PROVOST HYBRID COURSE AWARD REPORT

I. Background & Course Overview

The One Health concept is a worldwide strategy based on implementing inter- and trans-disciplinary approaches to improve and promote human, animal, and environmental health. One Health is an umbrella under which communication, collaboration, and problem solving among stakeholders and experts including agricultural scientists, anthropologists, economists, educators, engineers, entomologists, epidemiologists, hydrologists, microbiologists, nutritionists, physicians, public health professionals, sociologists, and veterinarians may flourish.

The ‘Fundamentals in One Health’ hybrid course was inspired by existing face-to-face (F2F) courses that target a variety of graduate and professional school audiences, along with the demand from students and stakeholders for an introduction to One Health topics at the undergraduate level. In the inaugural year of the course, upper division undergraduate students motivated by interests in health and its relationship to environmental change assimilated the basic theories and philosophies from their respective disciplines with concepts emphasized in the course curriculum to understand the One Health field. The diverse student and faculty backgrounds, including life, physical, environmental, and social sciences, contributed to a rich learning environment and collective problem solving using novel ideas coupled with technical innovation.

A. Course Structure & Flow

This three-unit course was structured as a hybrid class in that it included both F2F and on-line activities divided into two 1.5-hour sessions per week. One-hour office hour sessions were scheduled by each instructor weekly. Assignments were submitted electronically via the SmartSite® Course Management System. Group final projects included a formal presentation and term paper that examined problems, challenges, and solutions for a One Health case study.

1. Synchronous Activities

Pre-lecture reading was assigned for each class meeting and posted on SmartSite® in advance of the upcoming session. The lectures were 50 to 60 minutes with 20 to 30 minutes of interactive student-lecturer discussion. Students were required to prepare for class sessions by reading assigned articles or book chapters prior to the lecture and discussion sessions and post on Piazza (see below) before each class meeting. F2F lectures were presented during the first class meeting each week. The speakers and coursework highlighted how global health challenges can be addressed using transdisciplinary One Health approaches.

An in-depth weekly topic discussion session was facilitated virtually using AdobeConnect®. During the discussion sessions, the students were involved in developing One Health solutions and recommendations for global health concerns using critical and lateral thinking. We structured these online sessions starting with a short topical lecture for approximately 20-30 minutes followed by small group breakout sessions for 30 minutes and concluded with a group round robin where each group presented their conclusions from the breakout sessions for the final 20 minutes of the session.
2. Asynchronous Activities

Piazza was monitored daily and we used it as a central communication center between instructors and students in addition to the SmartSite® announcements site. To encourage student preparation and reading in advance for the lecture and discussion sessions they were required to post on Piazza, an online ‘gathering’ interactive site where students can ask, answer, and explore issues relevant to the weekly topic under the guidance of course instructors, before and after each class meeting. In addition to the class sessions students were required to view pre-taped webinars and complete case study assignments (asynchronously) using the IVIMEDS® online learning tool.

B. Course Resources — Hybrid Format

- **SmartSite®**: was the repository and course organization platform used for lectures, course communication, resources, forums, chat room discussions, and announcements, https://smartsite.ucdavis.edu/xsl-portal/site/ec205cc0-c68b-4857-b4ef-01e3375a6b7a
- **AdobeConnect®**: Accessed via the course SmartSite®.
- **Piazza®**: Accessed via the course SmartSite®.
- **IVIMEDS®**: Accessed via the course SmartSite®.

Tools used for the course

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
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<tbody>
<tr>
<td>SmartSite®</td>
<td>manage the course and post readings and assignments, and links to hybrid tools</td>
</tr>
<tr>
<td>Video</td>
<td>webinars, lecture video archive</td>
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<tr>
<td>AdobeConnect®</td>
<td>on-line synchronous discussion, projects</td>
</tr>
<tr>
<td>Piazza</td>
<td>on-line Q &amp; A, asynchronous discussions</td>
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<tr>
<td>IVIMEDS®</td>
<td>case study repository and interactive problem solving site</td>
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II. Pedagogy

The overriding pedagogy was to blend traditional lectures with newer online teaching methods that emulate the reality of how One Health projects work. We achieved this blend in teaching by: 1) bringing into one ‘classroom’, F2F and virtually, students from an assortment of disciplines, including pre-professionals, to understand the concepts of One Health and discover how to solve One Health problems, and 2) bringing the challenges to life of participating in One Health projects globally using technology to connect with One Health partners and collaborators. Students from biological, nutritional, and social sciences, pre-professional fields, and international development participated in this course. They communicated across disciplines during discussion sessions and group projects, and contributed knowledge from their majors during the interactive activities. The students enriched one another’s experiences and knowledge, which was especially brought to bear through their insightful Piazza postings.

