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Online Synchronous Faculty Learning Communities in Medical Education: It Can Be Done Successfully

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The effectiveness of a 14-month pilot online synchronous faculty learning community supported by asynchronous modalities was examined using a survey instrument to measure pre- and post-physician teaching competencies at a large osteopathic medical school in the Southwest. The successful implementation of this pedagogically robust web conference program with on- and off-site faculty and preceptors resulted in an overall improvement in all 12 teaching competencies and an increase in faculty projects and scholarly activity. Final program feedback revealed that 90% of the participants would recommend the faculty learning community, and 100% felt the FLC experience enhanced their teaching.

Institutions of higher education are emphasizing quality teaching and student learning in their efforts to provide innovative programs of

professional development. Heightened interest in reforming medical education came on the heels of a recent report by the Carnegie Foundation for Teaching, which identified a critical need to reform curricula, pedagogies, and assessment in medical schools and residency programs (Cooke, Irby, & O'Brien, 2010). This report encourages medical schools to develop innovative programs that will foster a better understanding of how people learn and lead to more intentional selection, development, and support of medical educators.

For significant reform in medical education to take place, teachers will need to become pedagogically skilled in order to meet their students' learning needs; this will demand more than one or two training workshops a year. The literature suggests that improvement in teaching practice and research productivity occurs when there is inquiry and dialogue that is critical, reflective, and constructive, takes place in social contexts with supportive peers, and extends over time to allow for cumulative learning, practice, and growth (Bussey-Jones et al., 2006; Schlager & Schank, 1997; Steinert et al., 2006; Vaughan, 2004).

A challenge that medical schools face is delivering faculty development to physicians who teach in medical offices and hospitals (that is, preceptors), many of whom are geographically remote from the medical school. The purpose of this article is to determine whether the structure of an online synchronous faculty development program will serve to connect preceptors with on-campus faculty and support participation in professional learning communities. At the same time, we wish to examine the effectiveness of this program in enhancing teaching competencies and increasing faculty projects and scholarly activity.

Review of the Literature

For over 25 years, faculty learning communities (FLCs) have provided the framework for connecting and engaging small groups of faculty in year-long professional development programs that lead to the improvement of teaching, learning, and scholarly activity (Hansen et al., 2004; Richlin & Cox, 2004). While face-to-face faculty learning communities have been the norm since the 1990s, online capabilities for convening FLCs have become a viable option, even a catalyst, for faculty development, because they can help faculty sort through massive amounts of information, understand it, and use it appropriately (Sherer, Shea, & Kristensen, 2003).

While many health professions are using online (or virtual) communities to provide academic enrichment and value to their programs, online communities for faculty education are less frequent. Examples of health

professions using online communities for faculty education include pharmacy, to provide initial development and continuing support for preceptors (Ackman & Romanick, 2011); nursing, to support the transition from clinicians to academics in the UK (Andrew, Ferguson, Wilkie, Corcoran, & Simpson, 2009); and dentistry, to enhance reflective practice of dental educators in an operative dentistry course (Gardner, Bridges, & Walmsley, 2012).

In a study involving small groups of physicians, researchers found that web conferencing as a method for delivering continuing medical education programs was well accepted. Further, they discovered that the educational role of facilitation was most important, and that attention to web conferencing techniques (for example, having correct camera placement, waiting several seconds for responses to questions, muting microphones, and dialing in well before start time) improved the educational and social experiences for all involved (Allen, Sergeant, Mann, Fleming, & Premi, 2003).

In his review of 355 comparative studies, Hrastinski (2008) noted that asynchronous and synchronous e-learning methods each support different purposes, and he described when, why, and how to use asynchronous versus synchronous e-learning. For example, Hrastinski noted that asynchronous e-learning is best used to reflect on complex issues when synchronous meetings cannot be scheduled. An advantage is that learners have more time to reflect and process information. Studies by Garrison (2006), a leading researcher in asynchronous online learning, showed that students involved in asynchronous activities develop deeper critical thinking and reflection when compared with those engaged in face-to-face learning.

This article reports a pilot study that explored the use of an online synchronous FLC supported by asynchronous activities in an osteopathic medical school. Although FLCs are being recognized as an innovative form of faculty development in medical education (Schonfeld, 2007), little research is reported in the literature about their impact on teaching, learning, and scholarly activity or the outcomes realized when FLCs occur synchronously by using web conferencing technology along with asynchronous modalities.

Background

Faculty Learning Communities

Faculty learning communities (FLCs) are cross-disciplinary groups of

8-12 faculty members who engage in a year-long curriculum focused on enhancing teaching and learning (Cox, 2002-03). Other types of faculty development initiatives are often of shorter duration, failing to connect the critical elements that produce lasting change, or any change at all. However, the continuity of regularly scheduled FLC sessions gives members an opportunity to become better acquainted, learn from each other, and build on each other's strengths. Through dialogue on thematic issues of interest to the group and collaboration on teaching projects, FLCs provide a collegial environment for substantial learning as well as an opportunity to explore new teaching strategies.

How the Online FLC Began

The dean of the medical school recognized the need for connecting on-campus faculty with clinicians serving as preceptors off-campus, and acquainting them with "Best Practices" in learning, teaching, and scholarship. To facilitate this long-term faculty development initiative, the medical school contracted with an external consultant, who was a medical educator experienced in establishing FLCs in academic medical centers. The goals of this pilot FLC were to (1) enhance the quality of teaching and learning and (2) build a strong sense of community between on-campus faculty and off-campus preceptors.

As the first formalized, long-term faculty development program instituted at this medical school, the FLC program required extensive planning and preparation. Over a 12-month period, the consultant worked with the Associate Dean for Academic Affairs to make preparations to launch the FLC. Preparations involved assessing institutional readiness, establishing a faculty development advisory council, training facilitators, recruiting members, selecting a theme for the program, developing a tentative topic schedule, selecting a web conferencing vendor, and obtaining training on how to use web conference technology.

