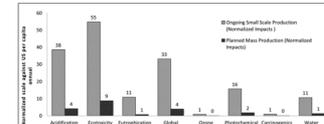


Figure 4: Production and relevant of environmental issue at different scale⁷

This is due to the economies of scale, improved process optimization, and more intelligent feed and product management. This will greatly minimize environmental costs, making the environmental benefits outweigh the environmental costs.

Conclusion

Relative to the potential for improvements in environmentally friendly technology. The dangers of particulate matter does not seem substantial. CO₂ extraction from the air, or a smokestack have the potential to greatly help the atmospheric balance of the earth. The required energy is problematic however, and the production of carbon nano particles does not fully address environmental issues yet. When this technology is scaled up, relative to humans environmental considerations carbon nanotechnology is a net benefit.

References

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Future Work

While this is novel technology, the analysis will need to be adjusted for the methodology that will be implemented in industry. The analysis can be more focused when large scale implementation has begun. Additionally the impact on plants, animals, and ecosystems need extensive research. This project was focused on the impact of human centric environment.



WHY WE DO THIS - BENEFITS OF THE POSTER ASSIGNMENT

Universal Benefits

- **Course Learning Objectives**
 - i.e. of a course learning objective that supports
- **Universal Design**
 - flexibility in learning environment, poster topic, and final expression
- **Authentic Learning**
 - real-world problems, open inquiry, social learning, student-directed learning
- **Development of Soft Skills**
 - information literacy, writing, oral communication, technology and software

Online

- **Temporal Flexibility**
 - asynchronous delivery and interaction
- **Affordability**
 - no need to print \$30+ poster per student
- **Resource Conservation**
 - no ink or paper needed
- **Fosters Meaningful Interaction**
 - in the online classroom: a difficult task



How can we provide a similar course experience to all of our students?





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ENR 2100

Introduction to Environmental
Science



What is ENR 2100?



Large introductory course offered AU, SU, SP semesters (Columbus, Marion, Mansfield campuses)

3-credit hour General Education Course that fulfills the Natural Science, Biological Sciences category

Spring involves a scientific poster project that spans the semester, broken up into 4 incremental assignments



ENR 2100 Student Poster Symposiums



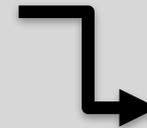
2012

2017

The Environmental Science Student Poster Symposium began in the Ohio Union for students in ENR 2100 to present their semester poster projects.



As the online section of ENR 2100 grew, we wanted to provide these students with the same educational experience as the face to face students. In order to enhance active learning in the course, a Virtual Poster Symposium was established.



A Virtual Student Poster Symposium was created for the SP17 online ENR 2100 course through the use of a CarmenCanvas discussion board.



Students generate a **Poster Final Draft** based on first draft edits in a PDF form

Students record a 2-4 minute **audio/video poster presentation** using a guided prompt



ASSIGNMENT OUTLINE

1. Obtain source information regarding environmental topic of students' choosing
2. Formulate scientific poster surrounding environmental science topic
3. Submit finalized poster and recorded poster media presentation to online "Symposium"
4. View students posters and interact with peers in discussion board comments
5. Receive peer feedback via a peer review assignment



This is a graded discussion: 15 points possible due Apr 12

Since this is a group discussion, each group has its own conversation for this topic. Here are the ones you have access to:

- Virtual Poster Symposium 1 1 63
- Virtual Poster Symposium 2 48
- Virtual Poster Symposium 3 4 48
- Virtual Poster Symposium 4 6 60
- Virtual Poster Symposium 5 76
- Virtual Poster Symposium 6 58
- Virtual Poster Symposium 7 6 72
- Virtual Poster Symposium 8 1 53
- Virtual Poster Symposium 9 12 114
- Virtual Poster Symposium 10 83
- Virtual Poster Symposium 11 2 47
- Virtual Poster Symposium 12 5 88
- Virtual Poster Symposium 13 2 67
- Virtual Poster Symposium 14 88
- Virtual Poster Symposium 15 1 65
- Virtual Poster Symposium 16 3 78
- Virtual Poster Symposium 17 2 61
- Virtual Poster Symposium 18 5 53
- Virtual Poster Symposium 19 1 58

 **Virtual Poster Symposium**
Ella Weaver (weaver.852)

The purpose of this Virtual Poster Symposium is to allow you to share your poster and view the posters of your classmates. This is the first ever ENR 2100 Virtual Poster Symposium! You will be able to read, "like," and comment on those posters that you find interesting. We hope that you will be able to explore and learn something new. If you do choose to comment on others' posters, be respectful and encouraging. Every student has put a lot of hard work into their poster and we are excited to see them all!

