DESIGNING PREDOCTORAL DENTAL EDUCATION PEDAGOGY UTILIZATION

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Abstract

Objectives:

The purpose of the study was to describe the current forms of pedagogical methodologies utilized by faculty at a single institution. Traditionally, dental education included a lecture-style classroom for didactic learning, but increasing numbers of new forms of educational methodologies are being studied and incorporated in dental education in recent years. However, little is known about the adoption of new teaching methods across the curriculum.

Methods:

An electronic survey was administered to the current course directors for the academic year 2017-2018 at Harvard School of Dental Medicine (HSDM). The online survey reviewed various pedagogical approaches used by faculty in the pre-doctoral curriculum and other questions, such as successes and barriers to implementing new teaching techniques.

Results:

Of 20 didactic course directors, 14 responded to our online survey that reviewed various pedagogical approaches used by faculty in the predoctoral curriculum; flipped classroom, problem-based learning, case-based learning, team-based learning, and peer-to-peer learning. The most utilized pedagogy was still traditional lectures, followed by case-based learning, and team-based learning. Most directors learned new teaching methods by working with peer faculty members. Common barriers to implementing a new teaching methodology were time, logistics, and faculty on boarding.

Conclusion:

Pedagogical planning of the curriculum can help identify barriers to implementing new forms of pedagogy within an established curriculum, and courses that are more challenging to change. Also, this process helps find possible solutions to promote new educational approaches to learning and teaching and allows for targeted faculty development in areas of need or interest.

Keywords: dental education, pedagogy, faculty development

Introduction

Innovation in education methodologies, such as flipped classrooms, have been shown in higher education to create an environment ripe for active learning by the student.[1] Variety, and innovation in pedagogical approaches such as problem-based learning, team-based learning, case based collaborative learning, and blended learning classrooms has been implemented in settings including nursing[2], pharmacy, medical and dental professional schools.[3]

Dental schools have been inspired to reform curriculum[4] by way of competency based curriculum and unique teaching methods such as journals, reflective storytelling, and other heuristic strategies.[5] In fact recently, a study identified five teaching styles that appealed to the millennial generation of learners: E-learning, flipped classroom, simulation and gamification, peer to peer teaching, and social media.[6] These teaching styles are embedded in some aspects of self-directed whether in a flipped classroom, or in examples of peer to peer learning. However, historically, it has been documented in education that there are courses and instructors that are resistant to change.[7] One goal was to identify courses or instructors resistant to using new teaching methods, we have identified ways that we can provide support and encouragement for the faculty to embrace new methods of teaching and learning.[5]

A preferred method for pre-doctoral education builds on interactive approaches to scholarship that foster active learning and critical thinking. It presents a shift from fragmented learning to integrated, coherent, case-based, and deep learning. Moving from the standard lecture model to the flipped classroom model; from the rigidity of large classrooms and small-group problem-based learning tutorials to experimentation with different interactive group sizes and principles of team-based learning; and to a better balance between an interactive learning environment on the one hand, and higher expectations and student accountability for their own learning on the other.

Mapping the teaching methodologies utilized within the pre-doctoral dental curriculum offers valuable insights into any institution. It helps understand the penetration of new teaching approaches or effectiveness of faculty development, identify faculty or courses struggling with new curricular change, and offers an opportunity to produce targeted faculty development to support the diversification in teaching methodologies. At Harvard School of Dental Medicine (HSDM), we have recently made curricular reforms and are currently interested in seeing which methodologies the faculty were using to engage students. This article evaluated the penetration of these pedagogical approaches in the predoctoral dental curriculum at HSDM.

The objectives of the study were to describe the current forms of pedagogy teaching methodologies being utilized in the predoctoral curriculum and understand the current pedagogies that are perceived to be effective and ineffective. The study also aimed to identify gaps in our current faculty development program and understand new mechanisms of faculty development that could be implemented to support course directors.

Methods

The research protocol for this study was reviewed and approved by the Institutional Review Board (IRB) of the HMS and HSDM (IRB Protocol #17-1293).

Design and Subjects:

The dental pedagogy and faculty development survey was created to understand the successes and challenges in implementing new forms of teaching methodologies among faculty. An electronic survey was created through an online survey tool (Survey Monkey, San Mateo, CA) and distributed to the twenty current didactic course directors for the academic year 2017-2018 at HMS and HSDM. The first-year dental students are taught jointly with HMS, and all HSDM and HMS course directors were included in the study. For instructors with limited email access, printed surveys were administered, and then entered into the data set.

The questionnaire was offered in an online response format that included a multiple-choice responses and short answers, specifically designed for responses in regard to barriers in implementing new methodologies. The overall questionnaire consisted of ten questions with required responses. Practice administrations during instrument development and implementation indicated that completion time was approximately four minutes. Of the twenty

didactic course directors, 14 completed the survey, with a response rate of 70%. Course directors at HSDM and HMS are full time faculty who direct and facilitate predoctoral core courses.

