INSTRUCTIONAL DESIGN AND ASSESSMENT

A Microteaching Exercise to Develop Performance-based Abilities in Pharmacy Students

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Objective. To create, implement, and evaluate a microteaching exercise to enhance student development of communication skills, critical-thinking skills, and problem-solving abilities.

Methods. A microteaching exercise was developed and implemented in 2 semesters of a professional development series. Advisees from 3 classes developed 7-minute presentations for classmates, followed by a brief question-and-answer session.

Evaluation and Assessment. Presenters received peer evaluations and a DVD of their presentation and then wrote a reflective essay on their performance. A 33-item survey instrument was administered to assess student impressions of the microteaching exercise. Survey results demonstrated students valued the microteaching exercise in terms of overall impression of the exercise, the class experience, personal outcomes, and the evaluation process.

Conclusion. A microteaching exercise is a valuable tool to help students develop communication, critical-thinking, and problem-solving skills. Further, it helps increase student learning, helps students to “think on their feet” and be reflective, provides an opportunity to have students analyze their own and fellow classmates’ presentation methods and develops their skill in the provision of constructive feedback through peer assessment.

Keywords: faculty advisor, microteaching, self-reflection, peer evaluation

INTRODUCTION

The Commission to Implement Change in Pharmaceutical Education recommended colleges and schools of pharmacy commit to engender competencies in students and educational outcomes essential to pharmaceutical care and strengthen the effectiveness of the process of pharmaceutical education.¹ The Commission also identified 10 general outcomes/competencies that underlie the education of a professional person and citizen. Based on those 10 competencies, in December 2002, the University of Illinois at Chicago College of Pharmacy adopted its own list of 10 performance-based abilities that its graduates should possess at the time of their graduation.

Colleges/schools of pharmacy should use procedures that promote integration, application, and assessment of principles, critical thinking, problem solving, and professionalism, in addition to memorization of facts.² Graduates should be capable of providing pharmaceutical care through patient-centered and population-based care and demonstrate communication and collaboration with prescribers, patients, caregivers, and other involved health-

care providers to engender a team approach to patient care. They should be able to retrieve, analyze, and interpret the professional, lay, and scientific literature to provide drug information to patients, families, and healthcare providers.³ A need also exists for graduates to help facilitate public health by assuring the availability of effective, quality health and disease prevention services.³

Most pharmacy students do not have an opportunity to develop teaching skills that would fulfill the ACPE Guideline 15.1 and the CAPE outcomes until beginning their advanced pharmacy practice experiences (APPEs) in the fourth professional year. Although many pharmacy curricula require students to complete group projects and presentations in the first through third professional years, these exercises fall short of achieving individual goals as students are not required to conceptualize, develop, and present something of their own making. Nor do students have the opportunity to view and self-reflect on their individual performance. Oftentimes, too, there is little or no peer evaluation of the presentation because of the numbers of students involved in group projects. Thus, students “usually” learn how to teach via 2 methods: First, they can observe other teachers and fellow classmates and then emulate or imitate them. However, there is the possibility of poor role modeling. Second, they can practice through

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“trial and error” during APPEs and in professional settings after graduation. However, they may receive little or no constructive feedback and probably would not have the opportunity to re-teach (and improve) the lesson.

Originally, microteaching was conceptualized and developed to provide high school teachers an opportunity to assess and improve their teaching skills.⁴ Since that time, many universities have provided a microteaching opportunity for interested faculty members to improve their teaching skills through a center devoted to faculty development, eg, Purdue University, Center for Instructional Excellence.⁵ Originally, the educator would present for 5 to 10 minutes and have the session critiqued by a center trainer/evaluator. The educator then had a brief amount of time to recast the lesson and repeat the instruction to a different person or group. The other educators participating in the session served as the audience, assuming the role of students, and providing a peer critique of the presentation. Later, videotaping afforded the opportunity for the educator to view and critique his/her own performance. For educators/participants already on a faculty, it was an in-service opportunity; for those about to begin their teaching careers, it was a pre-service opportunity.

