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WEB PAPER

A qualitative study of physicians' experiences with online learning in a masters degree program: Benefits, challenges, and proposed solutions

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Abstract

Background: In response to challenges to faculty development (e.g. time away from clinical, teaching, and other responsibilities; lack of mentors; and limited resources) online learning has become an important venue to provide education for physicians in curriculum development, instruction, assessment, evaluation, educational leadership, and education scholarship. Online learning however has its own unique challenges. Little is known about clinician-educators' experiences while participating in online programs and few studies have focused on their approaches to facilitate online learning.

Aim: To explore the experiences of physicians pursuing a degree in higher education with online learning, including motivations for choosing this format, barriers encountered, and ideas for facilitating learning in the online environment.

Method: All students ($n=71$) enrolled in online courses in the University of Illinois at Chicago Masters of Health Profession Education Program were surveyed in the spring of 2006. Responses were analysed using a qualitative approach.

Results: Of the 48 students who completed the survey (response rate 68%) 45 (94%) were physicians. The online format is convenient, flexible, and may be beneficial for learning. Students' responses raise issues inherent to online learning that must be addressed to optimize student-centered learning. These issues relate to: clarity of communication; difficulties in negotiating team work and in building relationships; technical demands; learning style preferences, and time commitment. Students provided recommendations for strategies to address these issues such as how to communicate clearly, facilitate teamwork, and optimize time management. Member checking supported the analysis.

Conclusions: Online education programs meet the needs of physicians but have associated challenges. Further research is needed to explore the potential value of student suggested ways to optimize the online learning experience.

Introduction

The Accreditation Council for Graduate Medical Education and the Liaison Committee on Medical Education have mandated improvements in instruction and assessment for core competencies (Accreditation Council for Graduate Medical Education 2007; Liaison Committee on Medical Education 2007). Others have called for well-designed research studies to advance the science of medical education and improve outcomes for learners and patients alike (Dauphinee & Wood-Dauphinee 2004; Regehr 2004; Searle & Prideaux 2005). Accomplishment of these tasks is incumbent upon clinician-educators, who typically have little formal training in teaching, curriculum development, educational leadership, and research.

To address these needs, academic leaders have implemented formal training programs, ranging from seminars and workshops to fellowships and advanced degree programs. Challenges facing participants in these programs include time

Practice points

- This study provides clinician-educators' perspectives about online education. Advantages of online instruction include convenience, flexibility, lower cost, and more time to learn concepts. The asynchronous communication environment and lack of face-to-face interactions are challenges.
- This study is the first to describe learner-generated solutions to the online learning environment from students with a background in higher education.
- Suggestions are provided for how to improve distance-based, online course work for both online students and faculty.
- Strategies to improve the online learning experience derived from this study should be evaluated.

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away from clinical, teaching, and other responsibilities; lack of mentors; and limited resources (Frohna et al. 2006; Gruppen et al. 2006; Muller & Irby 2006; Robins et al. 2006; Rosenbaum et al. 2006; Steinert & McLeod 2006). In response to these challenges, some programs are moving beyond the traditional on-site education format into the online arena to provide education for physicians in curriculum development, instruction, assessment, evaluation, educational leadership, and education scholarship. Despite this trend, little is known about clinician-educators' experiences while participating in online programs.

Studies suggest that physicians enjoy online Continuing Medical Education programs (Chumley-Jones et al. 2002; Cobb 2004; Cook et al. 2005; Curran & Fleet 2005; Fordis et al. 2005) and improve knowledge (Chumley-Jones et al. 2002; Cobb 2004; Wutoh et al. 2004; Cook et al. 2005; Fordis et al. 2005; Curran et al. 2006) and change behaviors (Fordis et al. 2005) after participating in such programs. Previous studies, however, have not found online education to be a panacea. Rather, despite the potential benefits, multiple barriers exist to successful completion of online education programs, such as inadequate computer hardware and expertise, insufficient internet access, and time constraints (Peterson et al. 1999; Thiele et al. 1999; Curran et al. 2000; Atack 2003; Harris et al. 2003; Lemaire & Greene 2003; Sargeant et al. 2004; Cook et al. 2005). In response to these challenges, faculty proposals to structure and facilitate online learning have been published (Palloff & Pratt 1999; Greenhalgh 2001; Schrum 2002; Cook & Dupras 2004; Smith & Curry 2005; Hill 2006; Sargeant et al. 2006). These recommendations stem from faculty experience as educators – typically within the undergraduate realm. Few studies focused on learner-generated solutions to the challenges of online learning by health professional students pursuing a degree in higher education. Therefore, we surveyed clinician-educators enrolled in an online Masters of Health Profession Education program to explore their experiences with online learning, including motivations for choosing this format, barriers encountered, and ideas for facilitating learning in the online environment. Practical suggestions for how to improve learning are provided for online students and faculty.