Potential faculty members and preceptors were personally contacted, provided an overview of the curriculum, and invited to complete an online application. This application included demographic and educational background information along with a brief needs assessment. Faculty were required to sign and submit a form indicating their full commitment to the year-long program.

This FLC resembled the traditional FLC model in that it was voluntary, multi-disciplinary, year-long (actually, 14 months) with monthly 60-minute sessions, and focused on building community and developing the scholarship of teaching and learning (SoTL). However, this FLC was unique in that sessions were held in an online synchronous format using webcams

and noise-cancelling headsets provided by the medical school. The FLC consisted of 10 individuals (seven male, three female), with nine physicians (six D.O.'s, three M.D.'s) involved in the teaching of osteopathic medical students (two of whom served as co-facilitators and members) and one Ph.D. medical educator/consultant.

The roles of the consultant and co-facilitators were integral to the success of the program. Initially, the FLC consultant worked with an academic administrator to determine faculty needs, identify a theme, and assist with the application process. Prior to launch, the consultant developed a curriculum based on faculty needs and conducted training workshops with co-facilitators. After the launch, responsibilities of the consultant included preparing weekly e-mail messages and productivity tips, creating a slide program for each session, meeting with co-facilitators pre- and post-session, archiving program material on the web platform, providing support to participants on their scholarly activities, and coordinating the end-of-year Scholarly Teaching Symposium.

The co-facilitators were experienced physician educators and department chairs integrally involved in course development, classroom teaching, and clerkship management, which made them an ideal team to help initiate this innovative program. Prior to the launch of the FLC, the co-facilitators participated in two workshops to familiarize themselves with the facilitator role and the goals, group process, and assessment of the FLC. They were involved in all aspects of the program—from planning to implementation, assessment, and scholarly activities.

The physician members of the FLC represented six medical specialties (family medicine, emergency medicine, internal medicine, psychiatry, surgery, and cardiology). Two members were new faculty, six were very experienced faculty, and one was a second-year medicine resident. Four of the members were on-campus faculty, three were located in the surrounding metropolitan area, and two were from residency programs at regional medical centers (Sierra Vista and Cottonwood), more than 100 miles from the campus.

Members were expected to attend all sessions synchronously, present a webinar on a theme-related topic of their choice, and develop a scholarly teaching project. In order to build community and be most effective, monthly reading materials were distributed, and participants were encouraged to engage in ongoing dialogue. All participants successfully completed the program.

Selecting a Web Conferencing Provider

Three types of web conferencing products were evaluated: Skype, El-

luminate, and Cisco WebEx. We compared connectivity, dependability, ease of use, and vendor support. In order to create a stronger environment for interaction and learning, we felt it was important to be able to see each other online. The earlier free version of Skype did not offer the ability to visualize multiple people at the same time. Elluminate offered an extensive array of tools for web conferencing; however, we felt the learning curve for mastery exceeded our time limitations. Our final choice, Cisco WebEx, was user-friendly, affordable, contained the basic web conferencing tools (that is, hand-raise, text chat, polling), and allowed individuals to be seen when they spoke.

Our consulting firm (Faculty Ed Solutions, LLC) provided WebEx training for facilitators, participants, and guest speakers, and hosted the monthly sessions.

The Curriculum for the FLC on Effective Teaching

Based on data collected from the needs assessment surveys during the application process, discussion topics were identified. We also chose our theme book, *ABC of Learning and Teaching in Medicine* (2nd edition). Each chapter is a short, easy read, and we focused on topics such as applying educational theory, course design, collaborative learning, evaluation, teaching large and small groups, giving feedback, and clinical teaching. The theme book, in combination with guest presentations, promoted the integration of scholarship of teaching and learning (SoTL) throughout the program.

Overview of an Online FLC Web Conference Session

Reminder e-mails and an invitation link for WebEx were sent to members about 45 minutes prior to each session. Our consulting firm administrator provided technical assistance to individuals prior to and during the sessions. A typical monthly FLC session began with 5-10 minutes of "Connecting and Reflecting" led by one of the co-facilitators. During this segment, they welcomed members, reviewed highlights of the last session, and provided opportunities to reflect on what the physicians had learned or put into practice. The next 25-40 minutes focused on a theme-related topic researched, developed and presented by a FLC participant or guest. In the final 5-10 minutes of each session members asked questions, shared ideas, discussed assignments, and were encouraged to try out new teaching strategies. Within 24 hours of each monthly session, the video recording and a feedback questionnaire (via Survey Monkey) were sent to participants.

The Addition of Asynchronous Learning Modalities to a Synchronous Environment

Asynchronous e-learning, facilitated by e-mail, discussion boards, blogs or wikis, video or audio streaming, and e-books, provides flexibility and supports work relations among participants; but learners can often feel isolated using only this modality. In contrast, synchronous e-learning, a modality less frequently used in e-learning programs, is delivered via webinars offering audio or web conferencing, chat, and instant messaging. This synchronous e-learning modality provides a social context in real time.

To complement our online program, we offered several opportunities for asynchronous learning. In addition to textbook reading assignments, a weekly e-mail included a message from the consultant and co-facilitators and a SoTL productivity tip prepared by the consultant. This weekly communiqué helped the group stay connected with the curriculum and the current topic being discussed. Program materials were archived weekly on Moodle, an open-source online course-management system, and made available to all participants for reflective activities.

The Importance of Social Gatherings

One of the important features that makes FLCs successful is the social interaction (Beach & Cox, 2009; Richlin & Cox, 2004). While our regularly scheduled monthly sessions occurred online, we added three social events to facilitate collegial interaction. A backyard holiday function included hors d'oeuvres, drinks, and dessert as well as an exchange of an "educational" gift. We gathered by the outdoor fireplace and had a WebEx presentation on a computer laptop by an active FLC facilitator from the University of Arizona College of Medicine - Phoenix. She enthusiastically described the benefits she had received from being involved in FLCs. Four months later, members participated in a working luncheon during the annual osteopathic convention in Scottsdale, Arizona, where we reflected on the progress, successes, and challenges associated with the FLC. The last social, a potluck held in an off-campus conference room, provided an opportunity to get to know each other better by drawing questions from a hat such as "What was your funniest teaching moment?" and answering them out loud.

