

# Preparing Faculty Members for Significant Curricular Revisions in a School of Dental Medicine

Heiko Spallek, D.M.D., Ph.D.; Jean A. O'Donnell, D.M.D.; Young Im J. Yoo, Ed.M.

*Abstract:* Resistance to change is expected, especially when change involves and impacts many stakeholders. During the past year, the Curriculum Committee at the University of Pittsburgh School of Dental Medicine has been preparing the dental school for a major curricular revision of its predoctoral program. This article describes how a faculty retreat was designed to gain support for and involvement in this reform process. In particular, it examines the results of a faculty survey that was used to shape the retreat and was developed to determine the faculty's perceived knowledge about instructional design, barriers to innovations in teaching, and the influence of student evaluations and evidence-based dentistry principles on faculty teaching. Having identified strengths and weaknesses and areas of concern among faculty members through the survey, the Curriculum Committee was able to prepare a retreat that addressed faculty needs while simultaneously advancing the movement towards curriculum reform.

Dr. Spallek is Vice Chair of the Curriculum Committee and Assistant Professor, Center for Dental Informatics; Dr. O'Donnell is Chair of the Curriculum Committee and Vice Chair of Restorative Dentistry/Comprehensive Care; and Ms. Yoo is the Curriculum Development Administrator—all at the University of Pittsburgh School of Dental Medicine. Direct correspondence and request for reprints to Dr. Heiko Spallek, Center for Dental Informatics, School of Dental Medicine, University of Pittsburgh, 3501 Terrace Street, Pittsburgh, PA 15261; 412-648-8886 phone; 412-648-9960 fax; hspallek@pitt.edu.

*Keywords:* curriculum, faculty, staff development, competency-based education, curriculum reform, instructional design, active learning

*Submitted for publication 5/19/09; accepted 11/14/09*

People often forestall change because they resist ambiguity.<sup>1</sup> Being confronted with a paradigm shift in dental education can create a sense of uncertainty among faculty. Reducing this ambiguity and thereby paving the road for major curricular revisions is the task of the Curriculum Committee leadership at the University of Pittsburgh School of Dental Medicine (UPSDM). This article will describe how a faculty retreat was designed to prepare faculty members for change and to engage them as active participants of change. It also examines the results of a faculty survey that was used to shape the retreat. This survey was conducted to determine faculty members' perceived knowledge about instructional design, barriers to innovations in teaching, and the influence of student evaluations and evidence-based dentistry (EBD) principles on faculty teaching.

The state-affiliated UPSDM is part of a large academic health center. At the UPSDM, eighty-nine full-time faculty members and approximately ninety-six part-time faculty members teach in the predoctoral and graduate residency programs. The predoctoral program consists of, on average, eighty students/class and six students in the advanced standing program; the residencies account for fifty-eight students in ten graduate programs.

An extensive body of recent dental educational literature describes in great detail the many ills of traditional dental education and provides us with guidance for improvement.<sup>2-11</sup> Leaders in dental education have responded, and reports such as those from the Santa Fe Group,<sup>2</sup> the Macy Study,<sup>12</sup> and the American Dental Education Association (ADEA) Commission on Change and Innovation in Dental Education<sup>13</sup> have called on schools of dental medicine to critically evaluate their curricula and make necessary modifications to meet the demands of the twenty-first century. In light of this evidence, the UPSDM Curriculum Committee (CC) reviewed the current curriculum with emphasis on the clinical sciences. Findings during the review, which served to identify a direction for change, included among others:

- Curriculum content overall appeared to be inclusive of relevant content, with hours of instruction in most disciplines consistent with those reported by ADEA. Content, however, was taught by individual disciplines in isolation, without a clear understanding of content being taught by other departments.
- Sequencing of clinical science content (didactic and preclinical) appeared to be out of step with basic science content and clinical experiences.

- Anecdotal reports from clinical faculty indicated a concern that concepts taught were not being applied by students to patient care at the desired level.
- Student surveys conducted during the preceding five years indicated a consistent call by students for earlier and more active clinical experiences.

Based on these findings, the UPSDM dean charged the CC to provide a new and improved curriculum for all first-professional students, including 1) community service experience for all seniors; 2) experience in the placement and restoration of implants; 3) experience with patients with special needs; 4) earlier clinical experiences; and 5) improved integration of the biomedical and clinical sciences. To facilitate the necessary curriculum changes, the composition of the CC was altered to ensure representation from all ten departments within the UPSDM at the department chair level (or the chair's designee). In addition, a staff position was created for a curriculum development administrator to work closely with the CC chairs. The UPSDM liaison to the Health Sciences Library System (HSL) and the associate director of the university's Center for Instructional Design and Distance Education (CIDDE) were brought on as consultants.

The new curricular leadership developed a framework to guide the overhaul (see Figure 1). This framework organizes each year under a theme with clear year-end goals and weaves three essential threads throughout the four-year curriculum.

