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Research

An objective structured teaching exercise (OSTE) for preceptor development

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Abstract

Purpose: To pilot test an objective structured teaching exercise (OSTE) to determine its feasibility and acceptability as a preceptor development method.
Methods: Phase I: A comprehensive training needs analysis was conducted. Data from a survey of pharmacy practice preceptors as well as students' evaluations of preceptors were analyzed using qualitative and descriptive methods. Preceptor training needs amenable to the OSTE format were identified. Phase II: Three OSTE cases were developed. A pre/post-OSTE survey measured preceptor reaction to the method and preceptor performance on each OSTE case was observed. Welch's *t*-test was used to assess the differences between mean responses of preceptors on the pre/post-OSTE survey.
Results: Phase I: Needs analysis suggested that preceptors needed more training when communicating feedback to learners in three situations: (1) a poor or failing evaluation, (2) an observed patient encounter involving an over-the-counter recommendation, and (3) an observed patient counseling session regarding metered-dose inhaler use. In all, 15 preceptors participated in the OSTE. Preceptor confidence in performing the skills practiced during the OSTE significantly improved. Preceptors reported that OSTE is an effective method to enhance feedback skills.
Conclusion: OSTE is an effective and well-received method for training pharmacy preceptors.

Keywords: Preceptor development; Faculty development; Objective structured teaching exercise; Objective structured teaching examination; Standardized student

Abbreviations: OSTE, objective structured teaching exercise; PharmD, Doctor of Pharmacy; ACPE, Accreditation Council for Pharmacy Education; ASHP, American Society of Health-System Pharmacists; AACP, American Association of Colleges of Pharmacy; OSCEs, objective structured clinical examinations; APPE, Advanced Pharmacy Practice Experience; MLS, METI Learning Space®; OTC, over-the-counter; SD, significant deficiency

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Background

Hands-on pharmacy practice experiences are a requirement for all PharmD and residency training programs. However, the quality of these experiences is contingent upon the knowledge, skills, and abilities of the preceptor.[1,2] Although the ACPE Doctor of Pharmacy Program and the ASHP pharmacy residency accreditation standards both require ongoing training and development of preceptors, there is a paucity of data regarding outcomes measures of preceptor development programs.[3–6]

The AACP conducted a survey during 2009–2011, querying pharmacy preceptors about the effectiveness of preceptor development programs. Over 75% of respondents either strongly agreed or agreed that such training was available, but improvement was needed.[7] Another study found that preceptors overestimated their performance regarding teaching behaviors, such as providing opportunity for students to ask and exchange opinions and being available when students needed help, when compared with student evaluations.[8] These findings suggest that there continues to be a need to enhance teaching skills among pharmacy preceptors.

The art of providing constructive feedback is an essential skill during a learning experience. Yet, Wilkinson et al.[9] reported that preceptors often lack formal training in this area. Preceptor development programs should provide pharmacy preceptors not only with new knowledge but also with the opportunity to acquire new skills and habits related to both their patient care and teaching responsibilities.[10] While various traditional methods have been utilized for preceptor development over the years, such as lectures and case discussions, these methods often lack opportunity for the adult learner to apply knowledge in real-world situations. Consequently, these methods of training result in less than optimal learning and little behavior change.[11]

The AACP Council of Faculties Faculty Affairs Committee recommended that preceptor development programs would be improved by identifying training needs and assessing program effectiveness through standardized methods of evaluation using reliable and valid tools. Additionally, recommendations were made to base these assessments on the principles articulated in Kirkpatrick's four levels of evaluation for training programs.[3]

A potential model for providing more effective preceptor development is an OSTE. Similar to OSCEs, this method attempts to create realistic, high-fidelity preceptor−student encounters in a standardized manner.[12] The OSTE technique provides preceptors with an opportunity to practice teaching skills, engage in self-assessment, and observe their own performance while receiving feedback in a low-threat environment.