The goal of this study was to determine the impact of a microteaching experience on student development of performance-based skills and to assess student perceptions of how the microteaching exercise helped them to develop the aforementioned performance-based abilities approved by the college.

DESIGN

The investigators took the concept of microteaching and integrated it into an elective professional development seminar series as a tool to help their advisees develop several of the professional performance abilities adopted by the College including oral communication, problem solving, and critical thinking.^{6,7} In addition, microteaching allowed classmates/advisees the opportunity to develop their own evaluation and writing skills by providing written feedback about the presentations. The personal assessment and peer evaluations were then employed by the students to write reflective critiques for their portfolios. During the past 3 academic years, this activity has been an integral component of 2 semesters of the Professional Development Seminar Series which is taught from the spring semester of the first year through the spring semester of the third year.⁷

The Microteaching Exercise

During the spring semester of the second year and fall semester of the third year of a 5-semester course sequence, students participated in a microteaching exercise.

At the beginning of the 2 semesters, students were provided an instructional overview of the learning exercise (Appendix 1). This document outlined the intended outcome of the learning experience and the mechanics of the exercise, eg, selection of a topic, preparation and delivery of the topic in 7 minutes, development of (a) presentation objective(s), and preparation of a written reflection of the experience. Students were informed they would be videotaped and were provided with a DVD after each presentation for review and ultimate placement into their student portfolio. Along with peer critiques of their presentation, students were instructed to review the DVD and write a reflective essay that included at least 3 strengths and 3 specific ways to improve their future presentations. This reflection was sent to their advisor electronically within 1 week after receiving their DVDs. The authors instructed the students to keep the 2 DVDs in their personal portfolio and use them, if necessary, for future interviews, eg, residencies, to demonstrate their skills.

For this study, the investigators developed a “component skills approach” for the students.⁸ The activity was broken into small components to simplify/improve the learning process, ie, *microlearning*. The individual skills to be achieved/mastered were outlined in a worksheet (Appendix 2). The worksheet was intended to be a guide for presentation development and included the following sections/steps:

- development of presentation objectives;
- construction of a plan to gain the attention of the audience;
- provision of audiovisual aids/props;
- development of a handout to complement the presentation;
- development of a strategy to explain the relevance of the topic to one’s audience,
- involvement of the audience in the instruction.

Students were instructed to complete each step outlined in the worksheet and present the worksheet to the investigators in print or electronic form no later than the day of their presentation. The investigators reviewed the worksheets and provided suggestions to the students either before or after their presentations, depending on when the worksheets were submitted. Because most students opted to give a PowerPoint presentation, students also were given a copy of the article, “12 Commandments of PowerPoint Presentations.”⁹

Students were instructed to select a topic of their choosing by the fourth week of the course and provide their handout to their advisor 1 week prior to their presentation to allow time for handout reproduction. Selected microteaching topics spanned disease states, eg, malaria; sickle cell anemia; insomnia; pharmacological classes of

drugs, eg, ACE Inhibitors; patient self-care, eg, diabetes foot care; antidiarrheal products; medical accessories, eg, blood glucose monitors; hearing aids; and current issues/concepts, eg, drug importation from Canada, traditional Chinese medicines, emotional intelligence. Two or 3 microteaching presentations were given per 50-minute class session. This allowed time for question-and-answer sessions and for peer assessment of each presentation. The microteaching exercises accounted for about 6 weeks of the course meetings.

An important component of the microteaching exercise was for students to learn how to evaluate fellow presenters and provide constructive criticism. Thus, a presentation rubric was adapted and given to the students to complete during and after each presentation (available from authors).¹⁰ Students were instructed on how to use the form and encouraged to write constructive comments in the space provided at the bottom of the form.

