INSTRUCTIONAL DESIGN AND ASSESSMENT

Design and Evaluation of a Self-Care Educational Activity as a Student Learning Experience

Jeanne E. Frenzel, PharmD, Elizabeth T. Skoy, PharmD, and Heidi N. Eukel, PharmD

College of Pharmacy, Nursing, and Allied Sciences, North Dakota State University, Fargo, North Dakota

Submitted July 9, 2013; accepted September 1, 2013; published February 12, 2014.

Objective. To design an educational activity and evaluate its effectiveness on increasing third-year pharmacy students' knowledge and confidence to recommend self-care products to patients.

Design. Faculty members created a self-care activity, the Amazing Self-Care Race, for educational use in a pharmaceutical care laboratory course. Student teams worked competitively to complete 15 stations focused on self-care. A complex, real-world case was presented at each station. Student recommendations were presented to a facilitator. Prior to and following the activity, students were invited to complete an online anonymous survey instrument.

Assessment. Eighty-six students completed presurvey and postsurvey instruments to assess their knowledge and perceived confidence to recommend a self-care product to a patient prior to and following participation in the Amazing Self-Care Race. Students demonstrated a significant increase in their ability and confidence to recommend self-care products following the activity ($p < 0.001$).

Conclusion. The Amazing Self-Care Race is an effective educational activity that increases student knowledge and confidence in self-care therapeutics. The activity helped students to develop self-care skills, enabled them to learn through doing, encouraged them to synthesize information while making self-care recommendations, and helped them to develop confidence by thinking on their feet.

Keywords: pharmaceutical care laboratory; self-care skills; nonprescription; self-care recommendations

INTRODUCTION

Without nonprescription medications, 56,000 additional full-time medical practitioners would be needed to provide care for consumers requiring prescription medications for self-treatable conditions. Nonprescription medications are used by an estimated 240 million people. Of those, 60 million would not seek treatment if nonprescription medications were not available.¹ Pharmacists are trained to assist consumers with their self-care needs. The 2007 Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree recommend that colleges and schools of pharmacy provide students with introductory pharmacy practice experiences (IPPEs) and advanced pharmacy practice experiences that allow students to learn and practice with self-care products and consultation.² Appendix B of the standards and guidelines provides additional guidance for clinical sciences to be included in pharmacy curricula, including nonprescription and point-of-care

testing devices.³ To prepare students for these experiences, students must be provided with opportunities to develop critical-thinking and problem-solving skills.²

Adult learning theory suggests that adults learn best when self-directed and actively involved in an activity.^{3,4} Learning is also improved when information presented is relevant.³⁻⁵ Authentic learning activities that are meaningful and purposeful create complex, real-world experiences for students.^{6,7} When applied to the classroom, these experiences deepen students' understanding of important information. Educational games create active-learning experiences for students that stimulate critical thinking, build knowledge and skills, and motivate through competition.^{8,9} This paper describes the design and evaluation of an educational activity used to create an learning experience for students focused on patient self-care.

DESIGN

The Pharmaceutical Care Laboratory III course is part of a 4-semester laboratory sequence designed to teach and assess practical application of the skills necessary to become a general pharmacist. The pharmaceutical care laboratory is a licensed pharmacy within the College of

Corresponding Author: Jeanne E. Frenzel, PharmD, Associate Professor, North Dakota State University College of Pharmacy, Nursing, and Allied Sciences, 1401 Albrecht Boulevard, Fargo, ND 58102. Tel: 701-231-8546. Fax: 701-231-7606. E-mail: Jeanne.Frenzel@ndsu.edu

Pharmacy, Nursing, and Allied Sciences at North Dakota State University. Four pharmacist faculty members instructed 12 third-year pharmacy students enrolled in each of 7 sections offered throughout the week. In the prior semester, students were enrolled in a 2-credit lecture-based course focused on self-care medications. To bridge traditional and laboratory coursework and to review self-care topics, faculty members created an innovative educational activity, the Amazing Self-Care Race, to produce a dynamic and authentic learning environment. The Amazing Self-Care Race was designed for use in the pharmaceutical care laboratory to ensure that students were able to apply learned concepts from the self-care lecture-based course.