Methods

To conduct our mixed-method study we sent an e-mail survey in the spring of 2006 to all students currently enrolled in the University of Illinois-Chicago Masters of Health Profession Education (MHPE) program, with the exception of the four authors. A full description of the MHPE program can be found at http://www.uic.edu/com/mcme/mhpeweb/. Briefly, the program is intended for leaders in health professions education and is designed to be completed in two to four years, including coursework and completion of a thesis; it can be taken on-site, online, or a combination of both. The majority of students choose to do at least part of their coursework online. The online courses are designed to be highly interactive, with extensive small group collaboration. Although there is some variability among the online courses, typically there are weekly topics with assigned reading and group work that is due prior to the start of the next topic and graded. Online platforms used are Blackboard and WebBoard, with some faculty requiring the use of both, while others rely on one platform.

Participation in the survey was elective and all responses were de-identified prior to analysis. Students were excluded if they had never taken an online course. A cover letter stated the purpose of the study and a second mailing was sent to non-responders. Survey questions included both structured (4 items) and open-ended formats (3 items), yielding a mix of quantitative and qualitative data. Structured questions inquired about demographics (gender, age), number of online courses taken, and computing skills. The three open-ended questions, as follows, pertained to experience with online courses: (1) What were your main reasons for choosing an online environment for some/all of your courses?; (2) Please describe what barriers or challenges you have encountered while trying to learn in the online environment?; and (3) Please share with us your solutions and insights into how to overcome obstacles in the online learning environment.

Responses to the quantitative items were analysed using basic descriptive statistics. Using a grounded theory approach of 'constant comparative analysis,' (Glaser & Strauss 1967) we identified themes in the resulting qualitative data with words and phrases as units of analysis. We independently coded an initial set of three surveys to derive codes and then conferred 'online' and by telephone conference to generate a second coding schema. This sequence was repeated with an additional three and then five survey responses, and finally the remaining responses. We adjusted the coding schema by consensus, following each round of coding. Comments within each category were counted and exemplar quotes were selected. To improve readability, quotes were corrected for grammatical errors. Four online students were recruited for member checking to support the validity of content analysis (Fraenkel & Wallen 2006).

Results

Of the 71 students who had taken an online course, 48 completed the survey (response rate 68%). Table 1 shows the demographic characteristics of the responders, along with their self-reported computer skills and number of online courses taken.

Reasons for choosing the online format

Three major themes were identified as reasons for choosing to take courses online: (1) convenience and flexibility; (2) cost of the program; and, (3) learning format preference (i.e. preferred online to on-site instructional method). The online learning format provided convenience and flexibility that enabled students to overcome constraints that would otherwise have prohibited their participation in the Masters program. Living and working outside of Chicago, having no similar on-site program offered closer to home, full-time employment and its related demands, and lack of sabbatical options and ability to get away from work were common geographical and work-related constraints for students. Few reported family demands,

Table 1. Demographics and characteristics of 48 postgraduate masters of health profession education students at university of Illinois-Chicago.

Variable	48 Students No. (%)
Gender	
Female	28 (58)
Male	19 (40)
Did not answer	2 (4)
Health profession: Physician	45 (94)
Age	
<35	12 (25)
35–39	11 (23)
≥40	22 (46)
Did not answer	3 (6)
Number of previous online courses	
1	7 (15)
2–3	15 (31)
4–5	7 (15)
≥6	16 (33)
Did not answer	2 (4)
Computing skills*	
Novice	0
Intermediate	38 (79)
Advanced	9 (19)

*Novice, Little prior use and mainly for word processing; Intermediate skill level, Use a range of programs for communication, presenting, word processing; Advanced skill level, Design web sites or online courses, program, graphics, etc.

in particular, childcare, or class availability (online versus on-site) as reasons for choosing the online format. Others preferred the online format in comparison with on-site participation because the tuition was lower and expenses related to travel and lodging could be avoided. Although most students (42/48, 88%) choose the online environment for convenience and flexibility, a minority (6/48, 13%) cited academic reasons, including curiosity about the online format, enjoyment of technology, or the facilitation of learning by allowing for time to reflect about the material. Quotes reflecting this point include: 'I also really enjoy having more time to reflect; the thought of covering all the material in two weeks [the time allotted for intensive on-site required courses] seems overwhelming to me;' and, '[I enjoyed the] extended time (compared with on campus course) to work with and digest course concepts – deepen learning.'

