

# Abstracts for Posters Presented at the 2014 ADEA Annual Session & Exhibition

Abstracts in all categories (*Educational Research, New Programs, and Works in Progress*) appear here in numerical order by day of presentation. Note that, unlike previous years, the posters are numbered consecutively for each day, rather than using one numbering system for posters on both days. For *Works in Progress* posters, only the titles and authors are published.

Presented on Sunday, March 16,  
2014, 1:00-3:00 pm

### PO-001. Does the Perceptual Ability Test Predict Dental School Clinical Success?

Dave Cho, Paul C. Stark, Yun Saksena, Tufts University  
*Educational Research*

Gaining entrance to a dental program in the United States is an extremely difficult endeavor. During the 2009-10 application cycle, while over 11,000 applicants applied for admission to a dental school, only 4,000 were accepted. This level of appeal for dental education places tremendous responsibility on the admissions committee of each dental school to interview and admit candidates with the most potential. Along with undergraduate GPA, dental-related experiences, a personal statement, and many more admissions criteria, performance on the Dental Admission Test (DAT) is used to predict the probability of academic and clinical success in dental school. The Perceptual Ability Test (PAT) of the DAT includes several subsections to test the applicants' spatial visualization skills. The purpose of this study was to determine if there is a relationship between PAT scores of admitted dental students and their subsequent clinical success in the third and fourth years of dental school. We hope to add to the scientific understanding regarding the reliability of PAT scores. This, in turn, would assist the admissions committee in admitting applicants that will be successful in the clinical years of dental school. Methods: Student records for one graduated class (class of 2012) from Tufts University School of Dental Medicine were examined. Those students' PAT scores, clinic points, clinical competency exams, and requirements completed were collected from the Office of Admissions and Student Affairs and de-identified. The data were then analyzed using SPSS software. PAT scores from the 2012 class served as the independent variable, while the clinic points, clinical competency exams, and requirements completed of the same student population served as the dependent variable. This study has IRB exemption status (#10506). Results: A weak correlation was observed between students' PAT scores and their average grade for competency exams in the third and fourth years of dental school. Also, a weak correlation was observed between students' PAT scores and their average grade for operative competency exams. No other correlations were observed between PAT scores of admitted students and the dependent variables in this study. In conclusion, PAT scores of admitted students and their clinical performance in the third and fourth years did not show a strong correlation. Further research may involve a larger sample size and more variables. With more data, it may be possible to discover preadmission criteria that show a stronger correlation with clinical success.

### PO-002. Innate Talent and Gender Influences on Career Choices in Dentistry

Amy S. Tam, Chanel N. McCreedy, Clarice S. Law, University of California, Los Angeles  
*Educational Research*

Previous studies have shown that gender, personality, relationship status, and income have strongly influenced individuals in making lifelong career choices. Considering the time and financial investment required for many career options for the dental school graduate, it would be beneficial to provide some indicators for career choice based on characteristics less susceptible to external influences. This study focused primarily on two inherent features of the individual: gender and innate talents. The Gallup Organization has developed a talent inventory, the Clifton StrengthsFinder, to identify potential areas of strength in an individual. The thirty-four talent themes are further categorized into four domains of leadership strengths: executing, influencing, relationship-building, and strategic thinking. The purpose of this study was to describe any correlations between gender and/or innate talents in predoctoral dental students' interest in dental specialties, career options, and potential practice environments. Methods: An anonymous questionnaire was administered to forty-three American Student Dental Association (ASDA) committee chair members at UCLA School of Dentistry who successfully completed the Clifton StrengthsFinder assessment. The questionnaire focused on students' interest in various dental specialties and possible career options, including private practice, academic dentistry, research, etc. Interest level was scored on a scale from 10=highly interested to 1=not interested. Participants were also asked to indicate the type of practice environment they would pursue if relevant. Solo private practice, partnership, group practice, and corporate dentistry were provided as potential practice environment choices. Statistical analyses were performed to determine differences in leadership domain profiles and interest in the career options. This study was certified exempt by the UCLA Institutional Review Board. Results indicate that interest in some dental specialties is heavily correlated with gender. Dental public health (female mean=4.38, male mean=2.86), oral and maxillary pathology (female mean=3.57, male mean=2.40), pediatric dentistry (female mean=6.71, male mean=4.18), and prosthodontics (female mean=4.71, male mean=2.86) elicited greater interest among female dental students. On the other hand, endodontics (male mean=3.5, female mean=2.95) and oral and maxillofacial surgery (male mean=5.09, female mean=3.62) attracted greater interest among male dental students. The choice of public health dentistry as a career option appealed more to female dental students (female mean=6.43, male mean=4.00), whereas the choice of organized dentistry as a career option appealed more to males (male mean=7.23, female mean=5.90). Academic dentistry attracted slightly more interest

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among male dental students (22 males compared to 18 females). Only one male dental student showed interest in a full-time academic career in basic science research; this career choice did not appeal to any female dental students in the cohort. Innate strengths also seemed to predispose students to select particular specialty programs and career options. When we looked at the leadership domain profiles of students choosing to pursue different dental specialties, specific leadership domain profiles were more dominant in the following specialties according to their corresponding correlation coefficients: periodontics (executing), orthodontics (influencing), general dentistry (relationship-building), and endodontics (strategic thinking). As students progress through dental school, understanding their innate strengths and dominant leadership domains may assist them in choosing suitable dental specialty career options. For dental faculty members, the ability to mentor students towards a successful career path based on their interests combined with a consideration for their gender and innate strengths may augment the mentoring process.

**PO-003. Anticipatory Guidance for Medical Home Providers Regarding Training Cup Use**

Erin R. Nicholas, Jennifer Zinberg, Kimberly K. Patterson, Midwestern University-Arizona  
*Educational Research*

According to the U.S. Department of Health and Human Services, there is a public perception that oral health is separate from general health and, therefore, less important. The establishment of a medical home for a child occurs shortly after birth and is a partnership between the patient and his or her family and the medical provider. The American Academy of Pediatric Dentistry recommends that a child's first dental examination occur by the eruption of the first tooth and no later than age one, thus establishing a dental home. With the pediatrician as the first point of contact in establishing overall comprehensive health care, a basic understanding of infant anticipatory guidance regarding training or sippy cup use and misuse is essential for the pediatric medical practitioner. As the medical curriculum at present offers limited information regarding anticipatory guidance on the use of training cups, the purpose of this project was to develop a clinically relevant resource for pediatricians outlining the use and misuse of these cups, their role in early childhood caries, and their contribution to trauma risk and speech delay, as well as to supply interceptive approaches pediatricians can incorporate into parental education. Methods: Based on a review of the literature, we identified the most common causative mechanisms for early childhood caries. Using this information, the misuse of training cups was identified as a major causative factor for early childhood caries. This information formed the foundation for the development of a resource guide for use by pediatricians to illustrate how training cups work, how they can be misused, and various anticipatory guidance recommendations the pediatrician can offer during parental education. No IRB approval was necessary for this project. Results: The resource guide consists of information that medical professionals may utilize to facilitate a dialogue with parents regarding the use of training cups. The resource guide describes the risks associated with misuse of the training cup, refers pediatricians to the American Academy of Pediatric Dentistry for further information, and is designed to support pediatricians in encouraging the families of infants to seek a dental home.

**PO-004. The Relationship Between Learning Modality and Academic Performance**

Heather P. Leung, Paul C. Stark, Yun Saksena, Tufts University  
*Educational Research*

A majority of dental faculty members teach in a single mode: the lecture. However, the mode by which students assimilate information

varies depending on age, gender, experience, and personality. This study aimed to explore the possible relationship between the dominant learning sensory modalities of predoctoral dental students at Tufts University School of Dental Medicine (TUSDM) and their academic performance in three first-year didactic courses: Biochemistry, Gross Anatomy, and Operative Dentistry (practical component). Methods: Student preferences in learning were assessed by a learning preferences instrument called the VARK (visual, aural, read/write, kinesthetic) survey. Following approval from the Institutional Review Board, the sixteen-item questionnaire was emailed via Qualtrics to 380 students in the 2015 and 2016 classes at TUSDM. An overall 15.3% response rate was obtained. Due to a relatively small sample size (n=58), the non-parametric Kruskal-Wallis test was used to compare the grades in the three courses across the four sensory modality groups (V, A, R, K). Pairs of modalities were compared using Mann-Whitney U tests. All statistical analyses were performed using SPSS Version 21. Results: Biochemistry grades differed across the learning modalities (p=0.017). The read/write modality had the highest median (range) GPA, 3.7 (1.0), followed by kinesthetic, 3.3 (1.7), then visual, 3.2 (1.3), and aural, 3.0 (1.7). There was a statistically significant difference between modality groups A and R (p=0.003) and modality groups R and K (p=0.020). No statistically significant differences were found in Gross Anatomy (p=0.071) or Operative Dentistry (p=0.495) between the four learning modalities. This study found that median grades differed across learning modalities for Biochemistry, but not for Gross Anatomy or Operative Dentistry. This might suggest that different learning styles process information differently. However, due to our low response rate, more work needs to be done before meaningful conclusions can be drawn.

**PO-005. Dental Students' Education and Attitudes Concerning Local and Topical Anesthesia**

Ian C. McComb, Sharon Aronovich, Marita R. Inglehart, University of Michigan  
*Educational Research*

Local anesthesia is a major concern of such dental specialists as oral surgeons, periodontists, and endodontists as well as of restorative dentists. Competence in local anesthesia promotes patient comfort and efficient use of chair time. This study was designed to gain a better understanding of how predoctoral dental students in the United States are educated about the use of local and topical anesthesia (LA/TA). Specifically, the objectives of this study were to explore a) how many hours of LA and TA instructions students receive in the four years of their dental education and how well educated they perceive themselves to be, b) how often they actually use LA and TA and how well they understand the complexity of the benefits of LA, c) the students' attitudes concerning LA and TA, and d) the relationships among their educational experiences, actual behavior, and understanding and attitudes related to LA and TA. Methods: This study was determined to be exempt from IRB oversight. Survey data were collected from 650 predoctoral dental students in 14 U.S. dental schools. All four years of dental education were represented well (D1: 20%; D2: 24%; D3: 36%; D4: 20%). Approximately half of the students were female (48%). They ranged in age from 21 to 45 years. The surveys were collected either by administering a paper/pencil survey or by providing the respondents with access to a website on which they could respond anonymously. Results: The data showed that the LA- and TA-related education of the students in the 14 schools ranged both in the number of hours of education received in classroom-based, clinical, and community settings as well as in the perceived quality of this education. Fourth-year students received significantly more hours of education about LA in all three settings compared to students in all other years. However, the average hours of TA-related education in the three settings did not differ by year of education. Concerning how well

educated students perceived themselves to be about LA and TA, the data showed that with each additional year of education the students felt better prepared to use LA. While this same pattern of responses was also found for the quality of the classroom-based and community-based education about TA, starting in year 2, the students already felt well prepared by their clinical education to use TA. Concerning how often students actually used LA and TA, the results showed that the fourth-year students used both LA and TA most frequently. In addition, they used it significantly more often in community-based settings than their own clinics. Fourth-year students, however, reported having to re-anesthetize patients less frequently than D2 and D3 students did, plus feeling most competent and reporting having the least amount of difficulties concerning obtaining profound LA. The students in the four years differed in their understanding of the complexity of the benefits of LA and in their attitudes. Fourth-year students had the most negative attitude concerning TA compared to all other student cohorts. The more hours of education the students had received in classroom-based, clinical, and community settings, the better they felt prepared. However, the number of hours of classroom-based education about LA was the only educational indicator related to the students' positive attitudes towards the use of LA and TA. Positive attitudes concerning the benefits of LA for the quality of the patient-provider relationship was correlated with the frequency of actually using LA. In conclusion, the students in the 14 U.S. dental schools reported varying numbers of instruction about LA and TA over the course of their curricula. The fourth-year students reported that their community-based education provided them with significantly higher numbers of educational experiences than their dental school clinics. While the extent and quality of classroom-based educational experiences were related to patient-centered attitudes in this context, the clinical experiences were not likely to be related to these patient-specific attitudes. Based on these findings, we recommend stressing patient-centered considerations related to the use of LA and TA in clinical settings in addition to teaching the technical aspects of these procedures. The value of community-based experiences for students' education about LA and TA has to be understood.

#### **PO-006. Factors Influencing Dental Student Specialty Choice: Changing Perceptions of Specialties**

Jane H. Shin; Marisa Zarchy; Taru H. Kinnunen; John D. Da Silva; Brian M. Chang, Harvard School of Dental Medicine; Robert F. Wright, University of North Carolina at Chapel Hill

##### *Educational Research*

This study provides data on the factors that influence dental students' specialty interests at Harvard School of Dental Medicine (HSDM). This is a continuation of our study completed in 2011 of the HSDM classes of 2007-11. The results from the HSDM classes of 2012-16 are presented in this study, and these results are compared with those from our 2011 study. Because of recent changes in the HSDM prosthodontics program to increase student interest in the specialty, we present a closer examination of students' perspectives on prosthodontics. Possible explanations for the observed trends are suggested. Methods: In 2012, our survey from our 2011 study was modified and distributed to HSDM students in the classes of 2012-16. The Internet-based survey (KeySurvey, Inc., Braintree, MA) was distributed through email with a cover letter explaining the purpose of the survey, a statement of confidentiality, notice of approval, and a contact at the Office for Research Subject Protection at Harvard Medical School (HMS). The survey was configured to allow only one response per respondent email address. Each potential survey respondent was given a unique link to the survey software to monitor progress and completion of the survey. The research protocol for this study was reviewed and approved by the HMS Committee on Human Studies as exempted research (IRB13-0408). Statistical

analysis was carried out in STATISTICA (StatSoft Inc., Tulsa, OK). Results: Of 176 current and recently graduated students at HSDM, 143 responded to the survey for an 81.3% response rate. Using the Pearson chi-square analysis, we analyzed the contribution of nine factors to students' choice of specialty. Enjoyment of providing that type of specialty service was the factor that the greatest number of respondents (85 percent) reported influenced their choice of dental specialty. Future salary as a professional specialist was second, reported by 57 percent of respondents as influencing their specialty choice. In terms of specialty choice, orthodontics and dentofacial orthopedics ranked highest with 27% of students planning to pursue this specialty; 14% of students chose to pursue GPR/AEGD upon graduation (more than double the 6% of those planning to enter GPR/AEGD programs in 2011). This increase came at the expense of students pursuing prosthodontics, with only 4% of students in this study planning to specialize in prosthodontics compared to 6% in 2011. A majority (70%) of the students reported positive experiences with prosthodontics, with only 7% reporting negative experiences with prosthodontics; this is compared to 13% of students reporting negative experiences with the specialty in 2011. Of the introductory experiences to prosthodontics having the biggest impact, having experiences under the category of faculty/mentoring was selected by the greatest number of students (43.6%); this is an increase from 37.1% in 2011. Respondents also ranked the nine American Dental Association-recognized specialties on several measures. They ranked prosthodontics second for greatest impact on patients' quality of life, compared to fifth in 2011. Interestingly, while students ranked oral and maxillofacial surgery first for greatest impact on patients' overall care in 2011, they ranked general dentistry first in the current study. The increase in positive perceptions of prosthodontics at HSDM follows changes made in 2004-05 to increase exposure to and mentoring in prosthodontics at the predoctoral level. Moreover, we saw a higher regard for general dentistry by HSDM students in the current study. To go along with the importance students placed on future salary when deciding their specialty, the increase in students pursuing general dentistry may in part be due to difficult economic times in the United States that students have felt in the past five years, pushing some students to forgo advanced graduate training to enter the workforce sooner.

#### **PO-007. Association Between Cumulative Grade Percent and Dental Licensure Exam Results**

Jasmine R. Jenkins, Paul Stark, Yun Saxena, Tufts University

##### *Educational Research*

Many factors, some unrelated to academic performance, can impact whether a student passes a licensure examination. Considering the importance of these examinations on the careers of future dentists, it is valuable to study the relationships between performance in educational programs and the outcomes of such examinations. Thus, the purpose of this study was to compare the relationship between selected measures of academic performance and outcomes on the North East Regional Board of Dental Examiners (NERB) and Western Regional Examining Board (WREB) licensing examinations. Methods: The dental students' cumulative grade percentage served as the primary predictor for evaluating this relationship. Data were collected on three graduating classes at Tufts University School of Dental Medicine (2010-12). Mean grades were compared between those who passed and those who failed their licensure examinations, using t-tests. All analyses were performed using SPSS, Version 19. The Tufts Medical Center/Tufts University Health Sciences Institutional Review Board approved this study. Results: There were 416 students in the combined group who took one of the exams: 280 took the NERB and 136 took the WREB. Of the 416, the 112 failures had a mean (SD) GPA of 86.04 (3.93), and the 304 who passed had a mean (SD)

GPA of 87.66 (3.80), indicating a statistically significant difference in GPA depending on licensure exam results. Conclusion: The study found that students who passed the licensure examination had a statistically significantly higher cumulative GPA than those who did not, although the difference was only 1.6 percentage points. Though statistically significant this is a very small difference practically. Such differences may not be discernible when grades are converted to a four-point GPA. Further work needs to be done to determine whether academic performance is a good predictor of passing the licensure examinations.

**PO-008. Determining the Importance of Histology to Pathology Courses in the Dental Curriculum**

Junu Ojha, Michelle A. Wheeler, Jane Summersett, University of Detroit Mercy

*Educational Research*

In the past years, curriculum reform in dental schools has been a major topic. There has been an increased emphasis on clinical application, problem-solving, and a thorough understanding of the various subjects taught at the dental schools. To find a balance of course material in the dental curriculum is imperative for dental students to succeed in both the academic and clinical settings. The objective of this study was to determine the importance of histology course material to the pathology curriculum and whether dental students find repetition and interweaving of course materials beneficial to their overall understanding and retention as future clinicians. The study also aids in determining whether there is a need to include relevant refresher material in other interdisciplinary dental courses. We hypothesized that there is a strong connection between histology and pathology courses in the dental curriculum. The results of this study may guide course directors to alter their material accordingly for the best learning outcome; also, students will benefit from the chosen course order and gain better retention from more material crossover. Methods: We developed and distributed surveys in paper form. The surveys consisted of questions targeted towards the students' perception of the role of a histology course in regards to their understanding and retention of pathology course material. Response choices were presented in a rating scale format from 1 to 4, with 1=not beneficial at all, 2=neutral, 3=a little beneficial, and 4=extremely beneficial. We provided a range of scores in order to better understand individual students' insights into the connection between the two courses. We also investigated the basis of how the students identified their greatest benefit from certain interrelated course structures in both standardized testing and later in a clinical setting. We used two separate surveys for the second-year and third-year dental students at the University of Detroit Mercy School of Dentistry, who had already completed both histology and pathology courses. Results: 86 second-year dental students and 57 third-year dental students participated out of a total of 140 and 96, respectively. 93.0% of the second-year students responded neutral to not beneficial at all regarding retention of histology material from the previous semester to better understand pathology, and 96.5% of the third-year students responded neutral to not beneficial at all. Also, 68.6% of the second-year students and 63.2% of the third-year students reported that adding refresher histology material to pathology courses would benefit them tremendously for easy grasp of pathology. Conclusion: These results suggest that there is an overall retention of histology and pathology information over time and there is a student consensus to add relevant histology refresher material to pathology courses for overall retention. This result carries over to the overall consensus from both the second- and third-year dental students for repetition of some interrelated course material between different subjects in the dental curriculum in all four years of dental school for better retention of knowledge as a future clinician. We anticipate following up on these recommendations in the near future.

**PO-009. Comparison of Flipped and Standard Classrooms in a Dental School Setting**

Laura J. Shim, Paul C. Stark, Yun Sakena, Tufts University

*Educational Research*

As there are many different styles of teaching and learning, it is sometimes difficult to know if students are more receptive to one method over another. The purpose of this study was to compare student performance and overall student experience between a flipped and a standard classroom setting in one of Tufts University School of Dental Medicine (TUSDM)'s preclinical courses. In standard classrooms, students usually attend a lecture in order to become introduced to a topic. After class, students are responsible for reviewing the material covered by studying the lecture slides, their notes, and reading the associated text. In a flipped classroom, students watch a video-captured lecture before class and spend class time in a more interactive and engaging fashion where students delve more deeply into the material. Methods: This study was conducted in the second-year Removable Partial Dentures course at TUSDM. Four flipped classroom sessions were preceded by available lecture slides and lecture video for students to watch online before class. Actual class time mainly consisted of students applying their knowledge by discussing case studies in small groups. The other nine classroom sessions were taught in a standard classroom setting. These standard classes were lecture-based, with some interactive elements (group discussions, clicker questions, etc.). Some designated material was covered only in the flipped classroom, and other designated material was covered only in the standard classroom to facilitate comparison of the two teaching methods. Student performance was assessed by both midterm and final examinations. On each exam, the questions used for this study were preselected with the criteria that the material was covered in either a flipped or standard classroom but not both. Percentages of correct answers in the two categories of questions were compared to determine if students learned better from one method over the other. The exact test for two proportions was used for the comparisons. In addition, online surveys were given to students at the end of the course; the responses were used to assess student attitudes toward and overall student experience with flipped classrooms. This study was approved by the Tufts Medical Center/Tufts University Health Sciences Institutional Review Board. Results: On the midterm exam, 84.25% of students answered the standard classroom questions correctly. The percentage was lower at 82.41% for the flipped classroom questions. The p-value of the midterm exam was 0.0444. In the final exam, 83.56% of students answered the standard classroom questions correctly. Again, a lower percentage of 82.13% answered the standard classroom questions correctly. The p-value for the final exam was 0.0701. Overall, 83.90% of students answered flipped classroom questions correctly, while 82.27% of the standard classroom questions were answered correctly. The p-value for the combined midterm and the final was 0.0045. This p-value suggests that the difference between the percentages of correct answers in the flipped and standard classrooms was statistically significant. This evidence indicates that students had better performance in flipped classrooms as compared with standard classrooms. In the surveys, students thought that flipped classrooms were a good idea in theory. However, the majority did not consistently listen to the lectures before the flipped classroom sessions and agreed that the concept of flipped classrooms was not practical or useful with their busy dental school schedules. The discrepancy between student performance and overall attitude towards flipped classrooms should be an area of further study.

**PO-010. Peer Tutoring in Health Care Education: A Review of the Literature**

Lauren Hum, Harvard School of Dental Medicine; Justin Macarro,

University of the Pacific Arthur A. Dugoni School of Dentistry; Sang E. Park, Harvard School of Dental Medicine

*Educational Research*

Cross-year peer tutoring appears to be a potentially powerful technique for increasing all levels of student learning and may be one method of maintaining quality of health care education in the face of growing student enrollment and a small faculty. A critical review of the literature was performed to ascertain whether cross-year peer-tutoring programs improve or maintain the academic performance of health professions students. Methods: A PubMed literature search was conducted to identify pertinent research. Only those articles that demonstrated programs that paired junior and senior students were included. Results: Most studies found that peer tutoring had a positive impact on academic performance. Additionally, cross-year peer tutoring was shown to provide psychological support and aid in professional and personal development, as well as provide a mutual educational benefit to both junior and senior students. Results: Some of the learning experiences of tutor and learner appeared to be unique to the peer-assisted learning setting and so strengthened the argument for the formal inclusion of cross-year peer tutoring into health professions curricula. However, studies with better designs and more detail are needed to answer definitively whether peer tutoring is of benefit.