The class has been divided into groups and within these groups you will submit your poster, view posters, and complete generated peer reviews. Directions for Submission are below. These directions and those for the peer review are also available on the [Virtual Symposium Peer Review Guide](#).

 **Directions on Submission**

A. **Click Reply Below** to submit your assignment.

B. You will be submitting two items: **(1) a PDF file of your poster to Poster Final Draft** and **(2) an audio (or video) presentation as one single post.**

The Virtual Poster Symposium was set up through the use of a discussion board and the class was divided into 19 groups of approximately 30 students.

Instructions were included within the discussion board itself, as well as, within a Canvas page that served as a "guide" for submissions.

Students submitted both their poster and presentation within a single post reply to the main prompt. They were encouraged to use Carmen's media recorder.



Mar 31, 2017

Audio poster presentation

ENR Virtual Symposium Final Poster: Microplastic Contamination In the San Francisco Bay & It's Potential Effect on the Pacific Oyster

ENRFINALPOSTER.pdf

Poster PDF

(1 like)

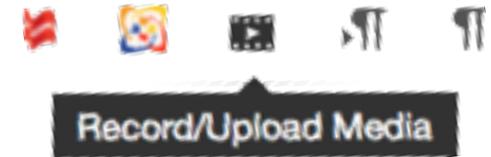
Apr 19, 2017

I conducted research on the algae breakouts that are contaminating the Florida waters, and its effect on the marine life. I found your research to be somewhat similar to mine, which intrigued me to learn more about the contamination of waters in California. I enjoyed reading your poster, and the research was extremely engaging!

Apr 19, 2017

Very well organized poster! I really enjoy the figures and graphs that you have included in the body. the flow of the presentation also went smoothly with the audio and poster. Your topic was also very interesting and I enjoyed reading you research. Good job!

This student used Carmen's embedded media recorder to record her audio for the post.



Student comments within the discussion board were encouraged and a guide was provided via a Carmen page regarding submission, recording, commenting, and completing peer reviews.



ENR 2100 Virtual Poster Symposium Design



Logistics

- 19 groups are created in CarmenCanvas (one per TA)
- Approx. 30 students per group
- Each student submits 1 single post containing poster + audio/video presentation