Previous studies have explored the use of OSTEs to develop medical school preceptors who supervise medical students and residents during required ambulatory care experiences.[13–16] Participants in an OSTE workshop agreed that peer observation allowed them to learn from other preceptors and the "actor" accurately portrayed the student role.[13] Participants in another OSTE workshop indicated that they felt challenged and that the OSTE method stimulated their learning.[14] Furthermore, OSTE sessions made preceptors more aware of their teaching behaviors, and they were inclined to change their behavior based on the feedback provided from students.[15]

An OSTE at the University of California, Irvine, College of Medicine focused on assessing preceptors' teaching performance.[16] After participating in the OSTE experience, participants reported being neutral about whether or not OSTE would alter their teaching practices. Moreover, the respondents felt that the OSTE activity was time-consuming. However, they did strongly agree that this method of training would result in increased interest in future faculty development activities. In contrast, the OSTE workshop facilitators felt that the technique was highly useful and provided valuable insight into practice-related teaching expectations.

A study has evaluated the feasibility of OSTE for pharmacy faculty development.[8] While some participants did not respond empathetically, follow up, or guide students to present the information in an orderly manner, they all agreed that OSTE is an effective approach, that the cases were realistic, and that it was a method that could be used with residents and preceptors to enhance their capacity to be better preceptors.

Based on these studies' results, OSTE appears to be an effective method for developing preceptors' overall skills and evaluating their performance while addressing the weaknesses of more traditional approaches. The objective of this study was to identify preceptor development needs amenable to the OSTE format by conducting a comprehensive training needs analysis and to pilot test an OSTE program for community pharmacy preceptors at the University of Maryland School of Pharmacy. The University of Maryland Institutional Review Board reviewed and approved the project proposal and the survey instruments.

Methods

Training needs analysis

A 49-item comprehensive training needs analysis survey was developed by study investigators. The goal of this survey was to identify preceptor development needs amenable to the OSTE format. The survey was piloted to all full-time pharmacy practice faculty members at University of Maryland School of Pharmacy. The draft survey was sent via e-mail to collect their feedback regarding the completeness and clarity of the survey, including the introduction, instructions, rating scale, and individual items. Pilot testers ($n = 9$; 26% response rate) provided several suggestions for improvement of the draft survey. A revised survey instrument was sent to all APPE community pharmacy preceptors

($N = 103$) at University of Maryland School of Pharmacy to their active e-mail address and through the US postal service. Participants were instructed to complete the survey via one method only. Survey responses were anonymous.

A five-point Likert scale was used (1 = completely true, 2 = mostly true, 3 = mostly untrue, 4 = completely untrue, and 5 = not applicable) for the first 39 questions of the survey. The survey began by asking six questions regarding the preceptor's confidence in performing specific tasks such as recommending nonprescription medications, and counseling patients on their medications. The next 15 items queried the preceptor's self-perception of their ability to provide constructive feedback to students on specific skills such as counseling a patient regarding medication administration technique, and conducting a symptom analysis. This section was followed by 18 items regarding a preceptor's ability to deal with students in certain student−teacher encounters. These included situations such as discussing a poor or failing evaluation and confronting a student who was tardy. The last 10 items of the survey consisted of a mix of open-ended questions, multiple-choice questions (one or more answers allowed), and dichotomous questions (yes/no), to gather information regarding preceptor demographics (five items) and to characterize the preceptor's practice site (five items). (The comprehensive training needs survey is available on request from the corresponding author.)

To obtain information from the students' perspective about community preceptors' performance, we analyzed data from an 18-item survey of self, site, and preceptor that students are required to complete after each APPE rotation (fall 2012 to summer 2013). As part of this instrument, students were asked to rate their level of agreement (strongly agree, agree, disagree, and strongly disagree) with a series of statements regarding preceptor teaching behaviors. (The student APPE evaluations are available on request from the corresponding author.)

OSTE topic selection and case development

Data from both the students' APPE evaluations of self, site, and preceptor and the comprehensive training needs survey were analyzed to identify preceptor development needs amenable to the OSTE format. The investigators ($N = 6$) and a group of fourth year Doctor of Pharmacy students ($N = 11$) developed three OSTE case scenarios based on the needs identified. For each case, a dichotomous skills-and-communication evaluation checklist was created, including the best practice teaching behaviors that ideally would be observed during the preceptor−student encounter.