**PO-011. Student Self-Evaluation Versus Faculty Assessment of Operative Competencies: An Analysis of Calibration**

Lauren E. Marzouca, Bradley T. Belous, Christopher R. Paolino, Steven E. Eisen, Gerard Kugel, Matthew D. Finkelman, Tufts University

*Educational Research*

Practicing dentists rely heavily on their ability to self-evaluate their work in order to provide the highest level of oral health care. Accordingly, a comprehensive goal of dental education is to foster a self-critiquing mind. Although many research studies have examined clinical aptitude, few studies have examined the effectiveness of student self-evaluation in the preclinical setting. We aimed to determine if students truly comprehend how to objectively assess their own operative dentistry preparations and restorations by comparing and contrasting calibrated professor scoring and first-year dental student self-evaluation. Methods: The Tufts University School of Dental Medicine (TUSDM) class of 2016 took their regularly scheduled operative dentistry preclinical practical examination on April 20, 2103 and May 2, 2013 (half of the class at a time). The class was told about the study prior to the practical examination, IRB approval was gained, and the students were shown an information sheet describing the study. Upon completion of the #3 MO amalgam restoration practical examination, students evaluated their own work. The students left their self-assessment forms at their Simulation Clinic seats, and the forms were collected after all students left the examination room. Finally, the professors evaluated the amalgam restorations using normal grading procedures. Two randomized and calibrated instructors collaboratively scored each student's practical on a ten-point scale, with the lowest passing score being a 7. The scale also included half-points (e.g., 7.5, 9.5). All students and faculty members used identical grading forms. The student score and the professor score were linked using only the Simulation Clinic chair number. The study data were not linked to any identifiable information. Results: Based on a #3 amalgam MO restorative operative dentistry practical whereby the entire TUSDM class of 2016 was asked to volunteer in a self-assessment, a significant difference was found between student self-evaluation and professor-generated scores. One hundred fifty-eight students chose to participate, roughly 85%

of the class. 23.45% of students graded themselves exactly the same as the professors. Of the student grades that differed from the professors' grades, 53.1% scored themselves higher; the largest percentage of students scored themselves higher by only 0.5 points (21.5%). Of the remaining students' scores that differed from the professors' scores, 23.4% of students graded themselves lower. Of this 23.4%, the majority of students graded themselves lower by only 0.5 points (14.6%). These data demonstrate that students tended to score themselves higher, rather than lower, by a ratio of 25:11. A paired samples t-test also revealed that students ( $M=8.38$ ,  $SD=0.92$ ) scored themselves higher than professors ( $M=8.04$ ,  $SD=1.06$ ) overall. A Spearman correlation revealed a statistically significant weak negative correlation of  $-0.304$ , when students' grades and the absolute difference between students' grades and professor grades were compared. Hence, as a student scored himself or herself higher, the numerical absolute difference between the student grade and the professor grade decreased. Conversely, as students' grades decreased, the absolute difference between the two grades became greater. This finding alludes to the fact that students with lower grades are not as familiar with an ideal preparation or restoration when compared to the higher scoring subset of students. Perhaps, then, the lower scoring students' inability to perform well during operative dentistry preclinical practical examinations could be attributed to a lack of calibration, rather than inherently poor hand skills. This lack of calibration could be attributed to low class attendance, lack of attention during calibration sessions, or disconnect between faculty instruction and student interpretation. Given the significant findings of this study, it may be appropriate to experiment further with blind student grading on a larger scale and with a wider scope to retest the hypothesis. Therefore, this study will be replicated with the TUSDM class of 2017 in the 2013-14 academic year. Six varied operative dentistry practicals will be included.

**PO-012. What Do Adults Know About Baby Teeth? A Pilot Study**

Lindsay L. DeSantis, Joan E. Kowolik, Indiana University

*Educational Research*

The purpose of this study was to identify the general knowledge of the adult population regarding the sequence and timing of the eruption and exfoliation of the primary dentition. Primary teeth are important for the development of the permanent dentition, and many school days are lost due to dental disease. If adults do not understand the value of these teeth, the child will suffer unnecessary pain and infection. Methods: The study, with Indiana University Institutional Review Committee approval, was completed at Indiana University School of Dentistry. Two hundred randomly identified self-selected adults (aged 18 years and older) accompanying their children for routine dental care at the Predoctoral Pediatric Clinic and the Graduate Orthodontic Clinic comprised one group. Two hundred randomly identified self-selected adults (aged 18 years and older) attending the Comprehensive Care Clinic for routine dental care comprised the other. A comprehensive, closed-ended, self-administered questionnaire was used to collect sociodemographic details and to evaluate pediatric oral health knowledge, general knowledge on primary dentition, attitudes, and practices of the adults. Responses were collated and entered into a computer database and examined statistically using chi-square tests. Results: Most responders were 30-50 years of age with 89% reporting raising at least one child and 56% reporting having at least one child currently in their household. Overall, 96% believed that primary teeth are important; however, only 26% believed that the caregiver should brush a child's teeth three times a day. This was answered most commonly by adults under the age of 20 ( $p=0.0025$ ). 37% believed that it was acceptable for their child to wait to see the dentist until the age of three, and 15% believed that caries in primary teeth did not

need to be restored. 63% of the surveyed population did not correctly answer the location for the eruption of the first primary tooth, and 42% believed the location varied from child to child. The population was tied for the answer regarding what age all of the primary teeth have erupted: 38% believed it to be two years, while another 38% believed that it was five years. 55% of the population believed that the primary canine erupts before the primary first molar. 80% believed that the canine exfoliates before the exfoliation of the first molar. 32% believed the first primary molar exfoliates between the ages of 7 and 9, whereas 32% believed that the first molar exfoliates between the ages of 10 and 12. 37% believed that any one of their child's primary teeth could be lost naturally at any age, and 15% believed that there was no pattern at all for tooth eruption. There was a statistically significant association between educational status and knowledge of primary teeth. Adults with only some level of high school education were more likely to strongly agree that teeth can exfoliate naturally at any age for a child ( $p=0.0416$ ) and that a child does not need to see a dentist until age three ( $p=0.0005$ ). The Hispanic and Asian respondents were more likely to strongly agree that any tooth could exfoliate naturally at any age ( $p=0.0113$ ). These populations more frequently selected that baby teeth did not need to be restored ( $p=0.0030$ ). The respondents who strongly agreed baby teeth were important increased with age, but dropped for age 70+. The 70+ population also answered that caregivers should only brush the child's teeth 1x per day ( $p=0.0025$ ) and was the least likely to answer that children should have a dental visit every six months. They were also very unlikely to agree that there was a pattern to the exfoliation of primary teeth. If the respondent was a parent or legal guardian, it was found that he or she more strongly disagreed that it was acceptable to wait for all of the teeth to grow in to start brushing ( $p=0.0002$ ). Also, adults who went to the dentist every six months were more likely to think children should have regular dental visits. These results reveal a deficit in the overall knowledge on primary dentition in this sample. To improve oral health of the primary dentition it is necessary to promote oral health awareness and understanding on the eruption and exfoliation of primary dentition. There is a demonstrated need for education to caregivers regarding oral health practices and early dental care for young children to prevent dental disease. This study presents an insight into an otherwise unknown domain and illustrates the need for focused education.

#### **PO-013. Effectiveness of a Predoctoral Orthodontic Honors Program on Postgraduate Education**

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*Educational Research*

In 2011, the NYUCD Orthodontic Department implemented a unique opportunity for its postgraduate students to pursue a career track in education for those interested in academic careers. Two postgraduate students in the education track oversaw and restructured the predoctoral orthodontic honors program and acted as teaching assistants in the program. They created a mini-residency building on students' previously attained knowledge, exposing them to clinical orthodontics, and guiding them through the application and interview process to postgraduate programs. The purpose of this study was to investigate the effectiveness of the predoctoral honors orthodontic program in preparing students for postgraduate orthodontic education. Methods: Each of the eight students accepted per year into the honors program was assigned to a senior resident in the NYUCD Postgraduate Orthodontic Program for clinical exposure and hands-on experience with orthodontic patients. Adult Learning Theory was applied to identify course objectives, which were met during weekly seminars facilitated by the teaching assistants and applied during clinical sessions and case presentations. Towards the end of the course, students took a written examination to verify their knowledge and

application thereof. In addition, each student was asked to complete an anonymous course evaluation in the form of a survey to determine the impact of the course. Participation in the survey was completely voluntary, and an IRB exemption was obtained. Results: The course evaluation yielded overall positive results. The students all reported improvement of orthodontic knowledge and skills and that they had sufficient exposure to clinical orthodontics. However, in the comments some students indicated that they desired more clinical exposure and more structured clinical participation. Overall, the students indicated that the course helped to prepare them for the application process and interviews to specialty programs as well as solidified their decision to pursue a career in orthodontics. The most positive feedback was received regarding the instructors and their teaching methods and motivation. Although the evaluations were overall very positive, the feedback on the clinical component of the course is being used to improve the course moving forward. The future plan is to follow up with the students who are currently in postgraduate orthodontic programs to determine if an honors program facilitated their transition from predoctoral to postgraduate studies.

#### **PO-014. Student and Faculty Learning Styles Related to Student Preferences**

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*Educational Research*

Learning style data have been used by various institutions to maximize the efficiency and effectiveness of instructional methodologies. Few studies have attempted to investigate the relationship between student and faculty learning styles and student preferences regarding which faculty members from whom they prefer to learn. Kolb described four learning modes as part of the learning cycle and developed the Learning Style Inventory (LSI) to measure how much individuals rely on each mode. He also identified four learning styles that reflect various combinations of the four modes. The purpose of this cross-sectional study was to determine the most common learning modes and learning styles among dental students and faculty and to evaluate whether a relationship exists between students' learning style and the learning styles of their favorite faculty members. Methods: Following IRB approval (#1213-97), DS2 students ( $n=144$ ) and full- and part-time faculty members ( $n=90$ ) at the School of Dentistry were invited via email to complete the online version of the Learning Style Inventory (LSI 3.1) to determine predominant learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE), as well as learning styles Converger (C), Assimilator (As), Diverger (D), and Accommodator (Ac). Students also completed a brief online Survey Gizmo questionnaire asking them who on the faculty is their favorite (F), from whom they learn the most (LM), and who challenges them most (CM). Student LSI results and their responses to the preferences survey were matched to faculty LSI results and coded to maintain confidentiality. Learning styles were calculated using learning modes scores for faculty and students in the matched data set. Data were analyzed using descriptive statistics. Qualitative data (reasons students gave for preferences) were analyzed for trends. Results: A total of 46 faculty members and 50 students (51% and 34.7% response rate, respectively) completed the LSI, and 43 (29.9%) students completed the faculty preference survey. Mean (SD) scores (0-100 point scale) for each learning mode for students were CE: 33.42 (28.72), RO: 53.95 (25.05), AC: 49.52 (30.96), and AE: 68.50 (32.36). Mean (SD) scores for learning modes for faculty were CE: 32.67 (27.53), RO: 57.82 (25.09), AC: 64.65 (28.16), and AE: 51.33 (31.98). For student preferences, 28 students had one or more matches with 10 of the 46 faculty members who completed the LSI. Student learning styles were C ( $n=14$ ), As ( $n=6$ ), D ( $n=4$ ),

and Ac (n=4). Learning styles of the 10 faculty members identified by students were C (n=2), As (n=4), D (n=3), and Ac (n=1). There was very little concordance between student and faculty learning style for F, LM, and CM. For F there were three matches with the same learning style for student and faculty; for LM: six same; for CM: four same. However, seven of 16 (43.8%) students chose two faculty members with the same learning style for both F and LM. Open-ended responses to reason for choice of LM faculty member included ability to explain things (10 comments), encourages and pushes to do best (5), shows how/gives examples (4), and lecturing ability (4). Reasons for choice of CM faculty members highlighted both positive and negative aspects of those who challenge most (12 positive and 12 negative comments). Positive responses included setting a high standard (5 comments) and providing encouragement and help (5). In conclusion, student learning mode scores in this sample were highest for AE and lowest for CE. Average faculty scores were highest for AC and lowest for CE. Due to the small sample size, no relationship between student learning styles and those of their preferred faculty members could be established. There was a trend toward different learning styles between student and preferred faculty member. A larger sample would improve the ability to analyze the data and draw inferences about student preferences for faculty with specific learning styles. Many other factors may also impact student learning including student prior experience, culture, gender, and faculty teaching styles. By understanding student preferences for learning modes, faculty members can design instruction and develop strategies for accommodating different learning styles and improving learning outcomes.

#### **PO-015. The Impact of NBDE Grading Changes on Dental Students**

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##### *Educational Research*

In 2009, the Joint Commission on National Dental Examinations (JCNDE) stated that “the purpose of the [National Board Dental Examination, NBDE] is to assist state boards in determining qualifications of dentists who seek licensure to practice dentistry.” The JCNDE has explained that the NBDE Part I was never designed or validated to differentiate students beyond a pass/fail level. In light of this, the JCNDE announced that, as of January 1, 2012, it would no longer report numerical scores for the NBDE Part I. This decision marks a significant departure from the ways in which dental students have historically been evaluated and is presumed to have resounding effects on students, predoctoral educators, and specialty residency directors. The purpose of this study was to assess how the change to pass/fail grading of NBDE Part I has impacted dental students’ study habits and perspectives on the pursuit of postdoctoral specialty education. Methods: This survey-based study enrolled over 75% of U.S. dental schools and received a total of 1,843 student responses. Enrolled schools distributed the electronic survey to the last class to take NBDE Part I for a numerical score and the first class to take NBDE Part I pass/fail; most commonly, this was the classes of 2013 and 2014, respectively. This sample corresponds to an average response rate of 25.6% of participating schools and 18.5% of all eligible students in the country. The study protocol was reviewed and approved by the Harvard Medical School/Harvard School of Dental Medicine Human Studies Committee (CHS Study #M23353-101). Results: Respondents who took NBDE Part I for a numerical score and were interested in a specialty reported studying the most on average (167 hours) and had the greatest percentage of respondents who, in retrospect, would have studied more for the exam (28.1%). Respondents who took NBDE Part I for a pass/fail score (PF) reported studying the least on average (114 hours) and had the greatest

percentage of respondents who, in retrospect, would have studied less (16.8%). Despite studying significantly less on average, 85% of PF respondents did not feel that it altered their clinical preparedness. Eleven percent of PF respondents reported having taken or planning to take the Graduate Record Examination (GRE), and 21% reported having taken or planning to take the United States Medical Licensing Examination Complete Basic Science Examination (CBSE). Those students who have already taken either the GRE or CBSE reported studying an average of 71 hours or 184 hours, respectively. Notably, 88% of respondents who took the CBSE reported that it either decreased or greatly decreased the amount of time they spent studying for their regularly scheduled dental curriculum. In addition, 92% of these respondents reported that, in retrospect, they would have studied more or much more. The PF respondents who felt that this change decreased their chances of getting into a specialty outnumbered those who felt that it increased their chances three to one. This ratio was even greater among respondents whose schools did not have an internal rank or numerical grading system. When respondents were asked how they could best differentiate themselves to specialty programs, the majority selected NBDE Part I with a numerical score followed by a pass/fail NBDE Part I with separate, specialty-specific entrance exams. The study revealed that the change to pass/fail grading of NBDE Part I significantly impacted students’ study habits and outlook on specialty education. The findings of this survey indicate that, as a result of the recent grading changes to NBDE Part I, students devoted less time to the exam, felt that the change negatively affected their chances of pursuing a specialty, and preferred a standardized, objective measure to help differentiate themselves to specialty programs.

#### **PO-016. Student Perspectives on Qualities of an Effective Dental Educator**

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##### *Educational Research*

The purpose of this study was to determine if male and female dental students, as well as dental students in different years of school, valued different qualities in an effective teacher in the didactic, preclinical (lab), and clinical settings. Methods: A teaching skills survey with questions pertaining to didactic, preclinical (lab), and clinical instructor characteristics was administered to second-, third-, and fourth-year UCLA dental students following UCLA IRB approval. The respondents were asked to rate the importance of each teaching quality in the three categories on a scale of 1 to 4 (1=not important to 4=very important). The survey was administered to 298 currently enrolled UCLA dental students. Student data were analyzed in aggregate using t-tests by year-in-school independent of gender, gender independent of year-in-school, and gender dependent on year-in-school. Results: Survey responses were collected from 166 out of 298 total UCLA second-, third-, and fourth-year dental students (55.7% response rate). Of those 166 responses, 71 were second-year students (30 male, 41 female) out of a total class size of 88 (80.7%); 45 were third-year students (23 male, 22 female) out of a total class size of 106 (42.5%); and 50 were fourth-year students (24 male, 26 female) out of a total class size of 104 (48.1%). When comparing the most important qualities of an effective didactic lecturer between class years, irrespective of gender, we noted distinct differences. Second-year students rated basic lecturing skills (audibility, visibility, and language) as the most important trait, while both third- and fourth-year students believed organization was the most important. Interestingly, male and female students irrespective of year both believed that organization was the most important skill of an effective lecturer. When male and female opinions were compared, they differed on three out of fifteen traits of an effective lecturer. Female students believed that the pacing of the lecture and

the topic coverage, instructor openness, and approachability, as well as availability of the instructor outside of class were more important than did male students. When rating preclinical (lab) instructor skills, each class of students varied on the trait it believed most important. Second-year students rated organization as most important, while third-year students rated both explanation of the subject and instructor openness and approachability as most important, and fourth-year students rated feedback and constructive criticism as most important. Data collapsed by gender independent of year showed that male students believed that organization was the most important quality in a preclinical (lab) instructor, while female students believed that openness and approachability were the most important qualities. Third- and fourth-year students were asked about traits important for clinical instructors. When separated by class year, third- and fourth-year students differed on the traits they felt were most important for effective clinical instructors. Fourth-year students felt that openness and approachability, constructive feedback and criticism, and punctuality/availability were more important for an effective clinical instructor than did the third-year students. Third-year students felt that effective demonstration of procedures by clinical instructors was more important than did the fourth-year students, rating it as the most important trait for an effective clinical instructor. Data collapsed by gender independent of year showed that male students rated feedback and constructive criticism as the most important quality of an effective clinical instructor, while female students rated punctuality and availability as most important. In conclusion, students considered different teaching skills important depending on the academic setting, year in school, and gender. Dental educators should recognize these differences in order to maximize effective teaching and create a positive learning environment. The dynamic of the dental student body has changed in the last decade with the number of female dental students increasing to more than 50% in some schools. Therefore, instructors should implement teaching strategies and communication skills that maximize learning for both genders. Additionally, their style of instruction should accommodate the changing learning preferences of dental students as they advance through their four years in dental school. Finally, the conclusions drawn from this study have potential to aid in the recruitment and development of effective teachers as a component of the strategy to address the growing shortage of dental educators. This study was supported by NIDCR #R25DE018437.

#### **PO-017. College Students' Oral Health and Nutrition**

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*Educational Research*

The purpose of this study was to investigate the relationship between the oral health of college students and the quality of their diets. Methods: After obtaining informed consent, each participant was administered the Dental Health Survey to provide information on perceived oral health status, dental history, access and utilization of dental services, importance of oral health, and smoking and tobacco use. A 24-hour dietary recall and the information gathered were used to calculate the Healthy Eating Index (HEI) score to assess diet quality for each individual. Independent t-tests, Tukey post-hoc, one-way ANOVA analysis of variance, and Spearman's correlations were performed to investigate the relationship between dental health and diet quality. Results: All participants had intakes with HEI scores above 30, indicating adequate dietary intake. Those who brushed their teeth three or more times a day had a significantly higher mean HEI for total fat sub-score than those who only brush their teeth twice a day or less. Those who never experienced tooth pain had a significantly higher mean HEI for saturated fat sub-score than those who experienced teeth pain rarely or more often. There was a significant inverse relationship between adverse dental outcome

and higher HEI sub-scores for vegetable ( $r=-0.344$ ,  $p=0.003$ ), grain ( $r=-0.258$ ,  $p=0.028$ ), sodium ( $r=-0.224$ ,  $p=0.05$ ), total fat ( $r=-0.278$ ,  $p=0.017$ ) and protein ( $r=-0.313$ ,  $p=0.007$ ), suggesting diet quality is associated with dental health outcomes. Conclusion: A higher quality diet, measured by the HEI, was associated with better dental health habits and outcomes. This study suggests that a healthy eating pattern may reduce dental problems and enhance preventive dental behaviors.

#### **PO-018. Dental Students' Perceived Value of Clinical Leadership Experiences**

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*Educational Research*

Clinical leadership experiences (CLEs), such as student peer mentoring, assist with professional development and career preparation. While such experiences have been studied extensively in nursing education literature, there is a gap in the literature regarding the perceived value held by dental students concerning CLEs. This study aimed to examine dental students' perceived value of CLEs with the use of post-CLE questionnaires. Methods: Predoctoral dental students in their final year of a four-year program (D4) mentored second-year predoctoral dental students (D2) during D2 patient treatment experiences in a supervised clinical education setting. These experiences were early patient treatment encounters for the D2 students. Five-point Likert scale questions were used to measure D2 and D4 students' perceived value of specific aspects related to these CLEs. In addition, free text qualitative data were anonymously collected via questionnaire completion to acquire more detailed information regarding students' perceived value of the experiences. Descriptive statistics were applied to the Likert scale responses, as well as thematic analysis to the questionnaire open text answers. Before data collection, IRB approval of exemption under 45CFR46.101(b) was granted. Results: The Likert scale measurements revealed that 1) the overall perceived value by D2 students for CLEs was high and for D4 students was neutral; 2) D2 and D4 students felt D4s have enough knowledge and skill to mentor D2s in supervised clinical settings; 3) CLEs have educational benefits for the predoctoral dental students; and 4) CLEs make students more comfortable communicating with one another. D2s specifically saw value in including CLEs as part of dental education and felt that CLEs make students better prepared to communicate with colleagues and employees. Furthermore, the free text responses emphasized that students value CLEs because 1) they increase student comfort; 2) peers are often more accessible than faculty; and 3) the D4s provided more guidance and individual attention while learning. Additionally, students felt that CLEs reinforced D4 students' skills, knowledge, and confidence and helped prepare them for private practice by providing experience in managing, leading, and working collaboratively with others and improving communication skills. However, students did voice specific concerns around D4s' level of interest and helpfulness, administrative and organizational issues, and limited D4 students' authority. Students also expressed a desire to work in more regularly scheduled pairs and partnerships to build rapport. Conclusion: The overall perceived value by D2 students for CLEs was high and for D4 students was neutral. Furthermore, student concerns such as the varied performance of D4s and administrative and organizational issues related to CLEs may need to be addressed with further program development. Particular advantages to this existing program noted in free text answers were increased comfort for students as well as increased guidance and individual attention. Overall, the perceived value of this CLE program suggests that similar programs should be considered and/or expanded in predoctoral curricula.

**PO-019. Tobacco Dependence Education in Accredited U.S. Dental Assisting Program Curricula**

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*Educational Research*

Use of tobacco remains the leading cause of preventable morbidity and mortality in the United States and has numerous adverse oral effects. Tobacco dependence education (TDE) should be an integral part of all oral health care professionals' education. This study was conducted to assess the level of TDE in the curricula of accredited U.S. dental assisting (DA) programs and to compare findings to those of a similar previous assessment of dental hygiene (DH) curricula. Methods: The Indiana University Institutional Review Board (IRB) approved this study (IRB # 1201007832). During the 2012-13 academic year, a 51-item survey, used by Davis and Koerber to study TDE in DH curricula, was sent to directors of all 298 accredited DA programs. Assessed were curricular content, time spent on each topic, expected levels of clinical competence, and resources used. Program directors were mailed the survey along with a cover letter, study information sheet, and self-addressed, stamped return envelope. Follow-up of non-responders included a second mailing and a postcard with an address to access the survey online. Responses from completed surveys were reviewed, coded, and entered into an Excel spreadsheet. Data analysis included counts, percentages and descriptive statistics. Associations between variables were evaluated using chi-square analyses, Wilcoxon rank sum tests, and Spearman correlation coefficients. Results: Eighty-nine programs returned completed surveys for a 30% response rate. Of the 13 TDE-related content areas, those most often covered were oral tobacco-related disease (100%) and general diseases related to tobacco use (93%); those least often covered were stages of behavior change (29%), how to develop a comprehensive tobacco intervention program in a private office setting (23%), and strategies for community-based tobacco control (22%). Mean curriculum time for all content areas ranged from 5.1 minutes to 43.5 minutes, with a mean of 17 minutes. In indicating the level of tobacco cessation competence students should be able to demonstrate upon graduation, 44% of program directors said brief intervention, 54% reported moderate intervention, and 8% replied intensive intervention. Less than half of all programs reported conducting a formal assessment of clinical competence in any of the seven TDE-related skills; however, skills in assessing patient tobacco use and associating head and neck findings to tobacco use were formally or informally assessed by 64% and 61% of respondents, respectively. Program directors' expectation of student competence in a brief level tobacco intervention was significantly associated with less frequent coverage of the content area nature of nicotine addiction ( $p=0.014$ ) and less curriculum time spent on the following content areas: factors associated with tobacco use ( $p=0.038$ ); nature of nicotine addiction ( $p=0.038$ ); developing a comprehensive tobacco intervention program in a private office setting ( $p=0.034$ ); and addressing dental assistants' own use of tobacco ( $p=0.046$ ). Program directors' expectation for student competence in a moderate level tobacco intervention was significantly associated with more frequent coverage ( $p=0.033$ ) and more curriculum time ( $p=0.033$ ) for the topic stages of change, as well as more frequent coverage ( $p=0.0015$ ) and more curriculum time ( $p=0.0001$ ) for the topic tobacco cessation pharmacotherapy. There was no significant association between competency assessment type (formal, informal, or none) and the level of tobacco cessation competence that program directors believe students should attain. Program directors' favoring student competence in a moderate level tobacco intervention was associated with more frequent assessment of only two of the seven TDE skills: associating head and neck findings to tobacco use ( $p=0.035$ ) and determining stage of change among tobacco users

( $p=0.01$ ). When compared to DH program survey results, of the 13 TDE content areas, only oral diseases related to tobacco use was covered more often by the DA programs. DA programs also reported less curricular time for each of the content areas, with the exception of addressing students' own use of tobacco. Compared to DH programs, tobacco dependence education appears to play a smaller role in the curricula of accredited U.S. dental assisting programs. DA programs are also less likely to formally assess clinical competence in TDE.