Faculty members and pharmacy residents on academic rotations developed 15 stations, each focused on a self-care topic (Table 1). Topics were chosen using the *Handbook of Nonprescription Drugs*.¹⁰ Two types of stations were created, accelerator and application. Three accelerator stations were designed for students to be able to quickly answer a self-care question. Twelve application stations required more time to complete as students had to evaluate a patient case, medication profile, or self-care product. Students were encouraged to approach the order of station completion strategically as the activity was a competition. Stations were designed to appeal to a variety of student learning styles. Stations included simulated patient interaction, solving paper-based patient cases,

Table 1. Amazing Self-Care Race Station Topics

Station Topics	Station Type	Station Description
Blood glucose monitors	Application	Compare and contrast 2 glucometers. Indicate on a diagram of a hand where to obtain a blood sample.
Constipation	Application	Review a patient case. Choose a self-care product, record the product name, dosing, and 1 important counseling point.
Cough and cold	Application	Review a patient case. Choose a self-care product, record the product name, active ingredients, and 1 important counseling point.
Fecal occult blood test	Application	Review the package insert for a colon disease detection kit and answer questions.
Headache	Application	Listen to a voicemail. Review a medication profile in dispensing software. Choose a self-care product, record the product name, dosing, and 1 important counseling point.
HIV testing kits	Application	Review the package insert for a home HIV test kit and answer questions.
Lice	Application	Choose a self-care product and complete a fill-in-the-blank consultation using the package insert.
Medication interactions	Application	Listen to a voicemail. Review a medication profile and screen for drug-drug interactions to determine product appropriateness.
Nutritional supplementation	Accelerator	Review a patient case, choose a self-care product, and record the product name, dosing, and 1 important counseling point.
Pediatric dehydration	Application	Review a patient case. Calculate a child's dehydration status, maintenance fluid requirements, and fluid deficit. Recommend appropriate dosing and frequency of electrolyte replacement fluid for a child.
Pediatric dosing	Accelerator	Listen to a voicemail. Review a patient case, calculate a medication dose, and draw up the first dose in an oral syringe.
Pseudoephedrine regulations	Accelerator	Determine, by law, what quantity of pseudoephedrine can be purchased in a 24-hour time period.
Smoking cessation	Application	Simulated patient station. Use the "5 A's" model to assess the patient's readiness to quit and, if necessary, counsel the patient on a nicotine replacement product using QuEST/SCHOLAR.
Urinary tract infection	Application	Review the package insert for urinary tract infection detection kit and answer questions. Choose a self-care product, record the product name, dosing, and 1 important counseling point. Choose a self-care product for urinary tract infection prevention, and record the product name, dosing, and 1 important counseling point.
Vaginal disorders	Application	Simulated patient station. Use QuEST/SCHOLAR to counsel a patient on a vaginal yeast infection product.

using guided worksheets, reviewing medication profiles, conducting hands-on product exploration, providing verbal recommendations or product consultations to patients, responding to a verbal request from a prescriber, and choosing a product from a self-care product area.

Students were randomly divided into teams of 2 to 3 students. Teams were given a list, referred to as a passport, of the 15 stations to mark as completed. Student teams evaluated information presented at each station and formulated an answer using appropriate references. They then presented their recommendation to the activity facilitator. If the recommendation was considered appropriate, the station passport was initialed by the facilitator and the team was directed to begin a new station. If their recommendation was inappropriate, the student team encountered a counseling roadblock, which required students to counsel their team member on a self-care product before they were allowed to resume the race. The members of the first team to complete all 15 stations and have the team's passport verified by the facilitator were declared the Amazing Self-Care Race champions.

Prior to and following the activity, students were invited to complete an anonymous online survey instrument using SurveyMonkey (SurveyMonkey, LLC, Palo Alto, CA) to assess their knowledge and confidence to evaluate and recommend self-care products to patients. The North Dakota State University Institutional Review Board approved the informed consent document and instruments used in this study.

EVALUATION AND ASSESSMENT

Eighty-six students consented to participate in the study and completed a presurvey and postsurvey instrument to assess their actual knowledge and perceived confidence to recommend a self-care product to a patient prior to and following participation in the Amazing Self-Care Race. Eighty-four (97%) of the students submitted complete data sets for analysis. Sixteen of the 34 presurvey questions evaluated students' abilities to make appropriate recommendations for common self-care complaints (Table 1). Students were asked to rate their confidence in making self-care recommendations. They

were also asked to quantify their hours of experience making self-care recommendations per week, where they received their experience with self-care products, and in what type of setting they practiced in as an intern. The 35-question postsurvey instrument repeated the same knowledge and confidence questions as the presurvey instrument and asked the students to evaluate the Amazing Self-Care Race as an educational activity.