The OSTE cases were piloted with a small group of full-time pharmacy practice faculty members and pharmacy residents. The feedback received during the pilot phase was used to improve the final version of each OSTE case. The case instructions and evaluation checklists were uploaded into MLS, a web-based standardized patient software.[17]

OSTE process

All APPE community pharmacy preceptors ($N = 103$) were invited via e-mail, the Maryland Mentors quarterly preceptor newsletter, and a follow-up phone call to participate in the OSTE. The OSTE was offered on three different dates with 3.75-hour Continuing Education (CE) credits awarded for participation. Capacity at each OSTE was capped at nine participants. The agenda for the four-hour OSTE is provided in Table 1.

Pre-OSTE and post-OSTE surveys were administered to participants on the day of the OSTE (Appendix A). During the OSTE, each student−preceptor encounter was digitally video recorded using the MLS software. Concurrently, members of the investigator team remotely rated the performance of participants using the case-specific evaluation checklists. The overall summary performance results of participants were revealed during a debriefing session that occurred after all participants had completed their encounters.

Statistical analysis

Descriptive statistics were utilized for survey response analysis in Microsoft® Excel® (Version 2007; 12.0.6683.

Table 1
OSTE agenda

0:00–0:30	[a]OSTE orientation/pre-OSTE written survey
0:30–1:00	"Feedback 101"—A brief presentation regarding best practices in formative feedback
1:00–1:10	Video 1 consisted of a student−patient encounter pertaining to Case 1 (ten minutes)
1:10–1:15	Individual video 1 reflection and evaluation
1:15–1:25	Video 2 consisted of a student−patient encounter pertaining to Case 2 (ten minutes)
1:25–1:30	Individual video 2 reflection and evaluation
1:30–1:40	Break
1:40–1:49	Case 1 (9 minutes)/facilitator remotely observe/grade using case-specific checklist
1:49–1:50	Change rooms
1:50–1:59	Case 2 (9 minutes)/facilitator remotely observe/grade using case-specific checklist
1:59–2:00	Change rooms
2:00–2:09	Case 3 (9 minutes)/facilitator remotely observe/grade using case-specific checklist
2:09–2:10	Change rooms
2:10–2:40	Preceptors watch their own videos for Case 1−3 and perform self-evaluation using the case-specific evaluation checklist/facilitator remotely watch remaining preceptors' video recordings/grade
2:40–2:50	Break
2:50–3:45	Debriefing of Case 1−3 with all participants, faculty, and students
3:45–4:00	Overall OSTE experience debrief (qualitative feedback) and post-OSTE written survey

[a] OSTE: objective structured teaching exercise.

5002). Welch's *t*-test was used to assess the differences between mean responses of preceptors in the pre-OSTE and post-OSTE survey in the statistical software package *R*.

Results

Training needs analysis

A total of 38 of the 103 preceptors completed the comprehensive training needs analysis survey (37% response rate). Some survey items had incomplete responses. Respondents reported a mean of 16.2 years in practice (median 11.5 years) and a mean of 7.7 years serving as a preceptor (median five years; range of 1–22 years). Educational background and certifications of respondents are shown in Table 2. The majority of respondents stated that it was "completely true" that they were confident in their ability to perform basic patient care tasks, fulfill preceptor roles and responsibilities, and provide constructive feedback to a student in a variety of situations (Table 3).

Additionally, data were collected from fourth year PharmD students ($N = 174$) regarding their community pharmacy preceptors from APPE rotations. The student responses supported the preceptor data regarding areas where preceptors were the least and most able to provide constructive feedback (Table 4). The comprehensive results from students' evaluation are available on request from the corresponding author.

OSTE case development

For OSTE case development, three themes amenable to OSTE were selected. These teaching-related tasks included the following: (1) providing feedback to a student who had a failing final evaluation ("Final Evaluation case"), (2) providing constructive feedback to a student after counseling a patient on an OTC product selection ("OTC case"), and (3) providing constructive feedback to a student who counseled a patient on a metered-dose inhaler ("Albuterol case").