Methods

This study uses a mixed-methods approach to investigate overall trends and evaluate the effectiveness of a faculty learning community at a large, osteopathic medical school in the United States. Specific teaching competencies for clinicians were quantitatively evaluated and compared pre- and post-FLC. In addition to the teaching competencies survey, we elicited participant feedback surveys that provided qualitative and quantitative data for quality improvement purposes. This information was collected at the end of each session (monthly surveys), on an interim basis (interim surveys), and at end of the FLC (program completion survey).

The Teaching Competencies Survey

After receiving Institutional Review Board approval, FLC researchers asked participants to complete an anonymous questionnaire on Survey Monkey to assess their teaching competencies prior to and following the online FLC. The survey instrument was developed by the Scottish Council for Postgraduate Medical and Dental Education (Hesketh et al., 2001) after extensive review of the medical education literature, a study of the content of local courses for teachers in medicine, and consideration of desirable learning outcomes appropriate for physician educators. While we are unable to confirm whether the researchers performed mathematical validation of the survey, it appears to have face validity, as a number of professionals (that is, clinicians, professional educators, education technologists and other health care teachers) were involved in the definition and refinement of the instrument. Hesketh et al. (2001) stated the instrument "was tested by mapping onto it the outcomes of existing courses for trainers" (p. 558) and "was used by course providers throughout Scotland to identify which of the learning outcomes were covered by each of their courses" (p. 563). We reviewed the competencies and felt they were applicable to our population. The survey, based on a learning outcomes framework, assessed the physician as teacher from three perspectives: The Doctor as a Teacher (that is, "doing the right thing"), How the Doctor Approaches Teaching (that is, "doing the thing right"), and The Doctor as a Professional Teacher (that is, "the right person doing it"). Participants in the FLC used a 5-item Likert scale to identify their level of competency for each of the 12 teaching outcomes (see Table 1).

Monthly Participant Feedback Surveys

A 10-item feedback questionnaire on Survey Monkey was sent to

Table 1
The 12 Teaching Competencies
Likert Scale for Assessing Teaching Competency

Beginner	Is aware of the basic actions of the behavior, may recognize the behavior when performed by others, performs the behavior less than 50% of the time effectively, and must rely on the help of others.
Minimally Competent	Can demonstrate knowledge of the behavior; recognizes performance in himself/herself and others; performs the behavior less than 80% of the time effectively; gets help as necessary.
Competent	Successfully performs the behavior more than 80% of the time. Recognizes when not performing effectively, and can correct own behavior.
Proficient	Almost always performs effectively; sets the standard for how the behavior is performed.
Masterful	Innovates new behaviors and practices.
	Category I: **The Tasks That the Doctor as Teacher Is Able to Do**
C-1	Competence in teaching large and small groups.
C-2	Competence in teaching in a clinical setting.
C-3	Competence in facilitating and managing learning.
C-4	Competence in planning learning.
C-5	Competence in developing and working with learning resources.
C-6	Competence in assessing trainees.
C-7	Competence in evaluating courses and undertaking research in education.
	Category II: **How the Doctor Approaches His/Her Teaching**
C-8	Competence in understanding the principles of education (the intellectual intelligences).
C-9	Competence with appropriate attitudes, ethical understanding and legal awareness (emotional intelligences).
C-10	Competence with appropriate decision-making skills and best evidence-based education (analytical and creative intelligences).

Table 1 (*continued*)
The 12 Teaching Competencies
Likert Scale for Assessing Teaching Competency

	Category III: The Doctor as a Professional Teacher
C-11	Competence in the role of the teacher within the healthcare organization.
C-12	Competence in personal development with regard to teaching.

Note. Adapted from Hesketh, E. A., Bagnall, G., Buckley, E. G., Friedman, M., Goodall, E., Harden, R. M., . . . & Oughton, T. (2001). A framework for developing excellence as a clinical educator. *Medical Education*, *35*, 555-564.

participants following each session; responses were anonymous, and the questionnaire was self-explanatory. Survey questions included both structured (seven items) and open-ended formats (three items), yielding a mix of quantitative and qualitative data. Structured questions inquired about the learning climate, comfort with online learning, quality of the session, presentation style, worthwhile use of time, incorporation of ideas into teaching, and assessment of group interaction. The three open-ended questions asked participants what they found most useful, helpful, or interesting, how they intended to make use of the new skills/knowledge, and what suggestions they had to enhance the next session.

Interim Participant Feedback Surveys

Two interim feedback surveys were sent via Survey Monkey following session four and session nine. These surveys assessed how participants were using the resources and what, if any, barriers were interfering with effective learning. The first survey contained eight structured items; the second consisted of nine items, six structured and three open-ended. Responses were anonymous, and the surveys were self-explanatory. The surveys asked participants to assess their enjoyment and benefit from the webinars, comfort level with the technology, satisfaction with the program, utility of the asynchronous resources, and the status of their teaching research project. The three open-ended questions asked what had most engaged, affirmed, or worked for participants in the FLC; what

had most distanced, frustrated, or not worked for them in the FLC; and what had surprised them in the FLC.

Program Completion Participant Feedback Surveys

The end-of-program feedback survey was sent via Survey Monkey; responses were anonymous and the survey was self-explanatory. The 9-item survey included structured (six items, which also invited comments/suggestions) and open-ended (three items) formats. Structured questions asked participants about the value of the communication tools, their satisfaction with the overall program, their likelihood to recommend the program to others, and how the FLC experience influenced/enhanced their teaching and/or scholarly activity. The survey also included the three open-ended questions used in the interim feedback survey.