While the CC had swiftly developed a plan for the curriculum overhaul, the CC leadership was aware that faculty support and buy-in were crucial for the actual implementation of such major revisions. According to a survey conducted by Kassebaum et al. of North American dental schools, approximately 87 percent of respondents believed that faculty development was necessary to facilitate curricular change.<sup>14</sup> A faculty retreat was planned for the fall of 2008, where the new framework would be unveiled. While the CC hoped to use the retreat to create a climate of change, engage faculty as participants in the new curriculum, and educate them as to how to approach designing curricular innovations, it became clear that the gap that had developed during the intense planning period between CC leadership and the faculty at large could not be easily bridged in a one-day event. In addition, little was known about faculty teaching experiences and the existing level of knowledge among faculty regarding instructional design and competency-based education. Thus, a faculty survey was developed to identify needs that could be addressed at the retreat. The survey served two purposes: 1) to learn more about the knowledge, attitude, and perceived barriers of faculty regarding teaching innovations and 2) to spark interest among faculty members and increase their awareness of the needed curricular overhaul.

Keeping these faculty survey goals in mind, the CC developed the following research questions:

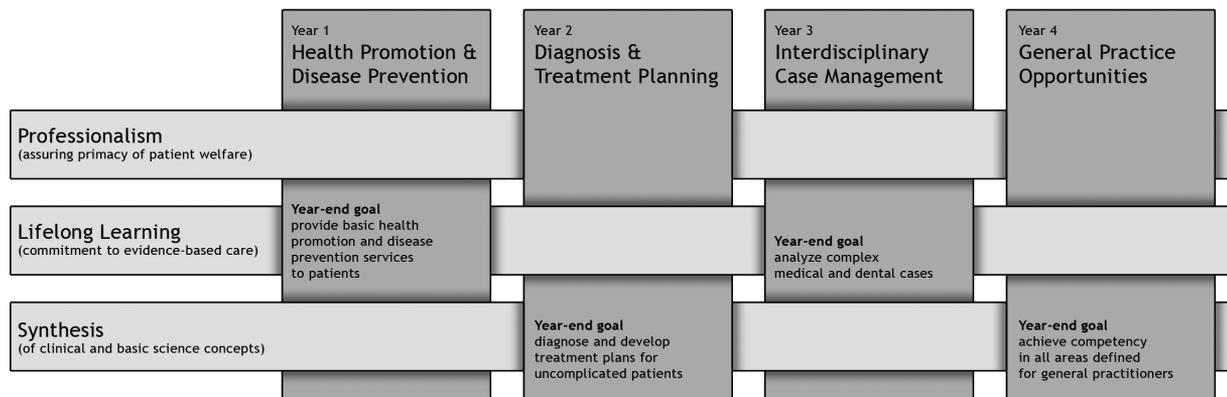


Figure 1. Relationship between themes and threads in the new UPSDM four-year curriculum

- What can we learn about faculty members' perceived knowledge about instructional design?
- What are the barriers to innovation in teaching?
- How do student evaluations influence how faculty members adjust their teaching?
- How do faculty members believe critical thinking skills and the use of evidence-based dental medicine can be improved among students?

## Methods

Informal interviews with faculty members in preparation for the retreat suggested some common themes regarding teaching experience, such as the utility of student evaluations, peer input, and online course development. These loose themes helped to form the basis of the survey instrument and were then refined using Dillman's tailored design method<sup>15</sup> and principles from *Thinking About Answers*.<sup>16</sup> The survey design, delivery, and responses are reported here according to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).<sup>17</sup> The final draft included sixteen questions and was tested in a two-step process. First, an expert group (one instructional designer, two SDM faculty members, and one educational specialist) provided qualitative feedback. As a result of their evaluation, six questions were dropped, seven were revised, and the texts of the preamble and the e-mail invitation were altered. Second, five faculty volunteers from the target population of all SDM faculty participated in an evaluation of the survey instrument using the Retrospective Thinkaloud protocol as suggested by Sudman et al.<sup>16</sup> This method avoids many of the pitfalls of concurrent narration such as disturbing the normal process of thinking about the answers. During a thirty-minute office visit by one of the researchers, volunteers were directed to the survey URL (SurveyMonkey) and asked to answer one survey question at a time; respond to a short follow-up discussion after each answer; elucidate the methods used to arrive at each answer; log their answers, problems, or comments; and provide final comments and general suggestions.

Evaluation of pilot interview data resulted in further revision of seven of the sixteen survey questions. In two cases, answer options were not sufficiently comprehensive; in one, the question was too specific; in four, questions were misinterpreted. The final version of the survey instrument included sixteen items that were presented on one screen: two questions regarding teaching format; one question on

active learning experiences; three questions about evaluation of teaching effectiveness; three questions on continuing education; four questions regarding barriers to teaching; two questions concerning instructional design; and one item for additional comments.