Data Analysis:

All statistical analyses were conducted with *R version* 3.4.1 assuming a 2-tailed α of 0.05. Univariate analysis was used to describe the prevalence of teaching methodologies, attitudes and perceptions of directors, and learning methods for the instructors. Inductive coding was used assess the qualitative data from questions 9 and 10 in order to identify the prevalence of major barriers, and faculty development suggestions.

Results

The results of the study showed that the familiarity around teaching these different teaching methods among faculty, and are rated either familiar, neutral or unfamiliar as shown in Table 1. Of the 14 course directors the most utilized pedagogy was still traditional lectures. However, team-based learning, and case-based learning were used roughly in 81% of the courses. The least used method of adult learning was problem-based learning (36%). (Figure 1)

When inquiring about faculty attitudes and beliefs around the impact of these teaching methodologies, Table 2 shows that most faculty felt that case-based learning engaged the students the most (45%) and generated a deeper student understand of course material. As expected they noticed that traditional lectures engaged the student the least (73%). (Table 2) When responding to their ability in teaching a new methodology and their preparedness for the transition of using a new methodology most directors (55%) stated they needed more than 5 sessions to hone their skills, and many (36%) required 3-4 teaching sessions. When polling instructors on how they learned new methods the most common included; learning from a fellow instructor (73%), continuing education (64%), and HSDM Faculty Retreats (55%). (Figure 2) The team of course directors were most interested in HSDM providing opportunities to learn more about team-based learning (70%) and using a flipped classroom environment (50%).

The survey question addressing the major barriers directors have faced in implementing a new teaching methodology indicated that of the 14 responses, time, logistics, and faculty onboarding were themes equally mentioned as being a barrier for directors to implement a new teaching style. In addition, one instructor found engaging students and encouraging participation in a classroom setting to be a major barrier to education. The survey question requesting suggestions in improving the penetration and utilization of new teaching methodologies revealed that faculty overwhelmingly suggested having protected time to prepare for courses, and additional audio-visual support for creating new content.

Discussion

Considering current teaching methodology usage within the dental curriculum can provide faculty in education an opportunity to find courses that would benefit students from implementing new teaching techniques. Exposure to new teaching techniques does not always equal utilization in the core curriculum. When faculty development targets new teaching techniques, a diversity in the teaching methods used will be seen with adequate support and training for the faculty. Understanding the trends, will help all educators target faculty development to removing barriers to implementation and a pictorial way to see if curriculum reform is being implemented at the course level.

As a new direction in predoctoral education in 2014, HSDM introduced flipped classrooms, followed by case-based collaborative learning (CBCL) which have been shown to facilitate active learning for students.[9, 10, 11, 12] Traditional lectures are still a major component to courses, but most courses feature the new teaching methods including flipped classrooms, CBCL, and team-based learning.

The results of the study included reviewing various pedagogical approaches used by faculty in the pre-doctoral curriculum were flipped classroom, problem-based learning, case-based learning, team-based learning, and peer-to-peer learning.

Change is difficult, and similar to HSDM, the University of Pittsburgh College of Dental Medicine (UPCDM) reports that they spent about 1 year prior to major curricular and pedagogical change preparing and gaining buy – in from faculty in 2008.[13] During this time of change they created a unique faculty retreated that supported and encouraged the new curriculum and had two goals "to prepare the faculty for a change in the culture and to teach in the new environment."[13] They found that the most common methods of active learning that were

adapted were case studies and small group activities. This was similar to what the faculty at HSDM found and they frequently implement case based and team-based learning. In the current study, HSDM faculty created short answer questions that allowed the faculty to speak freely about what would make encourage their learning and development as faculty. Like HSDM faculty, the faculty at UPCDM requested more time, and further teaching instruction through the university.[13]

Qualitative analysis revealed that there were two courses or directors that were very unfamiliar with all content yet employed all teaching styles except problem-based learning. It is likely that they made an error in the survey and were thinking to select very familiar, or they could be employing these new techniques without understand the concepts.

When discussing the barriers to implementation of new teaching methods the faculty in the study, faculty stated that time, logistical support, and faculty training were the most common barriers. Across higher education the most frequently cited barriers for resistance in change include lack of training, time, and implementation of incentives.[14] Understanding the common barriers faced by faculty will help create strategic change. Examples of strategic change that would benefit faculty included, protected teaching time for course directors while courses are undergoing pedagogical change, recruiting additional audiovisual support, and targeted faculty development trainings in team-based learning.

Managing the current forms of pedagogy teaching methodologies in dental education allows faculty and staff to understand how well their curriculum is incorporating innovative teaching methods. In addition, utilizing surveys that address the attitudes and beliefs of faculty engagement and development will allow faculty development to be strategic and targeted. The goal was to not just train faculty in new teaching methods, but to facilitate incorporation of diverse teaching methods into each core course of the curriculum and have a layer of accountability to evaluate curriculum reform.