Participant Feedback Survey One Year post-FLC

One year after program completion, participants were contacted via e-mail and asked how they were continuing to integrate new teaching strategies into their clinical/classroom environments. Participants responded qualitatively, and as noted in the results section, one year post-FLC, respondents continued to incorporate specific teaching strategies within the classroom and clinical setting, which enabled both their personal and professional growth in the learning environment.

Results

Teaching Competency Survey Results

Pre-FLC responses were received from all nine physician-participants yielding a response rate of 100%. Six of the nine physician-participants returned post-FLC responses, yielding a response rate of 67%. Table 2 lists the pre- and post-survey data across all 12 teaching competencies. Figure 1 summarizes the pre- and post- survey data in graphic form. The light bars represent Pre-FLC data, and the dark bars indicate post-FLC data. We found an overall linear increase in expertise across all 12 teaching competencies.

The four teaching competencies with the highest percentage of members reporting themselves as either "Beginner" or "Minimally Competent" pre-FLC are shown in Figure 2. The light bars represent pre-FLC, and the dark bars represent post-FLC. Over half of the members identified themselves as novices in these areas prior to participating,

Table 2
Teaching Competency Survey Composite Data

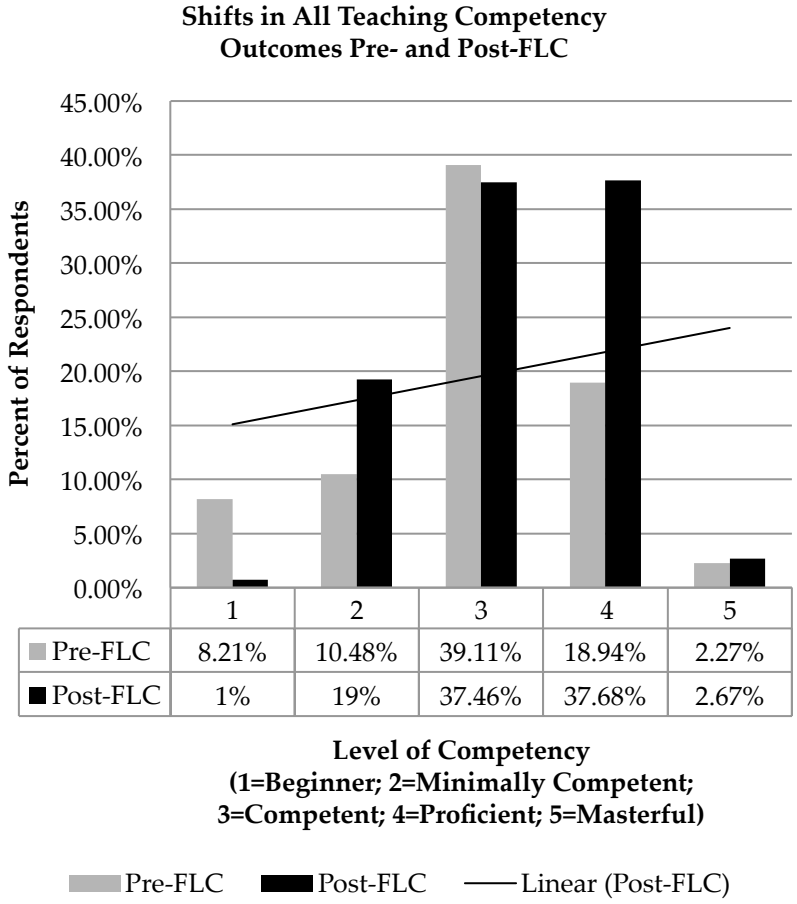
Competency		*Beginner*	*Minimally Competent*	*Competent*	*Proficient*	*Masterful*
Teaching Large and Small Groups	Pre-FLC	11%	0%	33%	33%	11%
	Post-FLC	0%	16%	16%	68%	0%
Teaching in a Clinical Setting	Pre-FLC	0%	0%	67%	33%	0%
	Post-FLC	0%	16%	16%	48%	16%
Facilitating and Managing Learning	Pre-FLC	0%	22%	67%	11%	0%
	Post-FLC	0%	32%	32%	36%	0%
Planning Learning	Pre-FLC	0%	22%	44%	11%	11%
	Post-FLC	0%	32%	16%	32%	20%

Developing and Working with Learning Resources	Pre-FLC	0%	44%	0%	44%	0%
	Post-FLC	0%	16%	48%	16%	20%
Assessing Trainees	Pre-FLC	22%	33%	22%	22%	0%
	Post-FLC	0%	20%	32%	48%	0%
Evaluating Courses and Undertaking Research in Education	Pre-FLC	11%	44%	33%	0%	0%
	Post-FLC	16%	20%	48%	16%	0%
Understanding the Principles of Education	Pre-FLC	11%	44%	11%	11%	0%
	Post-FLC	0%	16%	48%	36%	0%

Table 2 (*continued*)
Teaching Competency Survey Composite Data

Competency		*Beginner*	*Minimally Competent*	*Competent*	*Proficient*	*Masterful*
Understanding of Attitudes, Ethics and Legal Issues	Pre-FLC	11%	0%	33%	22%	11%
	Post-FLC	0%	16%	48%	36%	0%
Decision-Making Skills and Use of Evidence	Pre-FLC	0%	11%	44%	22%	0%
	Post-FLC	0%	16%	32%	34%	0%
Understanding the Role of Teacher in a Healthcare Organization	Pre-FLC	11%	0%	56%	11%	0%
	Post-FLC	0%	20%	40%	40%	0%
Personal Development with Regard to Teaching	Pre-FLC	11%	0%	44%	22%	0%
	Post-FLC	0%	20%	40%	40%	0%