To gauge the faculty's knowledge about instructional design, we adapted an instrument from Schleyer et al.<sup>18</sup> that presented paired instructional design concepts and asked respondents to what degree they could define the distinction between them on a three-point Likert scale. The scale for each item ranged from 1 (representing the respondent's inability to distinguish between the two concepts) to 3 (representing the respondent's ability to precisely distinguish between the concepts). We retained this question construct, but exchanged the computer terms as used by Schleyer et al. with instructional design concepts. The fourteen paired items included, among others, "formative vs. summative evaluation," "evidence-based vs. fact-based teaching," and "Bloom's taxonomy vs. attitude scales." Each item was classified as easy, intermediate, or difficult by a three-member expert group (comprised of two instructional designers and one dental informatics faculty member). Asking participants to rate their ability to answer questions rather than having them actually answer the questions is, admittedly, an unconventional way of assessing knowledge. We included this design in our survey because, to some degree, this approach removes the negative emotional associations that respondents may have with a test situation and it should, therefore, yield more authentic responses and increase the overall response rate. There was also a "general comments" section at the end of the survey. Please see the Appendix for the entire survey instrument.

Two question formats were used: ten questions were open-ended, asking for extended text input, and six questions provided multiple-choice options. The study was approved by the University of Pittsburgh's Institutional Review Board in September 2008 (PRO08080440).

We targeted all SDM faculty via e-mail using a centrally maintained distribution list of 185 full- and part-time faculty matching the personnel database. To increase the likelihood that the survey would be answered, two reminders were sent, one by the survey administrators and one by the dean.

A web-based format was chosen for the survey instrument because it significantly reduces turnaround time compared with mail surveys.<sup>19</sup> Survey-

Monkey (SurveyMonkey, Portland, OR) was used. Prospective participants were informed of how long the survey would take, the goal of the survey, and that the data would be used for retreat preparation as well as scholarly purposes. Incomplete surveys could be submitted by respondents since no validation of user entries was performed. Thus, the response rate for each question was different as reported in the survey results below.

The initial invitation was e-mailed on October 6, 2008. A reminder was sent on October 13, 2008, and a final reminder was sent on October 17, 2008. No incentives were provided to any respondents.

After the survey closed on November 15, 2008, all response data were downloaded to an MS-Excel spreadsheet stored on a secure local file server. Approximately half of the survey questions required quantitative responses and could thus be analyzed with little or no additional manipulation. The open-ended questions were coded into categories by two raters. After agreeing on a category coding scheme for each open-ended question, both raters independently coded all individual responses. Disagreements on coding for specific items were resolved through discussion.

Analysis of the data included descriptive characterization of the feedback. For the knowledge on instructional design question construct, a principal components analysis (PCA) was used to extract factors from the test item set.

The fourteen Likert-scale items were entered into a PCA to determine if there were any sets of items that could be used to form subscales of the instrument. The criteria for including an item in a factor were that it loaded at .5 or greater on a factor and less than .4 on any other factor. Using an Eigenvalue cutoff of 1.0, five factors were extracted. However, a few of the items loaded greater than .4 on more than one factor. The analysis was performed using varimax rotation. However, an inspection of the factors' item groupings by the authors led to the decision to use the fourteen items individually in further analyses, because none of the factors yielded a conceptually meaningful interpretation.

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## Results

This section outlines the results of our faculty survey, first describing the respondents in regard to their teaching activities and education preferences. Then, the respondents' responses to questions about

past innovations in their teaching approaches are described, as well as what triggered these changes. Next, the barriers to improving teaching as perceived by our respondents are summarized, and we conclude with questions about knowledge and attitude towards competency-based education and instructional design models.

## Respondents' Demographics

Forty-three faculty members participated in the survey, which translates into a response rate of 24 percent based on the 185 faculty members invited to the survey via e-mail invitation. The majority of respondents teach in the lecture hall. Wanting to know whether faculty members took advantage of opportunities to further their education, we asked respondents to estimate how frequently they took part in various activities. Not surprisingly, most respondents reported they rely on the regularly scheduled faculty development programs offered at the SDM. These results are summarized in Table 1.

## Past Innovations and Triggers

We wanted to learn what kind of innovations faculty members had previously undertaken to improve their teaching as well as explore potential triggers for these changes. Thirty-three faculty members responded to the question "Can you share an example in which you have successfully converted a previously lecture-based learning experience into an active learning experience for students?" with a wide range of answers (see Table 2). While we coded these answers into fifteen categories and an additional one for no response, the answers provided also allowed us to gauge our respondents' understanding of what constitutes an "active learning experience." For instance, activities like "using glasses and other props . . . while performing simple tasks with impaired senses . . . in order to allow students to understand the geriatric patient better" as well as "Moved from multiple-choice testing to essay examination" were both perceived as active learning opportunities. The most frequently performed change to promote active learning was the introduction of small-group learning and case studies (mentioned seven times; this takes into account additional columns that include additional responses from the same respondent). Group-based education ranged from facilitated discussions of lecture material in smaller groups to complex group assign-

ments, such as using an objective structured clinical examination (OSCE) format, which involved groups moving from station to station evaluating clinical tissue under a microscopic slide and answering clinical questions as a team.