Students demonstrated a significant increase in their ability to recommend self-care products following the activity. Prior to the activity, students demonstrated competence in their ability to recommend self-care products for an average of 10 out of 15 common self-care complaints ($p < 0.001$) and following the activity for an average of 12 out of 15 common self-care complaints ($p < 0.001$). A 5-point Likert scale was used to assess student confidence. Students demonstrated a significant increase in their confidence to recommend self-care products following the activity. Prior to the activity, students expressed confidence in their ability to recommend self-care products for an average of 4 of 15 common self-care complaints ($p < 0.001$), and following the activity, an average of 8 of 15 common self-care complaints ($p < 0.001$) (Table 2). There was no significant difference in presurvey knowledge scores based on the number of hours per week a student had experience with making self-care recommendations. However, students with no experience were significantly less confident than those with a little or substantial experience making self-care recommendations. Students whose experience with self-care products primarily came from IPPEs, pharmaceutical care laboratory experiences, or traditional lectures had less confidence in making self-care recommendations compared to those with work experience. Students who had internships in community pharmacies prior to the activity were more confident than student's working in an institutional setting or students with no pharmacy work experience. Students with the largest gain in confidence following the activity were those interning in an institutional setting ($p < 0.009$). Students who started with greater baseline knowledge in self-care and confidence in their ability to make self-care recommendations gained less knowledge

Table 2. Pharmacy Students' Actual and Perceived Competencies in Making Self-Care Recommendations to Patients Before and After Participating in The Amazing Self-Care Race (n=168)

Variable	Pre (n=84), Mean (SD)	Post (n=84), Mean (SD)	P ^a
Demonstrated competencies			
Number of competencies	10.4 (1.8)	12.1 (1.6)	<0.001
Perceived competencies			
Number of perceived competencies	4.0 (3.7)	8.2 (5.6)	<0.001

^a Probabilities denote 2-sided tests.

Table 3. Differences in Actual and Perceived Competencies by Pharmacy Student Experiences With Self-Care Recommendations Based on Hours of Experience with Self-Care Recommendations Per Week (n=84)

Variable	Less than 1 Hour (n=50), Mean (SD)	1 to 5 Hours (n=24), Mean (SD)	More than 5 Hours (n=8), Mean (SD)
Prescore	10.4 (1.9)	10.5 (1.7)	10.1 (1.7)
Postscore	12.4 (1.6)	11.7 (1.4)	11.3 (2.1)
Prescore to postscore gain in perceived competency	2.6 (1.8)	2.0 (1.4)	2.1 (0.8)
Confidence at the start of the activity	3.1 (3.3)	4.4 (3.3)	8.4 (4.4)
Confidence at the end of the activity	7.4 (5.7)	8.4 (5.0)	12.4 (5.2)
Confidence gained	9.3 (4.0)	8.8 (2.3)	7.3 (4.2)

and confidence during the activity. Similarly, those who started with a lesser baseline knowledge in self-care and confidence in their ability to make self-care recommendations gained the most knowledge and confidence during the activity (Table 3, Table 4, and Table 5). Overall, 76 of 86 (88.4%) students who took the postsurvey agreed or strongly agreed that the Amazing Self-Care Race helped to develop career skills. Eighty-one of 86 (94.2%) students agreed or strongly agreed that the activity enabled them to learn through doing and 79 of 86 (91.9%) students agreed or strongly agreed the activity helped them to develop confidence by thinking on their feet. Finally, 74 of 86 (86.0%) students agreed or strongly agreed the activity encouraged them to synthesize information from several sources to make informed decisions about self-care recommendations.

DISCUSSION

As the need for self-care and home testing and monitoring devices by consumers continues to rise, the pharmacist's role in providing recommendations for these products becomes increasingly important.^{1,2} An educational activity was developed and used to facilitate active learning and to increase student confidence in providing

self-care recommendations in an authentic learning environment. Adult learning theories were used to guide activity development. Real-world, complex cases were used to stimulate critical thinking and build knowledge and skills.

Students demonstrated a significant increase in their ability and confidence to recommend self-care products after completing the activity. Prior to the activity, students interning in community pharmacies also demonstrated the highest level of knowledge and confidence when evaluating and recommending self-care products. Following the activity, students with the largest gain in confidence were those interning in an institutional setting.

The Amazing Self-Care Race helped students to develop skills needed in their career, enabled them to learn through doing, and helped them to develop confidence by thinking on their feet. Students also felt the activity encouraged them to synthesize information from several sources to assist them in making informed self-care recommendations. The Amazing Self-Care Race is an activity easily implemented and customizable to meet the needs of students. Faculty members may consider using the Amazing Self-Care Race activity design to reinforce student learning for a variety of topics such as prescription medications, disease states, or treatment guidelines.