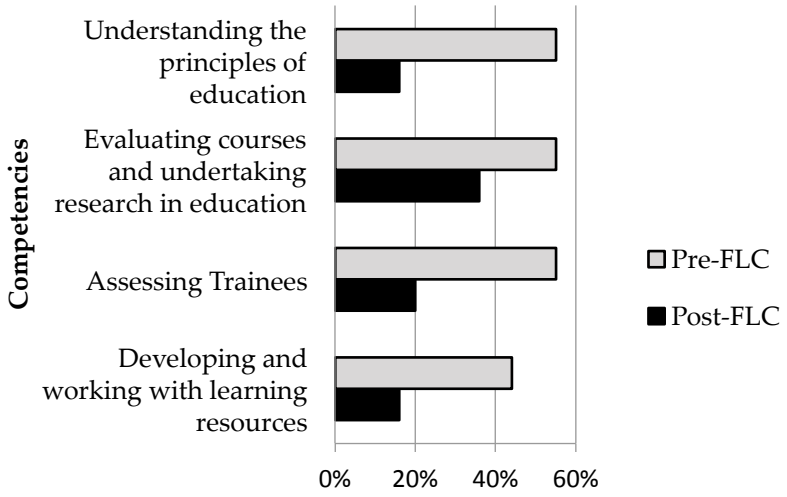
Figure 1
Measuring Effectiveness for the 12 Teaching Competencies



and there was a marked reduction in the percentage of members still reporting themselves as either "Beginner" or "Minimally Competent" in these four teaching competencies after 14 months.

On the other end of the spectrum, Figure 3 highlights the four competencies that demonstrated most movement INTO "Proficient" or "Masterful" ratings from pre- to post-FLC. The light bars denote pre-FLC, and the dark bars denote post-FLC. There was a 20%-30% increase in the percentage of participants reporting themselves to be at more expert levels of performance in these four teaching competencies from pre- to post-FLC.

Figure 2
Key Shifts in Learning Outcomes at the "Beginner" or "Minimally Competent" Levels (Competencies Showing Largest Movement OUT of Beginner/Minimally Competent Levels)

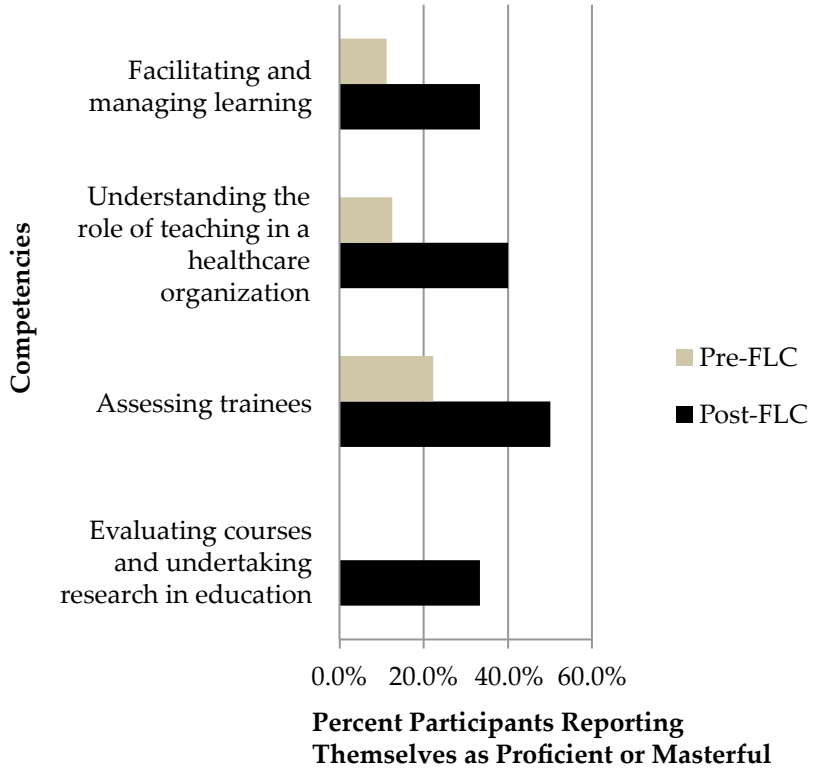


Overall, we discovered improvement in all 12 teaching competencies with movement toward "Proficiency." We found an overall improvement in self-reported abilities in all areas and also observed a notable movement either *out of* "Beginner" or "Minimally Competent" or *into* "Proficient" or "Masterful" ratings in all three domains deemed necessary for teaching excellence. Table 3 shows the teaching competencies with the most improvement over the 14-month period by category. Because of the small number of respondents, inferential statistical tests, such as a *t* test for dependent means, were not performed on the results.

Monthly Participant Feedback Survey Results

Monthly feedback revealed that the majority of participants felt online learning was promoted in a friendly, social environment. Partici-

Figure 3
Key Shifts in Learning Outcomes at the "Proficient" or "Masterful" Levels (Competencies Showing Largest Movement INTO Proficient/Masterful Levels)



pants were comfortable learning online and have plans to incorporate ideas learned into their own teaching practices. The time spent was perceived as worthwhile, and group interaction contributed to the effectiveness of the monthly sessions. Most respondents rated the individual sessions as excellent, and they felt the facilitators conveyed the material in a way that was readily understandable (see Appendix A).

Table 3
Teaching Competencies
Showing the Most Improvement by Category

Category I: The Tasks the Doctor as Teacher Is Able to Do:
• Facilitating and managing learning (C-3)
• Developing and working with learning resources (C-5)
• Assessing trainees (C-6)
• Evaluating courses and undertaking research in education (C-7)
Category II: How the Doctor Approaches His/Her Teaching:
• Understanding the principles of education (C-8)
Category III: The Doctor as a Professional Teacher:
• Understanding the role of the teacher in a healthcare organization (C-11)

Interim Participant Feedback Survey Results

Based on the data from the first interim survey (fourth session), about one third of the participants had listened to/viewed any of the recordings of previous FLC sessions, used the web platform (Moodle), or used the Library's Illiad system to request an article or book since they had started the FLC.

