

INSTRUCTIONAL DESIGN AND ASSESSMENT

A Required Online Course with a Public Health Focus for Third Professional Year Pharmacy Students

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Objective. To design, deliver, and evaluate the impact of a required course on student knowledge acquisition and ability to evaluate contemporary public health issues.

Design. A 2-credit course was implemented using asynchronous, online delivery. Learning activities included literature retrieval and assessment, analytic writing, quizzes, and creation of a group wiki evaluating a current public health issue. Course topics included health care reform, social determinants of health, health disparities, evidence-based medicine, end-of-life care, patient safety, and research ethics.

Assessment. Strong student performance on assessments indicated an ability to use higher-order cognitive domains. Online delivery provided students with the flexibility to complete assignments at their convenience, allowed participation by all students, and encouraged self-directed learning.

Conclusion. Completion of a required, online, asynchronous course with a public health focus allowed pharmacy students to increase their knowledge of and ability to evaluate contemporary ethical, social, cultural, and governmental issues affecting pharmacy practice.

Keywords: Public health, online learning, self-directed learning, instructional technology, wiki

INTRODUCTION

The field of public health focuses on disease prevention and promotion of good health among people at the community, regional, state, national, or international level.¹ The role of the pharmacist in public health is expanding as many pharmacists are becoming closely involved in patient-centered pharmaceutical care with responsibilities that include managing acute and chronic diseases, promoting medication adherence, preventing adverse effects, and encouraging lifestyle changes to prevent disease and improve overall good health. The literature describes pharmacist involvement in immunization programs, emergency preparedness, smoking cessation, health screenings, and the prevention and treatment of sexually transmitted infections, diabetes, and dyslipidemia.²

The role of the pharmacist in public health is recognized by the American Public Health Association and Healthy People 2020.^{3,4} In addition, pharmacy education is now placing a greater emphasis on the inclusion of public health concepts in the curriculum. Standard 2 of

the most recent accreditation standards from the Accreditation Council for Pharmacy Education (ACPE), which is adapted from the educational outcomes from the Center for the Advancement of Pharmacy Education, (CAPE), states that pharmacy graduates should be able to “promote health and wellness and describe the influence of population-based care on patient-centered care.”^{5,6} In addition, ACPE Standard 3 states that pharmacy graduates should be able to “identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution.”⁵

At the Jefferson College of Pharmacy (JCP) in Philadelphia, public health concepts are interspersed throughout required courses, including a health care service learning introductory pharmacy practice experience, a preventive and self-care course, and a medication safety course, among others. In the third professional year, a required 2-credit course titled Pharmacy Grand Rounds emphasizes higher-level cognitive domains of Bloom’s Taxonomy, with an emphasis on synthesis and evaluation of public health principles.⁷ This course is delivered via the university’s course management system as an online, asynchronous class, which allows incorporation of innovative self-directed and active-learning techniques, as recommended by ACPE’s Standard 10.⁵ The online delivery was deemed particularly appropriate for “millennial”

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Table 1. Resources Used to Develop Modules for the Online Pharmacy Grand Rounds Course