Knowing the value of student evaluation as a formative tool for continuous improvement of teaching, we wanted to learn how faculty members' teaching practices were influenced by student evaluations. First, we asked the following question: "We receive students' assessments of our teaching through the University of Pittsburgh's Office of Measurement and Evaluation of Teaching (OMET) evaluations. Have

you used any of the provided feedback as a basis for modifications to your courses?" Twenty-seven respondents said "Yes" (68 percent), and thirteen answered "No" (32 percent). When asked what they had changed based on student feedback, comments (thirty-four responses) in three categories included more than three response items: changes in content (seven times), delivery format changes (seven times), and changes in supplemental materials (four times). However, we also coded a category with comments expressing that students' feedback is of little value to the respondents (five times); for instance, respondents made comments like "evaluations are useless, more

**Table 1. Summary of demographic information**

Demographic Categories	Frequencies	Percentages
A. Teaching format (n=42)		
Lecture	34	81.0%
Clinic	26	61.9%
Small group	13	31.0%
Preclinic/simulation lab	12	28.6%
B. Faculty development participation (n=42)		
Routinely	9	21.4%
Often	17	40.5%
Seldom	15	35.7%
Never	1	37.5%
C. Study group participation (n=40)		
Routinely	4	10.0%
Often	6	15.0%
Seldom	15	37.5%
Never	15	37.5%
D. Journal club participation (n=40)		
Routinely	8	20.0%
Often	6	15.0%
Seldom	11	27.5%
Never	15	37.5%
E. Independent reading participation (n=36)		
>10	4	11.1%
6-10	5	13.9%
1-5	9	25.0%
0	18	50.0%
F. Online and on-site course participation (n=40)		
>10	1	2.5%
6-10	8	20.0%
1-5	20	50.0%
0	11	27.5%
G. Conference participation (n=40)		
>10	3	7.5%
6-10	2	5.0%
1-5	32	80.0%
0	3	7.5%

**Table 2. Response to survey question on conversion of lecture-based learning experiences into an active learning experiences (n=33) (multiple responses were permitted)**

Response	n	percent
Case studies	7	21.2%
Small-group activity	7	21.2%
Application in clinic	4	12.1%
None	4	12.1%
Demonstration in clinic	2	6.1%
New exam format	2	6.1%
Online interactive activity	2	6.1%
Application in simulation clinic	1	3%
Hands-on lab	1	3%
Interprofessional experience	1	3%
Online	1	3%
OSCE	1	3%
Simulation activity	1	3%
Student debates	1	3%
Supplemental material	1	3%
Yes but no example	1	3%

of a popularity contest” or “most [evaluations] were not helpful or constructive.”

Based on our pilot study and anecdotal evidence we knew that some faculty members augment our institution’s official OMET evaluations with assessment tools of their own; twenty-three of thirty-nine respondents (59 percent) claimed to have used assessment methods other than OMET evaluations. While eight respondents referred to the use of Cours Eval (version 3, Academic Management Systems, subsidiary of Liaison International, Amherst, NY), which was pilot-tested in 2007 as a potential substitute for OMET, using surveys and classroom assessment techniques (both four times) such as “muddiest point, minute paper” were mentioned most frequently. Some faculty members used elaborate systems to receive more structured input from students such as Blackboard’s student evaluation options or face-to-face approaches like focus groups in which select students (three who had earned an A, three earning B, and three earning C) were invited to discuss the strengths and weaknesses of a course.

Peers can be another trigger for improving teaching effectiveness. To determine whether our faculty took advantage of this valuable resource, we asked, “Can you describe a situation in which you approached faculty to get input on teaching?” The thirty respondents to this question most often expressed that they received feedback on content (six times)

and teaching strategies (five times). Typical answers included comments like this one: “I have frequent meetings with other faculty in the department about teaching approaches and content. I have had my course peer-reviewed by an external expert in the field to comment on the approach, content, and timing.”

However, some responses indicated that some faculty members assume continuous improvement is not necessary after acquiring some experience in teaching. One said, for example, “In my early years of teaching I asked assistance from my peers on my lecture handouts and test questions.” Another noted, “When I first began teaching, I often consulted with my mentor.”

## Barriers

In an effort to create an environment in which seeking improvements in teaching is encouraged, we were interested to learn which barriers currently exist and how faculty members rate these barriers regarding their significance. Thirty-eight respondents answered the question “Have you experienced any barriers (problems or resistance to your efforts) when you tried to implement an innovative teaching strategy (major changes in the way you teach)?” Fifteen (40 percent) had experienced barriers while twenty-three (60 percent) had not. Table 3 shows the categories of the perceived barriers with scheduling as the leading problem (five times).

The following statement is typical of one of the common comments: “I once suggested that it would be nice to have other faculty observe my lectures so they could give me feedback, and I would also like to observe other faculty to get ideas from them. This idea was rejected on the basis of faculty not having enough time to do such a thing, and I agree.”

We asked faculty members to rate the significance of barriers known from the literature<sup>13,14,20</sup> with this question: “Based on your own experience with our students and when talking to your fellow faculty members and students, please rate the following barriers to creating an interactive teaching strategy to engage students in learning.” Table 4 shows the results, which indicate that “no time to experiment with new teaching approaches” is perceived as the most significant barrier (rated as most significant fourteen times) followed by “students only want to know what will be on the final” (six times) and “students have barely enough time to learn all the facts (crowded curriculum)” (five times). On the other end of the spectrum, barriers found in the literature

and via anecdotal evidence were downgraded as not significant by our respondents: “no support from the school’s administration” (mentioned as the least significant barrier fifteen times) and “students are too intimidated to participate in lectures” (rated as least significant nine times).