**PO-020. Effects of the OSCE on Dental Hygiene Students**

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*Educational Research*

The purpose of this quantitative study was to determine how and why the objective structured clinical exam (OSCE) is stressful for second-year dental hygiene students at the University of Detroit Mercy School of Dentistry. Methods: IRB approval was obtained prior to survey distribution. The population surveyed was second-year dental hygiene students: 26 surveys were distributed, and 26 were returned. Results: 100% of the respondents returned their surveys. 92% reported that they felt the OSCE was stressful. 29% of the students stated they do not do well with timed tests. 12.5% reported that the study guide was too general, and 29% said they were not sure what to expect. 54% said the faculty could have provided a better study guide. 58% of the students said that faculty members could have done something to change their feelings about the OSCE. 65% also stated their feelings would have been different if they had a practice OSCE. Conclusion: 92% of the second-year dental hygiene students said that the OSCE is stressful for many reasons. There are major concerns for reducing the levels of stress for students. These need careful consideration by educators who may be developing and administering an OSCE.

**PO-021. Association Between Dental Students' Sleepiness and Stress and Their Simulated Clinical Performance**

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*Educational Research*

The goal of this study was to assess whether there is an association between dental students' sleepiness and stress and their performance in a simulated clinical setting where they are evaluated on their manual skill. The importance of this research is ultimately to improve awareness and diagnosis of sleepiness and stress in dental students. If there is an association with simulated clinical performance, there is an even greater need for awareness in students because this may imply that sleepiness and stress not only affect the clinician's quality of life but the health and safety of patients as well. Methods: The study was a cross-sectional study conducted at Tufts University School of Dental Medicine using students in the summer of their third year. Students in their third year are required to achieve clinical competencies in order to prepare for their licensure examinations in their fourth year. All students were given an opportunity to voluntarily participate in the study. The Tufts Medical Center/Tufts University Health Sciences Institutional Review Board approved the study. Students were asked to keep a sleep diary starting one week before the competency exam. On the day of the exam, the participants were given two short questionnaires that served to measure sleepiness and stress: the Epworth Sleepiness Scale (ESS), which rates the sleepiness for various situations using a 0-3 rating scale; and the Perceived Stress Scale (PSS) that is on a rating scale from 0 to 4 and asks ten questions on the participants' feelings and thoughts during the last month. Age and gender of each participant were also collected for demographic analysis. The grades from the clinical competency

evaluation were obtained. The maximum score of 51 points could be obtained by adding the three separate scores (0-17 points) for three crown preparations. Correlations and t-tests were used for evaluations. All statistical analysis was conducted using IBM SPSS Version 19. Any p-value less than 0.05 was considered statistically significant. Results: 68 students volunteered to participate in the study, but only 22 students completed the sleep diary, both questionnaires, and total score report from the day of the competency exam. Of the 22 students, the mean age was 27.2 years, ranging from 25 to 32 years. There were 8 male and 14 female students. The mean total score for the competency exam was 37.1 points. No significant associations were found between total grade and gender ( $p=0.929$ ), average hour of sleep for the week ( $p=0.533$ ), ESS score ( $p=0.218$ ), or PSS score ( $p=0.301$ ). In addition, no significant correlations were found between total grade and the total number of times students woke up during the night ( $p=0.968$ ) or the total caffeinated drinks the students had during the week ( $p=0.294$ ). However, the negative correlation between grade and age was found to be significant ( $r=-0.43$ ,  $p=0.048$ ). In addition, there was a significant positive correlation between grade and the average time students took to fall asleep ( $r=0.53$ ,  $p=0.011$ ), how refreshed students felt in the morning ( $r=0.46$ ,  $p=0.032$ ), and the amount of exercise that students had during the week ( $r=0.42$ ,  $p=0.049$ ). When isolating data from only the night before the exam, the analysis found there were no significant correlations between total grade and hours of sleep ( $p=0.453$ ), refreshed feeling ( $p=0.500$ ), exercise ( $p=0.858$ ), number of caffeinated drinks ( $p=0.053$ ), or number of times the student woke during the night ( $p=0.221$ ). The only significant correlation found from the isolated data was between total grade and the time it took students to fall asleep ( $r=0.58$ ,  $p=0.006$ ). These findings suggest that there is no association between sleepiness and stress and performance in a clinical setting. In addition, the average hours of sleep per night proposes the same conclusion. However, it was interesting to note that as age increased in the students, the grades significantly decreased. Though explanations for the decreased performance could be attributed to many factors, including increased family responsibilities, further studies are needed to examine the cause for this correlation. This study had limitations in terms of sample size and the grading structure of the exam but was important in acknowledging that sleepiness and stress in dental students could have an impact on clinical performance. Future studies on the effects of sleepiness and stress and the effects of possible interventional studies for stress reduction are required to understand how to better improve dental students' educational environment.

#### **PO-022. New Problem-Based Learning Assessment Tool: Professional Outcomes**

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##### *Educational Research*

Since its introduction in medical education in 1969, problem-based learning (PBL) has been a highly debated topic in the field of health-care education because of limited data for or against it. Experts in the PBL mode of teaching and learning argue that previous assessment methodologies were inappropriate in measuring PBL, and uniform guidelines in administering a PBL curriculum do not exist; this creates variability amongst PBL programs. The initial evaluation tools relied heavily on traditional methodologies to assess the effectiveness of PBL. The results were often not statistically significant, and PBL supporters argued that the goal was not to produce clinicians who would excel in standardized exams. PBL aims to teach students lifelong, self-directed learning that will guide a clinician's success in patient care. However, the impact of lifelong, self-directed learning over a career has not been evaluated. The objective of this study was to develop a tool to measure longitudinal professional outcomes of a PBL

curriculum. Methods: Literature searches were performed on PubMed to find outcomes associated with a PBL education. Most outcomes research on PBL education has vaguely characterized certain qualities that are stronger in PBL students (for example, self-directed learning) compared to traditionally trained students. Based on the outcomes from the literature searches, we inferred long-term professional outcomes of a PBL-trained dentist. From these inferences, 120 questions were generated. A team of PBL education specialists at the 2011 International PBL Conference evaluated and validated these questions for their ability to measure career outcomes of PBL training. These PBL specialists are faculty members from PBL-based dental schools around the world who contributed to the implementation of PBL at their schools and have overseen PBL curricula for over ten years. Each participant selected survey questions he or she determined were appropriate measures of long-term professional outcomes of PBL dentists. The top 60 questions were incorporated into a survey to be sent out to alumni of Harvard School of Dental Medicine (HSDM). IRB exemption was acquired through the Harvard Committee of Human Research and Harvard Medical School to administer the survey to the Harvard dental alumni list. HSDM implemented PBL in 1993 and, based on the participants' graduation year, we categorized participating dentists as PBL-trained or traditionally trained. The goal was to collect 50 surveys for each category. In the future, the survey will also be conducted with alumni of Hong Kong University and Adelaide University. Results: Data from HSDM revealed that 95.5% of the participants in the PBL group ( $N=66$ ) attend educational conferences compared to 85% in the non-PBL group ( $N=51$ ). At conferences, 81% of the PBL group participants attended mainly to learn, while 63% of the non-PBL participants attended to learn. In addition, dentists in the PBL group participated in journal clubs more frequently, with 37% (vs. 22% non-PBL) attending at least once every two weeks. Both groups engaged in community service 4.7 times a year and spent approximately 25 minutes discussing pertinent findings and treatment plans with patients. In addition, approximately 90% of dentists in both groups agreed or strongly agreed that they should regularly communicate with other health care professionals. The non-PBL dentists averaged 80.6 CE hours in the last three years (vs. 70.3 hours PBL). Approximately 22% of non-PBL dentists found it difficult to keep up with the advances in dentistry (vs. 36% PBL). In addition, 70% of non-PBL dentists felt that their knowledge of their field is more than their peers (vs. 45% PBL). This may be because non-PBL dentists are better at keeping up with current knowledge in their field or because PBL dentists have a better understanding of their own shortcomings in knowledge. Over forty years of research on PBL has not been able to convincingly persuade most dental schools worldwide to adopt PBL into their curricula. Prior evidence elucidating differences between the two groups has not shown much difference. When we analyzed the survey administered to HSDM alumni, the data revealed career outcomes that differed between the two groups. Although responses to some questions yielded similar responses, the findings from the survey reveal many career outcomes such as attending conferences, accumulating CE hours, and more that were different between the two groups. Dental schools interested in implementing PBL into their curricula can review the results of the survey and determine if the career outcomes associated with a PBL education align with the goals of the school.

#### **PO-23. Use of Portfolios for Evaluating Competence in Predoctoral Dentistry**

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##### *Educational Research*

The purpose of this study was to conduct a literature review on portfolio assessment as a strategy for capturing predoctoral dental student

competence. Methods: Database searches that included Medline/PubMed and ERIC were conducted using several combinations of the keywords higher education, health education, competency-based education, dental education, and portfolio assessment. The goal was to identify articles related to portfolio assessment of competence in higher education and specifically in dental education. Results: Many articles were found regarding portfolio assessment in higher education. Portfolios are an assessment strategy being used in health sciences education including medicine, pharmacy, and nursing. Literature in dental education regarding portfolios was scarcer, but some themes can be identified. The following provides a historical overview of portfolio assessment in dental education. Accreditation in 1998 by CODA set dental education on a new path of capturing and assessing student competence. Yet a study conducted ten years later found that dental schools continued to use traditional assessment measures (e.g., multiple-choice questions, daily grades in clinic) a majority of the time. Measures better suited to assess competency-based education (e.g., objective structured clinical exam, critically appraised topic summary, portfolios) comprised a mere 13%. The focus of dental education has typically been the knowledge and expertise of the faculty member rather than a student-centered approach based on student attainment of knowledge. This longstanding model of dental education has relied heavily on rote memorization rather than the critical thinking and problem-solving skills defined in the latest revision of the CODA standards (July 1, 2013). Portfolio assessment is one strategy for acquiring evidence and documenting competencies not typically captured with traditional measures. Portfolios require self-reflection, thereby showcasing critical thinking and problem-solving skills. Self-assessment entails the ability of students to reflect on what they know, what they do not know, ideas on how to fill knowledge gaps, lessons learned, and insights about dentistry throughout the course of dental school. Furthermore, portfolios are able to capture competence in professionalism and ethics while still serving as a good adjunct to traditional assessment tools. An added benefit of portfolios is that they encompass performance on competency exams, comprehensive patient care, case presentations, literature reviews and formal performance reviews from student self-assessment as well as supervising faculty members. Programmatic portfolios measure general competence rather than the assessment of solo components of competence. Portfolio assessment requires students to pull all their learning experiences together and reflect upon their overall competence. Recent changes in the reporting of the National Board Dental Examination I and II to pass/fail versus a numerical score have resulted in advanced education programs scrambling for new admissions criteria. Portfolios can be an adjunct for those applying or interviewing for associate positions and specialty programs. Portfolios that document predoctoral dental student competence could easily be adapted for this use. Not only can portfolios be used scholastically but in the career world as well. One could use them to serve as a resume builder or even for recertification purposes. Ongoing research is needed in dental education to track the use of portfolio assessment for capturing student competence and other areas of use.

#### **PO-024. Development and Evaluation of a Diabetes-Periodontal Disease Educational Video Module**

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##### *Educational Research*

The connection between oral and systemic health has become exceptionally apparent in recent years, yet many individuals are unaware of this link. Educational video modules (EVM) serve to inform patients of the direct association between oral and overall

health. The purpose of this study was to develop and evaluate the effectiveness of a diabetes-periodontal disease EVM in medical and dental health centers among patients and care providers. Diabetes ranks as the sixth major cause of death in the United States, affecting 8.3% of the population (25.8 million children and adults). Additionally, half of Americans aged 30 years or older (64.7 million individuals) have periodontitis. Research has shown a direct association between periodontal disease and diabetes, each exacerbating the complications of the other. Minimizing complications of both periodontal disease and diabetes can be accomplished by raising awareness and educating patients. In the past, most patient education material was written at a 10th grade literacy level. However, about 20% of Americans may read at lower than a 4th grade level. EVMs provide a more convenient and effective method of informing patients. Huang et al. found that knowledge increased significantly for patients who were shown an educational multimedia presentation focusing on diabetes compared to the control group that did not see the presentation. Furthermore, knowledge significantly increased between pre- and posttest in the experimental group. Methods: An EVM focusing on periodontal disease-diabetes was developed that targeted a 5th grade literacy level to provide effective education for a wide range of patients in a rural population. The EVM was sent to three dental centers and one nutrition and diabetes center across north-central Wisconsin to receive feedback from hygienists and nurse educators. The EVM was also shared in the waiting room via iPad to all willing patients throughout one workday at each of the centers. Patients were asked to rate their knowledge on the topic prior to seeing the EVM. After viewing, patients were asked a series of questions evaluating their reactions to the content. The study protocol was approved by the Marshfield Clinic Research Foundation's Institutional Review Board under 45CFR46.101(b) (IRB number ACH10212). Results: Feedback was received from 43 patients from the dental centers and 10 diabetic patients from the nutrition and diabetes center. Fifteen dental hygienists and two nurse educators also provided feedback on these EVM. Respondents provided overall positive comments, and 85% of dental and diabetic patients thought that the average patient would benefit somewhat to greatly from viewing it. Of dental hygienists and nurses, 88% ranked the EVM somewhat (24%) to very (65%) useful for patient education. Furthermore, 82% of dental hygienists and nurses said the EVM would assist them in educating patients. Fifty-one percent of all patients reported their knowledge increased from no/not much knowledge to some/lots of knowledge after viewing, and a total of 92% reported having some/lots of knowledge following viewing, regardless of initial knowledge level. Without being prompted, 21% of dental patients mentioned they or someone they know had diabetes. Forty percent of diabetic patients reported that their knowledge level did not change after viewing the EVM, and 50% thought it would be more beneficial for them if the EVM went into more detail (versus 16% of dental patients). Seventy-seven percent of all patients thought the most effective way to implement the EVM would be in a waiting room. Many patients and dental hygienists thought it would be beneficial to include more information about general brushing and flossing techniques and healthy eating habits. Providers found the EVM to be beneficial for patient education and noted they would utilize the tool in their practices. Dental patients thought the EVM was at an appropriate educational level for the average individual to benefit from. While still finding the EVM effective, diabetic patients had different opinions than dental patients. They desired more details perhaps because the EVM directly relates to their personal health. Implementation of oral-systemic patient EVM into medical and dental clinics will be beneficial in improving patients' awareness and knowledge of the association between oral and systemic health and ultimately help improve their health. These EVM will serve to benefit a wide age range of patients as well as assist health care providers as an educational tool.

**PO-025. Health Literacy: Information Seeking and Understanding of Dental School Patients**

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*Educational Research*

In 2012, the Institute of Medicine released a report that described 10 attributes of a health-literate organization. Two of the attributes were providing easy access to health information and services and navigation assistance and designs and distributes print, audiovisual, and social media content that is easy to understand and act on. Thus, health-literate organizations are urged to produce materials whether written or web-based that are easy to understand and navigate, so that patients can obtain relevant information about their health care provider; understand medical and dental advice and treatment directions; evaluate treatment options; show up for follow-up appointments; and make appropriate health decisions. The purpose of our project was to study the association between health literacy and the readability and understandability of a dental school's clinic website and written patient education materials. Specifically, we wanted to: examine the association between Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D) scores and patient sociodemographic variables and the patient's response to knowledge and understanding of the website and pediatric sedation form questions. Methods: We utilized a cross-sectional study and administered face-to-face surveys to 100 English-speaking adults who were seeking care for themselves or for their children at the University of California, Los Angeles School of Dentistry. The survey was approved for exemption by the Institutional Review Board. In order to assess the readability and understandability of the School of Dentistry's website and written pediatric sedation educational information, we used two assessment tools readily available online: SMOG (Simple Measure of Gobbledygook) and Flesch-Kincaid Grade Level. The SMOG formula required the number of sentences and number of polysyllables, while the Flesch-Kincaid required total number of words and syllables. Our sample included 56 males and 44 females of various ethnicities. The participants were asked to complete a 22-question survey while waiting in the reception area before initial screening. The survey questions included items about oral health knowledge, the participant's use of the school's website, comprehension of written pediatric sedation and website information, and health literacy. We used the 38 medical/oral health words that comprised the REALMD-20 and List 3 of the REALMD. Our results were analyzed through student t-test, chi-squared test, and Pearson's correlation. Results: Utilizing the Flesch-Kincaid and SMOG assessment tools, we found that both the school's website and pediatric sedation materials were tailored to an audience with a reading level of 9th grade and above. The U.S. Department of Health and Human Services suggests that materials be directed at the average American reading level, which does not exceed the 7th grade. There was a significant relationship between race/ethnicity and whether the patient accessed the clinic website before a first visit. The majority of African American and Asian participants did not visit the school's website before coming for their visit, while 50% of Hispanic and 64% of the white/Caucasian reporting visiting the website ( $p=0.040$ ,  $df=3$ ). As expected, there was a positive correlation between education and REALM -D scores ( $r=0.336$ ,  $p=0.001$ ). Participants with higher REALMD-20 and REALMD-List 3 scores had higher scores on dental knowledge ( $r=0.318$ ,  $p=0.017$ ) and questions about the clinic's website information ( $r=0.237$ ,  $p=0.017$ ), but no significant findings were found for the pediatric sedation form. Regarding educational backgrounds, 77% of the participants answered all three questions about the pediatric sedation information correctly, while among the 27 subjects with secondary school and high school education, only one answered all three questions about the clinic website correctly.

When asked what information participants sought on the clinic website, they reported directions, whom to contact, registration forms, information about dental problems, and types of dental services offered at the clinic. In this study, we found an association between an individual's oral health literacy, education level, and ability to understand information about the clinic's website, written education materials, and knowledge about dentistry. This study was supported by the National Center for Advancing Translational Sciences through UCLA CTSI Grant UL1TR000124.

**PO-026. Restored miR-125b Inhibits Head and Neck Squamous Cell Carcinoma Growth by Regulating Bcl-2 Family Expression**

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*Educational Research*

Squamous cell carcinoma of the head and neck (HNSCC) is among the top ten cancers in the United States, and its five-year survival rate has not significantly changed for the past two decades. Studies have been geared towards finding targets, such as apoptosis regulator Bcl-2 family which can be either pro-apoptotic (BAK, BAX, BAD) or anti-apoptotic (Bcl-2, Bcl-xL), to improve treatment and early diagnosis. This study identified the mechanism of miR-125b-regulated Bcl-2 family expression and evaluated the therapeutic potential of miR-125b in HNSCC. Methods: A stable expressed exogenous miR-125b HNSCC cell line (JHU-22miR125b) and an expressed empty vector HNSCC control cell line (JHU-22vec) were established using lentivirus system. The cell lines were applied in HNSCC tumor xenograft experiments. The tumor xenografts were processed for RNA and protein extraction and formalin fixed histologic studies. Expression of miR-125b was analyzed by using quantitative real time PCR. The protein expression levels of Bcl-2 family members were evaluated using Western blot assay. Results: The miR-125b transfected cell line stably expressed exogenous miR-125b. The expression levels of JHU-22miR125b exhibited an approximate fourfold increase in comparison to the control JHU-22vector. The average size of JHU-22miR125b xenografts (0.20g) was approximately three times smaller than the control JHU-22 vector (0.57g). The protein levels of anti-apoptotic proteins of Bcl-2 family, such as Bcl-2 and Bcl-xL, were significantly reduced in JHU-22miR125b compared to JHU-22vec control cells, the pro-apoptotic proteins; BAK were significantly increased, and BAX were not significantly changed. Conclusion: miR-125b is able to effectively regulate the apoptosis regulator Bcl-2 family expression. It significantly inhibits HNSCC xenograft growth. The study demonstrates the potential of miR-125b as a value target for HNSCC early diagnosis and treatment.

**PO-027. Development of a Preclinical Radiographic Shielded Alignment Device**

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*Educational Research*

The ability to provide safe and reliable radiographic capacity in a preclinical simulation laboratory is a tremendous advantage in delivering a quality dental education course, especially for preclinical endodontics. Since most intraoral x-ray machines are designed to work with patients sitting in an upright position in a dental chair, some type of device is required in a preclinical simulation laboratory. This device is to assist placement of the object (tooth) to be radiographed, align the object with the sensor/film, provide proper radiation shielding in an open, crowded environment, and be in compliance with state public health guidelines for radiographic safety. Commercial devices are few and usually limited to the regional radiographic service vendor design

and capabilities. Therefore, this study describes the construction, radiation safety testing, and operation of a shielded preclinical radiographic alignment device. **Methods:** After Roseman University of Health Sciences IRB granted approval of the project, a series of modifications were made to a common household stainless steel breadbox to adapt it as a shielded preclinical radiographic alignment device. Descriptions and illustrations will be provided to demonstrate where to purchase materials needed to construct the device along with a step-by-step instruction guide. After construction, the device along with the Carestream CS 2200 x-ray unit was inspected and approved by the State of Utah for compliance with state and federal regulations for radiation exposure to dental personnel. Radiation safety tests were performed with the x-ray unit at 60 kVp, 7 mA, and an exposure time of 0.454 seconds. **Results:** The device allows easy placement and centering of the object over the sensor/film with alignment of the x-ray tube collimator placed at 180 degrees to the arm of the machine (or perpendicular to the floor) minimizing repeat exposures. Consistent reliable images are captured while the object (tooth) is centrally positioned over the radiographs. The buccal object rule is easily applied for superimposed roots or root canal spaces by positioning the x-ray collimator 168 degrees instead of the normal 180 degrees. The radiation levels were tested by the State of Utah in accordance with radiation safety guidelines defined by the state. Fifty radiographs were selected as a standard number of films that may be taken during a preclinical dental educational course. Standing adjacent to the radiation source and alignment device, the radiation exposure level was measured at 0.182 mSv/year and descended to 0.063 mSv/year if operated from six feet away. This exposure level is significantly less than the natural background radiation (1.0 mSv/year) and the average occupational dose for dental personnel in the United States (0.21 mSv/year). These levels are significantly decreased as the device was recalibrated for optimal use in the preclinical simulation laboratory with the x-ray unit settings at 70 kVp, 7 mA, and an exposure time of 0.150 seconds. The device has been demonstrated to be a safe, consistent, and reliable method to adapt radiographic shielding and alignment into a dental preclinical setting. Additionally, the device may be safely operated either by standing next to or at least six feet away from the radiation source. However, there is a 66 percent reduction in radiation exposure to the operator standing six feet away from the device during operation. This device facilitates preclinical dental exercises requiring radiographic images.

#### **PO-028. Are Dental Students Using Optimal Study Techniques?**

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*Educational Research*

Self-testing is a profound way to enhance student learning. When students test themselves or are tested on material, they remember more in the long term than if they had repeatedly studied it. Also known as retrieval practice or the testing effect, the act of retrieving information from memory has been found to have a significant effect on the long-term retention of the tested information. However, as was found in Karpicke et al.'s 2009 study of retrieval practice in a group of high-achieving undergraduate students, even the best students were not employing the most efficient evidence-based techniques. This project examined how dental students at New York University College of Dentistry (NYUCD) approach studying, examining students' most favored techniques. Most notably, the research is attempting to see if dental students utilize retrieval techniques while studying and are aware of their mnemonic benefits. **Methods:** This study utilized Karpicke et al.'s survey instrument and in consultation with these researchers, sought to examine dental students' favored studying techniques in one dental school. To our knowledge, this is the first time this study has been replicated in a population of health

professions students. This project was considered exempted research by NYU's Institutional Review Board. An online Qualtrics survey was distributed to students in the second-, third-, and fourth-year classes at NYUCD. **Results:** 87 students participated in the survey, which asked them to choose among the twelve different study techniques listed in Karpicke et al.'s study and to rank order their preferred top five techniques. 69 (79%) respondents indicated that rereading notes or textbooks was among their top five study techniques, and 37 (42.5%) listed it as their top study strategy. Memorizing was listed by 55 students (63%), but only 7% listed it as their number one strategy. Highlighting important points was ranked in the top five by 51 students (59%), but only 4% listed it first. Rewriting notes and studying in groups were both ranked in the top five by 36% of students, and 13% and 8% respectively listed these two techniques as their top choice. Self-testing was in the top five techniques for 39 students (45%), but none ranked it as their favorite strategy. The findings indicate that many dental students are unaware of the benefits of self-testing or do not engage in retrieval practice as frequently as is indicated by recent cognitive research. Educators should encourage students to employ retrieval techniques while studying to more effectively retain information and enhance their academic performance.