Table 2
Training need analysis—respondent demographics

Demographic	No. (%)
Professional training	
PharmD ($n = 37$)	21 (56.8)
BS Pharm ($n = 37$)	14 (37.8)
PGY-1 residency ($n = 34$)	5 (14.7)
PhD ($n = 37$)	2 (5.4)
MBA ($n = 37$)	2 (5.4)
MS ($n = 37$)	1 (2.7)
PGY-2 or fellowship ($n = 34$)	0
Professional certifications	
Immunization ($n = 32$)	31 (96.9)
BCPS[a] ($n = 32$)	2 (6.3)
CDE[b] ($n = 32$)	1 (3.1)
Other ($n = 32$)	7 (21.9)

[a] BCPS: Board Certified Pharmacotherapy Specialist.
[b] CDE: Certified Diabetes Educator.

The goal was to see if preceptors would notice errors in specific behaviors described in each case in order to provide appropriate constructive feedback to the students. For example, the "Final Evaluation case" simulated a student who performed well overall on clinical aspects of the rotation, but performed poorly regarding professionalism. Similarly, the "OTC case" simulated a student counseling a patient on an OTC product in which the student had excellent communication skills but failed to collect critical information necessary for an appropriate symptom analysis and patient assessment. During the discussion with preceptor, the student was trained to state confidence in his/her performance but was also very receptive to constructive feedback. Lastly, the "Albuterol case" simulated a student counseling a patient on the use of a metered-dose inhaler in which the student provided factually correct information, but demonstrated poor verbal and nonverbal communication skills. During the discussion with preceptor, the student was trained to avoid eye contact and to lack self-confidence. In addition, the student was trained to become emotional if the preceptor voiced any perceived criticism. The student in this case was worried about getting a poor grade on the rotation, consequently affecting her high grade point average. Once all of the cases were developed, two standardized students recorded a video of a student counseling a patient for both the "OTC case" and the "Albuterol case". A midpoint and final evaluation with the preceptor's comments were developed in a print format by the investigators for the "Final Evaluation case". Additionally, the cohort of students was trained to serve as standardized students during the OSTE. The final instruction to participants and evaluation checklists for these three cases are shown in Appendix B.

Preceptor OSTE performance

A total of 15 preceptors participated in the OSTE. The mean score on the "Final Evaluation case" was 2.6 out of 3 possible points. More than 80% of the participants successfully addressed all three items of the "Final Evaluation case" checklist. The mean score on the "Albuterol case" was 6.2 out of 7 possible points. More than 80% of the participants successfully addressed five out of the seven items on the "Albuterol case" checklist. The mean score on the "OTC case" was 6.5 out of 10 possible points. More than 80% of the participants successfully addressed four out of the 10 items on the "OTC case" checklist. Performances on the OSTE cases are shown in Table 5.

Pre-OSTE and post-OSTE survey

All participants completed both the pre-OSTE and post-OSTE survey on the day of the OSTE (100% response rate).