Barriers and challenges in the online environment

Students expressed a variety of opinions about barriers and challenges encountered while trying to learn in the online environment. From thematic analysis of the responses, five categories of barriers were identified relating to the asynchronous communication environment, technical issues, learning style preferences, time commitment, and course-specific curriculum and scheduling.

Asynchronous communication environment. The asynchronous communication environment, while flexible and convenient, presented challenges for communicating clearly, collaborating, sharing the workload, and establishing relationships. Some students found it difficult to understand others' points of view or had their own points misunderstood. As one student commented, regarding communication, 'I have found it difficult at times to have a 'discussion' online as you are never quite sure about the exact meaning of what people are saying. You lose the contextual cues, inflection in voice, pauses, body language.' Effective collaboration could also be impeded by the complex dialogue and negotiation needed for conceiving, tracking and completing group projects. For example, one student wrote, 'It is difficult to actually chat to one another in this format and sometimes the right hand doesn't know what the left hand is doing.' Students commented that sharing the workload in the asynchronous communication environment depended not only on equitable participation but also on the timing of logging onto the online discussion environment. Those who logged on later than other team members struggled to contribute to the team's work due to the volume of postings and the difficulty in tracking conversations in progress. For some, the lack of face-to-face interactions impeded relationship building, with adverse consequences ultimately for learning, completing tasks, and satisfaction. Typical comments regarding relationships with other students include, 'I have real trouble relating to other students online which limits my learning;' 'Lack of real time face-to-face conversation can lead to frustration during group projects and tends to limit the amount of feedback I respond to;' and, 'I enjoy meeting students and getting to know them and online does not support this well.' Similarly, the absence of face-to-face time with instructors occasionally adversely impacted the quality of feedback and clarity of instructions. Typical comments include, 'Instructor feedback not always available to defuse a problem quickly, which increased time element;' and, 'I personally miss the availability of the instructor to provide quick affirmation or correction of the way I may (or may not) understand a particular topic.' For small groups with international team members, language barriers compounded communication difficulties. Students observed less communication difficulty with online team members whom they had previously met in person as exemplified by this comment, 'It helps if we have gotten to know our online classmates in-person from previous onsite coursework. When you already know someone's personality, communication is more efficient and meaningful online.'

Technical issues. The second most commonly reported barriers related to technical issues. A few comments pertained to personal technical issues such as inadequate computer hardware or software, insufficient computer and typing skills, and slow or unavailable internet access at home, work, or while traveling. The majority of comments, however, specifically referred to the online platforms (i.e. Blackboard, WebBoard). Students cited cumbersome navigation, the lack of intuitive functions, the number of board sites and discussion areas used, and difficulty tracking assignments and resources. Students also reported difficulties tracking, viewing, and responding to long, complex discussion threads. For example, one student wrote,

> It seems that reading from a computer screen creates a sort of 'tunnel vision,' where one can only see a small portion of the material available. [. . .] This is

> especially true when reading from a bulletin board. One can read a comment, close that window, then read a reply, close that window, and read yet a third reply. One must halt the first two comments in memory, and mentally reconstruct the threads that run through the discussion (and there usually are several).

Learning style preferences. Beyond these technical issues, the online learning environment was not conducive to all learning styles. Some struggled with the reliance on reading, online discussions, and group work for acquisition of knowledge. Although students could read aloud, and diagrams and pictures were occasionally incorporated into handouts or required readings, several students commented about how the lack of class presentations and visual stimuli limited their learning. For example, one student wrote about her difficulty with 'assimilating an entire course purely through the written notice communication' and her need for class presentations and discussions for learning. Another wrote, 'With online learning, everything is through reading, which doesn't seem to have the richness and depth of in-person instruction and discussion.' Other general comments about problems with learning through online discussion included the limited depth and inefficiency of online conversations and frustrations with the lack of responses to posted questions as exemplified by this comment, 'You may pose a question but the thread goes in a different direction and you never have your specific issue addressed.'