| Module Title | Content |
|--|---|
| Health Care Reform | <p>Content provided to students</p> <p>Health care reform and pharmacies. Article by N Milenkovich. Drug Topics. 2010. http://drugtopics.modernmedicine.com/drug-topics/news/modernmedicine/modern-medicine-feature-articles/healthcare-reform-and-pharmacies</p> <p>Pharmacy Principles for Health Care Reform: December 2008. Position Statement from Pharmacy Organizations. http://www.ashp.org/DocLibrary/News/PharmacyHealthCareReformPrinciples.pdf</p> <p>State Health Insurance Marketplace Profiles. Webpage from The Henry J. Kaiser Family Foundation. http://kff.org/state-health-marketplace-profiles/</p> <p>Summary of the Affordable Care Act. Webpage from The Henry J. Kaiser Family Foundation. http://kff.org/health-reform/fact-sheet/summary-of-the-affordable-care-act/</p> <p>The Requirement to Buy Coverage Under the Affordable Care Act. Infographic from The Henry J. Kaiser Family Foundation. http://kff.org/infographic/the-requirement-to-buy-coverage-under-the-affordable-care-act/</p> <p>The YouTube Get Ready for Obamacare. Video from The Henry J. Kaiser Family Foundation. http://www.youtube.com/watch?v=JZkk6ueZt-U&feature=youtu.be</p> <p>Additional References</p> <p>A guide to the Supreme Court's Affordable Care Act decision. Webpage from The Henry J. Kaiser Family Foundation. http://kff.org/health-reform/issue-brief/a-guide-to-the-supreme-courts-affordable/</p> <p>Continuing to implement the ACA in a careful, thoughtful manner. Blog post by M.J. Mazur. On the United States Department of the Treasury website http://www.treasury.gov/connect/blog/Pages/Continuing-to-Implement-the-ACA-in-a-Careful-Thoughtful-Manner-.aspx.</p> <p>Jost TS, Rosenbaum S. The Supreme Court and the future of Medicaid. <i>N Engl J Med</i>. 2012;367:983-985.</p> <p>Summary of New Health Reform Law. Webpage from The Henry J. Kaiser Family Foundation. http://kff.org/health-reform/fact-sheet/summary-of-new-health-reform-law/</p> <p>What is the health insurance marketplace? Webpage from Healthcare.gov. https://www.healthcare.gov/quick-guide/</p> |
| Social Determinants of Health and Health Disparities | <p>Content provided to students</p> <p>Atler DA, Stukel T, Chong A, Henry D. Lesson from Canada's universal care: socially disadvantaged patients use more health services, still have poorer health. <i>Health Aff</i>. 2011;30:274-283.</p> <p>Lurie N, Dubowitz T. Health disparities and access to care. <i>JAMA</i>. 2007;297:1118-1121.</p> <p>PowerPoint Presentation on Health Disparities and Social Determinants of Health In Sickness and In Wealth. Video from Unnatural Causes: Is Inequality Making Us Sick? http://unnaturalcauses.org/video_clips.php</p> <p>Additional references</p> <p>Carter-Pokras O, Baquet C. What is a "health disparity"? <i>Public Health Reports</i>. 2002;117:426-434. Summary. In: Smedley BD, Stith AY, Nelson AR, eds. <i>Unequal treatment: confronting racial and ethnic disparities in health care</i>. Washington, DC: The National Academies Press;2003:1-28.</p> <p>Woolf SH, Phillips RL. Social determinants of health: their influence on personal choice, environmental exposures, and health care. In: Scutchfield FD, Keck CW, eds. <i>Principles of Public Health Practice</i>. 3rd ed. Clifton Park, NY: Delmar, Cengage Learning; 2009:57-85.</p> |

(Continued)

Table 1. (Continued)

| Module Title | Content |
|------------------------------------|---|
| Evidence-based Medicine | <p>Content provided to students</p> <p>Diekema DS. Improving childhood vaccination rates. <i>N Engl J Med.</i> 2012;366:391-393.</p> <p>Quill TE, Holloway RG. Evidence, preferences, recommendations—finding the right balance in patient care. <i>N Engl J Med.</i> 2012;366:1653-1655.</p> <p>Shaneyfelt TM, Centor RM. Reassessment of clinical practice guidelines: go gently into that good night. <i>JAMA.</i> 2009;30:868-869.</p> <p>Steube AM. Level IV evidence—adverse anecdote and clinical practice. <i>N Engl J Med.</i> 2011;365:8-9.</p> <p>Additional references</p> <p>Bryant PJ, Pace HA. <i>The pharmacist's guide to evidence-based medicine for clinical decision making.</i> 1st ed. Bethesda, MD: American Society of Health-System Pharmacists; 2009.</p> <p>Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. <i>BrMed J.</i> 1996;312:71-72.</p> |
| End of Life Care | <p>Content provided to students</p> <p>The most important conversation you'll ever have. Article on Oprah.com http://www.oprah.com/relationships/How-to-Talk-About-Dying-Ellen-Goodman-The-Conversation-Project</p> <p>The Cost of Dying: End of Life Care. Video on cbsnews.com. http://www.cbsnews.com/stories/2010/08/05/60minutes/main6747002.shtml</p> <p>Excerpt from Amanada Bennett's "The Cost of Hope." http://articles.philly.com/2012-06-04/news/32007327_1_kidney-cancer-health-care-pending-intensive-care</p> <p>Additional references</p> <p>Azoulay E, Chevert S, Lelue G, et al. Half the families of intensive care unit patients experience inadequate communication with physicians. <i>Crit Care Med.</i> 2000;28:3044-9.</p> <p>Doukas DJ, McCullough LB, Hanson SS. Advance care planning: values and families in end-of-life care. In: Arenson C, Busby-Whitehead J, Brummel-Smith K, O'Brien JG, Palmer MH, Reichel W, eds. <i>Reichel's Care of the Elderly.</i> 6th ed. New York, NY: Cambridge University Press;2009:596-607.</p> <p>Modi S, Maxwell T. Care for the elderly patient at the end of life. In: Arenson C, Busby-Whitehead J, Brummel-Smith K, O'Brien JG, Palmer MH, Reichel W, eds. <i>Reichel's Care of the Elderly.</i> 6th ed. New York, NY: Cambridge University Press;2009:476-486.</p> |
| Patient Safety and Error Reduction | <p>Content provided to students</p> <p>Condition Help. Website from the University of Pittsburgh Medical Center http://www.upmc.com/about/why-upmc/quality/excellence-in-patient-care/pages/condition-h.aspx</p> <p>PowerPoint® Presentation on patient safety</p> <p>Pronovost PJ, Welsfeldt ML. Science-based training in patient safety and quality. <i>Ann Intern Med.</i> 2012;157:141-143.</p> <p>The Josie King Story. Video describing a medical error resulting in patient death https://www.youtube.com/watch?v=Mp8Kq3ajv3w</p> <p>Additional references</p> <p>Denham CR, Sullenberger CB, Quaid DW, Nance JJ. An NTSB for health care –learning from innovation: debate and innovate or capitulate. <i>J Patient Saf.</i> 2012;8:3-14.</p> |