Table 3
Training needs analysis—preceptors' ability to perform specific tasks

I feel confident in my personal ability to:	Completely true, no. (%)	Mostly true, no. (%)	Mostly untrue, no. (%)	Completely untrue, no. (%)	Not applicable, no. (%)
Counsel patients on the use of medications ($n = 38$)	37 (97.4)	1 (2.6)	0	0	0
Select and recommend [a]OTC therapies ($n = 38$)	36 (94.7)	2 (5.3)	0	0	0
Counsel patients regarding administration techniques ($n = 37$)	27 (73)	10 (27)	0	0	0
Gather information from students to assess their prior experience and professional goals ($n = 37$)	31 (83.8)	6 (16.2)	0	0	0
Confront a student who does not meet a deadline ($n = 37$)	29 (78.4)	8 (21.6)	0	0	0
Confront a student who displays inappropriate professional appearance and attire ($n = 37$)	29 (78.4)	7 (18.9)	1 (2.7)	0	0
Confront a student who is tardy during their rotation ($n = 37$)	28 (75.7)	8 (21.6)	1 (2.7)	0	0
Evaluate a student's knowledge of the drugs used to treat disease states commonly encountered on my rotation ($n = 37$)	26 (70.3)	9 (24.3)	1 (2.7)	0	1 (2.7)
Provide comprehensive written evaluations of overall student performance ($n = 37$)	24 (64.9)	10 (27.0)	3 (8.1)	0	0
Discuss an evaluation with a student who challenges the ratings or comments ($n = 37$)	23 (62.2)	13 (35.1)	1 (2.7)	0	0
Facilitate learner self-reflection and self-directed learning ($n = 37$)	22 (59.5)	14 (37.8)	1 (2.7)	0	0
Provide timely, formative feedback targeted at specific student behaviors throughout the rotation ($n = 37$)	22 (59.5)	14 (37.8)	1 (2.7)	0	0
Handle unmotivated students ($n = 37$)	21 (56.8)	15 (40.5)	1 (2.7)	0	0
Evaluate a student's knowledge of the pathophysiology of disease states commonly encountered on my rotation ($n = 37$)	20 (54.1)	15 (40.5)	1 (2.7)	0	1 (2.7)
Discuss a poor or failing evaluation with a student in a constructive manner ($n = 37$)	17 (46.0)	17 (46.0)	3 (8.0)	0	0
I am able to provide constructive feedback to a student regarding his or her ability to:					
Select and recommend OTC therapies ($n = 38$)	32 (84.2)	6 (15.8)	0	0	0
Counsel patients regarding the use of medications ($n = 38$)	32 (84.2)	6 (15.8)	0	0	0
Identify drug interactions ($n = 38$)	30 (78.9)	8 (21.1)	0	0	0
Counsel patients regarding administration techniques ($n = 38$)	29 (76.3)	9 (23.7)	0	0	0
Interview patients and caregivers to collect history (e.g., medication history, [b]HPI) ($n = 38$)	27 (71.1)	11 (28.9)	0	0	0
Recommend changes to prescription drug therapies ($n = 37$)	26 (70.3)	10 (27.0)	1 (2.7)	0	0
Conduct a symptom analysis to make a treatment decision ($n = 38$)	24 (63.2)	13 (34.2)	0	0	1 (2.6)
Conduct prospective drug utilization review ($n = 38$)	23 (60.6)	14 (36.8)	1 (2.6)	0	0

[a] OTC: over-the-counter.
[b] HPI: history of present illness.

Post-OSTE scores improved significantly (Table 6). All participants completely or generally agreed that "actor(s)" accurately portrayed the student role. All participants completely or generally agreed that the "OTC" case and the "Final Evaluation case" scenarios were realistic. A majority of participants also completely or generally agreed that the inhaler counseling case scenario was realistic, except for one person, who generally disagreed. All participants completely or generally agreed that the debriefing session helped them gain insights and learn different perspectives and they felt comfortable discussing their performance during the debriefing session. Further, all participants felt that the OSTE is an effective approach to enhance teaching skills and that they would participate in future OSTE sessions.

Based on spontaneous comments from participants and from the open-ended post-OSTE questions, participants found reviewing the videos of their performance and the opportunity to self-assess very useful. Lastly, some reported that working with standardized students was more helpful than traditional methods of preceptor development (e.g., lectures).

Discussion

We found a significant improvement in preceptor confidence to perform teaching tasks based on changes in pre-OSTE and post-OSTE survey, suggesting that this is an effective method for preceptor development using realistic situations encountered during structured pharmacy practice experiences. However,

Table 4
Students' evaluation results

Answer options	Strongly agree, no. (%)	Agree, no. (%)	Disagree, no. (%)	Strongly disagree, no. (%)	Not applicable, no. (%)
The preceptor provided timely, formative feedback targeted at my specific behaviors throughout the rotation ($n = 174$)	115 (66)	51 (29)	3 (2)	2 (1)	3 (2)
The preceptor provided feedback on how to collect a symptom analysis to make a treatment decision ($n = 174$)	95 (55)	56 (32)	7 (4)	2 (1)	14 (8)
Answer options	Yes, no. (%)		No, no. (%)		Not applicable, no. (%)
If you counseled patients on prescription medications during this rotation, did your preceptor provide useful feedback about your ability to perform this skill? ($n = 174$)	157 (90)		5 (3)		12 (7)
If you did recommend [a]OTC therapies during this rotation, did your preceptor provide useful feedback about your ability to perform this skill? ($n = 134$)	117 (87)		7 (5)		10 (8)

[a] OTC: over-the-counter.

the training needs analysis, case development, and OSTE implementation were time-consuming and resource-intensive. Our experience is consistent with previous reports.[18] While a majority of preceptors provided appropriate feedback during the three OSTE encounters, there were clear opportunities for improvement.