Time commitment. As expected from students who also have full or part-time professional positions, the time commitment was cited as a common challenge. Students struggled with completing their assignments and participating daily often due to work and family obligations. Some were surprised by the time commitment needed. For example, one student wrote, 'I think it is hard to gauge sometimes how much time and effort assignments will take in the online environment.'

Course-specific curriculum and scheduling. The few comments that pertained to specific online courses described particular course content as unsuitable for the online learning environment (e.g. statistics) or difficulties with scheduling desired courses. Others found the instructional design more of a barrier to learning than the online environment itself.

Pearls to facilitate online learning

Students offered insights into overcoming obstacles in the online learning environment. The majority of solutions focus on how to optimize time management, facilitate teamwork, or communicate clearly, while the remaining concern improving computer skills, ensuring adequate home computer equipment and internet access, improving learning, and fostering a positive attitude.

Time management. Time management suggestions were occasionally dichotomous, with some suggesting increased vigilance and logging in daily and others suggesting avoiding obsessive tendencies. An example of comments suggesting the value of frequent participation included, 'Always good to check in everyday, even if you don't write in – keeps you in touch with what the class is thinking.' In contrast, others encouraged a more relaxed attitude, as suggested by these comments: '[You] can get caught up checking the computer all day and night to 'not miss anything,' when in reality, the asynchrony is there to serve you;' and 'Let overachievers do their thing but don't let that interfere with your learning.' Students agreed more about the need to set time aside to do the online work. A typical recommendations was, 'Designate time out of your day (just as you would in face-to-face instruction) to engage with the online medium to complete coursework or participate in online discussions.' Suggestions for keeping up with the workload included printing out readings and postings to allow for multi-tasking (e.g. reading and making notes during 'cooking and monitoring of children's studies'), limiting the length of responses, ordering books early, not procrastinating, dividing tasks and establishing deadlines among group members, and setting realistic personal expectations. New students were also encouraged to start with one online course to allow time to familiarize themselves with the technical aspects.

Team dynamics. Students offered suggestions for improving team dynamics in the asynchronous online environment. Recommendations for building rapport included taking time to get to know your classmates, incorporating team building exercises, and making note of peers' backgrounds by reviewing their introductory statements at the beginning of each class. Two such comments were, 'Look at the pictures so that you know at minimum if you are conversing with a male or female;' and, 'Pay attention to those introductory statements we all do at the beginning of the course. Consider printing them off for the people in your small groups – it helps you know the person you're writing with [in small groups].' Similarly, taking the time to meet fellow students at national meetings or during the annual University of Illinois-Chicago MHPE conference was thought to facilitate future online interactions. Suggestions for how to facilitate online group work included checking-in frequently, informing others of expected absences (due to travel, work obligations, etc.), clearly dividing up the work, assigning leadership on a rotational basis, and using track changes on word documents to assist in recognition of changes made to the group's paper and facilitate progress. Typical comments were, 'Be respectful of everyone's schedule and try not to dominate;' 'Never go long periods without communicating with team . . . radio silence is perceived as failure to pull weight;' and, 'Clearly define the roles when leading an assignment and deadlines so that there is no overlap in work.' Students also had suggestions for how course faculty could aid the group progress by assigning group leaders and establishing ground rules for online discussion.

Communication. Online etiquette was also suggested as a method to promote effective team dynamics. Typical comments include, 'Don't write in all caps (considered yelling online) and choose words carefully;' and, 'Try to be aware of

how you "sound" when you post your views/opinions online; others only have the words to go by and so you may be perceived in very different ways than you intended!' To improve the clarity and usefulness of responses, students suggested that their colleagues invest time to reflect on others' comments and build on the perspectives previously posted, as suggested by these comments, 'Take a little longer time allowed by the online format to formulate a meaningful answer rather than simply speaking to be heard by echoing others responses;' and, 'Print out some of the longer threads if necessary before you respond to help you create the best response.' Some students found the asynchronous environment communication barriers to be insurmountable and suggested that students supplement asynchronous communication with synchronous communication on or off-line. For example, one student wrote, 'There were times when I was so relieved to just pick up a phone and speak with a colleague. [. . .] I was able to accomplish in a fifteen-minute phone conversation what would have taken me days to coordinate online. My advice is to allow room for personal interaction.'