The limitation of the study includes, the total sample size was rather small due to the size of the institution. Also, the focus of the current study included didactic teaching methods specifically, and the course directors of clinical rotations were not included in the sample. Directions for future study include follow up surveys that encompass mapping innovated teaching methods and assessments in our clinical courses.

Conclusion

Pedagogical planning of the curriculum can help identify barriers to implementing new forms of pedagogy within an established curriculum and offer potential directions to promote new approaches to learning and teaching.

Biography

Erinne N. Kennedy DMD, MPH

Erinne Kennedy graduated from Nova Southeastern University's College of Dental Medicine in 2015 with a degree in dentistry and a master in public health. Following, she attended a one-year general practice residency at the VA Hospital in Baltimore, MD. Erinne recently graduated from the dental public health specialty at Harvard University in Boston, MA and is working toward being the first master in dental education student graduate in May 2019. She is involved in organized dentistry through the American Dental Association, and by writing fro Dental Economics, Dental Entrepeneur, and DeW.Life Magazine.

Sang E. Park DMD, MMSc

Sang Park, DDS, MMSc is associate dean for Dental Education at the Harvard School of Dental Medicine. After completing a Certificate in Prosthodontics at HSDM in 2001, she joined the faculty in Restorative Dentistry. In 2009, as part of an exciting new direction in clinical dental education, she implemented the Case Completion Curriculum at HSDM. Dr. Park's research interests include the effectiveness of educational assessment methods such as case presentations and OSCE; the use of online portfolios, learning modules, and examination in dental education; and the integration of primary care medicine into dental education and patient care.

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Appendix

Table 1. Teaching Method Familiarity Among Faculty

	Unfamiliar*	Neutral	Familiar*
Flipped Classroom	14.3%	0%	85.7%
Case Based Learning	14.3%	0%	85.7%
Team Based Learning	14.3%	7.1%	78.5%
Problem Based Learning	14.3%	0%	85.7%
Traditional Lectures	14.3%	0%	85.7%

* During the analysis very familiar and somewhat familiar where combined to form the familiar category. The same was completed for unfamiliar with very unfamiliar and somewhat unfamiliar.

** This can add up to more than 100% as surveyors were allowed to select more than one.

Table 2. Faculty Attitudes around Teaching Methods

Question	Flipped Classroom	Case Based Learning	Team Based Learning	Problem Based Learning	Traditional Lectures
What form of pedagogy did they faculty feel engaged the student the most?	28.6%	57.1%	14.3%	0%	0%
What form of pedagogy did students learn the most? *	14.3%	28.6%	21.4%	35.7%	0%
What forms of pedagogy did students respond the least?	21.4%	0%	7.1%	0%	71.4%

* Question was not asked about students learning the least.

Figure 1. Current teaching methodology by course directors at HSDM

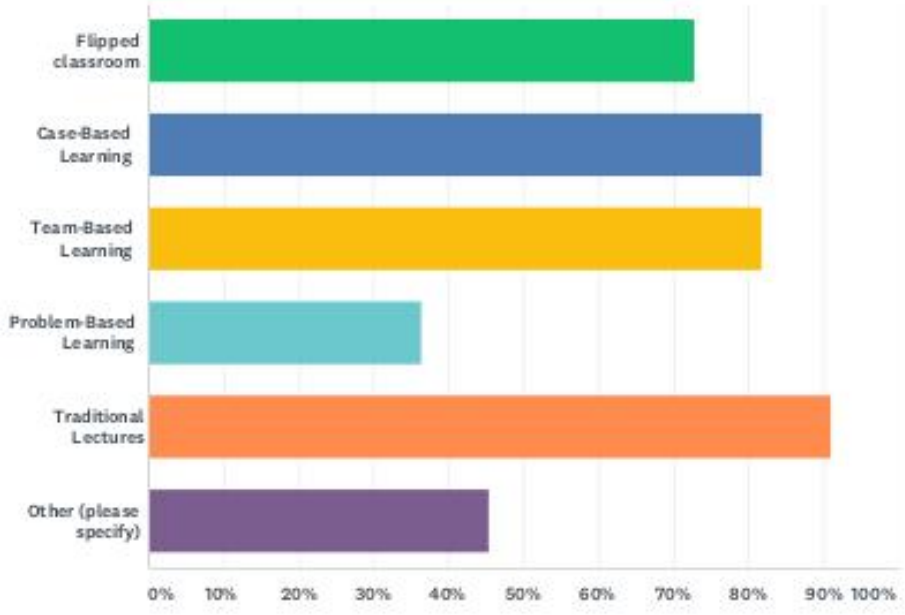

Figure 2. Faculty engagement and techniques used to learn new teaching methodologies at HSDM