#### **PO-029. Development and Assessment of Discrimination Exercises for Faculty Calibration**

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*Educational Research*

Students learn more efficiently when they receive consistent formative and summative feedback from faculty members teaching in a preclinical operative dentistry course. Poor agreement among faculty members may lead to confusion and frustration among the students. The purposes of this research were 1) to identify the level of inter-examiner agreement among preclinical operative dentistry faculty members when grading Class II preparations performed by first-year dental students; 2) to develop discrimination exercises for specific preparation components where inter-examiner agreement was poor; 3) to evaluate if discrimination exercises were able to improve inter-examiner agreement among preclinical operative dentistry faculty members; and 4) to identify the level of intra-examiner agreement among the course faculty. **Methods:** This study was IRB exempt (#12-0262). The level of examiner agreement among eight course faculty members while grading a Class II preclinical cavity preparation accomplished by first-year dental students was identified. The course faculty included five full-time faculty members, one part-time faculty member, and two graduate students. Thirty-two Class II preparations, representing ideal (n=8), acceptable (n=8), correctable (n=8), and unacceptable (n=8) student performance, were randomly selected from a pool of 82. The criteria used to assess the cavity preparations were adopted from Sturdevant's *Art and Science of Operative Dentistry*, 5th edition. Thirteen components of each Class II cavity preparation were assessed. Analysis of the average inter-examiner agreement on these components revealed that four were below 60%. Inter-examiner agreement below 60% was considered poor. The four components were contact clearance (proximal and gingival), retention groove placement, retention groove depth, and preparation margin orientation. A 30-minute calibration session was subsequently developed so as to provide discrimination exercises utilizing 3-D models and digital images of various levels of student performance for each of the four components; didactic training relative to use of the UNC-15 periodontal probe and an amalgam condenser (size 2) as standards for judging clearance and depth; and incorporation of a protractor within the digital images to aid in the interpretation of preparation margin orientation. Twelve months after the preparations had originally been graded, the discrimination

exercises were given to each of the same course faculty members, who then immediately assessed the same 32 preparations. The inter- and intra-examiner agreement, following the use of discrimination exercises, was then calculated. Results: The average inter-examiner agreement increased from 55 ( $\pm 9$ ) to 70 ( $\pm 2$ )% for contact clearance and 57 ( $\pm 9$ ) to 64 ( $\pm 6$ )% for preparation margin orientation. The average inter-examiner agreement decreased 59 ( $\pm 3$ ) to 55 ( $\pm 6$ )% for retention groove placement. The average level of inter-examiner agreement for retention groove depth remained at 59%. The average intra-examiner agreement among the course faculty was 74 ( $\pm 5$ )%. Discrimination exercises that include use of measurement devices (periodontal probe, amalgam condenser (size 2), and digital images with protractors defining margin orientation) increased the level of inter-examiner agreement. However, inter-examiner agreement in the grading of preparation components (retention groove placement and retention groove depth) that relies heavily on the visual identification of an internal landmark, such as the dentino-enamel junction, did not improve. All members of the preclinical course faculty benefitted from the discrimination exercises regardless of the level of teaching experience. This study supports the use of discrimination exercises among preclinical operative dentistry course faculty members so as to increase inter-examiner agreement and thereby improve the consistency of faculty-student communication.

**PO-030. An Interprofessional Student-Run Clinic for the San Antonio Refugee Population**

Zeena Alsaman, Birgit Junfin Glass, Emily Watters, Andrew Muck, Roseann K. Vivanco, Moshtagh R. Farokhi, University of Texas Health Science Center at San Antonio

*New Program*

Due to limited resources and stress, newly arrived refugees to San Antonio, Texas, suffer from acute and chronic diseases reducing their potential for success in the new host country. The need for proper health education coupled with a stable holistic health care facility is essential for their future success. In 2011, dental, medical, and nursing students joined to create the student-run San Antonio Refugee Health Clinic (SARHC). SARHC serves the refugees by providing free health care/education while connecting them to San Antonio's primary health care system. Access to health education, health screenings, tobacco cessation, and dietary counseling are some of the ways to introduce this population to a solid health foundation. Methods: Select dental, medical, and nursing students under the mentorship of their faculty operate the SARHC clinic. The students work in collaborative teams where select members of the refugee community and bilingual students provide translational assistance. The nursing students are the first point of contact. They take vital signs, and medical students perform physical exams after gathering a history of present illness. Dental students provide oral health/nutritional education and screenings inclusive of head and neck examination and oral cancer risk assessment. All student teams communicate, educate, and collaborate with one another in the delivery of patient care. Results: Last year, 25 dental, 77 nursing, and 83 medical students rotated through the clinic where the most common diagnoses were dental pain, musculoskeletal pain, and gastrointestinal problems. The majority of patients were Nepali, Burmese, Iraqi, Iranian, Congolese, Burundi, and Thai. Sub-programs such as the student interpreter program, women's health education, Refugee Accompaniment Health Partnership and Women's Health in the Resettlement Community have resulted from the SARHC initiative to meet the refugees' needs. Currently under development is collaboration with community dental clinics such as the San Antonio Christian Dental Clinic to serve as their dental home. This interprofessional model has resulted in holistic and accessible health care for refugees in San Antonio.

Patients receive complementary comprehensive care while students benefit from development of cultural competence and reinforcement of humanitarian values. It is difficult to conclude which group is the biggest beneficiary of attending SARHC, the student or the refugee patient. In the words of a medical student leader, "One of the most rewarding parts of working at SARHC is being able to learn from the refugees."

**PO-031. Effect of Prior Military Experience on Dental Faculty Teaching Perspectives**

Kristi N.J. Kennedy, Charles B. Hermes, Archie A. Jones, William D. Hendricson, University of Texas Health Science Center at San Antonio

*Work in Progress*

**PO-032. The Relationship of Parity and Severity of Periodontal Disease**

Ryan S. Brown, Robert J. Kanas, Joseph J. Yoo, Elizabeth J. Unni, Roseman University of Health Sciences

*Work in Progress*

**PO-033. Engaging Patients in Health Care Education: Integrating Experiences into Preclinical Training**

Adam D. Bennett, Arizona School of Dentistry and Oral Health

*Work in Progress*

**PO-034. The Science of Community-Based Learning: Perceptions and Experiences of Dental Hygiene Students**

Alyssa Goike, Mary Paige Fournier, Pamela V. Gibes, University of Detroit Mercy

*Work in Progress*

**PO-035. Learning with Games in Dental Education: A Literature Review**

Michele J. Equinda, Darren Huang, Anthony D. Conguista, New York University

*Work in Progress*

**PO-036. Maximizing Revenue: Sustainability Model in School-Based Oral Health Centers**

Samuel Y. Lee, Karen M. Lee, Sei J. Kim, Marisa K. Watanabe, Timothy S. Martinez, Western University of Health Sciences

*Work in Progress*

**PO-037. Senior Mentorship Program at Harvard School of Dental Medicine**

Tien Ha-Ngoc, Sang E. Park, Harvard School of Dental Medicine

*Work in Progress*

**PO-038. Chart Review of Treatment of Retained Primary Mandibular Molar Teeth**

Allison C. Scully, Joan E. Kowolik, Indiana University

*Work in Progress*

**PO-039. Epithelial Cell Function in the Progression of Periodontal Disease**

Ann M. Decker, Shannon M. Wallet, University of Florida  
*Work in Progress*

**PO-040. Bioengineering Salivary Glands Using Elastomeric Poly (Glycerol Sebacate) Scaffolds**

Barbara A. Graham, Elia Beniash, Charles Sfeir, Sayuri Yoshizawa, University of Pittsburgh  
*Work in Progress*

**PO-041. Resident Research Productivity During Advanced Specialty Training in Endodontics**

Bekir Karabucak, Deena A. Alani, Laura P. Gart, University of Pennsylvania  
*Work in Progress*

**PO-042. Reporting of Child Abuse and Neglect in the Latino Population**

Michelle E. Webb, Aidee Nieto-Herman, Tufts University  
*Work in Progress*

**PO-043. Perceptions of Wellness and Burnout Among Dental Students**

Nina M. Guba, Patricia Xirau-Probert, Peter L. Harrison, University of Florida  
*Work in Progress*

**PO-044. The Effect of Retrieval Practice in Competency-Based Dental Training**

Sarah E. Prehn, Rebecca N. Goldman, Mitchell J. Lipp, New York University  
*Work in Progress*

**PO-045. A Hybrid Course in Diagnosis and Treatment Planning**

Susan Roshan, Baylor College of Dentistry  
*New Program*

The Diagnosis and Treatment Planning course at Baylor College of Dentistry is taught to a rather large group of senior dental students. In order to encourage an active learning experience directed by the learning individuals, an online component is included. Online collaborations on a series of clinical cases are guided by the students themselves and aimed towards completing a mutual task (designing a treatment plan). These purposeful and self-guided discussions allow for better development of the students' critical thinking and evidence-based decision making skills. The course director and other teaching faculty can monitor the students' discussions or participate in them if needed. Methods: During the first three years of dental school, students gain basic knowledge on treatment options, techniques, and materials available to address their patients' individual needs. Generally, this is accomplished through various consults with faculty teaching at different specialty departments. Students, somewhat passively, learn to analyze and evaluate the available information and, following the instructions given to them, finalize a comprehensive treatment plan for their patients. As these students progress towards graduation, they are expected to gradually become competent enough to design their patients' treatment plans with little direct input from the

faculty. This, in turn, requires competence in critical thinking skills to ask the right questions, collect relevant information, analyze and interpret the information, make inferences, and apply the available evidence and best practices in order to arrive at a reasonable treatment plan. A series of clinical case studies in diagnosis and treatment planning are developed as part of a course taught to senior dental students. Each week, one of these cases is posted online (Blackboard Learning 9.1, Blackboard Inc., Washington, DC) for students to review and discuss. Students are assigned to mini-groups of four or five, and each mini-group has a discussion board on Blackboard. At the end of each week, based on their discussions and using their critical thinking skills, students in each group design a treatment plan for the assigned case and submit their plan to the course director. During follow-up weekly meetings, these treatment plans and cases are discussed among four mini-groups of students under supervision of a clinical faculty member (their comprehensive care group leader). These discussions allow for better in-depth understanding of the oral diagnosis and treatment planning concepts, as well as clinical procedures and techniques in all disciplines of dentistry. At the end of the summer session, a short survey of the students was conducted (103 students enrolled, 100 responded). A large majority of the students (80 students, 78% of the class) reported that using the Blackboard during the course was not a problem, and many of them (77 students, 75% of the class) liked using it. A lower majority of the students (55 students, 53% of the class) agreed that the online discussions were helpful in developing treatment plans. Results: Use of Blackboard, an Internet program, allowed the course director to enhance an active learning environment to improve communication and to encourage the students' participation in discussions, while using their critical thinking and evidence-based decision making skills.

**PO-046. "Involve Me and I Learn": Integrating Basic Science and Clinical Education**

Deborah R. Franklin, Leslie B. Roeder, Gena D. Tribble, Saroj M. Bahl, Arthur H. Jeske, Cameron B. Jeter, John C. McMahon, Ted D. Pate, Charles F. Streckfus, John A. Valenza, University of Texas School of Dentistry at Houston  
*New Program*

The University of Texas School of Dentistry at Houston recently underwent curriculum revision and implemented a new case-based course entitled Clinical Applications I in fall 2012. This course was designed to explore interesting and timely topics in dentistry related to the basic science material presented in the Biomedical Science core course and Oral Biology I course that ran concurrently. These three new courses were designed to coordinate with each other and to foster integration of basic and clinical science knowledge and critical thinking. Methods: Clinical Applications I is a case-based, active learning course designed to coordinate with major topics presented in Biomedical Science, held on Monday and Wednesday, and Oral Biology I, held on Tuesday. Clinical Applications I met on Wednesday and Thursday. 103 first-year students were divided into 16 groups, each with a facilitator. Groups were provided with case scenarios and questions on Thursday at noon, and they designed a strategy to research and answer the questions associated with the case. In Wednesday sessions, students prepared the group presentation, with periodic guidance from a facilitator. In Thursday morning sessions, groups presented the case and engaged in discussion with the facilitator and rotating clinical faculty members. In addition to basic science concepts presented in Biomedical Science and Oral Biology, the cases also required knowledge from other concurrent courses, including Nutrition, Biomedical Informatics, Ethics, and Preventive Dentistry. Grading was by rubric, and each weekly presentation resulted in a group grade. Students were also asked to self-assess, set goals, and discuss their strengths and weaknesses with facilitators.

Individual student grades were given once a month during the semester. Results: The course was evaluated by two methods: online course evaluation and focus groups. Online course evaluations had an N of 39 out of 103 students. 82% of respondents strongly agreed that the course was interesting and that it was understandable. 87% of respondents strongly agreed that the course prepared them for practicing dentistry. Two focus groups were conducted two months after the course ended. Two students were in the first group; eight students were in the second group. Feedback reinforced the course's relevance to dentistry. Constructive criticism included the need to coordinate better with the Biomedical Sciences core course and that the sequencing of the oral biology, biomedical sciences core, and clinical applications courses should be reviewed. Implementation of the Clinical Applications I case-based course, integrated with two core basic science courses, received strongly positive written evaluations by students and positive feedback in student focus groups.

#### **PO-047. Pipeline Program to Expose Disadvantaged Public School Students to Dentistry**

Deirdre D. Young, Diane C. Hoelscher, University of Detroit Mercy  
*New Program*

Pipeline programs have been used as a strategy to support disadvantaged and/or underrepresented minority students in considering and pursuing dental careers. These programs seek to address oral health care workforce disparities and positively impact access to care. The Dental Imprint Program (DI) was developed by University of Detroit Mercy School of Dentistry (UDMSD) as a grassroots effort in the city of Detroit using an innovative approach to recruit potential students to consider a career in dentistry and to assist in overcoming barriers. This program is conducted in partnership with Detroit Public School District (DPS). The goal of this ongoing program is to expose area middle and high school students to the field of dentistry while increasing their knowledge of the dental admissions process, benefits of a diverse workforce, and oral health care. Methods: The DI program is conducted throughout the academic school year with 10 Detroit schools. The program consists of two phases: Phase 1—presentation at each school and Phase 2—activities at UDMSD. Key features of the DI program include Career Day presentations, tour of the dental school, hands-on impression making, interactive gross anatomy observation, cultural awareness workshop, dental career path workshop, and lunch with local dental professionals. This study was exempt per UDM IRB. Outcomes of the programs were evaluated using pre- and posttest (general dental knowledge, admissions requirements, oral hygiene care) surveys and reflection essays. The survey included Likert-style items regarding the benefits of the tour, gross anatomy observation, perceived increase in knowledge about careers in dentistry, and choosing a career in a health profession. Reflection essays consisted of four questions to assess attitudes and knowledge regarding careers in dentistry, oral hygiene, dental school application requirements, and the benefit of having culturally diverse dentist in their community. Results: To date, two cohorts have participated in DI: Cohort 1 (2011-12, n=193) and Cohort 2 (2012-13, n=196). Only six schools in Cohort 2 completed the reflection essay (n=116). For Cohort 1, average pretest score was 54.6% and 87.1% at posttest. Survey average scores were 4.82 for student attitudes toward overall benefits of the program; 4.52 for gross anatomy hands-on workshop; 4.74 for agreement that the tour exposed participants to the field of dentistry; and 4.55 for student interest in pursuing a career in the health professions. For Cohort 2, grant funding allowed for a consultant to complete data analysis for pre- and posttest and reflection essays. The average score on high school students' pretest was 55% and increased to 90.5% on posttest (n=174). A dependent samples t-test indicated this difference was statistically significant. For middle school participants, pretest mean

was 62.2% and posttest was 82.7% (n=22). The gain was statistically significant. The effect size was  $d=1.54$ . Participants made multiple comments for each reflection question. The three most frequently mentioned responses are presented. Most frequent responses (n=155) for why choose a career in dentistry were 1) financial security, n=22 (14.2%); 2) many specialties, n=21 (13.5%); and 3) details about science/educational requirements, n=20 (12.9%). Of 191 responses to oral hygiene recommendation to a family member (Question 2), the top three responses were 1) floss once or more daily, n=22 (33%); 2) replace toothbrush at least every 3 months, n=21 (18.3%); and 3) brush once or more daily, n=20 (16.8%). Question 3 regarding application requirements for dental school, most frequent responses (n=206) were 1) three letters of recommendation, n=75 (36.4%); 2) 20 on DAT, n=34 (16.5%); and 3) science/English coursework, n=27 (13.1%). Question 4 regarding benefits of a culturally diverse dentist in their community, top three, of 119 responses, were 1) learning about other cultures n=27 (22.7%); 2) patient comfort, n=19 (16%); and 3) someone to relate to, n=14 (11.8%). In conclusion, this program met its objectives of exposing Detroit middle and high school students to the field of dentistry and increasing their knowledge of the dental admissions process, benefits of a diverse workforce, and oral health care. Long-term studies are needed to measure the impact pipeline programs have on increasing enrollment of disadvantaged and/or underrepresented minority students in dental and allied dental programs. UDMSD has partnered with Michigan Area Health and Education Center (MI-AHEC) to track DI students through the pipeline following this program. Sharing results from pipeline programs may assist other institutions in developing their own programming for disadvantaged students in urban areas. Program funding: HRSA-HCOP, W.K. Kellogg/ADEA, MI-AHEC, Robert Wood Johnson-NLI.

*PO-048 was cancelled.*

#### **PO-049. More Face Time! Enacting Differentiated Instruction Principles in Flipped Classrooms**

HsingChi von Bergmann, Judith Walker, Mark Fogelman, Adriana Manso, Karen M. Gardner, James Richardson, University of British Columbia

*New Program*

Students in all contexts differ in their readiness to learn, interests, study habits, or experiences. In flipped classrooms, students learn content outside of the class time, such as viewing recorded-lectures, and spend in-class time interacting with peers and instructor to deepen learning. This model allows instructional design guided by principles of differentiated instruction, which emphasize individual differences when planning teaching. In this poster, we will describe the theoretical origin of differentiated instruction, flipped classrooms in dentistry using a technology-enriched learning environment, and our conceptualization of a two-tailed model of differentiated instruction in the creation of two online mini-modules. Methods: Differentiated instruction is a way of thinking about and approaching the planning and implementation of curriculum and instruction with an understanding that learners differ in important ways. Tomlinson, a key advocate of differentiated instruction, argues that such an educational philosophy is to refine, not to substitute for, existing quality curriculum. Since 2006, the D.M.D. curriculum of UBC Dentistry has undergone restructuring and evolution. The overarching objective used to guide this curriculum restructuring was that all students should experience a rich learner-centered environment to achieve UBC Dentistry Competencies. Over the years, instructors have consistently identified students lagging behind, from one month to a whole semester, in some psychomotor areas, while other students maintain steady progress and excelling students remain unchallenged.

We conceptualized a two-tailed model of instruction in creating two online mini-modules to address learning issues observed in both struggling and excelling students, hence enacting the principles behind differentiated learning. Technology-enriched classrooms come with varying formats and benefits. We want to use technology (i.e., online mini-modules) to allow students to work through cognitively demanding concepts at their own pace and to free up more face-to-face classroom time (face-time) for interactions between instructors and students and between students and students. Salman Khan's words in a March 2011 TED talk sum up what we intend to achieve, which is to flip the classroom by taking out a fundamentally dehumanized experience of a one-size-fits-all lecture and replacing it with human experiences. This project employs Smith's definition of experiential learning and extensive support on sound multimedia learning principles. With differentiated instruction as a guiding principle, it emphasizes both learning enrichment and the self-directed progression of learning: multimedia principle—students learn better from words and pictures than words alone; spatial contiguity principle—students learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen; temporal continuity principle—students learn better when corresponding words and pictures are presented simultaneously rather than successively; coherence principle—students learn better when extraneous words, pictures, and sounds are excluded; modality principle—students learn better from animation and narration than from animation and on-screen text; redundancy principle—students learn better from animation and narration than from animation, narration, and on-screen text; and individual differences principle—design effects are stronger for low learners than for high learners and for high spatial learners than for low spatial learners. This poster is designed to achieve the following objectives: to convey differentiated learning principles, to illustrate how a technology-enriched learning environment helps enact those principles, and to discuss further possible approaches to increase face time for differentiated instruction.

#### **PO-050. Measuring the Use of Evidence-Based Dentistry in Clinical Decisions**

Richard H. White, Bernadette A. Fa, Eugene T. Santucci, Troy A. Schmedding, Nate K. Yang, University of the Pacific Arthur A. Dugoni School of Dentistry

##### *New Program*

Measuring the use of critical thinking skills and evidence-based dentistry (EBD) is a valuable assessment tool for an evolving dental school curriculum. The use of EBD in clinical decisions is a component of the Helix Curriculum at the Arthur A. Dugoni School of Dentistry. Evidence-based practice is the standard for dental school curricula. Excellence Day at the school provided an opportunity to measure students' use of EBD. May 2013 marked the celebration of the 13th anniversary of Excellence Day. Excellence Day encourages participation in three broad areas: clinical cases, research, or service. Participation was voluntary. Clinical cases were presented in ten categories: caries risk management, implantology, aesthetics, complex care, removable prosthodontics, CAD CAM, supportive therapies (including oral surgery, periodontics, and endodontics), orthodontics, second-year case, and first-year case. First-, second-, and third-year (senior) students presented their very best clinical cases. Each student made a verbal presentation of his or her clinical case supported by audiovisual aids including posters, articulated models, and technological devices such as computers and iPads displaying images or videos. In some cases, the student would manipulate the image on the iPad or computer while making the presentation. Faculty judges listened and observed each student's presentation. Each student received a score for the presentation based on observations from multiple judges. The purpose of this study was to measure dental

students' references to and documentation of EBD in their clinical case presentations at the May 2013 Excellence Day. Methods: Students were informed at the time of application that the judges would look for demonstration of EBD. Students presented their cases to faculty, students, and visitors at Excellence Day. The faculty judges were calibrated the morning of judging by faculty members from the Excellence Day event organization team. Judges were instructed to score the students on their use of EBD in diagnosis and treatment planning as shown in their verbal and visual presentation. Judges had the latitude to award from 0 to 3 points for EBD. IRB approval is not required for this study. Results: There were sixty-four clinical cases presented by the students in the ten possible categories. Of the sixty-four presentations, fifty-five were judged to have presented sufficient documentation of EBD to be awarded 1, 2, or 3 points. This measurement shows that 86 percent of the students delivered a presentation that contained information documenting the use of EBD. Dental students participated in Excellence Day on a strictly voluntary basis. Their presentations illustrated a significant use of EBD in clinical decision making. This was the first time that Excellence Day judging specifically evaluated the use of EBD. As students' awareness of this judging criterion becomes more common knowledge, it will foster additional emphasis of the importance of applying the principals of EBD. EBD is also included as part of the curriculum in integrated clinical science case reviews and in occlusion class with the occlusal case presentation. In addition, there is an assessment in the local anesthesia curriculum asking students to identify an example in which EBD may guide the clinician in treatment planning the delivery of local anesthesia. These measurements can be a useful documentation of the use of EBD by the students. These are examples of how the culture of learning at a dental school can embrace and foster the use of EBD in clinical decision making.

#### **PO-051. IPE: Geriatric Interdisciplinary Team Competition (Memory Cafe)**

June M. Sadowsky, Donna Warren Morris, University of Texas School of Dentistry at Houston

##### *New Program*

The purpose of the Houston Geriatric Education Center (HGEC) Interdisciplinary Team Competition is to challenge the ability of students from different disciplines to work together to evaluate, diagnose, and prevent or treat complex elder issues; enhance students' knowledge about other health sciences disciplines; and encourage an interdisciplinary approach to health care. The competition consists of two interdisciplinary teams of students who compete for awards of excellence by responding to the case developed and judged by faculty. The task chosen was the feasibility of establishing Memory Cafe programs for dementia patients in selected community centers such as nutrition sites in areas of cultural and ethnic diversity. Each project will be scored on the teams' critical thinking skills, innovation, creativity, and quality of presentation. Methods: In order to prepare for the team competition, participants were provided with 24 hours of comprehensive interactive, experiential, didactic, face-to-face, and online education. Teams used HGEC website resources to guide their learning and made of members from each discipline. Problem-based scenario was the focus. Each group presented to the audience. A real-world panel of judges decided the winner. All students received a medallion to wear at graduation. Some received academic credit. Once the teams had been formed and the problem been given to the teams, no changes to the team membership could be made. Thus, participation on a team requires a commitment to be a responsible member of a team who will do his or her part to ensure that the goals of the team are established and met and participate fully in team meetings and the preparation of tasks designated by the team. Students conduct a feasibility assessment for neighborhood Memory

Cafe programs; identify the structure, organization, and services offered by the assigned community centers and any current dementia-related resources; describe the characteristics of seniors and/or their caregivers in the community; distinguish the dementia-related health and social needs of the seniors and/or their caregivers; and develop a plan to meet dementia-related health and social gaps in the community. Community Needs Assessment (Aging Agenda and Assessment Tools for Multi-Purpose Centers) describes issues that are of concern to the older adults. The Area Agency on Aging Multi-Purpose Center Information Dementia/The Alzheimer's Association of Houston and Southeast Texas Chapter has been serving the Greater Houston area for over twenty years. It provides support, education, and resources. The Memory Cafe concept provides an informal café-like setting for people with early-stage memory loss and their family caregivers to enjoy socializing and making new friends. A guide to setting up a Memory Cafe provides an overview of the program. Since 2008, the students involved in the competition have represented 8-12 disciplines from three universities within the Texas Medical Center. Pre-post knowledge tests showed a significant increase before and after the experience. Seventy-five percent of the students indicated that they were satisfied or very satisfied with the experience. Student enrollment increased from 30 students the first year to 57 in 2012 (62 in 2013), indicating a growing interest. New disciplines have been added yearly also. Additionally, student reflections in their online journals revealed an understanding for elder issues and an appreciation for interprofessional collaboration.

