

Research Note

Assessment of a food microbiology senior undergraduate course as a potential food safety distance education course for poultry science majors

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ABSTRACT Distance education courses have become popular due to the increased number of commuter students as well as people already in the workforce who need further education for advancement within their careers. A graduate-level Web-based course entitled Special Topics—Poultry Food Safety Microbiology was developed from an existing senior undergraduate advanced food microbiology course in the Poultry Science Department at Texas A&M University. Conversion of standard lecture material into a distance education course can provide unique challenges to maintain com-

parable course content in an asynchronous manner. The overall objective for this course was to examine bacterial activities including ecology in food, animals, raw and processed meat, eggs, and human pathogenesis. Students were surveyed at the end of the class and the majority agreed that they would be willing to take the course as an online course, although they were not willing to pay an extra fee for an online course. The majority of students used the online version of the course as a supplement to the classroom rather than as a substitute.

Key words: distance education, poultry science, food safety, food microbiology

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INTRODUCTION

The poultry industry in the United States produces 43 billion pounds (19.5 billion kg) of chicken meat annually, a total farm value of \$20 billion (ERS, 2009). In 2008, US per capita consumption of poultry meat was 115 pounds (52 kg), over 40% of all red meat, poultry, and fish tracked by the USDA (ERS, 2010). In spite of the prominence of the US poultry industry, individual active departments of poultry science at universities have declined from 45 in the 1940s to 7 at the present time (Yegani, 2009). This decline presents challenges for educating the next generation of poultry scientists because there may be economic barriers to students being able to be physically present at these few universities, which leads to the opportunity to use distance education. Poultry companies need personnel that are educated in food safety, especially topics related to human pathogens.

In 2005, around 17% of all students took classes online as a part of their degree-seeking program (Allen and Seaman, 2006). It has been predicted that by 2014, only 5.14 million students will take all of their courses in a physical classroom, whereas 3.55 million will take all of their classes online and 18.65 million will take some of their classes online. Braun (2008) surveyed students enrolled in online or hybrid courses and discovered the most frequent reasons for enrolling in the online courses included financial (81%), flexibility (80%), and ability to work at home (74%).

Distance education and online classes can offer communication in either a synchronous or an asynchronous manner (Wu and Hiltz, 2004). Asynchronous communication allows students to access the online classroom any time or anywhere, whereas synchronous discussions involve the use of chat rooms or discussion boards to allow students to meet at the same time but in different locations.

As part of the Poultry Science Department at Texas A&M University's distance education Masters of Agriculture program, a graduate-level course entitled Special Topics—Poultry Food Safety Microbiology was designed from an existing undergraduate course in ad-

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Table 1. Survey results (answers expressed in percentages), n = 68

No.	Question	Answer ¹				
		A	B	C	D	E
1	I would be willing to take this course online	30.9	25.0	16.2	8.8	19.1
2	I would be willing to pay an additional fee per credit hour to take POSC 429 online	13.2	5.9	20.6	17.7	42.7
3	I used the online version of this course to replace attendance	22.1	19.1	13.2	19.1	26.5
4	I used the online version of this course because I missed something in lecture	38.2	25.0	7.4	11.8	17.7
5	I believe online courses are easier than typical lecture classes	10.3	10.3	38.2	20.6	20.6
6	I found the class format helpful to my comprehension of subject matter	11.8	35.3	26.5	13.2	13.2
7	I would take another class in this format	19.1	32.4	19.1	8.8	20.6
8	Slides are a valuable part of this course	52.9	36.8	5.9	4.4	0.0
9	Slides used in this course are a great help in learning the material	41.2	32.4	16.2	5.9	4.4
10	The course materials used in the class were of high quality	23.5	50.0	17.7	7.4	1.5
11	The course Web site contributed to the quality of this class	32.4	35.3	16.2	7.4	8.8
12	The course Web site was well organized	32.4	45.6	4.4	10.3	7.4
13	The course Web site was consistently updated and current	33.8	42.7	11.8	4.4	7.4
14	The course Web site was visually appealing	23.5	35.3	29.4	7.4	4.4

¹A = strongly agree; B = agree; C = undecided; D = disagree; E = strongly disagree.

vanced food microbiology. This course was offered as a Web-based asynchronous course designed for students not able to attend class and who were voluntarily seeking further education. Students were surveyed over a 2-yr period to determine their reactions to the class being made available online as compared with physical onsite classroom instruction.