(Continued)

Table 1. (Continued)

| Module Title | Content |
|---|--|
| The Interactions between Ethics, Culture, and Biomedicine | <p>Health care spending in the United States and selected OECD countries: April 2011. Webpage from The Henry J. Kaiser Family Foundation. http://kff.org/health-costs/issue-brief/snapshots-health-care-spending-in-the-united-states-selected-oecd-countries/Kucher N, Koo S, Quiroz R, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. <i>N Engl J Med.</i> 2005;352:969-977.</p> <p>Wachter, RM. <i>Understanding Patient Safety</i>. New York, NY: McGraw Hill; 2008.</p> <p>Content provided to students</p> <p>Elliott C. Justice for injured research subjects. <i>N Engl J Med.</i> 2012;367:6-8.</p> <p>Emanuel EJ, Menikoff J. Reforming the regulations governing research with human subjects. <i>N Engl J Med.</i> 2011;365:1145-1150.</p> <p>Henrietta Everlasting: 1950s Cells Still Alive, Helping Science. Webpage on Wired.com http://www.wired.com/magazine/2010/01/st_henrietta/</p> <p>Henrietta Lacks: A Donor's Immortal Legacy. Radio Interview with Rebecca Skloot, author of "The Immortal Life of Henrietta Lacks." http://www.npr.org/templates/story/story.php?storyId=123232331</p> <p>Mello MM, Wolf LE. The Havasupai Indian Tribe Case –Lessons for research involving stored biologic samples. <i>N Engl J Med.</i> 2010;363:204-207.</p> <p>Additional reference</p> <p>Skloot R. <i>The Immortal Life of Henrietta Lacks</i>. New York, NY: Crown Publishing Group; 2011.</p> |

learners, who characteristically value active learning, thrive on multi-tasking, and are accustomed to using technology.⁸ This paper describes and evaluates the public health content and online delivery of the course.

DESIGN

The Pharmacy Grand Rounds course addresses JCP's 6 curricular outcomes: (1) increasing student knowledge and understanding and applying social and administrative sciences, (2) fostering the ability to think critically and problem solve, (3) improving the ability to effectively communicate verbally and through writing, (4) encouraging development of the professional acumen to identify and analyze emerging health-related issues, (5) understanding how legislation, regulations, and related programs affect the practice of pharmacy, and (6) demonstrating the highest level of professional, legal, and ethical behavior.

The course learning objectives are to discuss how factors such as patient safety and error reduction, evidence-based decision making, end-of-life care, health disparities and social determinants of health, the interactions between ethics, culture, and biomedicine, and health care reform influence the health care system; to analyze current events and controversies in the US health care system as they relate to these factors; and to demonstrate effective teamwork skills.