### **PO-052. Avatar-Mediated Practice Scenarios to Evaluate Cross-Cultural Knowledge and Understanding**

Tara L. Newcomb, Joyce M. Flores, Amy Adcock, Brett Cook, Laurie Craigen, Old Dominion University  
*Work in Progress*

### **PO-053. Educational Outcomes: Live Lectures vs. Electronic Media**

Carol M. Stewart, Kathleen M. Berg, University of Florida  
*Educational Research*

In the era of computer-based technology and computer-savvy students, many dental schools are enhancing their curricula with online courses or replacing traditional lecture-based courses with electronic-assisted courses. An initial concern is teaching effectiveness. How does student performance in a web-based course compare with the same information being presented in a "live lecture" format? Although numerous studies have reported no difference in outcome between traditional and web-based instruction, the type of content covered in the course has also been identified as an important factor influencing the effectiveness of the electronic format. The course material presented in this project included clinical pharmacology and the approach to medically complex patients to include case vignettes of patients presenting with oral lesions, polypharmacy, and complex medical concerns. This poster provides comparison of a 4DN course delivered in the traditional lecture-based format with the same course one year later using web-based taped lectures. As part of the post-course debriefing, statistical analyses were performed on both classes. It was of critical importance to determine if the electronic lecture format could be maintained for this course in the coming years. Methods: Measures of student performance on a 4DN (senior) course entitled Oral Medicine and Clinical Pharmacology were compared. Student performance for the 2011 senior class (n=84) and 2012 senior class (n=80) were assessed. The course methodology and material for both courses were identical with one exception. For the 2011 course, initial didactic material consisting of seven lectures was delivered in live lecture format. These lectures were audio-

videorecorded and posted on the electronic media site for student viewing. For the 2012 course, these lectures were only available via the electronic media site format. The analysis included performance on both the midterm exam and comprehensive final exam. Differences in performance between the two groups were examined using the t-test for independent samples. Results: The results indicated that students in the 2012 senior class, those who viewed only taped lectures, scored significantly lower on the midterm examination than those who viewed live lectures the previous year. The 2012 class also performed more poorly on the comprehensive final exam, but the difference between groups did not reach statistical significance. The senior dental students viewing taped lectures showed slightly poorer performance on the midterm examination. Reasons for this outcome might be related to being more actively engaged in learning with live lectures. Of note, the course evaluations were higher for the 2012 class (4.62/5.0) vs. the 2011 class (4.37/5.0). This could be in part due to the increased student flexibility regarding when/where the material could be accessed for the 2012 seniors.

### **PO-054. Comparing Faculty and Student Use of Social Media**

Linh Phan, Maureen McAndrew, New York University  
*Educational Research*

Social media are an evolving set of web-based technologies that allow people to create, share, and exchange information and ideas. According to the Pew Research Group study conducted in 2010, there is considerable generational variation in time spent using social media. A study was conducted at New York University College of Dentistry (NYUCD) in fall 2012 to ascertain differences in faculty and student use of social media. Methods: An online survey instrument was created asking NYUCD students and faculty about their use of social media. The Pew study was used to inform several of the survey questions. The research project received exempt status from NYU's Institutional Review Board. 151 student participants and 38 faculty participants responded to the 19-item Survey Monkey instrument about whether they use popular social media sites such as YouTube, Facebook, LinkedIn, and Twitter and to list other sites frequented. Respondents were asked about frequency of use and how much of their usage was for educational/and or work-related purposes. Results: Of the 151 student respondents, 43 percent were male and 57 percent female. 85 percent were between 21 and 30 years old, 13 percent between ages 31 and 40, and 2 percent (three students) were over 41. Of the 38 faculty respondents, 71 percent were male, 29 percent female, and 75 percent were over 51 years. The results indicated that dental students spend significantly more time using Web 2.0 technologies than faculty members. Specifically, 96 percent of students use YouTube versus 58 percent of faculty with 51 percent of student users visiting it daily versus just 5 percent of faculty. Furthermore, 89 percent of students use Facebook versus 60 percent of faculty, while 84 percent of students visit it daily versus 35 percent for faculty. Twelve percent (17 students) used Twitter versus just one of the faculty members. LinkedIn was the only site faculty used more than students. Other popular social media sites for students were Instagram with 43 student users and Pinterest with 19. The faculty respondents did not report using other social media sites. In general, the proportion of student and faculty social media time dedicated to educational or work-related purposes is less than 25 percent of total usage with the exception of the LinkedIn site. Favorable attitudes towards learning with social media technologies are associated with younger age and frequency of use. According to the American Dental Education Association, the average age of dental faculty members is 52. Web 2.0 technologies have the potential to provide enhanced learning environments that are student-centered as well as collaborative. However, as this research study suggests,

a significant generation gap may be impeding the incorporation of these technologies into dental courses. Faculty may need professional development in social media for instructional purposes as there appears to be a generational difference in comfort and experience.

#### **PO-055. Oral Health Education for New Mothers on the Postpartum Unit**

Lily J. Lim, Jill B. Fernandez, Peter Catapano, Donna Hallas, New York University

##### *Educational Research*

The purpose of this study was to implement an interprofessional oral health educational intervention for mothers of newborns on the postpartum unit and to assess the current awareness of mothers on infant oral health. Methods: An interprofessional team (pediatric dentists, pediatric residents, general dental students, dental hygienists, newborn and pediatric nurses, pediatric nurse practitioners [PNPs], and PNP students) from New York University developed a collaborative intervention at Bellevue Hospital to educate mothers of newborns prior to hospital discharge. One-half watched a DVD, and the others received routine oral health instructions by a professional as part of newborn discharge. They all received educational materials about oral health care. All mothers completed a pretest prior to receiving any intervention. Infants were recalled at six months for an oral health examination and caries risk assessment. Each mother took a posttest (which was the same as the pretest) and received follow-up educational intervention. Questionnaire responses were analyzed. The study was approved by NYU School of Medicine IRB. Results: The program implementation was successful, and 94 mothers were included in the study. At six months' follow-up, only nine mothers (9%) returned to the clinic with their babies for an oral health examination. Most of the mothers responded correctly to the questions; however, 8% were unaware of vertical transmission of streptococcus mutans, 25% did not think fluoride is safe and helps to prevent cavities, and 9% did not think it is important for their baby to see a dentist by age one. Newborn and postpartum nurses should be educated to provide oral health education to parents of newborns prior to discharge. Pediatric and family primary care providers should also be educated to perform oral health assessments and apply fluoride varnish as a primary prevention strategy. Infants should be referred to see a dentist by age one to establish a dental home.

#### **PO-056. Dental Student Self-Assessment Efficacy in a Comprehensive OSCE**

Christopher J. Van Ness, Pamela R. Overman, University of Missouri-Kansas City

##### *Educational Research*

The purpose of this project (exempt protocol #13-804 reviewed by the UMKC Social Science IRB) was to investigate the relationship between fourth-year dental student performance during a comprehensive objective structured clinical examination (OSCE) and their self-assessment of competence. Methods: Fourth-year dental students participated in an OSCE at the UMKC School of Dentistry. Nineteen stations tested their ability to apply knowledge gained from the following curriculum areas: 1) diagnosis and treatment planning, 2) provision of restorative dental care, 3) provision of pediatric, orthodontic, and endodontic care, 4) managing hard and soft tissue lesions, 5) managing medical emergencies, and 6) practice management. The OSCE was developed with focus on these areas given that faculty members have found these topics to be difficult to assess using traditional examination methods. In addition, surveys from our graduating seniors and alumni have identified these areas as challenging for beginning dentists. The final OSCE station was self-assessment. Each student indicated whether or not he or she

felt clinically competent to perform the tasks required during the OSCE. They were also asked to detail the ways in which they would improve their knowledge if they did not feel ready to practice the particular skill (for example, evaluating a cast to be sent to the lab). Student performance ratings on the nineteen stations were the sum total of three-level competency ratings on each station (2=excellent, 1=competent, or 0=standard not met). Qualitative student responses from the self-assessment were analyzed and coded into 19 thematic categories and 62 subcategories using NVivo 10. Self-assessment responses that indicated issues with the test design and administration, rather than study options under individual student control, were counted and summed to create a measure of student externality. The dataset with thematic codes was then imported into SPSS 20 and analyzed in relation to student performance ratings. Correlation analyses were conducted to investigate relationships between student clinical competency as measured by the OSCE and their self-reported strengths and weaknesses. Results: Student performance on each OSCE station and the overall OSCE varied widely. While faculty content experts designed stations to be at the level of a beginning general dentist, the majority of students failed to meet faculty expectations. The percentage of students earning a competent on all stations was only 5%. Overall, student self-assessment was consistent with exam performance. The majority of students performing less than competent indicated that review of course materials was necessary. Among the review techniques mentioned by students were rereading course notes, memorizing key concepts using flash cards, reaching out to faculty, and preparing reference sheets for practice. Interestingly, participants who frequently listed external problems with the test (i.e., testing flaws, not enough experience, no practice opportunity, inappropriate course sequencing) were more likely to score higher on the exam. For example, over 60% of students who indicated that competence would not be gained until they were in practice achieved a passing score on the exam. Such findings suggest that students with greater confidence regarding clinical competence are more comfortable critiquing testing flaws or curriculum issues. The OSCE performance provided insights for curriculum management and faculty calibration, as well as the need to incorporate self-assessment practice earlier in the curriculum.

#### **PO-057. Using Needs Assessment to Drive Faculty Development**

Linda S. Behar-Horenstein, Charisse N. Hudson-Vassell, Frank A. Catalanotto, Cynthia W. Garvan, University of Florida

##### *Educational Research*

Researchers stress the importance of ensuring that faculty development services are aligned with faculty needs. Rather than assume what faculty needs are, researchers and practitioners should assess faculty members' needs prior to developing a program aimed at fostering professional growth. This type of assessment can help to ensure congruence between services and needs. In this study, we explored the degree of congruence between 1) faculty-identified needs and priority in teaching, scholarship, and administrative and leadership skills for career advancement and 2) satisfaction with current faculty development programs and participation. We also assessed faculty members' perceptions of the mentoring they have received and the top three needs that they believed would advance their career. Methods: An adapted faculty needs assessment was administered to full-time faculty members in a College of Dentistry (n=125). The Human Resources and Services Administration (award # 1D86HP24477-01-00) funded this faculty development initiative. After receiving IRB approval, participants received a pre-notification invitation, a letter of informed consent, and request to complete the 37 item survey. Participants rated their knowledge of topics using a five-point scale where 1=none, 2=very little, 3=some, 4=approaching

mastery, could not teach others, and 5=mastery, could teach others; they also rated the priority of the topics 1=low, 2=medium, and 3=high. The survey yielded a 58.4% response rate, with 73 out of the 125 full-time faculty members having participated. Of the 73 responders, 61 completed the survey. McNemar's test was used to measure the congruence between the participants' need for knowledge and their ratings of priority. Fisher's exact test was used to investigate the relationship between the program ratings and participation. A significance level of 0.05 was set, though a significance level of 0.10 was used to test for trend level significance. Of the respondents, 54 listed up to three current needs; in total 62 needs were listed. The items were open coded and categorized into six themes: faculty development, time, publishing/conducting research, mentoring, grant proposal writing, and leadership. Conceptual definitions were developed for each theme, and data were extracted to exemplify each of the themes. Results: Nearly three-fifths to nearly all (73.3% to 91.8%) of the participating faculty members rated their teaching knowledge as low on the items of providing constructive feedback to learners, using effective assessment, enhancing small-group teaching, using emerging technology in the classroom, selecting appropriate teaching methods, enhancing classroom teaching, designing courses, and developing an educational portfolio. Those who identified these activities as high priority needs ranged from less than one-third to less than one-half (26.2% to 47.5%). The findings showed that the respondents have the need for these skills but do not think they are high priority. More than two-thirds rated their knowledge as low in scholarship items: grant proposal writing in discipline research and documenting education outcomes. Less than one-third (18.0% to 32.8%), however, identified these activities as high priority. Nearly three-fourths to nearly all (73.8% to 91.8%) rated their knowledge as low in acquiring leadership skills for career advancement items: balancing work and personal responsibilities, managing stress, and providing peer observation of teaching with feedback. About one-fifth to slightly over one-half (20.0% to 55.7%) rated these activities as high priority. The findings showed a significant difference between knowledge areas and priorities. In some areas, when faculty members judged their knowledge to be low, they also judged the priority of these items to be high. In some areas when they judged their knowledge to be high, they judged the priority to be low. Significant differences were observed in seven of the nine knowledge items, five of the six scholarship items, and eight of the twelve items relevant to leadership skills that might fulfill career advancement items, suggesting that these were areas where they indirectly indicated the item was indeed a priority for faculty development. These findings imply that even when faculty members have the need for specific skills, they may not recognize it. The data also show that the majority of faculty members did not have quality mentoring. Findings from the needs assessment greatly shaped programming the faculty development initiative at UFCD. Our program currently addresses 14 of the 20 needs identified in this study.

#### **PO-058. Student Perceptions and Self-Report of Multitasking Behaviors by Course Structure**

Cameron B. Jeter, Gena D. Tribble, University of Texas School of Dentistry at Houston

##### *Educational Research*

Students increasingly have access to and use technology in the classroom. With this barrage of instant information, students may be more likely to multitask; yet this rapid task switching has been shown to be detrimental to attention and learning retention. We wondered if student awareness and perception of multitasking would impact classroom task switching behavior, whether these perceptions changed throughout the first semester of dental school or if task-switching activity varied by course structure. Methods: IRB exemption was

obtained. On the first day of class, faculty defined multitasking, discussed its barriers to attention and learning, and led students in an interactive demonstration of multitasking pitfalls. As a baseline, students were given the opportunity to answer three survey questions about current multitasking behavior and opinions. These same students completed the survey two more times throughout the semester in both lecture hall and small group settings. Group responses were compared across time points and class settings. First, we assessed if students' opinions and self-reported behaviors changed throughout the semester. Second, we considered whether teaching venue had an impact on their responses. Finally, we evaluated if their self-reported behaviors reflected their opinions on multitasking. Results: As the semester progressed, an increasing number of students reported that they got less done while multitasking, yet simultaneously an increasing number of students reported a rise in multitasking activities during class. Multitasking behaviors were more prevalent in the lecture-based course. Conclusion: Student instruction and opinion on multitasking are not always reflected in behavior. Increased experience with graduate level work led students to recognize the pitfalls of multitasking, but did not attenuate self-reported task switching behaviors. Course structure does impact multitasking opinions and behaviors; students involved in self-directed small group activities were less inclined to multitask than those in a classroom lecture.

#### **PO-059. Digital and Film-Based Imaging: Dental Hygiene Faculty Opinions**

Ann M. Bruhn, Susan L. Tolle, Old Dominion University

##### *Educational Research*

The purpose of this study was to determine dental hygiene faculty opinions regarding teaching in a clinical environment with digital radiography compared to film-based imaging after one year of digital imaging use in a baccalaureate dental hygiene program. Methods: Digital imaging systems are purported to offer advantages over traditional film based radiographic imaging. The potential for less exposure time may improve patient safety, and the almost instantaneous image display may be helpful when educating both students and patients. The integration of this technology into the education of future oral health care professionals is critical. However, despite the importance of digital imaging, few dental hygiene programs have incorporated this technology into clinical settings. A study determining faculty opinions about adoption of digital radiography compared to film-based imaging is important in order to assess functionality, needs preferences, and attitudes in an educational setting. The degree to which dental hygiene faculty members were satisfied with teaching in a clinical setting using 100% digital imaging technology after the elimination of film-based imaging was the major aim of this study. After institutional review board approval a 15-item investigator designed questionnaire was emailed via Survey Monkey to 21 dental hygiene faculty members in a B.S. entry-level dental hygiene program. Descriptive statistics were used to analyze the data. Results: An overall response rate of 100% was obtained. Results reveal that 57.2 percent of the participants believed student exposure of bitewing images were easier with film versus direct digital sensors, and over three-quarters of participants (80%) thought student periapical exposures were easier with film. Most faculty also indicated student instruction in radiographic technique was easier with film-based radiography (55 %) compared to the digital sensor although the vast majority (76.2) indicated digital technology saved considerable student treatment time. Compared with film-based radiography, a majority of respondents indicated digital radiography allowed for clearer interpretation of restorative materials (56.3%) and radiolucent diseases and artifacts (58.8%), and 50% of the respondents agreed that radiopaque artifacts were more easily distinguished with the digital image receptor. Results were

divided when comparing alveolar bone changes between the two imaging methods with almost 30% being uncertain which technique was best. When looking at retakes in the educational environment, most faculty respondents believed more were necessary to obtain an image of diagnostic quality (57%). The two questions allowing open-ended opinion comments revealed concerns that the digital image receptor was uncomfortable to the patient due to the size, which created difficulty in obtaining standardized images. However, several comments were positive toward instruction in radiographic technique focusing on the instant appearance of the image and ability to immediately correct errors. About one half of the respondents revealed they personally preferred to use direct digital radiography with 23.8 percent uncertain as to whether or not faculty members believe better imaging quality was found with film versus the digital image receptor in an educational setting; however, most respondents indicated that exposures were easier for students with film-based imaging. Although faculty members indicated digital imaging resulted in decreased student working time, they also indicated more retakes were necessary to achieve optimal image quality, which is a concern when evaluating radiation safety principles.

#### **PO-060. Student Perceptions of Classroom Instruction: Traditional versus Distance Education**

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*Educational Research*

In fall 2009, the Department of Dental Hygiene at the University of Arkansas for Medical Sciences (UAMS) in Little Rock, Arkansas, established a distant site approximately 180 miles from UAMS in Mountain Home, Arkansas. Using an interactive video network supplemented by online learning via Blackboard, didactic courses were broadcast from UAMS to Mountain Home allowing the five students in Mountain Home to receive the same classroom instruction, at the same time, and by the same faculty as the students in the parent program in Little Rock. The development of the distant site presented the opportunity to study dental hygiene students' perceptions of distance learning over time. The purpose of the study was to compare the students' perceptions at both program locations of distance learning as they progressed through the 21-month curriculum. The study sought to answer the following questions: 1) Is there a difference in the initial perceptions of students on the main campus and at the distant site toward distance learning? and 2) Do students' perceptions change over time with exposure to synchronous distance learning over the course of the curriculum? Methods: Thirty-nine dental hygiene students participated in the study. All students were females between the ages of 20 and 35 years; 37 were Caucasian and two African American. Adapted from a survey developed and validated by O'Malley, a 15-question Likert scale survey was administered to dental hygiene students at four periods during the 21-month program: matriculation, end of the first semester, end of the second semester, and program completion (fourth semester). The survey assessed students' perceptions on effectiveness of distance learning and advantages of distance learning. Independent samples t-test revealed a statistically significant difference between students on the main campus (n=34) and at the distant site (n=5) in their initial perceptions of effectiveness but not on advantages of distance learning. Results of repeated measures NOVA showed that students on the main campus statistically significantly decreased over time their perception on effectiveness and advantages of distance learning. Students at the distant site

statistically significantly increased their perception over time on effectiveness and advantages of distance learning. Results: The study revealed that over time students' perceptions at the main campus and distant site did change but in opposite directions: as the distant site students' perceptions of distance learning became more positive, the main campus students' perceptions became more negative. It can be hypothesized that because students in Mountain Home chose to attend at the distant site, they were a self-selecting group with positive perceptions toward distance delivery of education. Accordingly, students in Little Rock did not select distance delivery and, on occasion, found technical issues with the interactive video network distracting. Further research needs to be conducted to ascertain why the perceptions of these two groups moved in opposite directions. A limitation of the study was the small sample size at the distant site. The study has implications for improvement of teaching and learning in distance learning courses. A literature review revealed that little research has been done on the change in students' perceptions of the distance education delivery methodology overtime.

#### **PO-061. An Innovative Approach for Developing Competence in Lasers for Predoctoral Students**

Christina B. DeBiase, Susan Kay Morgan, West Virginia University  
*Educational Research*

Interest in lasers among dental professionals is rapidly growing. Currently, less than 10% of all dental schools in the United States provide clinical experiences for predoctoral students culminating in the achievement of competence in the form of laser certification. The purpose of this presentation is to provide an innovative format for laser instruction that can be easily integrated into the predoctoral curriculum and to demonstrate the outcomes of this approach over a four-year period. Methods: Laser instruction was initiated at West Virginia University School of Dentistry in 2009 with a two-day continuing education-type course involving fourth-year dental students, postdoctoral students in endodontics, orthodontics, and prosthodontics, and selected faculty members. The course was taught by an expert in the area of laser dentistry and on-site faculty members certified in laser dentistry assisted with the clinical portion of the course. Each day involved intense evidence-based lecturing with an unbiased perspective as well as hands-on experience with CO2 erbium YAG and diode lasers. At the conclusion of the course, a certification exam was administered to all participants. This exam consisted of both didactic (75-item multiple choice exam) and clinical components that addressed knowledge of the science of lasers (therapeutic applications, laser-based diagnostics, and soft tissue/hard tissue techniques), laser operation, safety issues, and infection control. In addition, a seven-item Likert scale course evaluation was distributed to gain feedback for future courses. Results: The passing rate (exam score of 75% or above) for participants was 96.8% over the four-year period. No differences were noted in pass rates among different groups completing the course: predoctoral students (n=183), postdoctoral students (n=32), and faculty (n=7). The majority of respondents strongly agreed/agreed that the course was current, comprehensive, well organized, stimulated critical thinking, and relevant to their role as health care providers. Additional comments were overwhelmingly positive. Over the years, suggestions for improvement have included conducting a longer course, offering it earlier in the curriculum, and the purchase of more lasers to enable longer hands-on sessions. The results indicate that the addition of laser instruction in the predoctoral curriculum is a valuable and relevant competence that can be easily integrated into the existing curriculum and assessed routinely by clinical faculty following the course. (IRB exemption is in process for the purposes of this submission, and by November 2013, data will be available to report for the fifth year of this course.)

**PO-062. Basic Preclinical Exercises as Educational Probes to Target Early Intervention**

Lee W. Boushell, University of North Carolina at Chapel Hill; Ricardo Walter, University of Pennsylvania

*Educational Research*

Poor student performance on preclinical practical examinations may impair learning efficiency and, potentially, subsequent clinical performance. Early identification of students with poor ability to execute clinically related cavity preparation tasks may allow development/implementation of student specific interventional strategies. The purpose of this research was to assess whether student performance on a combination of three basic exercises, utilized early in a preclinical operative dentistry course, could identify students who would potentially benefit from early remediation. Methods: This study was considered IRB exempt (#12-1849). Seventy-nine first-year dental students completed the following basic exercises at the beginning of their first-year preclinical course in operative dentistry: cavity preparations on a LAP II teaching aid, a Class I cavity preparation in a dentiform tooth, and a wax restoration of a Class I preparation in a dentiform tooth. Performance on the LAP II and the Class I cavity preparation was assessed for acceptable preparation depth/width. Performance of the wax restoration of a Class I cavity was assessed for acceptable anatomic form and marginal integrity. The basic exercises were assessed according to defined criteria by the course director who was blinded to student identity. Students were categorized as not at-risk, potentially at-risk, or definitely at-risk according to their performance on these exercises. Students who were able to acceptably accomplish three or four components of the basic exercises (correct depth/width on the LAP II, correct depth/width of a Class I preparation, correct anatomy/margins on the wax restoration) were considered to be not at-risk. Students who were able to acceptably accomplish two of the four components were considered potentially at-risk. Students who were able to acceptably accomplish none or one of the four components were considered at-risk. The students subsequently completed four practical examinations, each of which tested the level of development of various hand-eye motor skills necessary for patient care. The practical examinations were assessed according to defined criteria by the course director masked to student identity and graded as clinically acceptable or not acceptable. An exact logistic regression was used to analyze the relationship between basic exercise risk level of the students and the students' performance on the practical examinations later in the course. Results: Students who were potentially at-risk were 7.7 times more likely to have an acceptable grade on at least three of the four practicals and 18.6 times more likely to have received an acceptable grade on the first two practicals than students who were at-risk. Students who were categorized as not at-risk were not significantly more likely to have better performance on the practical examinations than those who were potentially at-risk. Performance on any one basic preclinical exercise, accomplished early in a preclinical operative dentistry course, may not accurately identify students who would benefit from additional instruction or practice. However, analysis of performance on a combination of basic exercises accomplished early in the preclinical operative dentistry course may allow identification of students who are at risk of unacceptable practical performance and who may benefit from immediate, additional instruction.