After nine months of involvement in the FLC, participants reported weekly engagement with reading assignments, and about 70% were accessing online resources. The majority of participants found the productivity tips informative. Eighty percent of the participants were satisfied to very satisfied with the online FLC, with just over half of the participants interested in working on a group teaching project (see Appendix B).

Year-End Participant Feedback Survey Results

The end-of-year assessment of the FLC experience revealed that 90% of participants were extremely/very satisfied with the overall FLC program. Respondents answered two additional questions, which demonstrated their degree of satisfaction with and support for the online FLC. For the first question, "How likely are you to recommend the AZCOM FLC to someone else?" 60% responded "extremely likely," 30% "very likely," and

10% "somewhat likely." For the second question, "Has the FLC experience influenced/enhanced your teaching and/or your scholarly activity?" 60% responded it had enhanced *both* their teaching and scholarly activity, and 40% responded it had enhanced their teaching.

Follow-Up Participant Feedback Survey Results One Year Post-FLC

One year after program completion, participants were asked how they were continuing to integrate new teaching strategies into their clinical/classroom environments. Four respondents indicated ongoing use of a variety of active learning techniques, with identified responses quoted below:

> One of the methods that works best in my clinical practice is co-facilitated dialogue between attendings on a designated topic in front of the learner(s). Essentially, a discussion between physicians convenes while the learners observe. Many times different viewpoints unfold and argument/counterarguments are made, while the learners passively watch. As discussions between attendings conclude, learners are invited to ask questions and even voice their own opinions.

> Co-facilitated teaching (2 faculty members teaching simultaneously) was integrated into our course in large group lectures. At course completion, students were polled to specifically assess this method of instruction. The majority of students liked this method, and felt the course was enhanced by introducing this teaching strategy.

> We take time at the end of class to break up into small groups. Students discuss the important takeaway points from lecture and what concepts remain unclear. A spokesperson shares the group comments with the entire class.

> I have not used the "pause" in my bedside teaching, but I do use it effectively in my small groups. I usually teach for 18 minutes and then have the students write down three things they have learned so far in the lecture. I give them two minutes to gather their thoughts, and then the students raise their hands to share what they learned. It has been quite powerful, and I have even had the students comment on the effectiveness in their evaluations.

As described in previous paragraphs, faculty members continue to incorporate a variety of active learning techniques in their teaching environments a year after completion of the FLC experience.

Scholarly Outcomes

FLC participants were involved in a variety of activities that included learning, teaching, reflection, and scholarship. New teaching technologies were integrated in both classroom and clinical settings, and these teaching projects were discussed online. Two academic posters, "Effective Delivery of Online Faculty Development" and "Impacting Critical Thinking in Osteopathic Medical Education," were presented at the Arizona Osteopathic Medical Association's spring 2012 convention. An oral presentation, "Measuring the Effectiveness of an Online Faculty Learning Community: Is It a Viable Option for Faculty Development?" was presented at the 2012 Lilly Conference on College and University Teaching (Pomona, CA). The facilitators and consultant presented a national FridayLive! webinar, "Online Synchronous Faculty Learning Communities: It Can Be Done Successfully!" to the TLT Group (faculty and staff who meet weekly online to discuss issues related to teaching, learning, and technology).

At the conclusion of the FLC, members shared their work with peers at the inaugural scholarly teaching symposium, and they were recognized by the deans for their participation and achievements. Certificates were awarded to those who completed a teaching project and participated in at least 70% of the online sessions. In addition, the co-facilitators for the next year's FLC were introduced. This event raised the consciousness of scholarship in medical education and encouraged others to become involved.

Discussion

This pilot study of a virtual learning community proved successful in connecting on- and off-campus faculty and preceptors across a wide geographic area. Moreover, this blended approach (that is, using synchronous and asynchronous modalities) enhanced specific physician teaching competencies, promoted collegiality, and aided the construction of collaborative knowledge. Similarly, Allan and Lewis (2006) found that participation in their virtual learning community led to an increased knowledge and understanding of learning technologies, curricular development, and collegial support.

Obstacles to using online communities for teacher development have been identified previously. They include a lack of commonality of purpose, an underdeveloped culture of shared critical reflection about practice, and a lack of familiarity and experience in using computer-mediated communications tools (Carr & Chambers, 2006). To counter concerns about using videoconferencing technology, all our members were individually

trained on WebEx prior to joining the first session, and a consultant was on hand during each of the sessions to address any technology issues. Members were enthusiastic about using the new online tools, and they found themselves surprised by the ease of use, even after the first session.

To help solidify our purpose, we designed our theme-based curriculum around faculty needs gleaned from the FLC application process. This helped us identify a topic schedule for the year and focus the discussions and activities for each session.

Carr and Chambers (2006) felt asynchronous modalities enhanced reflection, but that members did not always participate due to time constraints. We found that the synchronous online presence of our small group promoted conversations about teaching, while our additional asynchronous activities provided an opportunity for reflection on how members were using the tools and strategies that were being discussed.

A typical recurring theme in faculty development programs is time constraints (Allan & Lewis, 2006; Bland, Seaquist, Pacala, Center, & Finstad, 2002; Curran, Murphy, Abidi, Sinclair, & McGrath, 2009; Davison, Medina, & Ray, 2009; Dyrbye, Cumyn, Day, & Heflin, 2009; Vaughan, 2004). In fact, Beery et al. (2011) found that 89% of FLC participants said lack of time was their major challenge, while Hansen et al. (2004) found that time was the number one prerequisite for success in their statewide faculty learning community. We also found it difficult in the beginning to orchestrate a mutually agreeable time for all participants to meet. Even though an online platform decreases the need for travel time or leaving the workplace, we agree with Allan and Lewis (2006) that protected time is necessary. Overall, time requirements are not reduced with the use of e-learning.