## Knowledge and Attitude

Change requires the willingness to change and knowledge of the domain in which you want to change. To gauge faculty members’ level of knowledge regarding competency-based education and instructional design methods, we asked if they referred to the school’s competency statements to create courses and design educational experiences or first created the course and then selected the best fitting competencies. We tried to avoid divulging the “right answer” to this question by asking, “In general, do you ensure that you select the most fitting SDM competency(ies) for your syllabus before or after you complete your syllabus development?” Twenty-six respondents (67 percent) answered “before,” and thirteen (33 percent) answered “after.” The open-ended explanations to this question revealed that while many faculty members seemed to understand that, as one said, “The competencies are driving what we are teaching,” some lacked this understanding of the competency-based approach, making comments like “[After, since] it is easier that way” or “I know what I need to cover in a specific area and will see where the course fits in relation to the competencies.” Some comments indicated that the current competencies might not cover all areas sufficiently: “It is easier to determine what you think is important for students

**Table 3. Perceived barriers to active learning (n=15) (multiple responses were permitted)**

Barriers	n	percent
Scheduling	5	33.3%
Effort needed	2	13.3%
Lack of cooperation	2	13.3%
Lack of time	2	13.3%
Previous Curriculum Committee	2	13.3%
Access to educational technology	1	0.7%
Lack of facilities	1	0.7%
Lack of instructors	1	0.7%
Lack of relevance	1	0.7%
Lack of students’ critical thinking skills	1	0.7%
Students’ resistance to change	1	0.7%

to learn from your course first,” one responded, “then determine which competencies relate to your course, since many competency statements are rather vague and there are no SDM competencies which specifically relate to my course at this time.”

We also wanted to determine faculty members’ knowledge about instructional design. The fourteen-item question construct instructed them as follows: “Below is a set of paired terms that relate to teaching dentistry. Please rate your knowledge of the distinction between the terms in each pair by using the following scale.” Based on the results of the principal components analysis, we evaluated each item separately.

The promotion of critical thinking and evidence-based dentistry is a more recent paradigm in dental education, which in part stands in opposition to the development of mature technical skills in our

**Table 4. Barriers to creating an interactive strategy to engage students in learning**

	Least Significant			Most Significant		
Students only want to know what will be on the final.	4.8% (2)	7.1% (3)	35.7% (15)	38.1% (16)	14.3% (6)	
Receiving bad OMET feedback when we make students think.	23.7% (9)	21.1% (8)	28.9% (11)	15.8% (6)	10.5% (4)	
Students are too lazy to participate in lectures; they would rather sit and listen.	9.8% (4)	34.1% (14)	41.5% (17)	9.8% (4)	4.9% (2)	
Students are too intimidated to participate in lectures.	21.4% (9)	28.6% (12)	35.7% (15)	11.9% (5)	2.4% (1)	
Students learn only what is on the handout, not what we explain.	7.1% (3)	31.0% (13)	26.2% (11)	31.0% (13)	4.8% (2)	
No support from the school’s administration.	36.6% (15)	22.0% (9)	19.5% (8)	17.1% (7)	4.9% (2)	
No support from department chair.	65.9% (27)	9.8% (4)	19.5% (8)	4.9% (2)	0.0% (0)	
No time to experiment with new teaching approaches.	9.5% (4)	14.3% (6)	16.7% (7)	26.2% (11)	33.3% (14)	
Students need more technical skills.	30.8% (12)	20.5% (8)	25.6% (10)	17.9% (7)	5.1% (2)	
Students have barely enough time to learn all the facts (crowded curriculum).	14.3% (6)	11.9% (5)	33.3% (14)	28.6% (12)	11.9% (5)	

students. We wanted to explore faculty members' thoughts about the perceived conflicting demands on students' time. Out of the forty responses to the question "Do you think we can promote critical thinking and evidence-based dentistry in the clinic while developing mature technical skills in our students?" thirty-eight (95 percent) answered "Yes." Since we wanted to learn more about this topic, we prompted our respondents to explain further. Many of the comments reflected uncertainty and the struggle among our faculty members with what students should focus on in the limited time available to them. Typical comments were "I'm not sure they have enough experience to become critical thinkers. . . . Sometimes you just have to go practice your basic technical skill for a while before you can think critically about them"; and, taking the opposite approach, "technical skills taught to the students would be those developed by critical thinking and evidence-based dentistry. The resulting rationales would then be incorporated in explaining to the student why a particular technique is being taught." These comments, which displayed the struggle with what comes first and what is more important, were intersected by comments indicating that time and faculty shortages are barriers to promoting critical thinking. One respondent comments that "there are often insufficient numbers of faculty available to actually do teaching in the clinical settings. Often 'checking' the student's work is all there is time for."