Table 4. Differences in Actual and Perceived Competencies by Pharmacy Student Experiences With Self-Care Recommendations Based on Where Experience With Self-Care Was Obtained (n=84)

Variable	IPPE (n=6), Mean (SD)	Pharmaceutical Care Laboratory (n=5), Mean (SD)	Didactic Courses (n=32), Mean (SD)	Internship (n=41), Mean (SD)
Prescore	10.5 (1.4)	9.8 (1.6)	10.4 (2.1)	10.5 (1.7)
Postscore	12.2 (1.2)	12.8 (2.3)	12.5 (1.4)	11.7 (1.7)
Prescore to postscore gain in perceived competency	2.5 (1.5)	3.6 (3.0)	2.7 (1.7)	2.0 (1.4)
Confidence at the start of the activity	2.7 (3.9)	2.4 (3.2)	2.6 (2.7)	5.4 (4.0)
Confidence at the end of the activity	6.7 (6.0)	6.8 (6.6)	7.3 (5.9)	9.2 (5.2)
Confidence gained	11.8 (2.6)	10.0 (3.5)	9.5 (3.9)	8.0 (3.4)

Table 5. Differences in Actual and Perceived Competencies by Pharmacy Student Experiences With Self-Care Recommendations Based on Student's Primary Internship Site (n=84)

Variable	NA (n=35), Mean (SD)	Community Pharmacy (n=42), Mean (SD)	Institutional Pharmacy (n=5), Mean (SD)	Mean (SD)
Prescore	10.4 (1.8)	10.5 (1.7)	9.2 (2.5)	12.0 (0.0)
Postscore	12.6 (1.4)	11.7 (1.7)	12.4 (1.9)	12.0 (0.0)
Prescore to postscore gain in perceived competency	2.7 (1.9)	2.0 (1.3)	3.8 (1.5)	0.5 (0.7)
Confidence at the start of the activity	2.7 (2.8)	5.4 (4.0)	2.0 (3.4)	2.0 (2.8)
Confidence at the end of the activity	7.4 (5.8)	8.8 (5.3)	7.6 (7.1)	8.5 (5.0)
Confidence gained	9.9 (3.9)	8.0 (3.2)	9.8 (3.8)	11.5 (0.7)

This study had limitations. Only 15 common self-care complaints were used for data collection. Faculty members did not include herbal-based or natural remedy-based questions. Also, data were not collected to compare student performance in the self-care lecture-based course, which students had completed the previous semester. Finally, certain topics may have been covered in more detail during the self-care lecture-based coursework, leading to higher baseline knowledge scores in these areas.

SUMMARY

The Amazing Self-Care Race was successfully implemented for third-year pharmacy students in a pharmaceutical care laboratory course. The activity improved students' knowledge and perceived confidence in ability to evaluate and recommend nonprescription products for 15 common self-care complaints. The Amazing Self-Care Race provided students with an opportunity to develop critical thinking and problem-solving skills in self-care product recommendation. These are important skills required to meet the needs of pharmacy consumers.

ACKNOWLEDGEMENTS

The authors acknowledge Daniel Friesner, PhD, Associate Dean of Student Affairs, for his assistance with data analysis, and Alicia Fitz, PharmD, Erika Haglund, PharmD, and Kayla Vigen, PharmD, from North Dakota State University, Fargo, for their support.

REFERENCES

- Booz & Co. The value of OTC medicine to the United States. http://www.yourhealthathand.org/images/uploads/The_Value_of_OTC_Medicine_to_the_United_States_BoozCo.pdf. Published January 2012. Accessed July 3, 2013.
- Johnson J. Retailers can expect great things from home diagnostics category. Chain Drug Review Web site. <http://www.chaindrugreview.com/inside-this-issue/news/08-08-2011/retailers-can-expect-great-things-from-home-diagnostics-category>. Published August 7, 2011. Accessed June 28, 2013.
- Accreditation Council for Pharmacy Education. Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree. Chicago, Illinois. https://www.acpe-accredit.org/pdf/ACPE_Revised_PharmD_Standards_Adopted_Jan152006.pdf. Accessed July 3, 2013.
- Merriam SB, Caffarella RS, Baumgartner LM. *Learning in Adulthood: A Comprehensive Guide*. 3rd ed. Jossey-Bass; 2007.
- Bloom KC, Trice LB. Let the games begin. *J Nurs Educ*. 1994; 33(3):137-138.
- Sanders ME. Excellence in teaching: adult learning strategies for motivation. *ACSMs Health Fit J*. 2005;9(4):26-28.
- Brown JS, Collins A, Duguid P. Situated cognition and the culture of learning. *Educ Res*. 1989;18(1):32-42.
- Girard C, Ecalle J, Magnan A. Serious games as new educational tools: how effective are they? A meta-analysis of recent studies. *J Comput Assist Learn*. 2012;29(3):207-219.
- Akl EA, Mustafa R, Slomka T, Alawneh A, Vedavalli A, Schunemann HJ. An educational game for teaching clinical practice guidelines to internal medicine residents: development, feasibility, and acceptability. *BMC Med Educ*. 2008;8:1-9.
- Krinsky DL, Berardi RR. *Handbook of Nonprescription Drugs: An Interactive Approach to Self-Care*. 17th ed. Washington, DC: American Pharmacists Association; 2012.