Allan and Lewis (2006) showed that with asynchronous activities, participants tended to allow their projects to encroach on their family time. Due to the nature of our synchronous approach, most of the required sessions occurred during typical work hours, which served to protect participants' personal time. We noted the same benefits of web recorded sessions as did Cooper (2001). Our archived sessions were available for attendees as well as excused members to review and capture elements from a given online topic discussion.

A key factor associated with increased learner participation and successful online collaboration is the concept of social presence, defined by Gunawardena and Zittle (1997) as the degree to which a person is perceived as being "real" in mediated communication. Such things as facial expression, physical proximity, psychological distance, formality of dress, eye contact, and personal topics of conversation can influence

social presence (Cobb, 2009). Dolan (2011) noted that while an absence of face-to-face meetings does not decrease faculty loyalty and motivation, its presence is likely to increase these qualities. In addition, other researchers have commented on the loss of contextual cues, voice inflection, and body language when using asynchronous methods (Dyrbye et al., 2009). Because our FLC used a synchronous web format involving both nonverbal and verbal communication, it provided a greater degree of social presence than text-based computer mediated communication alone. Further, the co-facilitators played an important role in creating a sense of online community and enhanced social presence during the "Connecting and Reflecting" segments of each session by encouraging reflection and sharing of personal teaching activities. In addition, polling features, text chat, and ice-breaker activities enhanced collegial collaboration, and the incorporation of occasional social gatherings solidified relationship building. The members of our FLC community felt that they were able to forge new relationships despite the limited amount of face-to-face meetings.

The faculty learning community met the needs of the medical school by (1) developing a culture of collaboration, innovation, and evaluation; (2) encouraging reflective teaching at a peer level; (3) increasing scholarly activity of faculty, residents, and students, evidenced by an increase in IRB submissions; and (4) developing an expectation of teaching excellence, individual improvement, and community faculty development.

The FLC was helpful in meeting faculty needs by (1) exposing them to synchronous and asynchronous learning venues, (2) introducing them to various technologies, (3) incorporating interdisciplinary learning, (4) enhancing scholarly productivity and mentoring, (5) increasing faculty understanding of the millennial generation, and (6) improving bedside and classroom teaching. Participants learned about innovative teaching methods from their readings and discussions, and they experimented with these methods in their own teaching practice. To illustrate, two members adopted a new classroom teaching approach—co-facilitated teaching; a third faculty member adopted a "new" teaching strategy (that is, using "pause" to stimulate active–reflective learning) in his classroom; and a fourth physician participant worked on a teaching project that featured e-learning for third-year medical students.

Depending on their preferred learning style and openness to change, some individuals may find it difficult to adapt to an online synchronous FLC. Participants must be willing to take risks in trying out new methods of teaching, which may require training to become proficient. This adaptive change may also depend on one's ability to endure occasional technical glitches. We learned from our participants that the "fear fac-

tor" was real. It takes time to feel comfortable in this venue and to get to know each other. Participants said the pressure was intense to stay on track with their scholarly projects and strike a balance with their home and work schedules.

Learning and teaching online is different than face-to-face and requires a specific skill set. As Hughes and Hewson (1998) note, computer-based communication requires careful construction to achieve results similar to the range of interactive supports available to classroom teachers. During regular planning and debriefing meetings, the co-facilitators and the consultant identified each person's role, organized the session timeline and activities, and reviewed scripts and slide presentations. This intense planning helped to create and sustain an effective and efficient online experience for all.

As with any technology, a learning curve should be expected. In our experience, we found the learning curve to be fairly low for the participants, moderate for the facilitators, and high for the consultants. Prior to launching the program, we provided individual training sessions to acquaint participants with the WebEx Meeting Center and its video conferencing tools. In addition to planning sessions, rehearsals were conducted online with the co-facilitators, giving them practice in advancing the slides, sending/receiving chat messages, showing documents or websites, and switching the WebEx control to other presenters. Also, the consultants received a private two-hour online consultation with an expert videoconference host. Participant comments following the first FLC indicated that they were surprised at how well the technology worked and how easy it was to use. Individual comments included, "A superb start that we have been looking for . . . very refreshing"; "This shows this can be done all over the state . . . can even be done on an i-Pad or cell phone"; and "This sounds like a great program . . . didn't expect much going into it. I'm now glad I'm a part of it."

Limitations and Recommendations for Future Research

An obvious limitation of this study is that all surveys were based on self-reporting. Although the number of participants in this pilot study is small, the findings are positive. By design, FLCs are small groups, which led to our reporting more qualitative data, thus affecting the generalizability of our findings. As we continue to develop and implement more online FLCs, we intend to collect additional qualitative and quantitative data for comparison purposes. Because this was the first faculty development initiative at our institution, there was no infrastructure; thus,

a framework had to be created that included resources, curriculum, IT contacts, and support from the faculty.

While many studies report the benefits of virtual learning communities, their methods often involve open-ended questions, rather than specifically measuring individual teaching competencies pre- and post-program. A benefit of our study was the inclusion of a measurable evaluative tool for the identification of specific teaching competencies related to a physician as teacher. This approach could be expanded in future studies with larger participant groups, and across multiple institutions, to further direct efforts toward reforming faculty development for medical educators and preceptors. Further research should examine how specific program elements (that is, asynchronous or synchronous modalities) hinder or advance preceptor learning and teaching practice.

Lessons Learned

The online synchronous FLC with asynchronous learning modalities encouraged innovation in teaching and learning at the medical school. The FLC offered a sustained learning↔teaching environment in which individuals learned and reflected on their experiences. Teaching in a virtual environment was helpful, and faculty were able to connect using their computer, iPhone, or iPad. This served as a catalyst for faculty development, making it possible for preceptors in off-campus sites to connect with the medical campus and feel a part of the program/institution.

The FLC provided opportunities for participants to reflect on and share what they learned via role models, peers, and students. Personal growth was achieved through a sustained learning↔teaching environment with individuals who shared a common knowledge base, beliefs, values, and experiences.