While our question constructs guided faculty to respond in a fairly structured format, we also wanted to allow somewhat unguided opinions about teaching in general to discover aspects that we did not anticipate in advance. Thus we asked, "In a perfect world, what would make you a better teacher?" which was answered by thirty-seven respondents. However, the answers were more uniform than to most questions asked: twenty-one respondents expressed the need for more time in general with special emphasis on preparation time as expressed in this typical response: "More time to devote to lecture development. Ability to take advantage of teaching instruction offered by the university." Second to time was the need for more faculty development opportunities on educational topics.

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## Discussion

The large number of respondents teaching mainly in the lecture hall (only a few part-time faculty

teach didactic courses) as well as the large number of conferences attended by each respondent (part-time faculty usually do not attend more than two conferences per year in our experience) suggest that the survey was predominantly answered by full-time academicians.

In general, faculty members said they used a variety of methods to improve their teaching. The method most often mentioned was the conversion from lecture format to group-based teaching. This observation is in step with calls for reducing traditional lecture time in favor of more interactive approaches to learning.<sup>12</sup> The majority of our respondents (68 percent) have used students' feedback to change their teaching approach, mirroring the literature<sup>21</sup> that indicates that student evaluations can be an effective tool for ongoing improvement of teaching effectiveness. However, some faculty members consider feedback from students as less helpful or constructive.

While currently not required, 51 percent of our respondents said they already use some form of peer input in order to improve their teaching and they predominantly seek feedback on content and teaching strategies. While this can be seen as a desirable finding, one needs to also take into account the few faculty members who perceive peer input as something only needed at the beginning of a teaching career, implying that with maturity one does not require further input or improvement.

Although two-thirds of the responding faculty refer to the competencies when designing their courses, the fact that one-third of the respondents create course offering before looking at the competencies suggests that there still is a need to train faculty on the primary role competencies play in course design.

Critical thinking and the use of evidence-based dentistry (EBD) are key components in modern dental education and are embraced in the dental educational literature.<sup>13</sup> However, it is much easier to extol the virtues of these approaches than to operationalize them. While the paradigm shift from technical (vocational) training of skills to critical thinking and EBD is reflected in Commission on Dental Accreditation (CODA) standards and competency statements across the country, our school is no exception in having faculty struggle with identifying best ways to incorporate these into practice. While our results indicate that attitude and knowledge might be a factor, lack of time and faculty shortages certainly contribute to a large extent and were also indirectly expressed in our unstructured perfect-world question. Faculty shortage is one of

the well-known problems in dental education,<sup>22,23</sup> and the overwhelming majority of our faculty rated scheduling and lack of time as the biggest barriers to systematically improving teaching.

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## Conclusions

The conclusions of our research are multifaceted and long-lasting. However, this section will focus mainly on how these conclusions have been translated into action items, with special emphasis on how the faculty retreat was designed to reflect our findings and to bring the faculty as a whole closer toward supporting change and improvement. Some of our conclusions did not find their way into the retreat and were addressed by follow-up discussions and decisions by the CC, such as a recommendation regarding course evaluations. We will elaborate on these only briefly.

## Faculty Retreat Design

The overall goal of the faculty retreat was to raise understanding of and support for the new curriculum framework. By clarifying what it was and what it was not, we hoped to address resistance that could arise from ambiguity. We selected two objectives, coincidentally identified by Licari as key stages for successful implementation of curriculum change,<sup>10</sup> to support our goal. These were to prepare the faculty 1) for a change in the culture and 2) to teach in the new environment.

We not only wanted faculty members to imagine the proposed changes in the culture but to actually experience it for themselves. Merely presenting a lecture on active learning would send mixed messages: “Do as we say, not as we do.” Masella has reminded dental educators to address the hidden curriculum, i.e., the prevailing culture that can potentially undermine the desired goal.<sup>24</sup> This required us to design a retreat that would engage the faculty in an active learning environment with opportunities to collaborate across disciplines and synthesize theoretical and practical information. Even seating could not be left to chance if we wanted to promote the culture of cross-collaboration, so faculty members were assigned to tables of eight or nine with representatives from various departments, one student, and one trained facilitator.

From the survey results, we knew that there was already a movement toward group-based teaching; we attempted to feed this movement further by

emphasizing how to exploit other modes of active learning. Reducing the reliance on lecture-based content presentations while creating opportunities for reflection (except memorization) is in lockstep with suggestions from the dental educational literature.<sup>9,10,25-28</sup>

The need to train our faculty members in the many aspects of instructional design, and thereby equip them to implement the new curriculum, became clear from the results of the survey. In addition, faculty members overwhelmingly expressed their desire to improve their teaching by asking for more preparation time as well as further training in the education field. Our goal from the outset of the survey was to identify areas of weakness and design a retreat that was relevant and targeted the needs of our faculty. While describing all activities of the retreat is outside the scope of this article, we will highlight the main activities that supported our objectives.

