Creating an Online, General Education Agriculture Course for the University of California

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Introduction/need for innovation or idea

Most consumers have little understanding of the path that their food takes from farm to fork, or of the science and technology that support and protect this path. Lack of agricultural literacy was recognized and analyzed in a 1988 report published by the National Research Council. Their report explains agricultural literacy as education about the importance of agriculture that equips citizens to understand and support policies beneficial to agriculture. The report encouraged organized agricultural education be included in curriculum in grades K-12 (NRC, 1988). Education programs and studies have focused primarily on elementary school-aged students, leading to possible omission of older learners who could be more immediately involved in choices influencing agricultural direction and policy (Kovar & Ball, 2013). Studies have demonstrated a lack of agricultural literacy among college-age students. At a university in central Texas, the overall mean score achieved by 501 freshmen who completed an assessment of agricultural literacy was 50.4% (Colbath & Morrish, 2010). In a study consisting of 500 freshmen at Oklahoma State University, the students obtained an overall mean score of 56% on an abbreviated agricultural literacy assessment (Dale, Robinson, & Edwards, 2017).

There is a critical need for college students, as current and future consumers, to have informed perspectives to evaluate what they see in the media, make well-reasoned choices, and understand potential consequences. Agricultural topics are often in the news, and higher levels of agricultural literacy can impact how individuals perceive that information. Students from a large public university who self-reported higher levels of agricultural literacy had more positive reactions to images taken from a broadcast news story about antibiotic use in livestock (Specht, McKim, & Rutherford, 2014). Given the demonstrated lack of agricultural literacy among college freshmen, it is crucial that widely accessible general education courses about food and agriculture be available and encouraged. One highly effective way to make these courses more accessible is through online course delivery. Online courses can expand learning opportunities by helping to overcome time and distance barriers to class accessibility, especially when educational resources are shared via cooperation between multiple universities (Centner, 2014).

It is within the context of increased need for widely accessible, college-level, agriculture-related courses that the University of California, Davis (UCD) course Science and Society 2V (SAS 2V): *Feeding the World: Influences on the Global Food Supply* was conceived. This is a general education, lower-division, fully online course about the science, mechanisms, challenges, trade-offs, and impacts of agriculture. SAS 2V was selected as the UCD campus contribution to the food curriculum within the University of California Office of the President's (UCOP) Global Food Initiative (GFI). The goal of the UCOP GFI is to raise awareness across the UC system of the science and societal impacts of food production, challenges to agricultural sustainability, and the importance of informed food choices. Development and delivery of SAS 2V has been jointly funded by the Innovative Learning Technology Initiative (ILTI) and the GFI of the UCOP. This fully-online class is widely available and accessible not only to UC Davis students, but also to students throughout the UC system. Via the cross-campus enrollment system, students from 9 other UC campuses throughout the state can enroll and take the course for credit.

How it works/methodology/program phases/steps

SAS 2V is administered in a blended learning format with both asynchronous and synchronous delivery of material. Each week students are required to view approximately 2

hours of archived video lectures as well as participate in a 50-minute, instructor-led live webinar. The video lectures are multiple short video clips (approximately 3-5) about a specific topic. Students complete 1-2 topics per week. The video clips consist of instructor voiceover of PowerPoint slides containing graphics, animations, and video to enhance the presented material. Each video clip is limited to approximately 5-20 minutes to maximize student focus and attention. The 10-week quarter includes a range of topics such as: Agriculture's Evolution and Revolution, Population and Food, Farming Systems and Sustainability, Farm Energy Balance, Adverse Consequences of Farming, Climate Change and Agriculture, Human Nutrition, Food Safety, Agricultural Economics Basics, and International Agriculture.

The weekly webinars serve as important points of interaction between the instructors and students. The webinars begin with introductory Ag Trivia as a fun test of students' general knowledge about agriculture and food. This is followed by a discussion of the "Muddy Points Topics List" composed of students' questions about the material. Next is a review of the week's topics where the instructors pose questions to the students. The webinar concludes with an "Agri-fact or Agri-fiction" discussion activity such as a debate about opposing views of a current news article about agriculture. Learning is assessed via weekly online quizzes consisting of multiple choice and true-false questions, 2 short writing assignments about class topics, and a cumulative final exam administered via the online proctoring service ProctorU.

The course website (developed on Canvas by Instructure) serves as the delivery vehicle and roadmap for the course. The website is organized into weekly modules, each containing the lecture videos for the week's topics, supplemental readings, a link to the webinar, and the quiz.

Results to date/implications

SAS 2V was first offered for student enrollment locally at UCD in the fall quarter of 2018 with 66 students enrolled. It was subsequently offered for enrollment of students at UCD as well as other UC campuses in winter and spring quarters of 2019. Enrollment increased each quarter with 85 students in winter and 129 students in spring. The ever-growing enrollment numbers attest to student interest and satisfaction with the course. Organization of the course website into systematic, easy-to-follow, weekly modules proved highly effective. Student questions about course structure or navigation were minimal, and student completion of assignments and tasks was nearly 100% every quarter.

Future Plans/advice to others

SAS 2V will be offered for UCD and UC system-wide enrollment during fall, winter and spring quarters of the 2019-2020 academic year. Future offerings will be dependent on available funding opportunities for instruction, administration, and updating/revision of the course. Increasing enrollment of students from the different UC campuses is an ongoing goal. Advice and assistance from academic technology specialists is crucial to creating a successful course.

Costs/resources needed

The largest infusion of resources for development of SAS 2V was required upfront for generating the pre-recorded video lecture content. Creating PowerPoint slides, writing scripts for instructor narration, and recording and editing the videos was the most resource-intensive component. Constructing a well-structured website for course delivery required significant time and revision. Expenditures were primarily for equipment such as video editing software, high quality microphones, and creator/instructor salaries.

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