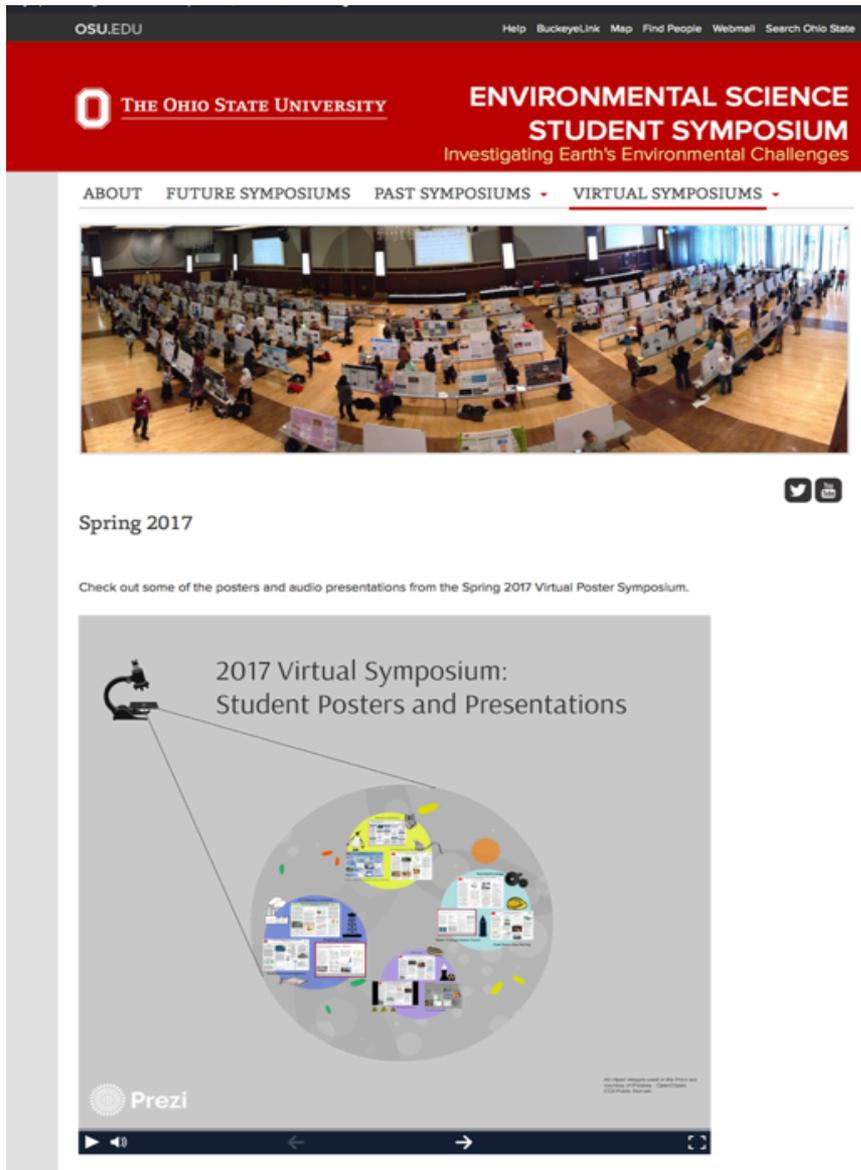
Communication

- Students can view, like, comment on posters in their group's discussion board
- Students complete peer reviews on 3 posters individually assigned to them based on their "symposium" submission



Assessment

- Emphasis put on;
- Student completion of audio/video presentation (students encouraged to use Carmen's embedded media recorder)
 - Student completion of detailed, thoughtful peer reviews



View the Environmental Science Student Symposium website!

<http://u.osu.edu/environmental-sciencesymposium/>

The website now features the Virtual Symposium and contains more examples of student posters and presentations from the first annual virtual symposium in Spring 2017.



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ENR 3300

Introduction to Forestry, Fisheries,
and Wildlife



What is ENR 3300?

Ecological principles applied to integrated management of forest, fish, and wildlife resources

Core course for majors; open to non-majors

- Prereq = ENR 2100

Primary instructor + support

In class offered AU and SP

- Class size = 60 - 80

Online offered SP and SU

- Class size = 25 - 50





Virtual Poster – Assignment Overview

Goal

Answer the following 3 prompts about an assigned topic (in poster format)

1. Introduce the problem
2. Summarize the previous and current management efforts centered on the issue
3. Provide recommendations and future directions



Project roadmap

Here's everything you need to do and remember for the project. Assignments can be accessed by following the links below, by the following the various links within the modules, or by navigating to the assignments tab in the course navigation bar.

- **Week 1-3** - Review the [poster project instructions](#)   and expectations
- **Week 3** - Know which of the four topics you have been assigned. (View groups under [People](#))
- **Week 4-7** - Research your chosen topic within the specialization area you have been assigned
- **Week 7** - Turn in your [Annotated bibliography](#), 30-points, DUE Friday by 11:59 pm
- **Week 8-12** - Use the [poster template](#)   provided for you on Carmen to complete your poster.
- **Week 12** - Turn in your completed [Poster](#), 55-points, DUE Friday by 11:59 pm. You will submit your completed poster to two places.
 - [Poster](#) -> this is where you will receive your poster grade and feedback from your instructors
 - [Final Poster Presentations for Peer Evaluations](#) -> this is where you will submit your poster with video/audio presentation to receive feedback from your peers.
- **Week 13** - Learn about your peer's posters and submit your [Peer Evaluations](#), 15-points, DUE Friday by 11:59 pm



Virtual Poster – Assignment Overview

STEP 1

Students are randomly grouped across 4 topics

- Topics integrate concepts from the course
 - Management of harvested and exploited species
 - Management of invasive species
- Great Lakes ecosystem only
 - Narrowing the topic is intentional, for grading and for expertise

How?