1. **Setting the Stage:** Perhaps this could be better described as “turning the stage.” The retreat began by turning to participants for their thoughts. Active learning could be possible even in a lecture hall of more than one hundred people with the aid of a student response system (i.e., clickers).
2. **Instruction and Practice:** In the morning session, the associate director of the university’s instructional design unit provided faculty members with some practical tools to help students learn in the classroom, the lab, the clinic, or any potential learning environment. By giving the faculty an opportunity to immediately apply their newly gained knowledge and by asking them to work in pairs, the speaker effectively modeled a key component of the new curriculum—active learning. Faculty members worked with a tablemate to develop learning opportunities that would actively engage students at the higher cognitive levels identified in Bloom’s taxonomy. This session also served as a prelude to the afternoon session, in which faculty members would be asked to work in multidisciplinary groups to create active learning opportunities for students in the new curriculum.
3. **Theory:** The dean of the University of Pittsburgh School of Education presented the theoretical backdrop for the morning and afternoon sessions by speaking on adult learning, cognitive load, instructional effectiveness, and problem-based learning.
4. **Synthesis:** Just as the new curriculum emphasized the importance of giving dental students opportunities to synthesize basic science and

clinical concepts, we needed to give faculty members a chance to bring their newly acquired knowledge and skills together. Each table, already organized into multidisciplinary teams through assigned seats, worked together to create proposals for interdisciplinary learning opportunities that could be implemented in the new curriculum. Facilitators at each table and four roving instructional designers fielded questions and kept groups on track. The working groups were not dissolved after the retreat, but instead were informed that they would receive feedback on their proposals, followed by the opportunity to assist with their implementation into the curriculum.

## Curriculum Committee Responses

Addressing faculty concerns regarding the value and validity of student evaluations was deemed outside the scope of the planned faculty retreat. However, this important result was not ignored, and subsequently, a new systematic course evaluation system was developed by the Curriculum Committee and approved by the UPSDM's Dean's Council. Reflecting new findings in the dental educational literature,<sup>29</sup> this new systematic course evaluation system uses the results of student evaluations not as the final outcomes measure, but as a trigger for further investigation. These more in-depth follow-up evaluations include content peer review by external reviewers and evaluations of instructional soundness by the university's internal instructional design unit. Both content review and evaluation of instructional soundness are performed with all courses regardless of the course director's tenure, addressing a result

from the survey that indicated there exists the perceived notion that teaching a course for a long time is an indicator of how well it is taught.

Embracing critical thinking and the use of EBD in the clinic is inhibited by time constraints and nationwide faculty shortages<sup>22,30</sup>—two factors that are not likely to be resolved easily. While expressed frequently in the survey responses, we could not address these factors in the framework of the retreat; however, subsequent discussions in the CC resulted in a proposal to close all primary care clinics for the predoctoral program one afternoon per week in order to provide time for faculty involvement in group-based learning activities with students, faculty development on teaching strategies, and faculty preparation time for course development. Addressing faculty shortages with residents from specialty programs as preceptors for clinical teaching, a strategy that has been employed in medical education for a long time, is one already in use at the UPSDM.

The general lack of knowledge in instructional design as indicated by our results was translated into new faculty development initiatives. While there is a faculty development program at the UPSDM that offers ten one-hour learning opportunities each year, this does not adequately address the actual need. With the implementation of the new curriculum, we plan to enhance the faculty development opportunities by adding topics specifically related to clinical teaching. Since part-time faculty often cannot attend these sessions, our plan is to videotape and post them online so that they are accessible at all times.

An opportunity to evaluate the retreat was offered to all participants. The perceived utility of the retreat activities as reflected in the post-retreat

**Table 5. Summary of retreat evaluation, by percentage and number of respondents**

	General: I will be able to use ideas from this retreat in my everyday teaching.	General: I feel better prepared for the implementation of Curriculum 2009.	Morning: This session helped me apply information in the afternoon activity.	Morning: The workshop materials were informative and helpful.	Speaker: This presentation facilitated the goals of this faculty retreat.	The working session efficiently supported the development of innovative learning activities.
Disagree 1	3.1% (2)	1.6% (1)				
2	3.1% (2)	10.9% (7)	3.1% (2)	1.6% (1)	3.1% (2)	3.1% (2)
3	15.6% (10)	26.6% (17)	15.6% (10)	12.5% (8)	9.4% (6)	15.6% (10)
4	29.7% (19)	23.4% (15)	37.5% (24)	31.3% (20)	37.5% (24)	48.4% (31)
Agree 5	45.3% (29)	34.4% (22)	39.1% (25)	51.6% (33)	46.9% (30)	32.8% (21)
"6" (write-in)					1.6% (1)	
No Response	3.1% (2)	3.1% (2)	4.7% (3)	3.1% (2)	1.6% (1)	

evaluation seems to indicate that we succeeded in our goal to provide the faculty with a meaningful learning experience while advancing the agenda for curriculum change. The results from the evaluation suggest that we have achieved some buy-in—a precondition for behavior change (see Table 5).

