



Adult Learning Models for Large-group Continuing Medical Education Activities

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BACKGROUND: Despite evidence suggesting that other learning modalities are more effective, large-group continuing medical education (CME) activities continue to be predominantly lecture based.

METHODS: Using convenience sampling, a cross-sectional survey was administered to health care professionals attending the 2009 American Academy of Family Physicians (AAFP) Scientific Assembly. Participants were asked to describe their preferred learning format for CME activities. Participants were asked which formats they felt were most effective in helping them retain information or change their medical practice.

RESULTS: Nearly half (46%) of sampled respondents indicated that they prefer lecture-based format for CME activities. Interestingly, interactive (39%) and procedural (27%) formats were more effective than lecture (24%) in helping health care professionals retain information. A similar response pattern was noted for which CME activities were more likely to change individual practice patterns. More physicians correctly answered board-type questions when attending interactive sessions compared with traditional lectures.

DISCUSSION: Health care professions prefer traditional lecture-based format CME activities but recognize that interactive sessions are more effective, helping them to retain information and change practice behaviors. Interactive sessions are equal or superior to lecture in short-term knowledge acquisition. CME planners should take these findings into consideration when organizing large-group CME activities.

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In 2008, the Macy Report reported that traditional didactic continuing medical education (CME) activities are largely ineffective at changing physician behavior. Systematic reviews^{2,3} suggest that interactive, multimodal CME activities are more effective in terms of both retention of information and changing physician behavior. Despite this, lecture-based presentations continue to be the most commonly used CME activity for physician education.

The American Board of Medical Specialties (ABMS) has established criteria for maintenance of physician certification. These include current professional standing, lifelong learning and self assessment, cognitive expertise, and performance in practice. One of the largest challenges facing organizations who plan and design CME activities is how best to offer a program that helps physicians meet these requirements for maintenance of certification.

One professional society, the American Academy of Family Physicians (AAFP) is also an accredited CME provider. The AAFP requires members to accumulate 150 credits of CME every 3 years for active membership. To do so, many members attend the AAFP Annual Scientific Assembly. This is a large-group CME activity that offers hundreds of potential CME credit hours. To reduce traditional reliance on lecture-based offerings,⁷⁻⁹ the 2009 AAFP Scientific Program offered a range of small-group and interactive sessions on common CME topics. The present investigation, therefore, was specifically designed to investigate physician preferences regarding educational formats in a large-group CME setting.

Methods

Setting

The AAFP Annual Scientific Assembly is the largest primary care CME activity in the United States. In 2009, the Assembly was attended by 4,389 health care professionals. Attendees chose from more than 180 courses and an array of educational delivery modalities. The variety of educational formats was designed to allow attendees to match educational

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sessions with their preferred learning style.

After receiving Institutional Review Board approval from the AAFP and from the Uniformed Services University, we sought member feedback regarding four educational tracks offered at the 2009 AAFP Annual Scientific Assembly. These tracks included traditional lecture-based formats, consisting of an informational session delivered by a respected presenter, interactive formats wherein attendees used case-based problem-solving strategies to think critically in small groups and respond to questions using audience-response technology, blast presentations wherein 15-minute presentations on a specific topic area with one specific learning objective per presentation were provided in relatively rapid succession, and procedural sessions where experts demonstrated procedures followed by hands-on practice by attendees. All presenters were aware that the study was taking place. To try and avoid presentation bias, standard learning objectives were given to each presenter across all types of CME activities prior to the activity.

Surveys

Using a convenience sampling technique, we randomly surveyed members to determine the extent to which they preferred each of the four different learning tracks. Respondents were asked to provide feedback regarding the effectiveness of the different session styles as it related to their preferred learning style. No personally identifying information was collected, therefore the return of a completed survey was considered to be implied consent.

Audience Response

A similar convenience sampling technique was used to distribute audience response devices to members attending a lecture on the management of lower extremity musculoskeletal injuries. Audience response technology allows respondents to push a numeric keypad to record

answers to questions delivered during a particular educational session. The keypad devices use infrared technology to deliver individual responses to a central database where answers are stored. During the presentation, material was covered for each clinical condition, questions about management posed to the audience, answers collected via keypad responses, and the correct answer reviewed. At the conclusion of the lecture, the same management questions were presented. Participants again used their keypad devices to record their answers.

Clinical Exam Questions

Using diabetes as a clinical model, we examined the extent to which the various programmatic elements were effective in improving member knowledge about diabetes by asking a standard series of three questions. These questions were straightforward board-type questions, and information sufficient to correctly answer each of the questions was provided during the sessions in each of the different formats.

Statistical Analysis

Using standard levels of error (alpha of 0.05 and beta of 0.80), to determine a 10% difference in member preference for differing CME activities, our power analysis projected the need to enroll a total of 216 subjects. Allowing for an anticipated response rate of 50%, we intentionally oversampled by handing out 500 total surveys to reduce the chance of type II error. Basic descriptive statistics were used for baseline group characteristics. We used two-sided *t* testing to compare continuous variables and chi-square parametric testing to compare categorical responses to survey questions.

Results

The average respondent was 46 years of age (range 24–80). Respondents felt that each type of CME activity was effective in meeting stated educational objectives. The primary findings from this study were that

respondents felt that interactive activities were most effective in clearly presenting and meeting stated educational objectives compared with other activity types ($P < .01$).