The course has been offered 3 times with an average class size of 68 students. Several changes have been made to the course based on student and faculty evaluations. The course is comprised of 6 learning modules that discuss the factors listed above. Table 1 enumerates the content included in each module. Learning modules are presented via a "wiki," a website whose content can be modified by anyone who has access to it, and include readings, videos, PowerPoint slides, audio recordings, and/or websites related to the module. Wikis were chosen to deliver content because students could easily respond to the content (though they did not modify the module content). Students have a 2-week time period during which they independently review module content. At the end of each module, questions are provided to stimulate student analysis of the topic and integration of prior knowledge and experiences with the newly acquired information. For each module, students must post one written response, which can be a reaction to the module content, to the questions, or to a fellow student's response.

During each 2-week module, students must complete a 10-question, multiple-choice online quiz to assess their comprehension. They have a single 30-minute attempt to complete the quiz. To promote academic integrity, quiz questions are displayed one at a time in random order.

Table 2. Rubric for Assessment of Student Responses to Learning Modules

| | Points Earned | Learning Module No. | | | | | | Group project response #1 | Group project response #2 |
|--|--------------------|---------------------|----|----|----|----|----|------------------------------|------------------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Post adds original information, perspectives, or questions that are pertinent to the discussion. | 3 | | | | | | | | |
| Tone of the post is respectful of others' ideas. | 1 | | | | | | | | |
| The student's point of view is clearly understood. (Spelling & grammar will be considered.) | 1 | | | | | | | | |
| Post is at least 100 words long. | 1 | | | | | | | | |
| Post contains correctly cited and formatted primary literature. | (check if present) | | | | | | | | |
| Total (per post) | | /6 | /6 | /6 | /6 | /6 | /6 | /6 | /6 |

Students are expected to complete the quizzes individually. Correct answers are not revealed at the end of the quiz, and students are encouraged to contact the course coordinator if they have questions regarding the answers.

A group project is required at the end of the course. For the first 2 years the course was delivered, the group project consisted of preparing an online poster based on an ethics case. Each group received a unique case, and students evaluated how the different modules related to the case and made recommendations for preventing or mitigating the ethical dilemma. After a reevaluation of the course, the final project was changed to a grand rounds project involving creation of a wiki that presented and analyzed a controversial or not fully understood issue relating to 1 of the 6 course modules. Groups of 4 to 5 students collaborated to identify and research a topic and to create the wiki. In addition, each student was required to post a written response to 2 of their peers' wikis. At the end of the project, students evaluated the contributions of peers in their groups.

After the initial offering of the course, the percentage contribution of assignments to the final course grade was adjusted. The contribution of student responses to the learning modules was increased while the contribution of online quizzes was decreased to reflect the importance of student learning through analysis, evaluation, and discussion. In the most recent offering of the course, each student's final course grade was based on the following: student posts to each of the 6 modules and to 2 peer groups' projects (48% total, 6% per post), final group project (30%), online quizzes (15% total, 2.5% per quiz), peer evaluation (5%), and completion of the course evaluation (2%). Descriptive statistics were used to evaluate course outcomes. The Thomas Jefferson University

Institutional Review Board (IRB) granted the research exempt status.

EVALUATION AND ASSESSMENT

Student responses to each module and to their peer groups' wikis were graded to assess ability to analyze and interpret information and develop and defend positions on topics discussed in the modules. The assessment rubric for this assignment was adjusted over the 3 offerings of the course. In 2010, the first year that the course was offered, students were required to post 8 written responses. The first 2 written responses were assessed formatively but no grade was assigned. Responses were assessed based on their inclusion of new information, perspectives, or questions (2 points), relevance to the topic being discussed (2 points), use of a tone that was respectful of others' ideas (2 points), ability to be clearly understood (1 point), and length (2 points). In 2011, the grading rubric was adjusted so that post length was worth only 1 point. In 2012, the student responses were graded using a participation rubric (Table 2), which assessed whether or not a student's written response added original information, perspectives, or questions pertinent to the discussion, was respectful of others' ideas, was at least 100 words long, and clearly communicated the student's point of view. In addition, for a minimum of 2 written responses, students were required to include a properly cited primary literature reference to support their argument. Students who did not include the minimum number of primary literature references received a 50% grade reduction on the written response portion of their final.