A. What Worked

**Seamlessly**: The lectures and lecture discussions were a strength of the course and were well received. The majority of the students prepared in advance for each lecture and discussion session, and they were actively engaged with the presenters during the sessions. SmartSite® as a course management system worked quite well and the students easily accessed the course materials.
The Piazza interactive online software posting system was an excellent tool for students to 'shout out' in Piazza style if there were any light bulb breakthrough moments as well as problems or concerns so that we could immediately resolve any issues; but more importantly, Piazza became a barometer for student participation, perceptions, and course acceptance. We were pleasantly surprised at the level of learning and comprehension the students showed through their Piazza postings. The utility of this online tool exceeded our expectations.

**With minimal effort:** IVIMEDS®, the case studies interactive platform, worked well once we resolved some minor problems with the software during the first two weeks of the course. This tool was exceptional for facilitating asynchronous assignment learning and the students excelled in completing these assignments with thoughtful responses that reflected their attention to the reading, lectures, and discussions. The use of multimedia images, videos, charges, links, and assessment question in the IVIMEDS® case studies helped bring the One Health stories to life for the students.

**B. Challenges**

We resolved most of the technical challenges during the first couple of weeks of the course regarding course requirements and the IVIMEDS® software, with the exception of technical challenges for some students using the AdobeConnect® virtual classroom. The weekly online discussion sessions were facilitated with AdobeConnect®, a multi-faceted software platform that we learned to navigate and host a virtual classroom. The primary ongoing challenges were the inconsistencies with AdobeConnect® for the students who were wireless and did not have access to cable connections. The connectivity varied from week to week with different students having problems, but we managed the problems on a case-by-case basis. Some students were somewhat frustrated with these technologic challenges, but they understood the utility of this tool in the One Health field and the flexibility in location that this tool enables. After a couple of weeks the students were able to identify areas around campus and Davis that had stronger WiFi signals if they were not able to connect via a cable to the internet. Part of the One Health pedagogy was to provide students with 'real life' communication experience on One Health projects that span across nations and continents.

**C. Innovation**

The hybrid course format provided an opportunity for us to immerse students in One Health problem solving using technology to learn and communicate synchronously and asynchronously. Innovation involved: 1) introducing the One Health transdisciplinary approach to solving problems at the interface between humans, animal, and the environment; 2) showing students the value in working across diverse fields of study using lateral and critical thinking, in a group, to solve problems; and 3) implementing state-of-the-art technical learning tools that we used to showcase methods to work on One Health solutions anywhere in the world.

**III. Assessments & Student Comments**

**A. Assessments**

We administered a pre- and post- course assessment survey to the students to gauge their One Health knowledge and collect comments on the hybrid course platform as a learning
and teaching method. We plan to include this assessment metric and the results in proposals for future funding opportunities. Highlights from the assessments are provided below.

Seventy-five percent of the students in the course on the first day of class that completed the survey and asked ‘What is One Health’ provided answers that were quite close to the definition. The high percentage of correct responses to this question was an indicator that undergraduates were aware of One Health and, by virtue of their enrollment in the course, sought formal training in this emerging discipline. Sixty-five percent of the students were able to give three examples of One Health problems. Most of the students felt they learned better by ‘doing’ and through ‘oral’ learning methods, followed by reading, and the majority of students did not have exposure to learning using case studies. In the post-course assessment survey, 90% of the students were able to concisely and clearly define One Health, and 100% of the students provided three examples of One Health problems in contrast to 75% and 65%, respectively, in the pre-assessment survey. We consider this outcome a success.

B. Student Comments on the Course
The students contributed thoughtful and constructive comments in their course evaluations. Most of the comments regarding the course were highly favorable and the over-arching concerns were with technical problems, primarily AdobeConnect®. Over half of the students that completed the course expressed that this course was of higher quality than their other courses and only one student felt that it was lower. Approximately 70% of the students enjoyed the hybrid format and a mix of synchronous and asynchronous learning platforms; however, a number of the 70% did have issues with the technology during the discussion sessions. The students enjoyed the diverse topics and presentations by experts in the various fields and they favored the case-based course format. They expressed concerns with AdobeConnect® during the discussion sessions, but acknowledged that virtual ‘meetings’ were a necessity to work in the One Health field. A number of students are interested in meeting with us to discuss course improvements and to help us advertise the course prior to the next course offering. My favorite comment from one student was ‘I wished I learned even more and for it to continue.’ Need we say more?