1. Differences in CME Activity Format: Effectiveness and Learner Preference

Of the 500 surveys regarding preferences for CME activity format, 327 were returned (65%). Forty-six percent of participants responded that they preferred lecture format for CME activities. Twenty-six percent indicated a preference for interactive sessions, 15% for procedural sessions, and 13% preferred the short (blast) sessions (Table 1). While respondents preferred the lecture setting, 39% indicated that they remembered more information following an interactive session. Twenty-seven percent remembered more after a procedural session compared with only 24% who responded that they were more likely to retain information after a lecture and only 10% following a blast presentation. In terms of changing clinical practice, 31% responded that they were more likely to change their practice following an interactive session, compared with 27% following a lecture, 25% after a procedural session, and 17% following a blast presentation ($P < .05$).

2. Audience Response and Short-term Recall

A standard series of four questions was asked during a presentation of common musculoskeletal disorders encountered in primary care. Pretest responses were recorded on 110 of 125 audience response devices (88%) and posttest questions on 119 of 125 devices (95%). The range of correct answers on the five pretest questions varied from 25% to 60%. Using the interactive audience response system during the presentation, the average number of correct responses to the same questions rose to 80%–99%. A sample question is shown in Table 2.

Table 1: Respondent Preferred Learning Format

Survey Question 327 of 500 surveys returned (65% response rate)	Lecture	Interactive	Blast	Procedure/ Hands-on
Preferred type of CME	n=143 46%	n=81 26%	n=40 13%	n=48 15%
Most effective for retention	n=75 24%	n=129 39%	n=30 10%	n=84 27%
Most effective for patient care	n=80 27%	n=94 31%	n=50 17%	n=76 25%

3. Exam-type Questions

Of 500 (87%) responses to the exam-type questions regarding diabetes care, 436 were returned. A total of 216 responses were from interactive sessions on diabetes, 111 were from lectures on diabetes, and 109 were from blast presentations on diabetes. Ninety-one percent of respondents in interactive sessions answered the questions correctly, and 90% of respondents in blast sessions answered the questions correctly, compared with only 85% of respondents from lecture sessions ($P<.001$).

Discussion

Mazmanian et al⁶ proposed a model for CME activities with four progressive levels of achievement. The first level provides credit for attendance in a lecture-based format. This remains the most common form of large-group CME activity.² The second level suggests providing CME credit for recall and application of knowledge in clinical practice. The third level gives credit for demonstrating competence in a particular area, and the fourth level awards credit for demonstrated performance that leads to positive practice change and improved patient outcomes. It is this fourth level of education that organizations should be striving for when designing CME activities.

A primary challenge facing CME providers, therefore, is how to best move CME activities through progressive levels of sophistication and away from lectures to promote lifelong learning, practice-based change, and improved clinical outcomes. Our study attempts to systematically

move large-group CME activities in this direction. The first important finding from our study shows that while physicians prefer lecture-based CME activities, they recognize that they are more likely to retain information and more likely to change practice when they participate in interactive CME activities. This self-recognition is important. One factor that may account for this disparity is that interactive sessions are uncomfortable for many learners. The fear of “standing out” in a public forum of physician peers may be a significant enough barrier to keep some individuals from attending interactive CME sessions altogether. Physicians are likely more comfortable with lecture-format CME activities as this is the most common mechanism for

delivering medical education in the undergraduate, graduate, and post-graduate medical education environment.¹ Lecture-type CME activities are easier to organize and easier to deliver. From a logistical standpoint, this makes lecture-based CME activities more efficient. Despite this, physicians acknowledge that interactive CME activities are more effective in terms of helping them to either retain information or change practice habits. This should challenge CME providers to offer more interactive learning sessions in large-group CME activity settings.

A second interesting finding of our study is that physicians are more likely to answer board-type questions correctly in interactive sessions as opposed to lecture-based sessions.

Table 2: Audience Response: Pretest-Posttest Answers

Pretest		
The Best, Evidence-based Treatment for Trochanteric Bursitis Is:		
	Responses	
NSAIDs and stretching	28	25%
Physical therapy	32	29%
Rest, ice, slow return to activity	27	25%
Steroid injection first, ask questions later	23	21%
Totals	110	100%
Posttest		
The Best Treatment for Trochanteric Bursitis Is:		
	Responses	
NSAIDs and stretching	0	0%
Physical therapy	1	1%
Rest, ice, slow return to activity	0	0%
Steroid injection first, ask questions later	118	99%
Totals	119	100%

While our sample here was small, this finding also lends important support to the value of interactive sessions in short-term knowledge acquisition.

Finally, we demonstrated that audience response technology promotes short-term knowledge acquisition during an interactive, musculoskeletal case. This supports other studies demonstrating short-term changes in resident and faculty knowledge using audience response technology.

Our study does have several recognized limitations. Though all presenters were given the core content and learning objectives to be addressed during their session, it is possible that differences in presentation style led to different responses from participants in terms of both knowledge and CME activity preference. Additionally, during the audience response session, transponders were randomly distributed prior to the presentation. We cannot verify that the same individual answered the pretest and the posttest questions in every case. It is possible that transponders changed hands during the presentation if people entered or left the room. Since the vast majority of follow-up answers were correct, we do not feel this unduly influenced our findings. An additional limitation is the lack of demographic data collected on respondents. This limits our ability to examine differences in learner responses based on age, gender, geography, or practice setting.

While these limitations may inhibit the generalization of our findings

somewhat, our findings nevertheless support the contention that large-group CME activities are ready for change. Physicians retain more information and are more likely to change their practice behaviors when engaged in interactive CME activities. Interactive activities positively change short-term knowledge acquisition compared with traditional lecture formats. Audience response technology is effective in promoting short-term knowledge acquisition. Individuals involved with the planning, design, or execution of CME activities should take these findings into consideration when planning group events. Interactive sessions help physicians assimilate new information with existing knowledge and should be more widely implemented in large-group CME settings.

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