In 2010 and 2011, the mean grades for the student responses were 8.8 out of 9 points (97.5%) and 7.8 out of 8 points (96.9%), respectively. The most common reasons

Table 3. Jefferson College of Pharmacy Written Communication Rubric for Third-Professional Year Students

| Element | 0 | 1 | 2 | 3 |
|---------------------------|--|--|--|--|
| Writing Proficiency | | | | |
| Proper grammar | Three or more grammatical errors present. | Two grammatical errors present. | One grammatical error present. | Complete absence of grammatical errors. |
| Accurate spelling | Three or more spelling errors present. | Two spelling errors present. | One spelling error present. | Complete absence of spelling errors. |
| Transition and flow | Written work includes the use of smooth transitions <50% of the time and flows logically for most of it. | Written work includes the use of smooth transitions 50-75% of the time and flows logically for most of it. | Written work includes the use of smooth transitions 76-99% of the time and flows logically for most of it. | Entire written work includes the use of smooth transitions and flows logically. |
| Reference format | <50% of the references are in the correct format. | 50-75% or less of the references are in the correct format. | 76-99% of the references are in the correct format. | All references are in the correct format. |
| Reference citation | <50% of the references are accurately cited. | 50-75% of the references are accurately cited. | 76-99% of the references are accurately cited within the document. | All references are accurately cited within the document. |
| Writing Content | | | | |
| Reference relevance | <50% of the references are related to the topic OR <50% of the critical references are included. | 50-75% or less of the references are related to the topic OR 51-75% or less of the critical references are included. | 76-99% of the references are related to the topic OR 76-99% of the critical references are included. | All references are related to the topic and all critical references are included. |
| Reference credibility | <50% of the references are credible. | 50-75% of the references are credible. | 76-99% of the references are credible. | All references are credible. |
| Terminology | Excessive use of inappropriate terminology. | Moderate use of inappropriate terminology. | Mostly appropriate level of terminology used throughout. | Appropriate level of terminology used throughout. |
| Pertinence of information | <50% of the material presented is essential to the topic and objectives. | 50-75% of the material presented is essential to the topic and objectives. | 76-99% of the material presented is essential to the topic and objectives. | All material presented is essential to the topic and objectives. |
| Information accuracy | Potentially harmful information presented OR completely inaccurate information provided. | Mostly inaccurate information provided throughout the presentation. | Mostly accurate information provided throughout the presentation. | Accurate information provided throughout the presentation. |
| Synthesis of evidence | Overall conclusion is contrary to the evidence presented or new evidence is presented in the conclusion. | Overall conclusion is not entirely supported by the evidence presented. | Overall conclusion is consistent with evidence presented. | Overall conclusion is consistent with evidence presented and incorporates knowledge from the clinical, social, and/or administrative sciences as applicable (eg, cost issues, quality of life, mortality). |

Table 4. Group Project Grading Rubric

| Element |
|--|
| Provide a brief description of the ethical dilemma |
| Group has provided a brief description of the ethical dilemma. (5 points) |
| Group has not provided a brief description of the ethical dilemma. (0 points) |
| Describe at least 3 of the 6 modules and evaluate how they contributed to the ethical dilemma |
| Group has identified 3 modules and adequately described and evaluated how they contributed to the ethical dilemma. (10 points) |
| Group has identified 3 modules but only partially described and evaluated how they contributed to the ethical dilemma. (8 points) |
| Group has identified 3 modules but does not describe and evaluate how they contributed to the ethical dilemma. (6 points) |
| Group has identified 1-2 modules and adequately described and evaluated how they contributed to the ethical dilemma. (4 points) |
| Group has identified 1-2 modules but only partially described and evaluated how they contributed to the ethical dilemma. (2 points) |
| Group has identified 1-2 modules but does not describe and evaluate how they contributed to the ethical dilemma. (1 point) |
| Group has not identified, described or evaluated any of the modules. (0 points) |
| Provide 2 recommendations on how the topics discussed in the modules could have been addressed in order to prevent or improve the outcome of the ethical dilemma |
| Group has identified 2 error prevention strategies and provided adequate evaluation of these strategies. (10 points) |
| Group has identified 2 error prevention strategies but has provided only a partial evaluation of these strategies. (8 points) |
| Group has identified 2 error prevention strategies but does not evaluate these strategies. (6 points) |
| Group has identified 1 error prevention strategy and has provided an adequate evaluation of this strategy. (4 points) |
| Group has identified 1 error prevention strategy and has not provided an adequate evaluation of this strategy. (2 points) |
| Group has not identified error prevention strategies (0 points) |