Our curriculum will change to address the demands for educating dentists who are ready to face the challenges of the new millennium; however, to quote President Obama, “We do not underestimate the enormity of the task that lies ahead.”<sup>31</sup>

## Acknowledgments

Special thanks go to Dr. Joanne Nicoll, Associate Director, CIDDE, who not only helped with the design of the survey instrument, but was the leading force in making the faculty retreat a success by donating her own and her staff’s time to our cause. Our thanks also go to Dr. Alan Lesgold, Dean of the UP School of Education, for his timely UPSDM faculty retreat presentation on instructional design issues. We would also like to acknowledge Dr. Mei Song, Research Coordinator at the UPSDM’s Center for Dental Informatics, for the many suggestions provided to refine our method. We would like to express our gratitude to Dr. Marnie Oakley, Chair of the UPSDM Department of Restorative Dentistry, for her thoughtful comments, which improved the first version of the manuscript dramatically, as well as John Close, faculty member at UPSDM, for help with the factor analysis. We would like to thank the members of the UPSDM Curriculum Committee for their dedicated work and support. Our thanks also go to the anonymous *Journal of Dental Education* reviewers for their insightful input prior to publication. Additionally, we would like to thank all faculty members at the UPSDM for their willingness to share their thoughts and comments via the survey as well as during the retreat with us; without their dedicated work, dental education would not be possible at the University of Pittsburgh. Lastly, we would like to thank our Dean, Dr. Thomas Braun, for his ongoing support for the multitude of initiatives and projects the CC has taken on during the past year; without his leadership, our efforts would have no chance of success.

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# APPENDIX

## Survey Instrument

### Teaching Experiences

1. Can you share an example in which you have successfully converted a previously lecture-based learning experience into an active learning experience for students?
2. We receive students' assessments of our teaching through OMET evaluations. Have you used any of the provided feedback as the basis for modifications to your courses?  
 Yes  
 No  
If "yes," please list here what you changed. If "no," why not?
3. Have you ever used any assessment methods other than OMET evaluations to assess your own teaching?  
 Yes  
 No  
If "yes," please tell us about the assessment methods you used.
4. Have you experienced any barriers (problems or resistance to your efforts) when you tried to implement an innovative teaching strategy (major changes in the way you teach)?  
 Yes  
 No  
If "yes," please describe these barriers/resistance.
5. Can you describe a situation in which you approached faculty to get input on teaching? (Please list specific situations.)
6. In general, do you ensure that you select the most fitting SDM competency(ies) for your syllabus before or after you complete your syllabus development?  
 Before  
 After  
Please explain why:
7. Do you think we can promote critical thinking and evidence-based dentistry in the clinic while developing mature technical skills in our students?  
 Yes  
 No  
Please explain:
8. In a perfect world, what would make you a better teacher?
9. Are you planning to convert one of your courses or part of a course into an online format in the next 12 months?  
 Yes, I have started already.  
 Yes, but I am only in the early planning stage for that.  
 No, at the moment, I do not plan to convert a course to an online format.  
 N/A (e.g., I do not teach didactically.)

10. Based on your own experience with our students and when talking to your fellow faculty members and students, please rate the following barriers to creating an interactive teaching strategy to engage students in learning, where "1" indicates the least significant and "5" indicates the most significant barrier.

	Least Significant			Most Significant		
Students only want to know what will be on the final.	<input type="checkbox"/>					
Receiving bad OMET feedback when we make students think.	<input type="checkbox"/>					
Students are too lazy to participate in lectures; they would rather sit and listen.	<input type="checkbox"/>					
Students are too intimidated to participate in lectures.	<input type="checkbox"/>					
Students learn only what is on the handout, not what we explain.	<input type="checkbox"/>					
No support from the school's administration.	<input type="checkbox"/>					
No support from department chair.	<input type="checkbox"/>					
No time to experiment with new teaching approaches.	<input type="checkbox"/>					
Students need more technical skills.	<input type="checkbox"/>					
Students have barely enough time to learn all the facts (crowded curriculum).	<input type="checkbox"/>					

11. My teaching activities mainly occur in (you may select more than one option if equally significant):

- clinic
- preclinic lab/simulation lab
- lecture hall: didactic courses
- small-group sessions
- other (please specify)

12. I read (not just subscribe to) the following journals on a fairly regular basis:

13. Dentists further their education in a variety of ways, such as by attending conferences, taking online or onsite courses, participating in study groups or journal clubs, and reading journal articles for independent reading programs. How often do you participate in the following activities?

	Never	Seldom	Often	Routinely
Participate in journal clubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participate in study groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faculty development programs to improve teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How often do you participate in the following activities?

- Independent reading programs (number/last 12 months)
- Online and onsite courses (number/last 12 months)
- Conferences (number/last 12 months)

15. Below is a set of paired terms that relate to teaching dentistry. Please rate your knowledge of the distinction between the terms in each pair by using the following scale:

	I do not understand the distinction at all.	I have a general appreciation of the distinction, but cannot define it.	I can define the distinction.
PBL vs. small group learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problem solving vs. critical thinking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bloom's taxonomy vs. attitude scales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning goals vs. learning objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clinical vs. didactic teaching skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching methods vs. activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fact-based vs. interactive teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formative vs. summative evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feedback vs. reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative vs. positive reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher level vs. lower level thinking skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge level vs. application level thinking skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence-based vs. fact-based teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competency-based vs. content-based teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. If you would like to add any comments regarding this survey, please use the space below.