**PO-063. An Analysis of Student Self-Assessment of Operative Preparations Using CAD-CAM: A Preliminary Analysis**

Keith A. Mays, East Carolina University; Eric D. Levine, University of Maryland

*Educational Research*

One of the goals of dental education is to train the dental student to become a self-directed learner. In order to become a self-directed learner, the student must be trained to critically evaluate his or her own work. Therefore, self-assessment is an integral component of the dental education process. To that end CAD-CAM technology potentially affords dental education an opportunity to generate an objective assessment tool to evaluate tooth preparations. Traditionally the evaluation of the dental student's work by the faculty member or the student has been a subjective visual process that is heavily dependent upon the experience of the evaluator. The purpose of this study is to demonstrate that CAD-CAM technology will improve the student's ability to self-assess tooth preparations. Methods: The University of Maryland Institutional Review Board approved this study. Sixteen first-year students prepared Class II cavity preparations. The students evaluated their preparation by two methods (visual and CAD-CAM), then an experienced faculty member evaluated each preparation. A matched paired t-test was used to compare the difference between the mean preparation score for the student and the faculty member. Descriptive analysis was performed for select criteria for the procedure. Results: There was no significant difference in the total score when comparing the digital and visual for both evaluators. The average total score grade for a Class II operative preparation when graded by the experienced clinician was not significantly improved by using digital scanning. Although the average total score when evaluated by students was not significantly different, evaluation with a digital scanner helped students to better assess the occlusal size and shape, retention and resistance form, and cavity definition. There was a trend for the students' assessment to be closer to the faculty members' assessment when using CAD-CAM for occlusal size and shape, proximal shape and orientation, retention and resistance form, and retentive grooves. In conclusion, CAD-CAM technology is a potential tool that will improve students' ability to self-assess specific aspects of cavity preparations.

*There is no PO-064.*

**PO-065. Efficacy of Preclinical Fixed Prosthodontics Courses Preparing Students to Treat Patients: Survey Analysis**

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*Educational Research*

Developing the ideal dental school curriculum is an ongoing challenge for dental educators. The ultimate goal of health professions education is to craft a program that integrates and implements the various domains of learning that hopefully instill competent practice in a learning environment that mirrors actual work settings. In pursuit of this result, dental schools must continually adjust curricula, coursework, and content in search of the perfect paradigm. Assessment of dental school curriculum is a critical component of the educational development that defines the practice of dentistry. Literature and research on assessment methodologies in dental education are relatively sparse. The purpose of this project was to assess the effectiveness of preclinical procedures presented in a fixed prosthodontics course with respect to preparing students for clinical care. Methods: An IRB-approved survey was distributed via Qualtrics to third- (pre-prosthodontic clinic) and fourth-year (prosthodontics clinic) dental students regarding their perception of their preparedness to diagnose and treat patients with fixed prosthodontics needs. Thirty survey items developed based on the logical sequence of events for treatment planning and execution of simple fixed prosthodontics cases were phrased as "how helpful was (topic) in preparing you?" Each item was rated using Likert-like responses ranging from strongly

agree to strongly disagree. An exploratory factor analysis of the thirty items was used for data reduction. Hypothesis testing indicated that three factors were sufficient (Ho: three factors are sufficient;  $p=0.07$ ). Survey items were assigned to one of the three factors if the factor score for that item was 0.25 or higher and if the difference between factor scores for that item was 0.10 or greater. The standardized Cronbach coefficient alpha values were 0.81 for diagnosis and treatment planning, 0.71 for technical skills on execution of treatment, and 0.68 for laboratory procedures and problem-solving techniques. Average scores were calculated for each construct. The responses regarding which preclinical procedure of the course prepared students the least and the best were consistent between the third- and fourth-year students. Greater than 23 percent of students (both classes) perceived that the diagnosis and treatment planning and cementation selection and procedures modules were not effective preparation for clinic, while greater than 40% perceived the foundation and post and core preparation as ineffective. Greater than 23% of students reported that multiple tooth preparation and preparation of casts and diagnostic waxing were highly effective modules; greater than 36% positively perceived the provisionalization module; and greater than 84% perceived the single tooth preclinical preparation was highly effective. Results: The answers to the questions regarding which procedures in the preclinical course the students perceived prepared them for clinical care the least and the best were consistent between the third- and fourth-year students. Diagnosis and treatment planning, foundation post and core preparation, and cementation selection procedures preclinical programs were selected by the fewest students as areas that best prepared students for clinic. These rankings suggest that improvement is required in these areas to put them on par with the rest of the program. Shortage of faculty, lack of dental technicians, and budget constraints would be easy scapegoats for the apparent shortfall in teaching the unique aspects of treatment planning and sequencing of treatment. While our research suggests that there is a weakness in the current system, further research is necessary to pinpoint the specific causes of the weaknesses in the system structure. Despite its shortcomings, the current curriculum and system provide the most viable way of teaching motor skills and simulating dental practice.

#### **PO-066. Assessing Critical Thinking of Dental Hygiene Students Utilizing Virtual Patients**

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*Educational Research*

Critical thinking has been identified as an essential attribute for health care professionals. While treating patients, dentists and dental hygienists are required to analyze clinical situations in order to solve complex clinical problems. Dental hygiene as well as dental education has been charged with the task of determining which educational practices promote critical thinking. The purpose of this pilot study was to determine the effects of virtual patient simulation on critical thinking in dental hygiene students. Methods: Virtual patient simulation is an active learning strategy that uses computer-based virtual patients to create a simulated patient experience in a controlled environment. Virtual patients are designed to replicate as authentically as possible real-life clinical scenarios. Virtual patients were introduced into the curriculum at the University of Texas School of Dentistry at Houston in an effort to provide students with a common and consistent clinical experience. We have sought to integrate students' basic science knowledge with their clinical knowledge as a way to help them connect the dots between what they learned in the classroom and providing patient care. The patient cases offer clinical scenarios that the students may not have experienced in clinic and include situations that incorporate all aspects of clinical practice including medical management, medical emergencies, ethics and professionalism, cultural awareness, and patient management as

well as clinical decision making and implementation of treatment. The pilot study was initiated after being granted exempt status from the Institutional Review Board at the University of Texas Health Science Center. A pretest-posttest design utilizing the Health Science Reasoning Test evaluated the critical thinking scores of second-year dental hygiene students who participated in virtual patients during their senior year. A paired t-test was conducted to compare the pretest and posttest scores. Results: There was an observable gain of nearly one point in the critical thinking scores, although the paired t-test did not demonstrate a statistically significant gain in this relatively small sample from pretest to posttest ( $p=0.074$ ). Analysis included the difference in scores from each individual from pretest to posttest, as well as mean scores. While the mean difference score was only 0.77, some test takers improved their scores as much as six points. The results of this pilot study are encouraging and may have implications to support the use of virtual patient simulation in dental hygiene education. Further research is needed to validate the findings of this study.

#### **PO-067. Student Preferences and Performance in Crown Design: Conventional Versus CAD**

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*Educational Research*

Computer-based education methods can facilitate interactive learning and have potential benefits as a teaching resource. While the use of computer-based digital interactive technologies incorporating 3D graphics as an educational aid in teaching dental morphology has been reported, its application in fixed prosthodontics curricula is minimal. Many preclinical fixed prosthodontics courses require students to apply the skill set developed in dental morphology to the design and fabrication of full contour restorations. Yet there exists an apparent gap in use of 3D graphics technology between dental morphology and crown fabrication in fixed prosthodontics. Currently, the preclinical fixed prosthodontics courses at Southern Illinois University at Edwardsville's (SIUE) School of Dental Medicine require students to manually design a crown form in wax. The purpose of this study was to compare student experiences with this traditional crown design method to computer-aided design (CAD) and computer-aided manufacturing (CAM) of a full contour crown. We sought to evaluate student perceptions of traditional vs. computer-aided crown design, while comparing the effectiveness of either technique through comparative grading of the final products. Methods: This research was approved by the Institutional Review Board of SIUE. Each student received two identical maxillary right first molar manikin teeth prepared for an all-ceramic crown. On one tooth preparation, students fabricated a wax pattern for a full contour crown, and on the second tooth preparation, students designed and fabricated an all-ceramic crown using CEREC technology. After completion of each project, students submitted their crown designs (wax and CAD/CAM all-ceramic) on the manikin tooth under blinded conditions. Each project was equal in weight for eventual course grade computation. Immediately following completion, projects were evaluated for occlusion by three faculty members. Prior to grading the projects for anatomic form, manikins with each of the crown designs were duplicated and poured in dental stone to blind the evaluators as to which crown designs were wax vs. CAD/CAM ceramic. Upon completing of the projects, students were asked to complete a nine-question, five-point Likert scale survey, designed to assess their perceptions of and learning associated with the two design techniques. The primary outcomes measured were the project grades and the number of occlusal contacts realized. Data were analyzed for statistical differences using a paired t-test. Results: The average grades for crown design projects were 78.3 (CAD) and 79.1 (wax design). This difference was not statistically significant.

The mean numbers of occlusal contacts were 3.8 for CAD crowns and 2.9 for conventional wax technique, which was significantly higher for CAD crowns compared to the wax group. There was no significant difference between numbers of crowns demonstrating hyperocclusion or tripodization among the two groups. The survey results indicated that 92 percent of respondents strongly agreed or agreed that they enjoyed designing a full contour crown using CAD, while only 22 percent of respondents strongly agreed or agreed that they enjoyed designing a crown using conventional wax techniques. When asked about ease of use, 86 percent of respondents strongly agreed or agreed that they spent less time designing the crown using CAD and 90 percent strongly agreed or agreed that it was easier designing a crown using CAD as compared to wax. From a learning perspective, 78 percent and 74 percent of respondents strongly agreed or agreed that they learned more about position of occlusal contacts and the size/strength of occlusal contacts (respectively) using CAD to design their crowns as compared to conventional wax. Forty-two percent of participants strongly agreed or agreed that they learned more about tooth contours using CAD to design a crown as opposed to waxing a crown, while 62 percent indicated they strongly agreed or agreed that they learned more about excursive occlusion/interferences using CAD. Lastly, 72 percent of respondents strongly agreed or agreed that CAD should be included in the laboratory portion of the dental morphology course. Survey results demonstrated a strong preference among students for computer-aided design of crowns in favor of conventional wax design. Students indicated that they learned more about occlusal position, size, and strength of contacts using CAD but did not indicate a preference of either technique for judging crown contours or excursive occlusion/interferences. Finally, respondents indicated the CAD technique was more time efficient than the conventional wax technique. Student grade outcomes were not different using the two techniques; however, students achieved more occlusal contacts using CAD than conventional wax techniques.

#### **PO-068. Using Prerequisite Courses to Predict Grades in Dental School**

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##### *Educational Research*

The purpose of this study was to determine the value of undergraduate courses, specifically biochemistry and anatomy, in predicting grades in comparable dental school courses and to use this information to evaluate whether these courses should be a requirement for entering dental school at the University of Florida. Methods: Two undergraduate courses, biochemistry (with or without a laboratory component) and anatomy, were selected for this study. Biochemistry is a required course, and anatomy is a recommended course for matriculation into the University of Florida College of Dentistry (UFCD). Undergraduate biochemistry and anatomy numerical course grades, credit hours, and undergraduate science GPA were obtained from AADSAS applications for each student of the UFCD entering class of 2012 (n=82). UFCD numerical grades (range 2.0 to 4.0) in comparable courses were then recorded for each student. The data were de-identified, and statistical analyses were performed to compare the undergraduate science GPA and biochemistry and anatomy course grades, categorized by the number of courses or credit hours completed, to grades in comparable dental school courses. Statistical analyses, including an unpaired two-tailed t-test, one-way ANOVA with Bonferroni's multiple comparison post-test and linear regression analysis, were performed where applicable. Appropriate IRB approval was obtained. Results: Anatomy is a recommended but not required undergraduate course for UFCD matriculation, so a comparison was made between students who had taken an undergraduate anatomy course (n=52) and those who had not taken an undergraduate anatomy

course (n=30). The results of the anatomy prerequisite course analysis were as follows. First, there was no significant difference in the UFCD gross anatomy course grade between students who had or had not taken an undergraduate anatomy course (p=0.8485). Second, there was no significant difference in the UFCD gross anatomy course grade based on the number of undergraduate anatomy courses taken (range 0-3) (p=0.9206). Third, the grade received in the undergraduate anatomy course associated with the UFCD gross anatomy grade (p=0.0019). Fourth, the undergraduate science GPA was associated with the UFCD gross anatomy grade (p=0.0254). Biochemistry is a required UFCD undergraduate course although not all undergraduate biochemistry courses taken by UFCD students included a lab component. This allowed for comparison between courses with and without the lab. Results of the biochemistry course analysis were as follows. First, there was no significant difference in the UFCD biochemistry course grade based on the number of undergraduate biochemistry credit hours (range 2-6) that were taken (p=0.9529). Second, completing an undergraduate biochemistry lab course versus not completing one had no significant difference in the UFCD biochemistry course grade (p=0.5671). Third, the undergraduate biochemistry lecture course grade is associated with the UFCD biochemistry course grade (p=0.0227). Fourth, students having taken less than four credit hours of undergraduate biochemistry had a strong association with their undergraduate course grade and their UFCD biochemistry grade (p=0.0039). Fifth, undergraduate science GPA was associated with the UFCD biochemistry course grade. Sixth, undergraduate science GPA was more strongly associated with the UFCD biochemistry course grade for students who did not complete an undergraduate biochemistry lab course. The surprising result of this analysis was that the number of completed undergraduate biochemistry or anatomy courses or credit hours made no significant difference in grades in the comparable dental school courses. The variability in undergraduate course content among colleges and universities may have contributed to this finding. Taking an undergraduate biochemistry lab course did not affect the dental school biochemistry grade. This result may be explained because the content of the lab course did not have relevance to the dental school course that did not have a lab component. Not surprising is that the grade in both undergraduate courses associated with the comparable dental school course grades, particularly in anatomy. Also, as expected, the undergraduate science GPA correlated with dental school grades in both courses, especially in biochemistry. The results from our study suggest continuing to use the current criteria for admissions, except for eliminating the biochemistry lab as a prerequisite.

#### **PO-069. Evaluating the Inclusion of Cultural Competence in a Tobacco Dependence Curriculum**

Heather J. Doucette, Peggy J. Mailet, Dalhousie University

##### *Educational Research*

The purpose of this study was to assess dental hygiene students at Dalhousie University for perceived knowledge of the culture of Canadian First Nations and Inuit peoples and perceived preparedness to provide patient education and health behavior counseling to this population. The literature suggests that oral health professionals are well placed to provide tobacco dependence education (TDE) to patients. There is also the suggestion that cultural competence in health care is necessary to improve patient outcomes. First Nations and Inuit peoples have been identified as having tobacco use rates three times that of the Canadian national average. Dental hygiene students at Dalhousie University take part in outreach that involves treatment of this population. Providing TDE requires an understanding of the factors surrounding tobacco use that are culturally specific to this population. The results of the research are to be used to inform the curriculum in an effort to better prepare graduating students for

providing TDE to these populations. Researchers have identified a lack of cultural competence as a barrier to oral health professionals providing TDE to patients. Methods: The TDE curriculum at Dalhousie University School of Dental Hygiene was revised to include Canadian tobacco use content and a First Nations and Inuit peoples cultural component. The cultural component contained historical and present-day cultural perspectives and tobacco use information. Approval of the research project was granted by the Dalhousie University Research Ethics Board (REB file #44976). A 32-question survey with Likert-scale questions was developed. The questions were divided into five sub-groups each having a rating of 1-5. Students from the year one survey were compared with students of the year two surveys by comparative analysis of the responses using the chi-square and the Mann Whitney U test. Each subgroup was analyzed separately to determine areas of deficiency. The survey was designed to assess dental hygiene students' perceived knowledge of the culture of Canadian First Nations and Inuit people. It also assessed the perceived preparedness of the students to provide patient education and health behavior counseling to these populations. The initial survey was distributed to the second-year dental hygiene students who did not experience the revised curriculum. Of thirty-two eligible subjects, eighteen responded and participated in the survey. The revised TDE curriculum was presented to the first-year students the following year, and the identical survey was repeated with these students. Thirty students were eligible with nineteen participating. Results: There was an overall improvement in all the subscales evaluated. This was mainly attributable to the improvement in the knowledge subscale scores. There was a significant ( $p=0.002$ ) improvement in the knowledge subscale of the students who received the new TDE curriculum, more specifically in the knowledge surrounding sociocultural characteristics, health risks, and cultural healing traditions of First Nations and Inuit people. However, it was unclear whether the students felt more prepared to clinically deliver TDE to this population. The investigators feel that there was a limitation of the survey questions to determine this level of preparedness of skill. For future research, the investigators would examine what learning experiences could have been provided to better facilitate the level of preparedness to successfully deliver TDE.

#### **PO-070. Is DAT Score an Accurate Predictor of Student Performance in Clinical Dentistry?**

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##### *Educational Research*

This study determined whether a statistically significant correlation existed between Dental Admission Test (DAT) scores, in particular the Perceptual Ability Test (PAT), and clinical performance in the mock board exam in dental school. There has been much debate on the relevance of DAT scores for dental admissions criteria, and several studies have shown mixed results with respect to preclinical performance, clinical performance, and overall dental school GPA when compared to DAT scores. Scores from the mock board exam administered during the fall quarter of the fourth year of the curriculum at Midwestern University College of Dental Medicine-Arizona were used as the clinical performance determinant and were compared to DAT scores from the graduating classes of 2012 and 2013. It is theorized that students who perform highly on one or more sections of the DAT will perform highly on clinical exams and ultimately regional board exams. The authors expected to find the highest correlation between the scores achieved in the PAT section of the DAT and the clinical scores of the mock board exam. Methods: The study population consisted of 216 students from the Midwestern University. All student names were coded to protect confidentiality and to link their DAT scores and mock board exam

scores. The protocol was approved by the university Institutional Review Board. Student DAT scores were subdivided into perceptual ability (PAT), total DAT (TDAT), academic average (AA), reading comprehension (RC), quantitative reasoning (QR), and total science (TS) and were used as predictor values. Outcome variables were subsections of the clinical mock board exam, which includes written and clinical patient care sections. Subsections of the clinical patient care portion of the exam include endodontics, operative dentistry, and periodontics. Subsections of the written portion of the exam include patient assessment and treatment planning (PATP), periodontics, and prosthodontics. All students are required to take the exam under uniform conditions, written portions in the same classroom, and clinical patient care portions on the floor of the MWU Dental Institute over the course of three days. Grading for the clinical procedures is done on the first floor of the Dental Institute with no visual or verbal contact allowed between students and evaluators. Written communication for treatment modifications is permitted. Tracking of procedures is linked to the students and patients through a randomly assigned numbering system and is designed to simulate examination conditions used by regional board testing agencies. The authors hypothesized that DAT scores, in particular the PAT, would show a strong correlation with the results from the mock board exam. Results: Mean values for the DAT scores were higher for the Class of 2013 than the Class of 2012 in the following sections: PAT (19.43/18.58), TDAT (112.03/106.65), RC (20.24/18.93), QR (16.69/15.96), and TS (18.44/17.66). AA (18.56/19.21) was the only section of the DAT where the Class of 2012 had a higher score than the Class of 2013. Mean values for the mock board scores were higher for the Class of 2013 than the Class of 2012 in endodontics (3.34/3.26), periodontics (94.33/86.40), and PATP (122.76/119.39) and lower in operative dentistry (3.50/3.77), periodontics written (83.44/88.90), and prosthodontics (83.44/88.90). For the clinical sections of the mock board exam, correlations were generally higher with the inclusion of the PAT scores than without the PAT scores. PAT/AA combinations produced the highest correlations for endodontics 2013 (0.1841), operative dentistry 2012 (0.1627), operative dentistry 2013 (0.1801), and periodontics 2012 (0.2434). For the written portion of the mock board exam for the classes of 2012 and 2013, the combination of the PAT and QR scores demonstrated the highest correlation with the PATP (0.2059, 0.1215). The AA score demonstrated the highest correlations with periodontics when combined with the PAT (0.1542, 0.2627) and RC (0.1594, 0.2614). Finally, the RC score demonstrated the highest correlations with prosthodontics when combined with the PAT (0.2818/0.2364) or AA (0.2705/0.2195).

#### **PO-071. Predicting Performance in Technical Predoctoral Dental Courses Using Advanced Simulation**

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##### *Educational Research*

The purpose of this study was to determine if elements of Advanced Simulation examinations, such as exam score, session time spent completing the exam, number of evaluations student used to assess his or her performance during exam, and total evaluation time spent assessing the exam served as predictors for performance in two preclinical courses. Methods: The study was reviewed and approved by the Institutional Review Board (IRB #HM15508). Data of dental students' performance in three sequential classes in two preclinical laboratory courses, Operative Dentistry (OD) and Fixed Prosthodontics (FP), were compiled for analysis. The OD laboratory course was a two-semester course in the D1 year, consisting of both virtual reality-based training (Advanced Simulation using DentSim [DS] by Image Navigation Ltd.) and conventional manikin simulation sessions. Course competencies included Class I and II amalgam

preparations (Advanced Simulation, DS1 and DS2, respectively), Class II amalgam preparation and restoration, Class II composite restoration, Class IV composite restoration, and five-surface complex restoration (conventional simulations). The exams were given throughout the D1 year, beginning with the Advanced Simulation procedures. The FP laboratory course was a two-semester course in the D2 year, consisting of conventional manikin based exercises given throughout the year: CVC, PFM and ceramic preparations (single), interim crown, CVC and PFM FPD preparations, and interim FPD. Study subjects were students who completed the OD and FP preclinical courses (n=282). Students who repeated a course were not included in the analysis (n=6). Student distribution: Year 1 n=99, Year 2 n=93, Year 3 n=90; 129 (46%) females and a total of 16 (6%) left-handed students. Analysis was designed to first investigate which variables were significant for performance on each individual Advanced Simulation exam and then test these significant variables as predictors for performance in the two preclinical course examinations. Correlations between significant predictors and the preclinical grades were calculated. Advanced Simulation exams were also compared to analogous individual OD and FP competency exams that involved only the completion of a single tooth preparation. Analyses were completed using JMP 10.0.0 SAS Institute Inc., USA. Results: Regression analysis revealed both Advanced Simulation (DS1, DS2) exam scores were significant predictors of the preclinical courses. Year was significant for only FP. The elements of session time, evaluation time, number of evaluations, gender, and handedness were not significant. There were no significant interactions detected between year and the other predictor variables. Notably, for DS1, exam scores fell as session time increased; and for both DS1 and DS2 exam scores rose as number of evaluations increased. Of the Advanced Simulation exams (DS1, DS2), correlations exceeding 0.20 were found for both OD and FP courses, including the highest OD correlation of 0.35 with DS1 exam and the highest FP correlation 0.40 with DS1 exam in Year 2. The authors conclude that Advanced Simulation exam scores serve as predictors of performance in OD and FP preclinical courses. These results highlight the predictive value of dental students' performance on the Advanced Simulator at an early stage of their psychomotor skill development. Advanced Simulation exam elements demonstrate the value of computerized assessment with immediate feedback and the ability to detect trends such as exam scores rising as number of evaluations increase. It is essential for students to develop self-assessment skills to avoid repeating errors such as additional tooth damage and lower their scores with increased session time. Recording students' performance at initial stages of training in Advanced Simulation assists OD and FP course directors in designing suitable procedures for students and better allocating resources to support struggling students as well as challenge advanced students. The authors suggest laboratory instruction include exercises to reinforce self-assessment and thereby improve future performance.

**PO-072. Pilot Study of Critical Thinking Skills of Dental Students: University of Texas School of Dentistry at Houston Results**

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*Educational Research*

In August 2010, the Commission on Dental Accreditation's Accreditation Standards for Dental Education Programs added a requirement that dental school graduates must be competent in the use

of critical thinking. The Health Sciences Reasoning Test (HSRT) is a proprietary instrument calibrated for health professionals and used worldwide to measure critical thinking skills. The HSRT is a 33-item multiple-choice exam administered in a 50-minute setting by either hard copy or electronically. The HSRT overall score and subscores for analysis, inference, evaluation, induction, and deduction are reported. The HSRT was recently used in a multi-center pilot study (three dental schools) to assess the impact of using standardized dental diagnostic terminologies, EZCodes, in the treatment planning module of the axiUm electronic dental record on the critical thinking skills of dental students. Secondary aims of that multi-center study were to pilot the introduction and administration of the HSRT to the dental students at the three schools. The following report describes the implementation of the pilot study at the University of Texas School of Dentistry at Houston. Methods: This pilot study employed a cross-sectional study design for data collection during the spring and summer of 2013 using the HSRT for Classes 2013-17. The IRB-approved protocol allowed the investigators to use email blasts, word-of-mouth, and in-class announcements to promote the opportunity for students to participate in the study by taking the web-based HSRT at designated times and room locations. Refreshment incentives (pizza) were included. Results: Response rates by class and by participation opportunity were tabulated. Demographic and HSRT scores by class are presented by descriptive statistics, means and standard deviations, and ANOVA with F statistic, two-sample t-tests with 95% Confidence Intervals, and p-values. The first major finding indicated that the web-based HSRT system was easy to administer. This pilot study used the dental school class and not individual student as the unit for analyses; however, HSRT can accommodate for an individual's longitudinal measurement through dental school. An important second finding was that HSRT overall scores were significantly different and higher when English was a first language. Fortunately, HSRT is available in seven languages for offer to students in future studies. The third finding was that overall student participation was slightly less than 42%. This finding may have been as a result of the recruitment methods of this pilot study or the timing of the administration of the survey (spring/summer). It is not known if this moderate response rate introduced any form of bias into the study. A possible solution for increasing the response rate is the mandatory assignment of HSRT to gain more accurate individual and class results of dental students' critical thinking skills. Overall, this pilot study did identify the strengths and weaknesses of administering the HSRT to University of Texas School of Dentistry at Houston students. Suggested changes for future studies include a possible administrative requirement to facilitate a 100% student participation rate, the offer of the web-based HSRT in other languages, and the unit of analyses at the student level. With this critical thinking skills metric, curriculum influences within and between dental schools can be compared. These results from the pilot study of the HSRT at one dental school combined with the other two schools will be used for planning large scale collaborative studies among the dental schools of the Consortium for Oral Health-Related Informatics (COHRI) group.