for point reductions were late posts and spelling or grammatical issues that affected the faculty member's understanding of the student's point of view. Student responses were not graded formatively in 2012 as a result of the high mean grades for the written responses to the learning modules during the prior 2 years. In 2012, the mean grade for student responses was 5.99 out of 6 points (99.8%). The most common reasons for point reductions were posts too short in length or that were late. All students provided primary literature references for at least 2 of their posts, and 12 out of 79 students (15%) provided more than 2 primary literature references throughout the course of the semester. In 2010, 2011, and 2012, overall quiz grades were 56.1 out of 60 points (93.5%), 57.7 out of 60 points (96.2%) and 49.4 out of 54 points (91.4%), respectively, indicating that students had a strong grasp of the material discussed in the modules.

The online poster evaluating an ethics case was assessed with 2 rubrics: the JCP written communication rubric for third professional year (P3) students (Table 3), which contributed 30% of the assignment grade and the group project grading rubric (Table 4), which contributed 70% of the assignment grade. The written communication rubric assessed writing proficiency (including spelling, grammar, flow and transitions, correct formatting of references, and correct citations of references) and writing content (terminology, reference relevance and credibility, pertinence and accuracy of information, and synthesis of evidence). The group project grading rubric assessed the

group's ability to adequately describe the health care-related emerging issues involved in the ethics case and how they contributed to the dilemma presented in the case, to explain how the emerging issues could have been addressed in order to prevent the ethical dilemma, and to state how an interprofessional approach could have improved the outcome of the ethical dilemma. In 2010, the average group project grade was 27.0 out of 27.4 points (98.5%); in 2011 the average grade was 26.3 out of 27.4 points (96.1%). In 2012, student groups were required to develop a student grand rounds group wiki on a current controversy related to one of the 6 modules. The project was graded using a rubric (Table 5) developed for the project. The rubric assessed whether or not the topic was controversial and related to the online modules; it also assessed grammar, spelling, transitions and flow, appropriate level of terminology, organization, pertinence and accuracy of information, and appropriate use of primary literature and evidence from other sources. The average grade for the wiki was 34.1 out of 36 points (94.8%).

Students were required to evaluate each group member's performance during the group project. Factors assessed were timely communication, respect towards and cooperation with other group members, preparation for group meetings, contribution of constructive and appropriate ideas, and sharing assignment workload. Average peer evaluation grades for 2010, 2011, and 2012 were 4.4 out of 5 points (88.3%), 4.96 out of 5 points (99.2%), and 4.99 out of 5 points (99.8%), respectively.

Table 5. Student Grand Rounds Group Wiki Grading Rubric

| Element | 0 | 1 | 2 | 3 | Comments |
|-------------------------------|--|--|--|--|----------|
| Topic Selection | | | | | |
| Topic applicability to course | Topic is unrelated to a topic discussed in the course. | Topic is not controversial OR topic is fully explainable and/or understood. | Topic specifically relates to a topic discussed in the course. | Topic is controversial and/or not fully explainable or understood | |
| Topic controversy | Topic is not controversial OR topic is fully explainable and/or understood. | | | | |
| Writing Proficiency | | | | | |
| Proper grammar | Three or more grammatical errors present. | Two grammatical errors present. | One grammatical error present. | Complete absence of grammatical errors. | |
| Accurate spelling | Three or more spelling errors present. | Two spelling errors present. | One spelling error present. | Complete absence of spelling errors. | |
| Transition and flow | Written work includes the use of smooth transitions <50% of the time and flows logically for most of it. | Written work includes the use of smooth transitions 50-75% of the time and flows logically for most of it. | Written work includes the use of smooth transitions 76-99% of the time and flows logically for most of it. | Entire written work includes the use of smooth transitions and flows logically. | |
| Content | | | | | |
| Pertinence of information | Content is minimal | Some essential knowledge about the topic is missing. | Includes essential knowledge about the topic but details and examples are lacking. | Covers topic in-depth with details and examples. | |
| Explanation of controversy | 1 viewpoint is explained in a superficial manner. | Only 1 viewpoint is fully explained. | 2 viewpoints are explained in a superficial manner | At least 2 viewpoints are fully explained. | |
| Terminology | Excessive use of inappropriate terminology. | Moderate use of inappropriate terminology. | Mostly appropriate level of terminology used throughout. | Appropriate level of terminology used throughout. | |
| Use of primary literature | No literature published in a medical or pharmacy journal is referenced. | | | At least 1 piece of literature published in a medical or pharmacy journal is referenced. | |
| References | 1 or 0 references are used. | 2 references are used. | 3 references are used. | A total of at least 4 references are used. | |
| Information accuracy | Potentially harmful information presented OR 3 or more factual errors are present. | 1-2 factual errors are present. | Accurate information provided throughout the presentation. Subject knowledge is good. | Accurate information provided throughout the presentation. Subject knowledge is excellent. | |
| Organization | No clear or logical organizational structure, just facts. | Content is logically organized for the most part. | Headings or bulleted lists are used to organize, but the overall organization of topics appears flawed. | Content is well organized. Headings or bulleted lists are used to group related material. | |