The FLC's scholarly timeline (that is, monthly goals) aided accountability and goal completion. Participating in presentations and research activities provided meaningful opportunities to develop scholarship skills.

Effective and passionate FLC co-facilitators were essential to the success of the FLC. Having a consultant who served as coach, mentor, and cheerleader helped us accomplish goals and advance individual and collective scholarly productivity.

While participants did access resources from the Moodle site, uploading these materials was cumbersome and time consuming. In subsequent FLCs, web archiving was eliminated, and, instead, participants were encouraged to create a folder on their desktop to capture program materials.

Recommendations

Based on our experiences, we would recommend that those developing online synchronous FLC's begin by selecting a web conference platform that is right for you, learn to use it well, and provide training so that participants can become comfortable with its use. Schedule quarterly face-to-face events to aid socialization and networking, and encourage participants to work together on projects of mutual interest. Continue to hold participants accountable for their participation vis-à-vis assignments, contributing to the online discussion, and project completion.

Conclusions

This pilot study highlights an innovative online synchronous faculty learning community model (with asynchronous modalities) that faculty developers and academic institutions can use to enhance teaching and learning and connect on-site and off-site faculty and preceptors. Whether the participants had little or a lot of experience using computers or the Internet, they found the virtual FLC convenient, effective, and efficient. Participants improved across all 12 physician teaching competencies as well as increased their scholarly activity.

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Appendix A
Selected Monthly Participant Feedback

		Session 7	*Session 9*	*Session 11*
1. A friendly, social environment was created online in which learning was promoted.	Strongly Agree	71.4%	64.3%	100.0%
	Agree	28.6%	35.7%	0.0%
	Disagree	0.0%	0.0%	0.0%
	Strongly Disagree	0.0%	0.0%	0.0%
2. I was comfortable with learning online.	Strongly Agree	57.1%	57.1	100.5%
	Agree	42.9%	42.9%	0.0%
	Disagree	0.0%	0.0%	0.0%
	Strongly Disagree	0.0%	0.0%	0.0%
3. How would you rate the session as a whole?	Excellent	71.4%	71.4%	100.5%
	Good	28.8%	21.4%	0.0%
	Satisfactory	0.0%	0.0%	0.0%
	Poor	0.0%	0.0%	0.0%

		Session 7	*Session 9*	*Session 11*
4. The facilitators/presenter(s) conveyed the material in a way that was readily understandable.	Strongly Agree	71.4%	78.6%	100.0%
	Agree	28.6%	21.4%	0.0%
	Disagree	0.0%	0.0%	0.0%
	Strongly Disagree	0.0%	0.0%	0.0%
5. I plan to incorporate some of the ideas discussed into my own teaching.	In 3 months.	66.7%	84.6%	100.0%
	In 6 months.	16.7%	7.7%	0.0%
	In 9 months.	0.0%	0.0%	0.0%
	In 12 months.	16.7%	7.7%	0.0%
	Never	0.0%	0.0%	0.0%
6. Participation in this session was a worthwhile use of my time.	Strongly Agree	57.1%	64.3%	64.3%
	Agree	42.9%	35.7%	35.7%
	Disagree	0.0%	0.0%	0.0%
	Strongly Disagree	0.0%	0.0%	0.0%
7. Group interaction contributed to the effectiveness of this session.	Strongly Agree	71.4%	53.8%	100.0%
	Agree	28.6%	46.2%	0.0%
	Disagree	0.0%	0.0%	0.0%
	Strongly Disagree	0.0%	0.0%	0.0%

Appendix B
Nine-Month Assessment of the Online Faculty Learning Community (FLC)

1.	Do you regularly read the weekly FLC e-mail?	
	a. Every week	57.1% (4)
	b. Sometimes	26.6% (2)
	c. Seldom	14.3% (1)
	d. Never	0.0% (0)
2.	Are you finding the Productivity Tips informative/helpful?	
	a. Yes	42.9% (3)
	b. To some degree	28.6% (2)
	c. Not very much	28.6% (2)
	d. No	0.0% (0)
3.	Have you ever used the resources on Moodle?	
	a. Yes	42.9% (3)
	b. To some degree	28.6% (2)
	c. Not very much	57.9% (4)

4.	Would you be interested in working on a group teaching project?	
	a. Yes	57.1% (4)
	b. Not sure	42.9% (3)
	c. No	0.0% (0)
5.	How would you describe your satisfaction with the AZCOM online FLC thus far?	
	a. Very satisfied	40.0% (2)
	b. Satisfied	40.0% (2)
	c. Somewhat satisfied	0.0% (0)
	d. Somewhat dissatisfied	20.0% (1)
	e. Very dissatisfied	0.0% (0)
6.	If you have an individual FLC project, how would you describe the level of your satisfaction with it so far?	
	a. Very satisfied	40.0% (2)
	b. Satisfied	40.0% (2)
	c. Somewhat dissatisfied	20.0% (1)
	d. Dissatisfied	0.0% (0)
	e. Very dissatisfied	0.0% (0)
	f. I have not started a project.	0.0% (0)

Appendix B (*continued*)
Nine-Month Assessment of the Online Faculty Learning Community (FLC)

7.	What has most engaged, affirmed, or worked for you in this FLC so far? "My own motivation to read for the project." "Ideas/teaching points learned during the online lectures." "The opportunity to learn more about faculty development and learn from others."
8.	What has most distanced frustrated or not worked for you in this FLC so far? "Time constraints as well as the lack of total participation from the group." "Can't maintain interest in the e-mail." "Technical issues with WebEx."
9.	What has most surprised you in this FLC so far? "The fact that much more has been accomplished than I ever thought possible and that working together with accountability partners really helps keep a person focused on reaching their goal." "So little personal interaction." "Online learning is much easier to do than initially expected. There is a lot to learn from others."