**PO-073. A Comparison of A.S. and B.S. Degree-Seeking Dental Hygiene Students on Self-Perceptions as Health Educators**

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*Educational Research*

Although all dental hygiene programs include a patient education component, it is unknown whether four-year programs are more or less demanding as two-year programs in the development of skills relevant to health education. The purpose of this cross-sectional study was to determine if dental hygiene students attending a four-year program of study are more likely to perceive themselves as health educators than

are students in a two-year program. Methods: Self-perception theory and theory of reasoned action informed this study in which 286 dental hygiene programs were invited to participate in a web-based survey. Program directors or a representative faculty member were asked to fill out a questionnaire regarding health education in their curricula and to invite their students to participate in the student survey. Sixty-five programs and 307 students participated. The study was approved by Institutional Review Boards of both East Tennessee State University and Walden University. East Tennessee State University's IRB approval number is 1110.27e, and Walden University's IRB approval number is 01-20-11-0086746. Results: The t-tests for independent samples showed no significant differences between the two- and four-year students on the variables of self-perception, behavioral intentions toward health education, volunteerism, and career expansion. Eighty-four percent of each group said their educational experiences have resulted in a positive shift in their views of the health education role of dental hygienists. There was a significant difference in the variable of behavioral intentions toward professional leadership, with four-year students more likely to take an active role in the professional organization. Less than half of the participating programs are requiring students to show competence in individualizing patient education for tobacco users or diabetic patients.

#### **PO-074. OSCE as Predictor of Student Performance and Calibration of Faculty Assessments**

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##### *Educational Research*

The purpose of this study was to evaluate the objective structured clinical examination (OSCE) as a predictor for student performance and determine whether postgraduate student examiners and full-time faculty examiners are calibrated in terms of evaluation methods. Methods: An OSCE is a type of examination often used in health sciences to test clinical skill performance and competence in skills such as communication, clinical examination, medical procedures/prescription, exercise prescription, joint mobilization/manipulation techniques, radiographic positioning, radiographic image evaluation, and interpretation of results. An OSCE is usually comprised of a circuit of short stations in which each candidate is examined on a one-to-one basis with faculty examiners. Each station has a different examiner, as opposed to the traditional method of clinical examinations in which a candidate would be assigned to an examiner for the entire examination. Candidates rotate through the stations, completing all the stations on their circuit. In this way, all candidates experience the same stations. It is considered to be an improvement over traditional examination methods because the stations can be standardized, enabling fairer peer comparison and complex procedures can be assessed without endangering patients' health. Results: The OSCE included ten disciplines: pediatric dentistry, orthodontics, operative, prosthodontics, endodontics, oral diagnosis and radiology, oral pathology and medicine, periodontics, treatment planning, and oral health policy and epidemiology. Across the disciplines in which the students were assessed, some trends existed in certain areas, so further calibration would be required based on the status of faculty evaluators.

#### **PO-075. Students' Perceptions of Experiences with the Flipped Classroom Mode of Teaching**

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##### *Educational Research*

Generation X refers to those who are born between 1977 and 2002 and accounts for most of the students in dental and medical schools throughout the world. These young adults are different from preceding generations because they have grown up with computers and the Internet. Research shows that Generation X students are likely to be strongly computer-literate and prefer collaborative work in group environments. Teaching methodologies that utilize these characteristics are likely to improve their learning outcomes. However, little is known about student perceptions related to replacing traditional lectures with these new styles of learning. The objective of this study was to evaluate student perceptions of the flipped classroom model of teaching immediately after experiencing a flipped classroom session themselves. Methods: Two lectures related to composite restorative materials and bonding mechanisms of restorative materials were recorded online using the record function in PowerPoint. These lectures were made available to students at the start of the week, and students were provided with protected study time to allow them to view the lectures. One lecture session (50 minutes) was used to facilitate case-based discussions related to the lectures and to answer student questions. A survey given to students immediately after the discussion time asked questions related to perceptions of the online lecture and in-person case-based discussions. Students were also asked to comment on their preference (or otherwise) for the flipped classroom style of learning to the traditional in-person lectures. Results: 100% of the students viewed the two lectures online, but only 92.3% attended the case-based discussion and Q&A session. A total of 23.1% strongly agreed and a further 23.1% agreed that they preferred viewing the lectures online than attending a traditional in-person. Responses to the statement "I preferred viewing the lectures online rather than having to attend in-person" were strongly agree 23.1%, agree 23.1%, neutral 30.8%, disagree 7.7%, strongly disagree 15.4%. Responses to the statement "I believe I learned a lot more from the Q&A session with case discussions than if we had only had an in-person lecture" were strongly agree 25.0%, agree 50.0%, neutral 8.3%, disagree 8.3%, strongly disagree 8.3%. Responses to the statement "I believe the online lectures, case discussions, and Q&A sessions were more engaging than in-person lectures" were strongly agree 16.7%, agree 41.7%, neutral 16.7%, disagree 16.7%, strongly disagree 8.3%. Responses to the statement "I believe the concept of online lectures with class discussions rather than only in-person lectures could be a valuable educational tool to pursue at HSDM" were strongly agree 25.0%, agree 50.0%, neutral 8.3%, disagree 8.3%, strongly disagree 8.3%. Conclusion: Initial findings from this study were that 75% of the class agreed or strongly agreed that more online lectures coupled with case-based discussions and Q&A sessions should replace traditional lectures. Additionally, 75% of the class agreed or strongly agreed that they gained more from the online lecture, case-based discussion, and Q&A sessions than traditional in-person lectures. More research on the comparative effectiveness of this style of teaching is necessary.

#### **PO-076. Using CAD/CAM Technology in Dental Education**

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##### *Educational Research*

Due to ever-increasing resource demands, both financial and time, virtually every academic dental institution is searching for more effective and efficient ways to educate its students. Recent efforts have been directed towards utilizing CAD/CAM technology in the education of future dentists. A digital model of an ideal preparation can be superimposed over a digital model of the students' attempt at an ideal preparation, thus giving the student the opportunity to visually compare the difference between the two. The purpose of

this study was to investigate the effectiveness of using CAD/CAM technology in the instruction of students when preparing a tooth for a full coverage metal restoration. Methods: This study received approval from the Institutional Review Board. Seventy-six sophomore dental students were divided into two groups, Group A and Group B. Three practical examinations (tooth #30 full gold crown) were administered to the class over a six-week period. Group A was permitted to use the technology prior to the first practical examination while Group B was not. For the second practical examination the roles were swapped: Group B being permitted to use the technology while Group A was not. For the third practical examination, both Group A and Group B were permitted to use the technology. Use of the technology was voluntary, and the overall time of utilization was recorded for each individual between each practical examination. Surveys assessing the students' perception of the effectiveness of the technology were administered. All statistical analyses were performed using SAS 9.3. The significance level was set at 0.05. Effectiveness was assessed by performing independent t-tests for each exam comparing Group A with Group B. Effectiveness was also assessed by calculating a repeated measures ANOVA to determine if the three exam scores changed over time and whether or not this change was dependent on group. Due to the small number of individuals using the E4D in the groups, effectiveness was assessed by performing the analyses above, but comparing those who actually utilized the E4D vs. those who did not. Results: The first set of tests run was to determine if there were differences between the groups. The second set of tests was to compare those who actually utilized the technology to those who did not. The results of the t-tests showed that there were no statistically significant differences between Group A and Group B for any of the three exams. Results of a repeated measures ANOVA showed that the mean exam scores changed across time and that the change in mean practical score was not dependent on group. The t-test results showed that individuals who used the E4D technology scored statistically significantly higher on exam 1 (83.8 vs. 80.3;  $p=0.04$ ). There were no statistically significant differences found for exam 2 or exam 3. However, the sample sizes of those using the E4D technology before these exams was low (exam 2:  $n=7$ ; exam 3:  $n=4$ ). Results of a repeated measures ANOVA showed that the mean exam scores changed across time and that the change in mean practical scores was not dependent on whether or not the individual used the E4D technology. Discussion: The sample size utilized for this pilot study was not large enough to draw any statistically significant conclusions in regards to the effectiveness of E4D technology as a teaching tool. Since we limited our analysis to those who did utilize the technology compared to those who did not, there were noticeable differences in the means and the results of the repeated measures ANOVA showed a trend towards statistical significance ( $p=0.08$ ). The survey results indicate interest by the students in utilizing this technology as an aid to learning and improving their tooth preparation skills. However, students were more apt to request feedback from the professor who will ultimately be grading the practical examination than to visualize the difference themselves. Conclusion: To increase utilization of the technology, we recommend that the results derived from the comparisons be quantified and utilized in some fashion as part of the grading rubric.

**PO-077. Relationship Between Successful Clinical Dentistry Course and What Motivates Millennial Students**

Nadege J. Dady, Rutgers School of Dental Medicine  
*Educational Research*

The students currently attending most dental schools are known as Millennials. Millennials, who were born between 1983 and 1993, value socialization, networking, structured learning environments

with clear expectations, are motivated by learning that demonstrates how their training connects to future success, and prefer hands-on learning collaboration that leverages technology. At the Rutgers School of Dental Medicine (RSDM), the clinical dentistry course receives positive course evaluations (three to four years of above average results) because the course construct addresses some of the core educational needs of the Millennial student group. The course encourages students at the point in their education where they are in need of reconnecting to future goals. The first and second years of dental school are well known for being the most difficult due to an overwhelming number of curricular hours needed to absorb course material (total of 2,230 at RSDM) and successful management of all course examinations in order to progress into the clinical years of instruction. This pressure can at times contribute to losing sight of the bigger picture and understanding how all this preparation will contribute to future career goals. The clinical dentistry course cuts through this angst by providing an opportunity to get out of the classroom and see the clinic, observe upperclassmen while working, experience a first patient contact, and rotate through the various departments and specialties. For the first time students get to see themselves in a role that up until now was theoretical. Knowledge of this information provides educators with an opportunity to reconstruct educational strategies that will produce optimum results. Methods: The first two years of the dental school curriculum is traditional in that the large majority of curricular hours is devoted to in-classroom learning. Most school days are eight hours and structured to support the lecture presentation format. Generally, lectures involve presenters at the front of the room who discuss their material via a PowerPoint presentation. Its effectiveness is dependent on the lecturers' ease with presenting and experience with communicating dense information that needs to be retained for future use. On average, each lecture lasts for two hours, and at times problem based learning is incorporated to engage learners. Results: The clinical dentistry course begins in fall of the second year. The course runs for a full year for four hours per week. The course construct is unlike any other course students have and incorporates aspects important for Millennials. First, they are required to rotate through different clinical departments for the first time. It is at this point that they are formulating questions about the type of practitioner/specialist they might want to be. Networking with faculty members who teach in those departments provides the perfect opportunity to answer those questions. Second, students are moving through these rotations in groups, and most of the curricular hours are spent completing hands-on or clinical chairside exercises. This mode of instruction addresses the need for socialization as student groups are often called on to perform exercises on one another and work with each other to achieve desired goals. It also addresses the Millennials' need for a structured learning environment with clear expectations as the faculty provide an overview lecture to demonstrate what will be expected in the laboratory or clinical session. The third advantage of this course is that for the first time in the curriculum students are exposed to learning in the clinic, live patients, and expectations associated with moving from learning basic sciences to learning clinical sciences. It eases the overwhelming transition that comes with receiving the first family of patients. This is where that mental transition takes place: for the first time they can picture themselves in the future and are thus motivated and thrust forward by this renewed sense of purpose.

**PO-078. Innovative Program for Ensuring Infection Control Compliance**

Stephen J. Stefanac, Brandonn K. Perry, University of Michigan  
*New Program*

Our goal was to implement an Infection Control Monitoring (ICM) program that both effectively and efficiently ensured that students,

faculty, and staff complied with the University of Michigan School of Dentistry (UMSD) infection control (IC) guidelines. The school had an existing ICM program but the following questions kept occurring: Who should be responsible for monitoring IC? Are our IC training materials appropriate and is the content current? When an IC deficiency is discovered, how should clinicians be informed and corrective actions implemented? How are individual deficiencies best tracked? What should be done with these data? What are the consequences for clinicians who do not comply with the ICM program? We believed that without well-defined answers to these questions it was difficult to ensure a high level of infection control compliance. Methods: We began with revision of our protocols after reviewing the literature and meeting with student leaders, faculty, and clinical staff. We grouped IC protocols into three categories: required personal protective equipment (PPE), required barriers (uncapped needles, headrest covers), and procedural violations (failure to properly clean and disinfect cubicle, failure to turn in instruments). Point values were assigned to each violation based on the level of severity. Next, we enhanced IC training for faculty, students, and staff by creating short video presentations that were also posted online, small group sessions to practice IC techniques, and mandatory yearly online training. We incorporated IC techniques into multiple didactic courses and created an IC best practices document that we circulated widely. An infection control analyst was hired to monitor compliance in the clinics and laboratories. The analyst documented all IC violations and informed clinicians directly or with an email message. All violations were tracked for follow-up purposes and reviewed monthly. To ensure compliance with our protocols, we created consequences for IC lapses based on the point system. When 10 deficiency points were accumulated in one semester, the analyst met with the clinician to review the violations and develop a performance improvement plan. When 15 deficiency points were accumulated, the clinician met with the IC analyst and the patient care coordinator (PCC) to again review the violations. If the clinician was a dental or dental hygiene student, he or she began losing clinical education units (CEUs) equal to the value of all deficiency points accrued over 15. Faculty members, residents, or staff were required to meet with the associate dean for patient services. If a student had additional deficiency points over 20, a meeting was scheduled with the clinic director, PCC and IC analyst. The CEU deduction then doubled, and the clinical professionalism portion of the student's comprehensive care grade was reduced to zero for that term. When points over 30 accrued, the student was removed from clinical activities and referred to the Honor Council for further action. A letter was also placed into the student's permanent academic file regarding lack of adherence to UMSD infection control compliance guidelines. Faculty members, residents, or staff were evaluated for removal of clinical teaching privileges. We ran the new program for one term without consequences to obtain baseline data to measure future effectiveness. Results: We began implementation of the new ICM program in our four comprehensive care clinics, which contain 345 dental and 60 dental hygiene students. In the first year of the program, compliance with protocols improved significantly. Monthly averages for PPE deficiencies decreased from 53 deficiencies to 19, a 64% decrease; required barrier deficiencies decreased from 142 deficiencies to 23, a 83% decrease; and procedural violations remained constant from the test period. The numbers of students reaching the 10, 15, and 20 and greater violation point thresholds during the test period were 35, 14, and 15. Two semesters later the numbers were 4, 1, and 1. We believe the clinicians' appreciation for and understanding of infection control have improved and plan next to implement the program in our specialty clinics.

#### **PO-079. Positive Effects of Morning Rounds on Dental Students Beginning Clinical Training**

Marie A. Congiusta, Gene Sherwin, New York University  
*New Program*

New York University College of Dentistry is approaching the start of its third year of implementation of a program termed Morning Rounds. The inception of this program arose from a perceived need to offset the anxiety and uncertainty many students experience prior to entry into the clinical phase of their dental education. The objective of this program is to facilitate the transition that students make from the preclinical setting into the clinical setting. Experiential learning is utilized; that is, learning takes place in the same setting in which students will be practicing. Methods: Small groups of second- and third-year dental students gather monthly in the clinic with a faculty facilitator to discuss and enact what takes place in the clinical setting beginning from the initial encounter with a patient. Third-year students are included both to enhance their educational experience and to draw upon peer teaching and learning. They can convey their experiences treating patients to the second-year students, who have not yet been initiated into patient care. During a typical session, a preselected case is open for discussion. The faculty facilitator's role is to prompt students to identify all relevant data and encourage them to think independently when formulating treatment options. As a result, students develop a clearer understanding of what they will be expected to know and do upon entering the clinic for the first time. Results: This understanding instills more confidence and less anxiety as students begin working with patients. Since the development of this program, department leaders continuously seek to improve its effectiveness. Participating faculty meet annually to openly exchange new ideas and discuss ways to further improve the efficacy of the program.

#### **PO-079b. Self-Assessment and Peer Assessment in Dental Education: Developing Lifelong Critical Thinking Skills**

Marie A. Congiusta, Maria Rodriguez, New York University  
*New Program*

The goal of this new program is to develop a student's ability to learn how to effectively evaluate his or her own skills and knowledge so that constant learning and development are achieved. Demonstrating competence in self-assessment and peer assessment is a process that requires effort and time in order to do it with proficiency. Students must learn how to assimilate and apply knowledge to solve problems and to continuously improve their clinical skills. Methods: The faculty is involved and responsible for leading students toward acquiring and perfecting these skills. As dental students graduate and begin practicing, they will no longer be able to rely or depend on instructors to provide them with decision choices. They must learn how to evaluate their own work and be ready and confident in solving problems on their own. By cultivating these important skills, students will be able to apply their acquired knowledge to make good evidence-based decisions. Conclusion: It is with this objective in mind that New York University College of Dentistry is implementing this exciting new learning program. The goal is to enhance and create innovating changes to the dental curriculum that will impact education long term.

#### **PO-080. Pilot Testing CAMBRA/Oral Health Promotion Clinical Competence**

Natalie A. Hagel, Carole A. Palmer, Tufts University  
*New Program*

The goal of this program was to introduce CAMBRA (Caries Management by Risk Assessment) into the Tufts University School of Dental Medicine (TUSDM) curriculum, implement a clinical

competency in the third year, and assess results of the pilot program. Dental caries management in dental schools has progressed from the traditional surgical model to a more appropriate, risk-assessment and preventive model developed by a dental collaborative and titled CAMBRA. This model involves evidence-based caries risk assessment and risk-specific, non-surgical and surgical management options for the prevention and control of dental caries. TUSDM introduced CAMBRA into the school's didactic and clinical curriculum in 2010 and pilot tested student competence in the general clinic in the 2011-13 academic years. Methods: The CAMBRA protocol was introduced to students and faculty in town meetings and taught in first-year didactic courses Restorative Dentistry and Oral Health Promotion (OHP). TUSDM's patient electronic records system, axiUm, was programmed with CAMBRA patient assessment criteria. A clinical CAMBRA/OHP competency was then developed and implemented as a third-year clinical requirement in the Oral Health Promotion program, which spans all four years of TUSDM's curriculum. To utilize CAMBRA in clinical patient care, the medical and dental history of all general clinic patients now includes a CAMBRA questionnaire based on CAMBRA's clinical guidelines for patients six years and older. Dental students must complete questions for each patient to obtain the patient's caries risk score, which then determines the patient's suggested risk level. Once a patient's caries risk has been determined, the student develops and implements a preventive treatment plan for each comprehensive care clinic patient, using the CAMBRA protocol. At TUSDM, dental students are assigned to practice groups in the general clinic. For the clinical competency exam, third-year students were assigned by practice group to a month in which to sign up to take OHP/CAMBRA competency exam. Sign-up sheets are posted in the clinical area, and compliance is reinforced by the practice coordinators (dentist supervisors). The dental faculty who administered the competency exam included a dental hygienist, dentists, and registered dietitian. This faculty group met and discussed ways to calibrate assessment, and guidelines were written to regulate the calibration. A formal evaluation form was used, part of which is standardized for all clinic competency exams and part is specific to OHP. During the OHP/CAMBRA competency examination, students share their primary prevention treatment plan with both the patient and faculty. The faculty member evaluates the student on his or her knowledge of caries risk indicators and protective factors, preventive materials, including fluoride toothpaste, prescription fluoride, mouth rinses, MI paste and xylitol, and proper plaque removal techniques, including tooth brushing and flossing. How well the student develops an appropriate primary prevention treatment plan and communicates with the patient are also included in the examination. Results: The CAMBRA/OHP competency exam was implemented in September 2011-April 2013. In 2012 only one student out of 189 did not complete the exam in the required time frame; in 2013, four students out of 194 did not complete it by the due date. The challenges to implementation of this pilot were several. First, implementing this new exam into the clinic meant scheduling a time convenient to student, faculty, and patient, so broken patient appointments aborted the examination schedule. Second, there was a tendency for grade inflation, due partly to the newness of the protocol and perhaps faculty unease with giving a verbal exam in the clinical setting. Third, since this was a new protocol, it was a challenge initially to inculcate the CAMBRA model into the mind set of both faculty and students. Indeed, it may be easier to teach the students than the faculty, as it does not require students to unlearn old approaches. CAMBRA has successfully been implemented into the TUSDM curriculum. Faculty will calibrate again for the upcoming academic year and meet regularly to ensure standardization of the grading process. Anticipated improvements to the OHP/CAMBRA program include development and dissemination of a survey to ascertain student and faculty opinions on their OHP/CAMBRA learning, testing experience, and intended use in practice.

Prospective research on the effects of prevention and control of dental caries, with the use of the CAMBRA protocol in the Tufts predoctoral dental clinic, is also being established.

#### **PO-081. Pediatrics and Dentistry: The Interdisciplinary Team**

Alyson J. Leffel, New York University  
*New Program*

New York University College of Dentistry (NYUCD) promotes patient-centered care, and dental students are being trained to communicate effectively with patients, focusing around their chief complaint and understanding their needs beyond the scope of their teeth. Each individual patient is unique in his or her experience, but often we can approach distinct patient populations with special attention to their particular needs. Through a collaborative team approach, dental students learn more sensitive and effective communication when working with this specialized population. In addition, the work introduces other professionals, like social workers, to the dental needs of young patients. Methods: The social work intern actively engages with children and also collaborates with dental students in recognizing the particular needs of the children. At the Head Start programs, dental students see the young children without a parent present. Consequently, some children exhibit behavioral symptoms of fear or anxiety. Their feelings may manifest as crying, as silence, or as a verbal indication of being scared. Through interdisciplinary work, the dental students and social work intern create an environment in which these patients can receive the specialized treatment they need. If a child appears nervous or upset, the social work intern may accompany the child during his or her dental screening, as a parent would do. If a child is resistant to the typical steps taken during the screening, the social work intern may encourage flexibility when working with the child. The social work intern supports the dental students to practice holistically with the patients, build trust with them, and identify their feelings and respond accordingly. Additionally, the dental students model for the social work intern how behavior management techniques function in a dental setting. The disciplines engage in a mutual learning experience. Results: Through the interdisciplinary work in ICE, the dental students learn better communication skills, the social work intern practices the interdisciplinary team approach, and patients have more positive dental experiences. The social work intern models therapeutic interventions that the dental students can use in their work, such as empathy, sensitive communication, and meeting the patient where he or she is. The experience creates the opportunity for students in different disciplines to learn from each other, help each other and work together, and thus improve health outcomes in the future.

#### **PO-082. Going Paperless: Student Feedback on an Electronic Radiology Laboratory Manual**

Anthea P. Senior, Peter A. Senior, University of Alberta  
*New Program*

With the move to a new paperless building, an electronic version of the radiology technique manual (previously only available as a printed manual) was prepared. The purpose of this study was to see what formats of the manual were used most frequently and preferred by first- and second-year dental students. Methods: An updated radiology technique laboratory manual was provided in two electronic formats (iBooks and PDF) to first-year (n=33) and second-year (n=34) dental students for free download. Previously the manual was available only as a paper version for purchase (\$27). The iBooks format is viewable only on iPads, while the PDF can be viewed on a laptop or printed. The PDF was also viewable on clinic computers during lab sessions. At the end of the eight-week radiology

courses, students were surveyed as to how frequently (regularly, often, sometimes, rarely, never) they used each format and to give a rating on a five-point scale. Respondents were asked which format they would purchase in the future (iBook \$15, PDF \$15, or paper \$30). Second-year students were asked whether they preferred the new electronic manual to the previous paper-only version. Comments were solicited as free text. Results: The response rate was 100% in both classes. The proportions of DDS I and DDS II viewing the PDF on laptop sometimes or more were 78.8 and 73.5%, respectively; viewing iBooks on an iPad were 27.3 and 11.8%; and only 9.1 and 2.9% used a hardcopy of the PDF. Of DDS II, 32% reported using the old paper-only version sometimes or more. DDS I students were more likely to use an electronic format exclusively than DDS II (33 electronic, 3 paper v 29 electronic, 13 paper;  $p=0.023$ ). Electronic formats were rated higher than paper (out of 5) by DDS I, while there was no difference between format ratings by DDS II. DDS I indicated they were more likely to purchase an electronic format in the future than DDS II. For students using both iBook and PDF ( $n=8$ ), ratings were higher for iBook. In the free text comments section, all the electronic formats were described as easy to use, readily available, and well laid out. The iBook had the additional advantages of interactivity, attractive layout, convenience, and portability but could only be used by students with an iPad. Although the PDF was not subject to any hardware limitations, disadvantages described included no hyperlinks or interactivity. Seven students indicated a preference for paper copies of textbooks and resources in general. The new radiology manual provided in electronic formats was used frequently and highly rated by both DDS I and DDS II students. Most students used more than one format. Those who used the iBook version particularly enjoyed the formatting, interactivity, user friendliness, and portability of this medium. Although the iBook version was rated highly and brought additional interactive features over PDFs, only a small proportion of either class used it, probably because this format can only be viewed on iPads. For students who use a Mac platform, the new OS X 10.9 Mavericks software (which enables iBooks to be viewed on a Mac laptop) will enable more students to view the iBook version with its interactive features even if they do not own an iPad. Students who used the PDF version still enjoyed the organization and availability of an electronic version but lost the interactivity features. The DDS I class had a higher preference for electronic formats, with greater use of paper formats by the DDS II class. A significant proportion of DDS II students continued to use their old paper-only manual from the previous year. This study suggests that having the manual available in both iBook format and printable PDF formats for future classes with the capacity to print would meet all students' needs.