Technology. Students suggested ways to improve computer skills (e.g. taking advantage of the online tutorial, asking the help desk for assistance). Nuances considered particularly helpful included learning how to continue a thread of a conversation and how to mark responses as read. Similarly, students proposed that colleagues invest in good computer hardware and software and obtain at home the fastest internet connection possible. Students also offered specific recommendations for the program and their online programmers, including standardization of the discussion boards, provision of a non-technical manual, and developing programs that facilitate having multiple messages open at the same time.

Learning. Students also suggested learning methods to both overcome challenges, and to optimize the potential of online learning. Students recommended using information resources beyond what was provided by the faculty, spending adequate time discussing topics online, obtaining feedback from local experts on projects, clarifying questions with instructors, and making learning an active and reflective process. Typical comments include, 'Participate faithfully in online discussions; it not only counts as part of your grade, but you will learn most by engaging in discussions with classmates and reading their own ideas and approaches;' and, '[Engage in] "interactive reading" with highlighting, margin notes, and informal notes on a yellow pad to help to bring the assigned readings to life.'

Attitude. Finally, there were a few comments relating to personal attitudes. Students wrote about a need for a relaxed and positive attitude and a willingness to admit limitations and make suggestions. Typical comments include, 'Relax during group work . . . it doesn't have to be exactly how you would do it individually because most of the learning is in the process rather than the final product;' 'Try to maintain a positive attitude and assume that any slights or overly harsh criticism is due to the asynchronous communication and to not take it personally;' and 'Take a risk, put your ideas out there, speak up if you have questions or are confused. There's a high likelihood that others in the group who also aren't speaking up have the same questions or concerns.' Although the vast majority of comments were constructive, one student simply wrote, 'Grin and bear it.'

Member checking

Four students, who were also participants in the study, were asked to read the results and discussion sections of this paper, reflect on their experience, and comment about the themes and interpretations. Student reviewers agreed with the thematic interpretations described in this paper and thought that the quotes were representative. The students agreed that the convenience, flexibility, and lower cost of the online learning were definite advantages. Comments about the difficulty of maintaining relationships, having discussions, and dealing with blackboard programming also resonated with their experience. One student commented that although she had not considered the discontinuous nature of the online environment as allowing for reflection, after reading other students' comment it struck her as true. Another student remarked that issues pertaining to attitude and motivation may vary by who is paying for the tuition (i.e. the student themselves versus another source).

Discussion

Clinician-educators seeking careers in academic medicine may benefit from pursuing further education and training to enhance their teaching, educational leadership skills, and scholarship skills. Given productivity pressures, such education may be difficult to achieve within the normal workday. Online programs may offer an alternative access to formal education for clinician-educators. Consistent with previous research focused on online learning (Atack 2003; Sargeant et al. 2004; Wyatt 2005), this study identifies specific reasons for the popularity of online learning, including its flexibility and the ability to overcome geographic distance and work/family obligations. The ability to choose the time, place, and pace are clear advantages over traditional on-site programs. Given that most of the participants in this study are busy health professionals in mid-career, the online format creates educational opportunities for full-time faculty that might not otherwise exist. Our study identified additional advantages of online instruction such as lower cost and more time to learn concepts when compared to the alternative intensive on-site course. Cost savings and time for reflection were also noted as advantages among rural physicians participating in a computer-mediated continuing medical education course (Curran et al. 2000).

As with online continuing medical education programs, online faculty education leadership and scholarship programs are not a panacea. Our students had similar problems with computer hardware and expertise, internet access, and time constraints due to multiple other responsibilities (Peterson et al. 1999; Curran et al. 2000; Atack 2003; Harris et al. 2003; Sargeant et al. 2004; Cook et al. 2005). Dissatisfaction with faculty involvement and student-faculty interaction has also been noted among nursing students (Atack 2003).

Students expressed a need for more immediate and real-time feedback from instructors to confirm that their understanding and efforts were 'on track.' The most pervasive challenge among our participants, however, was the asynchronous communication environment and the lack of face-to-face interactions with their peers that resulted in difficulties with communicating, establishing collegial interactions, negotiating group tasks, and tracking progress. Although certainly a source of frustration for the participants, the exact impact of the asynchronous communication environment on the quality of learning remains unclear (Chumley-Jones et al. 2002).