IV. Course Impact & Scalability
A. UCD

This course spawned inspirational discussions between the School of Veterinary Medicine, the Plant Pathology department, and the School of Medicine to develop an undergraduate Global Disease Biology major. Drs. Miller and Papageorgiou, along with Dr. Conrad, have been involved in these discussions since the inception of the concept and have continued to work on the committee as the proposal for this major moves forward. The One Health: Human, Animal & Environment Interfaces course is slated as the flagship course for the Global Disease Biology major core courses.

B. UC Global Health Institute (UCGHI)
1. UC Davis

UC Davis has two centers of excellence (COE) within the University of California Global Health Institute (UCGHI): 1) One Health: Water, Animals, Food, and Society, and 2)
Migration and Health institute. The UCGHI is developing a robust, comprehensive One Health Master’s program and this course was developed to align with the mission of these COEs and acquaint undergraduates to One Health. The course introduces highly motivated students to One Health and fosters trans-disciplinary training to evaluate, assess, and solve global One Health problems using novel teaching methods and technology. The basic principles and training students gain from this course provides them with the building blocks necessary to pursue training in graduate programs (e.g. UCGHI Masters) or professional health alliance careers.

2. UCSF Global Health Institute (GHI)

Drs. Miller, Papageorgiou, and Conrad had a productive meeting with one of the UCSF GHI groups that is interested in developing hybrid courses for their international field professionals in East Africa. Dr. Papageorgiou spent a half day at UCSF doing a presentation for their team describing the philosophy and design on how she and Dr. Miller developed this hybrid course. The UCSF team is interested in this course model and design and may be working with us to convert their materials to a hybrid format.

This same team from UCSF has been contacted by the Khan Academy to develop short video modules about One Health. The Khan Academy, a non-profit educational website with a mission to provide a “free world-class education to anyone anywhere” with over 260 million lessons delivered using 4300 micro-lectures. As a leader in advancing didactic and practical training in One Health, partnering with the Khan Academy is a natural fit our UC One Health and Global Health teams to showcase and educate global communities on our expanding One Health programs and projects.

C. Other California Higher Education Institutions

Dr. Kirkwood Land, a tenured professor at the University of the Pacific developed and launched a One Health seminar course this year patterned after this hybrid course in One Health. We worked closely with him to shape the course and together with Dr. Land, we are planning to submit a proposal to NSF education program for funds to continue to develop One Health training for undergraduates that will leverage the PHCA award funds to benefit the UC system as well as our educational research interests. Towards this goal, we have administered pre- and post-assessment ‘tests’ to the students in the courses to evaluate their knowledge about One Health and provide preliminary data for the NSF proposal. We plan to submit this proposal spring 2014 once the call is posted.

V. Next Phase & Scalability

A. Ain’t Broke, We’re Not Messing With It

We were successful in developing a slate of lecture and discussion sessions that matched the topics to dynamic speakers and engaged the students to foster a rewarding F2F and virtual classroom learning experiences. The discussion session format worked quite well in this first ‘trial’ and we plan to maintain the general format with some minor modifications. The IVIMEDS® case studies provided the students with real-world case problems to solve using an interactive format. Based on the responses to the questions embedded in the IVIMEDS® case studies, the students excelled in integrating material from the lectures, discussions, and readings to respond to, and elaborate on, the questions.
B. Course Improvements
   1. Piazza® postings
      a. continue to post individual comments pre-lectures and discussion sessions
      b. the posts after the lecture and discussion must be in response to a pre-lecture to enhance asynchronous communication among the students and build a stronger online community
   2. Final Projects: to improve the student learning experience for GE oral and written communication
      a. work more closely with the students to improve their final project presentations
      b. have students submit part of the final paper for grading a couple of weeks earlier than the due date to allow us to review and guide the students to improve and submit a more polished written document.

C. Scalability
   1. Work on a course design for a multi-campus offering
      a. consider scaling up by adding one campus at this time
      b. UC Riverside is a logical campus for course expansion because the UCD OHI has a One Health graduate course that we offer together with this campus
   2. We plan to apply for the upcoming ILTI RFP once it is posted
   3. We have discussed expanding this course to two-quarters and plan to have the last half of the second quarter for students to research, write, and prepare their topics in greater depth for their final presentations and written project.
   4. Work with the OHI partner institution, Nelson Mandela Institute in Tanzania, to include them in this course in either a hybrid or fully online format. If the technology on both ends works then we can enhance the student One Health experience by partnering students from both countries to exchange and learn from one another during the course.