MATERIALS AND METHODS

Conversion to Online Class

The lecture overheads and handouts were converted to PowerPoint (Microsoft Corp., Redmond, WA) presentations. Note packets with skeleton outlines of the PowerPoint lectures were purchased by students. The professor's voice, slides, and notes were recorded using the Smart Symposium (Smart Technologies ULC, Calgary, Alberta, Canada). The Shure Presenter cordless microphone (KRM Technologies Inc., Alpharetta, GA) was used to produce an audio file with the slides and notes. The program coordinator used a FTP program to transfer the file to the media center, where the file was converted to a streaming video to be viewed on RealPlayer (RealNetworks, Seattle, WA). The classroom lecture remained the same in meeting 3 times a week

for 50 min. The students taking the course at a distance could access the lectures at any time from any computer with access to the internet.

Questionnaire

After completion of the class, a total of 68 students were asked to complete a 14-question survey. Each question had 5 responses ranging from strongly agree to strongly disagree (Table 1).

Statistical Analysis

Answers were compiled according to frequency and analyzed using SAS (SAS/STAT, version 8, SAS Institute Inc., Cary, NC). A χ^2 analysis was performed to analyze relationships between questions, with results considered significantly different at $P < 0.05$.

RESULTS

More than half of the students stated that they would be willing to take the course online (Table 1) as opposed to the more formal classroom setting. Only 41% of the respondents used the online class to completely replace the face-to-face class, with 63% saying they used

Table 2. Two-way table for the relationship of question 1 (Q1, I would be willing to take this course online) and question 2 (Q2, I would be willing to pay an additional fee per credit hour to take this course online), n = 68

Q1	Q2 ¹					Total	χ^2	P-value
	A	B	C	D	E			
A	9	2	2	4	3	20	43.3	0.0002
B	0	1	7	4	5	17		
C	0	1	2	3	5	11		
D	0	0	2	0	4	6		
E	0	0	0	1	10	11		
Total	9	4	13	12	27	65		

¹A = strongly agree; B = agree; C = undecided; D = disagree; E = strongly disagree.

Table 3. Two-way table for the relationship of question 5 (Q5, belief that online courses are easier than lecture classes) and question 1 (Q1, willingness to take this course online), n = 68

Q5	Q1 ¹					Total	χ^2	P-value
	A	B	C	D	E			
A	6	0	0	0	1	7	49.8	<0.0001
B	2	2	3	0	0	7		
C	7	10	5	3	1	26		
D	4	4	2	3	1	14		
E ¹	2	1	1	0	10	14		
Total	21	17	11	6	13	68		

¹A = strongly agree; B = agree; C = undecided; D = disagree; E = strongly disagree.

the online class because they had missed something in lecture (Table 1), indicating students might prefer to have the online access as a supplement to the classroom rather than a replacement. When we examined the relationship between question 1 (willingness to take the course online) and question 2 (willingness to pay an extra fee) we discovered that even those willing to take the course online were not willing to pay an extra fee for the class (Table 2).

Forty percent of the students did not agree that online classes are easier than typical lecture classes, but an almost equal percentage (38%) was undecided about the question. When looking at the relationship between whether online classes were in general perceived as easier (question 5) and willingness to take this specific class online (question 1), those who were undecided about the ease of online classes were willing to take this course online (Table 3). However, those who strongly disagreed that online classes were easier also strongly disagreed that they would be willing to take this course online (Table 3).

Almost half (47%) agreed that the format of the class was helpful to understanding the subject matter, but there was also a large segment (26%) that was neutral on the concept. The relationship between question 6 (class format was helpful in understanding the subject matter) and whether students would be willing to take another class in this format (question 7) revealed that the largest portion of the class agreed the format was helpful and would be willing to take another class in that format (Table 4).