EVALUATION AND ASSESSMENT

A 33-item survey instrument to assess student impressions of the microteaching exercise, their class experience, personal outcomes, and evaluation of the “in-class” microteaching exercise was developed by the investigators. In addition, the survey instrument asked respondents to suggest ways to improve the exercise, list 3 take-away lessons from the exercise, and share any additional thoughts/reflections. A short demographic form at the end of the survey instrument asked the respondent’s gender, class year, age range, and whether he/she had a previously earned college degree. Subsequently, an external review of the items and open-ended questions was conducted by 5 pharmacy academicians around the country with instructional design experience in the doctor of pharmacy curriculum. The content validity panel was asked to evaluate each item on a 5-point scale ranging from “highly pertinent/valid” to “highly invalid.” For item inclusion in the instrument, at least 4 experts had to indicate the item was either valid or highly pertinent/valid. Subsequently, the research plan and survey instrument (available from the authors) were approved by the Institutional Review Board of the University of Illinois at Chicago.

Students from the graduating classes of 2007, 2008, and 2009 who had one of the investigators as their faculty advisor were asked to participate in the survey. Advisees from the classes of 2007 and 2008 were contacted via e-mail and asked to complete the survey instrument and return it electronically to the investigators. Advisees in the class of 2009 were surveyed during their last class meeting in the spring semester of their third year. Students were informed their participation in the survey was vol-

untary, and choosing not to participate would not affect their grades or class standing. Student responses were considered confidential and students were informed data would only be reported in aggregate for purposes of statistical analysis and reporting.

Twelve graduates (70%) from the class of 2007, 12 advisees (52%) from the class of 2008, and 21 (84%) advisees from the class of 2009 participated in the survey. Twenty-six percent of the respondents were male. Seventy-five percent of the respondents were 23 to 26 years old. Forty-eight percent had previously earned a baccalaureate degree. The demographics of the respondents did not reflect the overall demographics of the student body, which was 35% male with a mean age of 28 years. However, the percentage of students holding a bachelor’s degree was similar to that of the respondents.

The majority of the respondents agreed or strongly agreed the microteaching exercise was beneficial (Table 1). Overall, the microteaching exercise and the classroom experience were viewed positively by the students. In terms of performance-based skill acquisition, data demonstrated students increased their oral communication skills, increased their confidence in presentation skills, and developed confidence by “thinking on their feet” and answering questions. The majority of respondents (ie, 78%) from the classes of 2008 and 2009 strongly agreed or agreed the exercise helped to develop their problem-solving and critical-thinking skills. Fifty-eight percent of the class of 2007 strongly agreed or agreed that the exercise developed their problem-solving and critical-thinking skills. The remaining 41% neither agreed nor disagreed the exercise helped their problem-solving and critical-thinking skills.

The majority of respondents (91%) indicated the microteaching exercise increased their learning, helped them to be reflective and analyze their own and fellow classmates’ presentation methods, and develop their skills in providing constructive feedback to their classmates. Only 58% of the class of 2008 respondents “strongly agreed” or “agreed” their learning was enhanced by receiving a personal DVD of their presentation for review, compared to 66% of the class of 2007 and 95% of the class of 2009.

Suggestions for improvement of the microteaching exercises related in part to topic selection. For example, given there were 2 opportunities to present over 5 semesters, some students thought that 1 of the 2 topics should have been assigned by their faculty advisor. For example, 1 student suggested the class provide topic ideas and have the advisor randomly assign them to the students. Another suggested the first presentation be on a “personal” topic (eg, a travelogue about the student’s country of birth) and

Table 1. Student Outcomes to Survey Instrument by Item

Item	Agreed or Strongly Agreed, %
Is of practical value to me as a student	97
Is a stimulating assignment	88
Is a meaningful learning experience	97
Encourages student creativity	91
Helps to develop skills that I will need in my future career	97
Provides an opportunity to learning from my classmates	97
Provides an opportunity to teach my classmates	100
Encourages in-class questions and discussion	91
Encourages the student to contribute to classroom learning	97
Enables me to learn through “doing”	97
Challenges me to develop a presentation	97
Helps me to accept feedback from my classmates about my presentation	95
Provides new ideas, “tips,” techniques and styles of teaching that I can use in my future presentations	95
Encourages a student/teacher partnership in learning	95
Helps me develop my oral communication skills	100
Increases my confidence in my presentation skills	100
Helps me develop confidence by “thinking on my feet”	97
Encourages me to synthesize information from several sources	88
Helps my organize my ideas and information	97
Develops my skills to provide constructive feedback to my classmates	95