In this study, students offered several strategies that parallel those recommended by experienced educators for online faculty (Palloff & Pratt 1999; Greenhalgh 2001; Schrum 2002; Johnson & Aragon 2003; Cook & Dupras 2004; Smith & Curry 2005; Hill 2006; Sargeant et al. 2006). For example, the students' needs for technical support and explicit instructions, desires for timely and thorough feedback, and needs for clear instruction on how best to communicate online echo recommendations for faculty suggested by Smith and Curry (2005) and Hill (2006). Several general strategies and techniques for success in distance education suggested for students by Hill (2006) also emerged from comments made by students in this study, including taking the initiative (starting conversations, seeking resources, asking for help, etc), committing adequate time, contributing frequently, and enhancing written communication skills. Students also suggested reviewing colleagues' biographies constructed by faculty, to use as ice-breakers (Smith & Curry 2005). Additional approaches suggested included recommendations for time management and teamwork facilitation, computer hardware and internet access, and approaches to learning and personal attitudes.

The few tips offered to online instructors pertained mainly to facilitating the group process, communication, and technology. Several of the challenges raised might be addressed by a variety of innovative strategies. For example, instant messaging can be incorporated into the online environment to enable students to be aware of others currently online (e.g. fellow students, faculty), post questions, and receive immediate responses. Synchronous online communication tools may help students overcome some of the inherent difficulties within the asynchronous communication environment, particularly when the instructional design focuses heavily on group interaction. Suggestions for how faculty can facilitate online interpersonal interaction have been previously published (Johnson & Aragon 2003; Sargeant et al. 2006) and are likely applicable to other online learning environments. Online faculty need to be attentive to a learner-centered model of instruction, and should identify students' previous experience with the format to determine the need for technical assistance, be explicit in course instructions about online etiquette and rules, offer suggestions for how to construct online responses and good time management, and check-in with students during the course to determine what, if any, barriers are interfering with effective learning in 'real-time.'

There are several limitations to this study. First, generalizability of the findings may be limited by the sample population. Specifically, few respondents were non-physicians and the study was conducted at a single-center. On the other hand, the consistency of the study's findings with existing literature about the nature of online learning supports its validity and generalizability. Second, with a specific set of survey questions, students had limited flexibility in relating their experiences (Fraenkel & Wallen 2006). The advantages of this approach, included ease in comparing responses, more complete data collection on pre-identified topics, and improved organization and analysis of the data (Fraenkel & Wallen 2006). This approach increased the likelihood of thematic saturation and eliminated interviewer effect and bias. We do not know if using a face-to-face interview for open-ended questions instead of typed answers would have affected responses. Nonetheless, our approach minimizes interviewer effect and bias and reduces cost. Thirdly, the investigators are students in the online program and thus, may have anticipated certain responses based on their own previous experiences and sought to confirm our own beliefs. Responses were independently coded by all four researchers with a deliberate effort to minimize bias.

This study describes learner-generated solutions to the online learning environment by health professional students enrolled in an advanced degree program. Other studies that contained suggestions were all faculty driven (Greenhalgh 2001; Johnson & Aragon 2003; Cook & Dupras 2004; Smith & Curry 2005; Hill 2006; Sargeant et al. 2006). The results of this survey have very practical implications for current and prospective students of distance-based, online coursework and provide suggestions for both online students and faculty. The relatively high response rate (68%) makes response bias less likely. By surveying students with a variety of levels of experience, this study offers the basis for a 'survival manual' for students, instructors and program developers participating in online coursework. We followed standard principles for qualitative analysis methodology. The use of verbatim quotations conveys significant face validity (Harris 2002). Triangulation with the literature and respondent validation (i.e. member checking) lend credibility to the findings (Mays & Pope 2000). Based on these strengths we believe our findings are relevant beyond the University of Illinois-Chicago Masters of Health Profession Education online environment.

Given the explosion in online continuing medical education opportunities over the past five years (Accreditation Council for Continuing Medical Education 2000–2005), online faculty education for teaching, education leadership, and scholarship skills are likely to grow, and further studies seeking strategies to facilitate their success are needed. Areas for future study include replicating the study with a larger group of physicians engaging in online faculty education to explore issues related to computer experience and instructional formats. Additionally as technology evolves, future studies will need to address how to continuously monitor student learning challenges related to format and adjust courses accordingly. Finally, researchers should compare responses from physician educators to those from other health professional educators that are enhancing their teaching, educational leadership, and scholarship skills online.

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