Most students agreed that PowerPoint slides were a valuable part of the course and that the slides were helpful in learning the material. In addition, most respondents agreed that course materials were of high quality. Most respondents found the Web site to be well organized, current, and visually appealing. The relationship between questions 11 and 12 is presented in Table 5. It can be seen that there was a high correlation between agreement that the course Web site was of high quality and agreement that the Web site was well organized.

DISCUSSION

Although students expressed a willingness to take courses online, they did not agree that they would pay an extra fee for the online course versus taking a traditional class. Utah State University (2009) in their spring 2009 distance education survey received comments from students indicating that the extra fees for the distance education courses were burdensome. Likewise, Braun (2008) found that only 20% of students surveyed preferred a completely online course. Most of the respondents in this study used the online version of the class to supplement the classroom instruction and not as a substitute for the classroom. Marcketti and Yurchisin (2005) also found that students preferred the hybrid learning model to both the online-only and face-to-face-only courses. Most students found the Web site to be well organized and a valuable resource. Pomales-Garcia et al. (2009) found that attributes of online

Table 4. Two-way table for the relationship of question 6 (Q6, found class format helpful) and question 7 (Q7, willingness to take another class in this format), n = 68

Q6	Q7 ¹					Total	χ^2	P-value
	A	B	C	D	E			
A	5	3	0	0	0	8	61.3	<0.0001
B	7	10	4	1	2	24		
C	0	9	4	1	4	18		
D	0	0	4	4	1	9		
E	1	0	1	0	7	9		
Total	13	22	13	6	14	68		

¹A = strongly agree; B = agree; C = undecided; D = disagree; E = strongly disagree.

Table 5. Two-way table for the relationship of question 11 (Q11, the course Web site contributed to the quality of this class) and question 12 (Q12, the course Web site was well organized), n = 68

Q11	Q12					Total	χ^2	P-value
	A	B	C	D	E			
A	17	4	0	1	0	8	78.2	<0.0001
B	4	17	3	0	1	24		
C	1	4	1	3	1	18		
D	0	1	1	3	0	9		
E	0	2	0	0	4	9		
Total	22	28	5	7	6	68		

¹A = strongly agree; B = agree; C = undecided; D = disagree; E = strongly disagree.

materials were ranked in order (most important first): clarity, organization, structure, simplicity, attractiveness, and excitement. According to Vencatesan (2006), poorly designed course materials are a chief factor in drop out from distance education courses.

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REFERENCES

- Allen, I. E., and J. Seaman. 2006. Making the grade: Online education in the United States, 2006. Sloan Consortium, Needham, MA.
- Braun, T. 2008. The perceptions and attitudes of online graduate students. *J. Technol. Teach. Educ.* 16:63–92.
- ERS. 2009. Poultry and eggs. Accessed Nov. 4, 2009. <http://www.ers.usda.gov/briefing/poultry/>.
- ERS. 2010. Food availability. Accessed Feb. 12, 2010. <http://www.ers.usda.gov/data/foodconsumption/FoodAvailspreadsheets.htm>.
- Marcketti, S. B., and J. Yurchisin. 2005. Student perceptions of a hybrid course. Accessed Nov. 4, 2009. http://findarticles.com/p/articles/mi_hb3325/is_3_9/ai_n29219707/.
- Pomales-Garcia, C., Y. Liu, and A. D. Lopez. 2009. Student perceptions on the importance of distance learning module design dimensions. 39th ASEE/IEEE Frontiers in Education Conference, San Antonio, TX. IEEE, New York, NY.
- Utah State University. 2009. Distance education student survey—Spring 2009. <http://distance.usu.edu/files/uploads/DE-Survey-Spring-2009-Summary.pdf> Accessed Nov. 12, 2009.
- Vencatesan, J. 2006. Recent initiatives in distance education. *Curr. Sci.* 91:891–893.
- Wu, D., and S. R. Hiltz. 2004. Predicting learning from asynchronous online discussions. *J. Asynch. Learn. Net.* 8:139–152.
- Yegani, M. 2009. The future of poultry science: Student perspective. *Poult. Sci.* 88:1339–1342.