Table 6. Student Responses to Selected Course Evaluation Statements

| Survey Statement | Students who agreed or strongly agreed with the statement, n (%) | No. Responses ^a |
|---|--|----------------------------|
| The use of technology aided my comprehension of course material. | 180 (93) | 194 |
| The course added to my knowledge in this subject. | 182 (91) | 199 |
| This course contributed to my ability to critically think and problem solve. | 182 (92) | 198 |
| This course contributed to my ability to demonstrate the highest level of professional, legal, and ethical behavior. | 175 (93) | 188 |
| This course contributed to my ability to exhibit professional acumen to identify and analyze emerging health-related issues. | 192 (97) | 198 |
| This course contributed to my ability to exhibit a working knowledge of how legislation, regulations, and programs affect the practice of pharmacy. | 177 (91) | 195 |
| The text and other assigned readings contributed to my learning in this course. | 182 (91) | 199 |
| Course assessments were relevant to the stated objectives of the course. | 184 (93) | 197 |

^aNot all numbers add up to 199 because some students either did not answer the question or marked the “not applicable” box on the survey.

The average course evaluation completion rate over the course of 3 years was 199 out of 205 students (97%). Using a 5-point Likert scale (1=strongly agree to 5=strongly disagree), students were asked whether they agreed or disagreed with 23 statements. Table 6 shows the overall percentage of students who agreed or strongly agreed with selected survey statements. Over the 3 years, there were 172 free-text responses to questions asking students what course strengths were and what suggestions they could offer to improve the course. Table 7 includes student comments regarding the content of the course. Students tended to appreciate the opportunity to learn about events pertaining to social, legal, and cultural aspects of the health care system. Some students felt they had received enough training on ethics, while others requested topics that were more controversial or related specifically to pharmacy. Examples of student reflections relative to the technology used in the course are included in Table 8. Overall, students appreciated that the online nature of the course allowed them to work at their own

pace. Many students liked that posting responses to modules allowed all students to participate in the discussions. Some students stated that they would have preferred to discuss topics face to face. Many students requested reminders about due dates for wiki posts. In addition, the transition of the group project from an online poster to a student-designed wiki was a result of student suggestions on the course evaluation.

DISCUSSION

The purpose of this course is to increase pharmacy students’ knowledge of and ability to evaluate contemporary ethical, social, cultural, and governmental issues as they relate to pharmacy practice. This goal is supported by the CAPE Outcomes and the ACPE Accreditation Standards. The college’s curriculum introduces public health concepts during the first and second professional years in several required and elective courses. Pharmacy Grand Rounds, a course offered fall semester of the third professional year, requires students to integrate knowledge

Table 7. Student Comments on Course Content

| |
|---|
| “I loved the variety in the topics. I think they covered a lot of content and they really touched on a lot of issues that I didn’t know about previously.” |
| “We need more courses like this to keep us aware of issues and regulations in...the pharmacy practice field. The learning experiences I gained from this course made me become a more informed pharmacy student.” |
| “This class really made me look at current health issues and reflect on them.” |
| “It is refreshing to have a class that focused on pharmacy/medicine on a personal, cultural, legal, social level.” |
| “The fact that this class dealt with the social and cultural aspects of health care gave a refreshing perspective and different food for thought.” |
| “Include topics more specific for pharmacy.” |
| “We get enough ethics in other classes.” |
| “Pick some new super-controversial topics for us to talk about and debate!” |
| “The topics were always relevant and interesting although sometimes time consuming to read.” |