not necessarily pharmacy related to encourage student comfort in presenting to classmates. They then could apply the constructive criticism they received to the second presentation. Rather than therapeutic and patient care topics, some students suggested more presentations on current pharmacy issues of importance to practicing pharmacists, eg, pharmaceutical industry, political action work, re-importation of drugs from Canada, contraceptive Plan B. Another student suggested having nontraditional topics and avoiding those topics already being learned in therapeutics and elective offerings. Other recommendations included more presentation opportunities during the professional development seminar series.

Another innovative suggestion was to have a clinician and/or additional faculty critiquing the presentation to assure accuracy. One student wrote, “Classmates do not take enough time evaluating presentation style and offering advice. A more thorough critique of ‘performance’ would be helpful.” Another student suggested it would be beneficial to convert each item on the peer evaluation sheet into a number and provide the presenter a numerical score for each item, followed by a listing of the averages for each section on one form so the presenter could identify which areas needed the most improvement. Another suggestion was to require 1 presentation to include a video/audio clip to ensure presenters know how to integrate these into a PowerPoint presentation.

The students’ take-away lessons from the exercise corroborated data from the survey questions and were

consistent among the 3 classes of students. Specifically, increasing one’s communication skills; identifying components of a good, well-rounded presentation; increasing student confidence in presenting and “thinking on one’s feet;” developing the ability to organize, present, and answer questions; practicing and developing peer evaluations; and learning to accept constructive criticism were primary themes. Further, comments about learning to develop presentation skills (eg, pacing, avoiding vocal distractions, making eye contact with the audience, staying focused on audience questions) appeared several times. Interestingly, this exercise surprised some students who were not prepared to answer questions about slide content, eg, definitions, clarifications, vocabulary, and those who failed to realize to “always dress for success.”

DISCUSSION

Usually, academic advising may extend beyond selection of course work and include career choices. However, rarely is it used to develop specific performance-based abilities. The professional development seminar series was conceptualized and implemented, in part, to do this through a weekly meeting. The seminar series provides opportunities for advisees to be reacquainted with a central goal of the doctor of pharmacy curriculum, which is to nurture and develop performance-based abilities in each of its graduates.

While microteaching was originally intended to help high school teachers, the teachers of the professional

development seminar series used it to help increase student communication skills, critical-thinking skills, and problem-solving skills in preparation for APPEs. Most students will have the opportunity to develop presentation abilities and skills in other doctor of pharmacy course work; however, prior to beginning APPEs in the fourth year, development of teaching/speaking skills usually is limited to group projects and presentations. The seminar series provides value-added experience in that it is an extra opportunity for students to develop their presentation skills in a class setting with fewer students. While a majority of participants from the classes of 2008 and 2009 agreed the exercise helped to develop their problem-solving and critical-thinking skills, only 50% of the class of 2007 strongly agreed or agreed with this item. Fifty percent of this group of students was "neutral" in their assessment. The investigators speculate these students were neutral because of confounding factors, eg, other course work or leadership activities within professional student organizations that required them to complete similar exercises with the same goal/outcome toward performance-based ability development.

Respondents realized value in the microteaching exercise and experience. Oral communication skill, critical thinking, and problem solving were nurtured by this course exercise. One respondent shared that she had numerous opportunities to present through her previous internships and prepharmacy education and therefore did not think the exercise contributed to her skill development. However, this same student also shared her amazement at learning that a few of her classmates had never given a presentation on their own. Another class of 2007 respondent shared that "back when we were still in school, we did not appreciate any opportunities to do presentations. To us, they were extra work that did not help with our grade or exam." This same student suggested that students give "non-therapeutic presentations," eg, pharmaceutical industry, political action groups, re-importation of drugs from Canada, as a means to foster imagination and creativity, and encourage some students to take the exercise more seriously and learn from it.