- **Canvas' Groups – random sorting**
 - Randomly assigns students across a chosen number of groups
 - These groups then have their own dashboard from which to communicate

CREATE GROUP SET

Group Set Name

Self Sign-Up Allow self sign-up ?
 Require group members to be in the same section

Group Structure Split students into groups
 Require group members to be in the same section
 I'll create groups manually

CANCEL SAVE



Virtual Poster – Assignment Overview

STEP 2

Students submit an annotated bibliography via **Canvas' Turnitin**

- First cut at “primary literature”
 - 5 sources, each with 1-2 sentence summary of the work and 1 sentence relating to poster relevance
- Instructional staff provides multiple resources for source identification
 - Nice way to bring in **subject librarians** and **online search practice**

Feedback is offered on the following:

- Quality of sources
- Correct formatting
- Appropriate depth on topic

How?

- **Turnitin's** review software (similar to Word)
- **Rubric** uploaded here as well (or in **SpeedGrader**)

What is “peer-reviewed” or “primary literature”?



- Academic or scholarly journals that are “refereed”.
- Peer-review process





Virtual Poster – Assignment Overview

STEP 3

Students are put into focus groups

- 1 student from each topic area
- Each student serves as an “expert” in their topic
- Allows students to become an expert in one area while learning about the 3 other topics

How?

- **Canvas’ Groups – manual sorting**
 - Offers private discussion board, file storage, and **conferences**
 - ****This is where they share their presentations (more to come)**

☰ Focus Group 2 > People

Switch Group ▾

Home

Announcements

Pages

People

Discussions

Files

Conferences

Collaborations

Group Members



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Andrew Tillotson

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Virtual Poster – Assignment Overview

STEP 4

Students submit a professional poster and a 2-3 minute recorded presentation for peer review

- Instructional staff provides a poster template AND video demonstration
- Peers provide similarities and differences with their poster (content, not look)
- We require particular recording capabilities in the syllabus

How?

- Carmen audio/video recording and file upload
- Focus group discussion board
- Peer review is NOT done using Carmen's Peer Review function
 - Students just comment using the discussion board

The screenshot displays a discussion board with four posts. Each post includes a user profile picture, a date, and a gear icon for settings. The first post is dated Apr 6, 2017, and features a video player icon and a PDF attachment labeled 'ENR3300_poster.pdf'. The second post is dated Apr 11, 2017, and contains the text: 'Our cases are similar in that our future recommendations both involve a shift in the current management paradigm. While yours calls for a shift to using markets in addition to control, mine entails shifting from a hands-off to a hands-on management approach. Despite the fact that our proposed solutions are very different, they share this component.' The third post is dated Apr 14, 2017, and contains the text: 'The differences between backgrounds of the species we covered was the most eye opening for me. It's weird how some species, like the asian carp, seem to be able to survive and thrive anywhere and how others, like the Karner blue butterfly, have such a specific niche of habitat that any slight change in the habitat can be completely disastrous for the species.' The fourth post is dated Apr 14, 2017, and contains the text: 'You did a nice job at summarizing this problem. My topic was harvested species, specifically lake whitefish, the most commercially valuable species in the Great Lakes. So the management approaches for our posters are obviously going to be rather different – even diametrically opposed you could say – in terms of promoting the health of a commercially important native Great Lakes species versus actively trying to stop a non-native species from having negative effects on the native species. But you can easily see how these ecosystem management issues are intertwined because efforts you described to contain Asian carp such as electric, acoustic and bubble barriers will quite possibly have a direct impact on the catch of lake whitefish in a given year if carp are able to out-compete lake whitefish. You mentioned using carp as fish food and fertilizer, which are good ideas, but you also mentioned human consumption. I wonder how successful that last effort would be. One of the main reasons why the Great Lakes fishery for lake whitefish does so well economically is because people prefer the taste of that species. If people generally consider carp to be of poor taste, I imagine it would be difficult to convince people to eat them.'