Limitations in our study should be considered. The sample sizes for both the training needs survey and OSTE were relatively small. Responders who took the comprehensive training needs analysis survey were preceptors with several years of practice experience; therefore the results from the needs assessment survey may not represent the

Table 5
Preceptor OSTE performance results ($N = 15$).

Final evaluation checklist results	No. (%)
Tells student he was given at least one [a]SD rating for "Timeliness/Commitment" or "Initiative" elements on the final evaluation	13 (87)
Verbal feedback given to student includes specific behaviors/examples that justify rating	13 (87)
Avoids enabling language that affirms student excuses	13 (87)
Albuterol case checklist results	
Identify at least two of the following student performances that needed improvement: (a) lack of eye contact with patient, (b) heavy reliance on the patient medication leaflet,(c) inappropriate use of medical terminology, and/or (d) no pauses or attempts to verify patient understanding	15 (100)
At least one positive student performance acknowledged	9 (60)
Asks student to self-assess performance before giving any feedback	11 (73)
Shows empathy to student by using supportive language if student becomes upset	13 (87)
Feedback is specific	15 (100)
Negative feedback is constructive by offering specific suggestions for improvement	15 (100)
Avoids condescending statements/tone	15 (100)
[b]OTC case checklist results	
Identifies that student did not perform symptom analysis	4 (27)
Identifies that student did not gather medication history	4 (27)
Identifies that student did not ask about allergies	4 (27)
Identifies that student did not ask about past medical history	6 (40)
Identifies that student was inappropriately chewing gum	10 (67)
Asks student to self-reflect before giving feedback	11 (74)
Feedback provided to student is specific	14 (93)
Any negative feedback is provided to student is constructive by offering specific suggestions for improvement	15 (100)
Avoids condescending tones/statements	15 (100)
Acknowledges at least one positive student performance/behavior	14 (93)

[a] SD: significant deficiency.
[b] OTC: over-the-counter.

Table 6
Mean scores for the pre-[a]OSTE and post-OSTE survey ($N = 15$)

[b]Survey statement	Pre-OSTE	Post-OSTE
Confident in my ability to:		
Provide feedback to a student on their communication skills	3.2	3.7[‡]
Identify critical information related to student performance and behaviors	3.2	3.6[‡]
Provide feedback to a student on professionalism and behavior	3.3	3.8[†]
Interact with students during confrontational situations	2.9	3.8[*]
Discuss a poor or failing evaluation with a student in a constructive manner	2.8	3.8[*]
Effectively use questions to promote learning when interacting with students	3	3.9[*]

[a] OSTE: objective structured teaching exercise.
[b] Items were ranked on a scale of 1–4, where 1 = completely disagree, 2 = generally disagree, 3 = generally agree, and 4 = completely agree.
[*] $p < 0.001$ for statistically significant difference between pre-OSTE and post-OSTE activity.
[†] $p < 0.01$ for statistically significant difference between pre-OSTE and post-OSTE activity.
[‡] $p < 0.05$ for statistically significant difference between pre-OSTE and post-OSTE activity.

needs of preceptors with less experience. In addition, a limited number of preceptors were permitted to register for the OSTE, and our results may reflect the positive feelings of "the willing few." Furthermore, only three OSTE cases were used during this pilot study. Prislin et al.[16] implemented eight OSTE stations. Although, the optimal number of stations for OSTE is not very clear, when looking at OSCE literature, a study reported that OSCE ratings become more reliable with increased number of stations ranging from 12 to 16 stations.[12] Therefore, one could reasonably assume that multiple OSTE cases also lead to improved reliability of OSTE ratings.

Lastly, our project addressed only level one and level two of the Kirkpatrick's four levels of evaluation.[19] In order to comprehensively measure the effectiveness of this preceptor development program, future studies will need to determine if the skills developed during the OSTE are transferred (level three) to practice and result in improved student learning (level four).