The other surprising outcome was that only 77% of the respondents felt the microteaching experience was enhanced by receiving a personal DVD of their presentation. The investigators speculate there are students who do not want to review their performance visually. Anecdotally, several students admitted this apprehension during the professional development seminar series. One student wrote, "I actually did not look back on the video of my presentation, and to be honest, I probably would not look back on it unless I was forced to, despite my knowing

that there would be benefit." It is possible some students did not view their DVD because of self-consciousness and embarrassment. Other students might have thought reviewing the DVD was a waste of time.

The open-ended question relating to how this exercise could be improved provided invaluable insights to revise this exercise for future offerings, eg, provision of a mandatory, individual, private verbal and written critique provided to the student by his/her advisor after the presentation rather than informal feedback. Another keen insight was to have 1 of the 2 presentations assigned by the faculty advisor from a pool of topic suggestions provided by the class. In addition, several students suggested nontraditional topics be used and "basics" already taught in core coursework be avoided. However, the investigators believe both presentations should have a link to pharmacy rather than be on a personal topic as one student suggested. Students should have every opportunity to translate their pharmacy knowledge into an oral presentation, and realistically there are not too many opportunities for this in the didactic curriculum. Another respondent suggested a clinical faculty member attend with the appropriate expertise to determine the content validity of the presentation. Although this might help to verify that the information presented was correct and valid, it might be difficult due to the wide range of presentation topics and commitment of faculty time that would be necessary. However, the central goal of the microteaching exercise was to have the student conceptualize, develop, and present a 7-minute presentation, answer questions, and receive feedback from fellow advisees.

This research involved doctor of pharmacy advisees of the investigators at the UIC COP from 3 distinct classes. These students selected the investigators to be their academic advisors rather than being assigned to or "cherry picked" by the faculty members. Word of mouth is how the students learn of this series of classes and its value in providing opportunities otherwise not available within the curriculum. In addition, it provides credit for elective professional course requirements of the curriculum. A question is whether the students selected the investigators in part based upon what they believed to be their own greatest strengths, ie, the students enjoyed giving presentations and/or already had strong presentation skills. The investigators are unable to answer this question. However, judging by the response of the students to the assignment, for many, this was the first opportunity for them to give a PowerPoint presentation. The investigators believe the students' selection of the professional development series was predicated on the opportunities afforded in the series to develop their abilities, among these the microteaching exercise.

Another limitation was 2 of the classes had to be contacted via e-mail to participate in this study. One class of students already had graduated and the second was involved in their fourth year APPEs at the time of the study. It is difficult to know whether these additional experiences impacted the survey results. However, the students were instructed in a cover memo that the survey was to determine the impact the microteaching exercise on their development of presentation skills. Whether this was clear enough for the students to differentiate between the microteaching exercise and subsequent curricular experiences is unknown. In addition, the investigators do not know if the students' presentation skills improved subsequently after their microteaching experience. Although during a subsequent offering of this course to another cohort of second-year student advisees, 2 former students shared the value of the microteaching exercise and how it helped them create and deliver with confidence PowerPoint presentations during their summer internships.

The outcome of this project might not apply to a situation where students do not enroll in a professional development seminar series sequence on a volunteer basis. In addition, there was no control group in any of the classes to rule out confounding factors within the curriculum that might also help the students to develop communication skills, problem-solving skills, and critical-thinking skills.

CONCLUSION

A microteaching exercise nested within a professional development seminar series was an effective method to enhance and develop communication, problem-solving, and critical-thinking skills in pharmacy students. Further, this exercise was an effective tool for the student to learn from others in the group and develop their skills in providing constructive feedback to classmates. It helped students be reflective in their learning and was evaluated in such a manner as to foster student learning.

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Appendix 1. Microteaching exercise as part of a Professional Development Seminar

Microteaching is defined as a way to help an individual develop his/her oral presentation abilities given a short time frame (eg, 10-15 minutes) to deliver the presentation and answer questions. The purpose of performing this exercise is to help the student develop several of the professional performance abilities adopted by the College of Pharmacy faculty in December, 2002 (Note attachment). These are oral communication ability, problem solving abilities, critical thinking abilities, integrative competence, and life long learning.