Virtual Poster – Challenges

What challenges needed to be overcome?

Peer review process

- CarmenCanvas offers a “Peer Review” option on assignments
- Does NOT function well for this assignment

CarmenCanvas learning curve

- Powerful tool, multiple intricacies
- One semester experience smooths out the “bumps”

Assignment instructions

- ENR 2100 staff has conquered this learning curve; ENR 3300 has not
- Clear, detailed instructions are key

Assignment Group: Assignments

Display Grade as: Points

Do not count this assignment towards the final grade

Submission Type: Online

Online Entry Options

Text Entry

Website URL

Media Recordings

File Uploads

Group Assignment: This is a Group Assignment

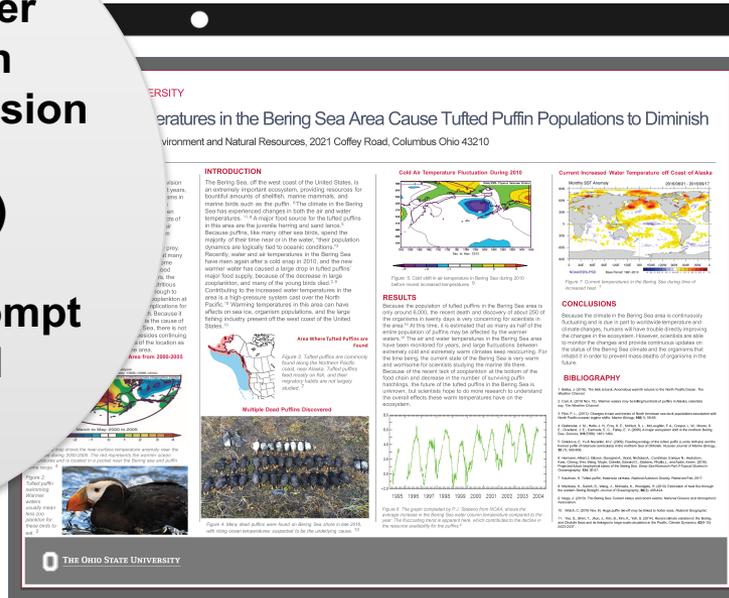
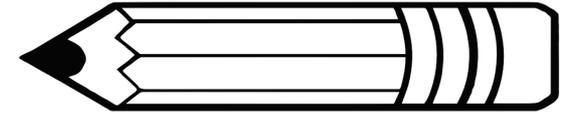
Peer Reviews: Require Peer Reviews



How to overcome the challenge? Manual Peer Reviews

The last portion of the poster assignment involved student peer reviews. The peer reviews assignment has been developed over time and includes:

- Establishing peer review design in Carmen (discussion boards vs. peer review function)
- Designing a prompt to elicit detailed reviews



Comparing ENR 2100's Poster Symposiums, the online section of the course has shown more thorough, detailed, and constructive peer reviews, as well as, more detailed presentations through the use of media tools.



Virtual Poster – Areas for Growth/Opportunity

What areas for growth exist with this approach?

Optional in-person opportunity

- Offer students an in person symposium at the university
 - Example: connect with the in class symposium
 - Face-to-face meeting with other students

Synchronous presentations

- Mimics the real thing
- Allows for real-time questions and answers
- Meaningful student-student interaction

Media recorder practice

- Currently the poster presentation is their first use of the tool
- Offer a pre-check to overcome any obstacles



ACKNOWLEDGEMENTS



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SCHOOL OF ENVIRONMENT
AND NATURAL RESOURCES

The Faculty of SENR who developed
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Thank you to SENR and CFAES staff
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implementation of our online courses.

**Thank you to the
many online students,
who without, none of
this would be
possible.**

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**All the great designers
and support staff in ODEE**



UNIVERSITY CENTER FOR THE ADVANCEMENT OF TEACHING



Thank you!
Questions?

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SENR Instructional Aids Associates