Conclusion

We systematically determined the training needs of preceptors and implemented an OSTE to address the identified needs. This novel method of preceptor development was received well and resulted in meaningful gains in preceptor confidence to provide constructive feedback to learners. Although these findings are promising, there is a clear need for additional research in a broader group of preceptors who practice in a wider range of settings. Lastly, follow-up data are needed to determine if the skills learned in the OSTE have a lasting impact on preceptor teaching behaviors.

Appendix A. Supplementary information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.cptl.2015.06.007.

References

1. *American Pharmacists Association*. The community pharmacist preceptor education program. http://elearning.pharmacist.com/Portal/Files/LearningProducts/6b07c742b2e94cdaac7fc8000f27f843/assets/Preceptor%20monograph_061312.pdf; Accessed June 6, 2015.
2. Haase KK, Smythe MA, Orlando PL, et al. AACP white paper: quality experiential education. *Pharmacotherapy*. 2008;28:219e–227e.
3. Guglielmo BJ, Edwards DJ, Franks AS, et al. A critical appraisal of and recommendations for faculty development. *Am J Pharm Educ*. 2011;75(6): Article 122.
4. Kirschenbaum HL, Zerilli T. Assessment of full-time faculty preceptors by colleges and SOP in the United States and Puerto Rico. *Am J Pharm Educ*. 2012;76(8): Article 148.
5. Sturpe DA, Layson-Wolf C, McPherson ML, et al. An objective structured teaching examination (OSTE) for faculty development. *Curr Pharm Teach Learn*. 2013;5(6):616–619.
6. Vos SS, Trewet CB. A comprehensive approach to preceptor development. *Am J Pharm Educ*. 2012;76(3): Article 47.
7. Harris BJ, Butler M, Cardello E, et al. Report of the 2011-2012 AACP professional affairs committee: addressing the teaching excellence of volunteer pharmacy preceptors. *Am J Pharm Educ*. 2012;76(6): Article S4.
8. Sonthisombat P. Pharmacy student and preceptor perceptions of preceptor teaching behaviors. *Am J Pham Educ*. 2008;72(5): Article 110.
9. Wilkinson ST, Couldry R, Phillips H, Buck B. Preceptor development: providing effective feedback. *Hosp Pharm*. 2013;48(1):26–32.
10. Dugan BD. Enhancing community pharmacy through advance pharmacy practice experiences. *Am J Pharm Educ*. 2006;70(1): Article 21.
11. Shi JL, Shih BJ, Chen RL. The design and evaluation of virtual situation role-playing learning game (VSRPG). *Int J Instr Technol Distance Learn*. 2006;2(11).
12. Sturpe DA. Objective structured clinical examinations in doctor of pharmacy programs in the United States. *Am J Pharm Educ*. 2010;74(8): Article 148.
13. Simpson DE, Lawrence SL, Krogull SR. Using standardized ambulatory teaching situations for faculty development. *Teach Learn Med*. 1992;4(1):58–61.

14. Wilkes MS, Hoffman JR, Usatine R, et al. An innovative program to augment community preceptors' practice and teaching skills. *Acad Med*. 2006;81(4):332–341.
15. Lesky LG, Wilkerson L. Using standardized students to teach a learner-centered approach to ambulatory precepting. *Acad Med*. 1994;69(12):955–957.
16. Prislin MD, Fitzpatrick C, Giglio M, et al. Initial experience with a multi-station objective structured teaching skills evaluation. *Acad Med*. 1998;73(10):1116–1118.
17. C.A.E. Healthcare. ⟨www.caehealthcare.com⟩; Accessed June 6, 2015.
18. Stone S, Mazor K, Devaney-O' Neil S, et al. Development and implementation of an objective structured teaching exercise (OSTE) to evaluate improvement in feedback skills following a faculty development workshop. *Teach Learn Med*. 2003;15(1):7–13.
19. Ramalanjaona G. Faculty development: how to evaluate the effectiveness of a faculty development program in emergency medicine. *Acad Emerg Med*. 2003;10(8):891–892.