Table 8. Student Comments on Technology Use in the Course

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| “I enjoyed contributing to the wikis since it is an effective way for me to voice my opinion and thoughts.” |
| “I was glad to be able to think about my responses before writing them up, which I wouldn’t have been able to do in a classroom discussion.” |
| “The course. . .allowed our class to discuss these issues in depth through the online wikis.” |
| “Interactions through wiki posts amongst colleagues were helpful in the overall learning experience of each topic.” |
| “The online medium was ideal for presenting this type of information.” |
| “Perhaps require an additional post to each wiki where the student must respond to another person’s primary response. I think this will allow for a more virtual discussion.” |
| “It would be very helpful to receive automated updates about what is due in this course. The fact that is completely done online makes it difficult to keep track of it with all our other classes.” |
| “I believe this course would have been much more beneficial if it was an open forum class meeting that actually got people talking.” |
| “Online format allows for completion of assignments based on student’s personal schedule.” |
| “Instead of using the online poster format for the group project, my suggestion would be to use a group wiki post, which would have been a better way to format the project.” |

from prior coursework, experiential learning, and personal experiences with new knowledge, and to think critically about course content. The topics and higher-order thinking required for this course prepare students to identify and manage issues they may encounter during their advanced pharmacy practice experiences during their fourth professional year.

Grades from quizzes indicate students had a strong knowledge of course topics. Although students had 30 minutes to answer 10 knowledge-based questions, the volume of material provided in each module likely precluded students from using that material to answer questions. Nonetheless, it is possible that quiz grades did not accurately reflect knowledge gained. Grades from wiki posts and from group projects indicate that students were in fact thinking critically and using higher-level cognitive domains, including analysis, synthesis, and evaluation. The online nature of the course allowed all students the opportunity to participate in the discussions and receive feedback from the course coordinators regarding their individual responses to the modules and group projects, despite the large class size. While some students felt that a live discussion would have been better for this material, a majority of students felt that technology aided their learning, and several students commented that the asynchronous nature of the course allowed them to participate, whereas a classroom setting would have limited participation. Requiring students to locate, present, and cite a primary literature reference to support their arguments in 2 wiki posts throughout the semester allowed students to enhance self-directed learning and peer teaching, and allowed for an expansion of the discussion beyond the ideas discussed in each learning module. These are both strengths of the course.

Student evaluations of the course were overwhelmingly positive, with students enjoying the format and

convenience of the online, asynchronous nature of the course as well as the course content. Students enjoyed being able to progress through the modules at their own pace and being able to learn about specific aspects of each topic more in depth if they chose. Several modifications were made to the course based on student and course coordinator feedback. The percentage of the final course grade derived from quizzes was decreased and the percentage of the final course grade derived from wiki posts was increased. For the next course delivery, students will be assigned to small groups within the course, and each group will have its own wiki discussion board. This will facilitate conversation among students and will require them to work in groups throughout the semester, not just during the final project. In addition, students from nursing, occupational therapy, and physical therapy will participate in future offerings of the course.

To our knowledge this is the first study to assess a required online course with a public health focus within a pharmacy curriculum. Limitations of the study include the potential that quizzes did not accurately measure student knowledge. For this reason, the percentage of the final course grade derived from quizzes was decreased. Because the intent of the course was to assess student ability to think critically, the wiki posts and group projects allowed appropriate assessment of that type of learning.

SUMMARY

Completion of an online, asynchronous, required course with a public health focus allowed pharmacy students to increase their knowledge of and ability to evaluate contemporary ethical, social, cultural, and governmental issues as they relate to pharmacy practice. To date, the course has been delivered 3 times, and student feedback regarding course content and delivery has been positive

and has been used to improve the course. Future plans include incorporating students from other health care disciplines and assigning small groups within the course to facilitate more personalized discussion. Schools of pharmacy may want to consider developing such as course to facilitate student understanding of how public health issues affect patients and the practice of pharmacy.

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