In its purest sense, microteaching as a learning technique involves videotaping the individual during the presentation and allowing him/her to self assess himself/herself after his/her presentation. A CD of the presentation will be prepared and shared with the presenter. In addition, your fellow students will give you written feedback about your presentation (note attachment) and develop their skills with peer evaluation.

As a result of this exercise, you will have the following questions answered:

1. What do my fellow students think about my presentation strengths?
2. What suggestions do my fellow students have on how my presentation might be improved?
3. How do I provide constructive feedback to my fellow students about their teaching style and presentation?
4. What are some new teaching tips, techniques, and styles I have learned so that I can use them in the future?

Mechanics: Each enrolled student will,

1. identify a “familiar” pharmacy or professional topic of interest that will be of interest to fellow classmates and provide the topic title to his/her academic advisor by **February 19th**.
2. prepare and deliver a seven minute piece of instruction using PowerPointJ, an overhead projector, or the blackboard. If you want your fellow students to assume the role of a patient, that would be fine. Otherwise, they will remain as students in the audience.
3. write at least one objective to guide your presentation and be sure to state your objective(s) at the beginning of your lesson. **Remember, that an objective should be written in terms of what your fellow students should be able to do as a result of your instruction.** Use action verbs, such as list, explain, describe. A listing of “action verbs” is attached for the presenter’s use.
4. complete and provide to Dr. Popovich or Dr. Katz a completed “Micro-Teaching Worksheet,” (note attachment), the day of his/her presentation. This sheet can be submitted either electronically or print-based.
5. be encouraged to be interactive with the class. Remember, they are students and it might be more fun for them if you build in some interaction (eg, questions) and/or some class participation.
6. be randomly selected by either Dr. Katz or Dr. Popovich in the order in which he/she will present the topic of his/her interest.
7. An additional three minutes will be devoted for the audience to complete their written critiques. Because of time limitations, each student will be restricted to no more than 15 total minutes.
8. provide a handout of the presentation. This will allow the audience to listen more and write less. **The handout should be provided to Dr. Popovich or Dr. Katz electronically at least one week prior to the presentation so that they can be reproduced.**
9. receive from those in attendance a written critique of his/her performance and prepare a written self reflection of the experience and **provide a copy of this to his/her academic advisor within one week of the presentation.** Specifically, the reflection should include:
 - a. **at least three strengths** the student exhibited during the presentation. Be sure to be specific and **provide evidence or proof** of each of these strengths.
 - b. **at least three specific ways to improve** aspects of the presentation and/or his/her presentation skills in the future. The student should be specific and **provide his/her reasoning for choosing these areas** for his/her improvement.

Note: Electronically, Dr. Popovich and Dr. Katz will provide the “Micro-Teaching Worksheet,” so that it can be completed and emailed to Drs. Popovich or Katz no later than the day of the presentation.

Appendix 2. Micro-Teaching Worksheet

STUDENT NAME _____ YEAR 20__

(To be turned no later than the day you are videotaped)

1. What is the topic/title of your micro-teaching presentation?
 2. What do you want your “students” (ie, the workshop participants) to learn as a result of the lesson? Write an objective for this lesson, making sure that you use an action verb.
 3. To what professional pharmacy year student is your presentation intended? What learning styles or learning preferences have you noticed they have as individuals—or as a group? Do your “students” have any special needs (e.g. visual impairment, hearing impairment), or anything you should take into consideration when preparing this lesson?
 4. Briefly describe what print materials (or handouts) you plan to provide (if any).
 5. Will you bring any props to teach this lesson? If so, describe.
 6. What media or audio-visual equipment will you need?
 7. Is there a clever way to get your students’ attention at the beginning of the lesson? Describe how you are planning to get their attention.
 8. Explain how you are going to explain the relevance of this topic.
 9. List three main points (ie, “take home” messages you want students to get from your presentation).
 10. Explain how you plan to involve your “students” in the lesson.
 11. If you were teaching this lesson in a longer form (ie, >7 minutes), what methods would you use to assess how well your students have learned this material?
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