#### **PO-083. The Role of Caries Management by Risk Assessment (CAMBRA) in Patients Seeking Dental Treatment**

Balsam Faize Jekki, Loma Linda University  
*New Program*

This poster is presenting a patient situation of a 33-year-old female with the need of restoring her carious teeth. Patient dentition was affected by use of methamphetamine for 10 years. CAMBRA (Caries Management by Risk Assessment) was used to assess the patient's risk for caries before any treatment was provided and to determine appropriate preventive and therapeutic approaches. Methods: The CRA form was published in the *Journal of California Dental Association* in October 2007. The recommendations and guidelines form the basis for practical caries intervention and prevention both by individuals and communities and were crafted for use with children and adults. According to this form, a patient is assigned to a caries risk level (low, moderate, high, and extreme) based on caries disease indicators, caries risk factors, and caries protective factors. Caries

susceptibility test was done before and after dental treatment, and the final results showed improvement of caries risk level. Conclusion: Since dental caries is an infectious disease, CAMBRA should be considered the standard of care and should be included as part of the dental examination. CAMBRA is essential in decision making to guide clinicians in the diagnosis, prognosis, and treatment recommendations for the patient and can be used to provide better cost-effectiveness and success in treatment.

#### **PO-084. Learning the Essential Skills to Diagnose and Effectively Manage Medical Emergencies**

Morey J. Gendler, Scott W. Podell, David H. Hershkowitz, Mark S. Wolff, New York University  
*New Program*

Learning the essential skills to diagnose and manage medical emergencies is a critical part of a dental student's clinical training. New York University College of Dentistry (NYUCD) has implemented a scenario- and case-based model for training our students for medical emergency preparedness. The students' training incorporates a didactic portion with an interactive clinical training component allowing them to develop skills necessary to recognize, diagnose, and effectively manage various medical emergencies in the dental setting. Simulation exercises facilitate a team approach where students work cohesively while gaining the confidence and clinical expertise necessary to care for a patient experiencing a medical emergency. Methods: In Phase I of NYUCD's Medical Emergency Training Program, students receive didactic training including a comprehensive review of the clinical signs and symptoms of various medical emergencies including vaso-vagal syncope, orthostatic hypotension, hypoglycemia, asthmatic crisis, latex allergy, angina, myocardial infarction, and/or epileptic seizure. They learn to recognize if the emergency is life-threatening and if the College Emergency Response Team or 911 should be summoned. Students develop critical thinking skills required to establish a differential diagnosis through the rapid and logical synthesis of the patient's signs and symptoms. Students demonstrate their proficiency with emergency response skills appropriate to the emergency including the administration of oxygen, glucose paste, and patient ventilation. They learn to apply all initial life support and any secondary life support as required. Another essential component involves their ability to appropriately interact with emergency responders and present their patient's medical history, signs and symptoms, and timeline of events in a clear and concise manner. Students learn that the first line of care in managing any medical emergency is being able to keep it from happening in the first place. They initially evaluate their patient as they greet and escort him or her from reception area to treatment setting, looking for any signs of an imminent medical problem. An initial evaluation is made of the patient's appearance, gait and speech pattern, signs of breathing difficulty, abnormal body movement, or excessive perspiration. If any deviation from a normal appearance is evident, the student is trained to ask appropriate questions and make subsequent decisions based on patient responses. A current and detailed medical history is completed at the initial visit, and the medical history is reviewed at each appointment. Students are trained to evaluate their patients' medical histories, perform a detailed review of systems, obtain necessary medical consults, and learn when a medical referral is indicated due to data obtained from screening questions. Phase 2 includes simulation drills in which students diagnose and render emergency care for medical emergencies. In this phase, case-based scenarios and simulation exercises assist students in becoming skilled at recognizing and treating several medical emergencies. Students receive case-based narratives that include signs and symptoms patients are experiencing and are asked to make a differential diagnosis and answer questions related to the patient's condition. The objective of

these exercises is to have students develop critical thinking skills to become proficient at diagnosing and treating medical emergencies. Our students gain the confidence and clinical expertise necessary to care for a patient experiencing a medical emergency. Conclusion: To become competent in the management of medical emergencies, dental students must receive in-depth training that will equip them to assume responsibility and properly respond to a variety of emergency scenarios. Our medical emergency training program, which combines a didactic component with clinical training simulation drills, is an effective model for training students. This model encourages and mentors students in developing necessary critical skills to effectively diagnose and manage dental office emergencies. These skills and the experience and knowledge gained by our students will greatly benefit their current and future dental patients and communities.

*There is no PO-085.*

### **PO-086. DDS Summer Scholars Program Solidifies Pre-Professional Students' Pursuit of Dentistry**

Ann M. Nasti, Sara B. Goldberg, Stony Brook University  
*New Program*

The purpose of the Discover Dental School (DDS) Summer Scholars Program is trifold. First, it provides a mechanism by which students interested in pursuing a dental career are afforded an intensive, well-supervised, hands-on curriculum. Simultaneously, it provides these students the ability to truly understand the daily academic and social life of a dental student, as each participant is mentored by a current dental student under direct faculty supervision. Secondly, it allows our current dental students a chance to share their knowledge and demonstrate their amazing leadership skills. And finally, this program serves as a recruitment tool for Stony Brook University School of Dental Medicine (SDM) to screen potential dental school applicants and increase cultural diversity in future classes. Methods: During a week-long interactive pre-dental program (in August 2013), 30 SDM faculty and 30 current dental student/peer mentors came together to participate in the DDS program. Participation in this tuition-based program included 53 undergraduate pre-dental students. There was overwhelming program interest, and students not enrolled were placed on a wait list for the next program in August 2014. Program residents comprised 32% of participants, with a 2:3 male to female participant ratio overall. This program is unique in that one day was reserved for Dental Specialty Boot Camp, during which all of the dental specialties were represented. Participants rotated through activities in pediatrics, dental anesthesia, orthodontics, endodontics, oral surgery, and periodontics. In addition, this program provided exposure to CAD/CAM dentistry, operative dentistry, and simulated instruction in the SDM preclinical Simulation Laboratory and Clinical Skills Center at Stony Brook University Hospital. Evening social activities included a welcome dinner at the Stony Brook Yacht Club, a catered BBQ tailgate and games night, go-karting/batting cages, and a final semi-formal recognition dinner. At program's end, participants completed questionnaires designed to solicit program feedback and evaluate participants' pursuit of a career in dentistry. Participants were asked to evaluate program components on a scale of 1-5, with a response of 1=most unfavorable and 5=most favorable. Results: Results from the survey items were as follows. The DDS Summer Scholar Program director and student leaders were responsive to participants' needs and concerns: 93.2% recorded a score of 5 and 6.8% a 4. The information presented in lectures was interesting, engaging, and relevant: 59.6% recorded a 5, 29.8% a 4, and 10.6% a 3. The hands-on activities were sufficient for participants to experience various facets of the dental profession: 88.9% recorded a 5 and 11.1% a 4. The interactions with various faculty members throughout the week were informative and helpful to participants in exploring the dental profession: 88.9%

recorded a 5 and 11.1% a 4. The social activities were enjoyable and in a sufficient amount: 42.6% recorded a 5, 38.3% a 4, 14.9% a 3, and 4.3% a 2. The dietary accommodations (breakfasts, lunches, dinners), including dietary restriction needs, were organized and carried out well: 73.9% reported a 5, 21.7% a 4, and 4.3% a 3. The dental students' perspective on life in the dental school was informative and helpful to participants: 93.2% reported a 5 and 6.8% a 4. The number of hours spent on student interviews and the Q&A session with students was sufficient: 84.1% entered a 5, 13.6% a 4, and 2.3% a 3. The Discover Dental School Summer Scholars Program solidified participants' interest in dentistry and their subsequent application to dental school. The findings also confirm the need to expand the program in both length and participant enrollment.

### **PO-087. Dental Students' Perception of the University at Buffalo's CARES Program (Social Work Program)**

Valerie A. Fatta, Julie R. Rockmaker, University at Buffalo  
*New Program*

The purpose of this study was to identify dental student perceptions of the Counseling, Advocacy, Referral, Education, and Service (CARES) Program at the University at Buffalo School of Dental Medicine (SDM). The CARES Program is a social work program that aims to remove barriers faced by dental patients in completion of care, while providing interprofessional practice and education opportunities. The social workers of the CARES Program make themselves available to the students of the SDM to discuss patients' psychosocial and behavioral needs. They also complete a consultation and assessment with every patient referred to the program. Throughout the intervention process, CARES staff strives to maintain communication with the dental student about what is being done to address the patient's needs. Identifying student perceptions of the program can help to implement changes to improve the relationship between CARES Program social workers and the students. Such results can inform other dental schools that might be considering implementing a social work presence in their programs. Methods: A survey was created for the CARES based on past exit interview questions asked of graduating seniors about the CARES Program. The survey contained six questions about the CARES Program: two yes/no response questions, one rating scale question, and three open ended response questions. Third- and fourth-year dental students were asked to review the CARES Program as part of their yearly clinical evaluations. Evaluations were collected anonymously electronically through the SDM intranet. This study was determined to be not research by the Social and Behavioral Institutional Review Board of the University at Buffalo, IRBNet ID 489784-1. Results: 139 of 222 third- and fourth-year students responded, for a response rate of 63%. A majority of respondents had referred at least one of their patients to the CARES Program (62%, 84 of 136), and most believed the CARES Program efforts helped their patient to access dental care (79%, 90 of 114). Students were asked to rate how well the CARES Program assisted the patient they referred on a four-point scale from not at all to greatly, with an additional category of not applicable. The number of respondents for this question was 126. Excluding those who choose not applicable (38), the most common response was greatly with 42% respondents; not at all was selected by 19% of respondents. When asked what part of the CARES Program the student found most helpful, the most common response was financial or donation assistance (37%, 26 of 60). Those who indicated not applicable/did not use the CARES Program were excluded (5 of 65). When asked "What part of the CARES Program did you find to be least helpful?" the most common response was the time it took to complete a CARES intervention was too long (33%, 13 of 38). Those who indicated not applicable/did not use the CARES Program were excluded (10 of 48). The most common response for recommendations for improvements

was to make the intervention process faster (34%, 12 of 33). Those who indicated not applicable/did not use the CARES Program were excluded (4 of 37). Conclusions. The CARES Program was generally favorably viewed by the students who utilize it. A majority of students who utilized the program believed it was beneficial to their patients. Students recommended a reduction in the time to complete CARES interventions as a way to improve the program.

#### **PO-088. Interprofessional Education for Dental and Pediatric Nurse Practitioner Students**

Jill Betty Fernandez, Donna Hallas, New York University  
*New Program*

The purpose of this interprofessional educational module was twofold: 1) to provide formal opportunities for second-year dental students and pediatric nurse practitioner (PNP) students to collaboratively examine the evidence-based program; and 2) to explore culturally sensitive approaches to oral-systemic health care for culturally diverse, underserved children. An overall goal for these educational opportunities was to enable the students to collaboratively plan interventions that reduce the incidence of early childhood caries (ECC). Methods: The interprofessional clinical practice rotation was scheduled over a four-to-six week period. Throughout each rotation, the second-year dental students and one PNP student practiced together one day each week at various Head Start Programs throughout NYC. The team provided oral health education, oral exams, and fluoride varnish to children under five years of age. Podcasts were developed to initially prepare all students for the rotation, and iPad technology was used to videotape students at the point of care to provide a forum for the students to explore their interprofessional experiences and skill development. Students were encouraged to develop interprofessional communication skills as they studied common core competencies and interprofessional referrals. At the end of each rotation, each group of students met with at least one faculty member in the cafeteria at NYUCD for an interprofessional luncheon and discussion of their clinical experiences including core competency skills, cultural competencies, and beliefs about interprofessional practice. Conclusion: Three hundred and sixty second-year dental students, seventeen second-year PNP and eight third-year PNP students, and one first-year independent study PNP student participated in this project. The implementation of the iPad technology to videotape students as new skills were learned and practiced offered students the opportunity for immediate self-reflection on their individual performance of new skill sets: oral health assessments, application of fluoride varnish, interactions with the children and parents, and most importantly, the opportunity to immediately make corrections in their performance. This technique enhanced student learning by immediately correcting a skill thus improving performance of technical skills and self-confidence. IPE and IPP require the acquisition of new skill sets for students and faculty members and promote a mutual understanding and respect of each other's discipline and a willingness to learn and grow together with the overall goal of improving health care outcomes for all patients.

#### **PO-089. Weakest Students Benefitted Most from One-Day Team-Based Learning Experience**

Romesh P. Nalliah, Harvard School of Dental Medicine;  
Veerasathpurush Allareddy, Children's Hospital Boston  
*New Program*

In addition to the full medical curriculum, students enrolled at Harvard School of Dental Medicine take a course at the dental school for the first two years. In their last three months of the second year they become fully integrated into the dental school. These students

begin intense preclinical preparations, lectures, and tutorials related to diagnosis, treatment planning, basic restorative dentistry, and prevention. Students will have many problem-based learning (PBL) experiences, including case-based learning in their own patient cases. Anecdotally, senior tutors (faculty responsible for training treatment planning) report a varied development of critical thinking skills and basic dental knowledge among students in the early part of the clinical years because student knowledge development depends strongly on the type of cases in their patient pool. A student with complex cases could learn at a more rapid rate than a student with basic cases. A case-based class exercise was developed to attempt to standardize the basic knowledge of students to empower them to have better learning experiences in treatment planning and continue to develop critical thinking skills. The objective of the one-day team-based learning (TBL) experience was to boost students' baseline knowledge of basic treatment planning concepts, facilitate group work, enhance critical thinking skills, and empower them to have better learning experiences in treatment planning in the third and fourth years. Additionally, the one-day PBL-TBL experience was designed as an innovative alternative to the usual PBL sessions which run over a week. PBL has been shown to improve learning outcomes. However, effective PBL in a dental learning environment requires many highly trained faculty. The United States is suffering a crisis in dental education with a lack of qualified faculty. TBL tries to engage students in small group discussion that is similar to PBL. However, PBL is practiced in small groups of 6-10, and TBL can involve hundreds of students in a lecture theater. Our project involved a group of close to 40 students who participated in a TBL that was run like a PBL with the introduction of a case, self-directed research, and reporting back to the group for synthesis and discussion. This session was run by one faculty member. Methods: A single bitewing radiograph with a carious tooth was displayed, and informal class discussion was facilitated by a senior tutor with the objective of identifying information needed to make a complete diagnosis, problem list, and treatment plan and determine what concepts needed to be understood more clearly. No other information about the patient was presented because the objective was not to solve the clinical case but to identify what information was needed to make a diagnosis and treatment plan. Students self-allocated research tasks to group members. After conducting research on their topics over the next three hours, students presented back to the class, and faculty facilitated discussions that aimed to foster critical thinking. Institutional Review Board exemption was acquired for this study. Pretests and posttests were administered to identify changes in knowledge related to treatment planning, critical thinking, and basic dental concepts related to treatment planning. Results: The mean difference between pretest and posttest scores was a 1.4% improvement; however, the mean difference among those who scored 85% or less on the pretest was 10.2%. Additionally, this class was highly rated by students with a mean of score of 1.3 on a scale with 1=excellent and 5=poor. This session was the second most highly rated learning experience in the year. This one-day TBL-PBL hybrid may be a novel way to engage Millennials and teach large quantities of information in an enjoyable and interesting format.

#### **PO-90. Dental Hygiene Students and Interprofessional Education in HIV: The JACQUES Initiative, University of Maryland**

Marion C. Manski, Sheryl E. Syme, Jacquelyn L. Fried, Alexandra Reitz, Valli Meeks, Sharon Varlotta, University of Maryland  
*New Program*

Preparing the Future (PTF) through the JACQUES Initiative (JI) is an interprofessional initiative through the University of Maryland School of Medicine with the goal of addressing the National HIV/AIDS Strategy by normalizing and integrating HIV into health professionals'

future clinical practices. Dental hygiene students at the University of Maryland School of Dentistry participate in this program with peers through a multidisciplinary didactic and hands-on curriculum across a total of six professional schools (medicine, dentistry, nursing, pharmacy, law, and social work). In this hands-on and didactic curriculum, students from these disciplines are introduced to the HIV epidemic and their role in addressing this issue collaboratively and interprofessionally. Dental hygiene students are certified in testing methods (salivary diagnostics), educated to address HIV across the continuity of care spectrum, engage in interprofessional learning opportunities, and integrate the academic component of the curriculum with clinical opportunities to promote HIV testing in clinical settings. Unique to the UMB campus, these dental hygiene students will apply their new skills offering rapid HIV testing at the School of Dentistry Dental Clinic. Methods: The program is comprised of six components: 1) introductory lecture, a three-hour session conducted by multidisciplinary experts, provides the foundation for collaborative approaches to addressing the HIV epidemic; 2) rapid HIV testing training is a four-hour, hands-on session in which students learn how to test for HIV using salivary diagnostics; 3) in interdisciplinary case conferences, interdisciplinary teams are presented with cases regarding patients with HIV and together strategize to create a plan of care involving all of the team members' expertise and input; discussions generate care and treatment considerations and concerns; students, faculty, and JI staff are involved in these cases; 4) LGBT cultural competency heightens awareness of the LGBT population with discussions among interprofessional teams of students regarding working with LGBT clients; 5) in a service-learning component, two two-hour hands-on sessions with patient contact in the School of Dentistry PLUS/SPC Clinic, students apply the continuum of care that includes outreach/testing linkage to care, early treatment/retention, and adherence; and 6) in the post event debriefing, students meet with dental students and a lead faculty member to reflect in an interactive discussion. Students are given the chance to discuss problem-solving and sharing of practices/lessons learned at the conclusion of the semester in a group discussion of all team members. Conclusion: Interprofessional education creates an environment conducive to collaborative practice. PTF, an interprofessional educational approach to HIV, creates a collaborative practice that ascribes to the belief that when an interprofessional team provides care, positive patient health outcomes will increase. Students also learn and value how members of other disciplines contribute to creating a stronger team when care is provided. Other health care providers gain insight into oral health care concerns that may not have been discussed in their curricula. This integrated learning experience provides dental hygiene students at the University of Maryland School of Dentistry with interprofessional education and a certification in HIV testing. Students are able to address HIV across the continuity of care spectrum. Students also benefit from interprofessional learning opportunities and experience integration of the academic component of the curriculum with clinical opportunities to promote HIV testing in clinical settings. In evaluation of the program, students complete pre- and posttest evaluations of their knowledge and skills. Through this evaluation, faculty and JI staff can gain insight into students' views of the program.

#### **PO-091. Quality Assurance in Fixed Prosthesis at UAB School of Dentistry**

Toni T. Neumeier, University of Alabama at Birmingham  
*New Program*

The object of this program is to demonstrate improvements in patient care from a Quality Assurance (QA) program. QA on dental student lab work plays an important role in dental schools. The improvements to be gained are seen not only in the positive effects on patient care,

but also in faculty calibration and the standardization of student quality in patient treatment. It is a challenge for every dental school to carry out the mission of providing the best oral health services to patients. In achieving this mission, QA plays an essential role. At University of Alabama at Birmingham School of Dentistry (UAB SOD) we established a new QA system for fixed prosthodontics lab work two years ago, through which we have achieved improvement in patient care. Also, through use of QA data, administrators have identified areas in the curriculum where correction and adjustment have been beneficial. Methods: The QA faculty team was established with the assistance of school administration and includes five prosthodontists who rotate QA responsibilities daily. Students receive and are briefed on the QA guidelines at orientation, and these guidelines are reinforced throughout the school year. Once a student's lab work has been entered in the Salud system, it is sent to a designated QA room before being sent to a lab. If the lab work is not approved by a QA faculty member, he or she fills out the QA form with recommendations and returns it to the student for correction. For every piece of incoming work from a lab, a QA faculty member evaluates it before giving it to students; for any viewed as needing correction, a QA form will be filled out. Depending on the type and severity of flaws, the questionable lab work will either be returned to the lab for correction or the closely supervised student will be allowed to proceed with patient try-in before a remake or chairside adjustment decision is made. For every remake case, the student fills out a remake form before lab work can go out. All QA form data are collected and analyzed at the end of the semester and presented to administrators. The QA form includes two sections: one for QA on student work sent to a lab after being checked includes 13 QA criteria on final impression, diagnostic wax up, mounting casts, work authorization form, etc.; the other is QA on returning lab work from either the in-house lab or a commercial lab and has 10 criteria on following work authorization, crown fits on die, correct occlusion, etc. The remake form includes previous treatment date, reason for remake, the faculty member who supervised the case previously, and the faculty member who approved the remake decision. Results: The percentage of overall cases (both D3 and D4) determined by QA as needing to be returned to students for correction before sending to lab has decreased from Year 1 (8.98%) to Year 2012 (6.01%), for a 33% relative decrease. The percentage of cases for D4 students needing to be returned to students for correction before sending to lab decreased from Year 1 (12.84%) to Year 2 (6.92%) for a 46% relative decrease. The percentage of cases for D3 students needing to be returned to students for correction before sending to lab increased slightly from Year 1 (5.06%) to Year 2 (5.21%) for a 3% relative increase. (This may be due to D3 students having less clinical experience, thus being supervised more closely by faculty during their clinical rotations.) Data show that incorrect mounting of casts is the most common error students have made among all cases needing correction. The rest are impression and die margin discrepancies. The number of cases needing to be returned to the labs is small and changed little from Year 1 (16 cases) to Year 2 (18 cases). (This is possibly due to the labs being brought on board with the QA process early and being proactive in correcting deficiencies brought to their attention.) Overall, remakes increased from 3.43% to 4.38% (27% relative increase). (This is likely due to all the faculty becoming more aware of standards emphasized by the QA process.) It takes a group effort from the QA team, plus support from administrators, to improve the quality of all student lab work. QA on fixed prosthodontics has proven to be successful at the UAB SOD Comprehensive Clinic. Currently, the QA system is being expanded to include removable prosthesis.

#### **PO-092. Nursing and Dental Students' Experiences with Interprofessional Education**

Gail A. Czarnecki, Stephanie J. Kloostera, James R. Boynton, Marita R. Inglehart, University of Michigan

*New Program*

New CODA Standards stress the importance of interprofessional education (IPE) for predoctoral dental students. Research has shown that IPE has the potential to enhance student learning and improve the quality of patient care. Joint IPE activities for dental and nursing students offer opportunities to educate future nurses about the importance of oral health for their patients and ways they can get involved in oral health-related care. These activities might be especially important when nurses care for pediatric patients because the regular schedule of well child visits early on in children's lives allows them to play an important role for oral health promotion for these patients. Dental students who participate in IPE with nursing students might change their thoughts concerning the role that nurses can play for oral health promotion based on their experiences. The purpose of this new educational program was therefore to analyze the effects of IPE in a pediatric dental clinic for first-year nursing and third-year dental students. Specifically, Aim 1 investigated whether nursing students' own oral health-related behavior plus knowledge changed over the course of this program. Aim 2 analyzed whether nursing and dental students' values concerning the importance of nurses' oral-health-related knowledge and skills increased by the end of the program. Aim 3 explored whether these students' motivations were related to their scores on the Readiness for Interprofessional Learning (RIPL) scale. The final aim was to assess the students' evaluations of their IPE experiences. Methods: Survey data were collected from 33 first-year nursing and 40 third-year predoctoral dental (D3) students before and after their rotation in a pediatric dental clinic. In addition, control group data were collected from dental students who had not participated in such a rotation (103 D1 students, 102 D2 students, 75 D3 students) as well as from six pediatric dentistry residents at the beginning and end of the term. The nursing students participated in a one-week rotation along with D3 students. Results: The data showed that the nursing students changed their own oral health-related behavior from before to after their rotation. Their own frequency of tooth brushing increased significantly, and their emotional response to visiting a dentist became more comfortable. In addition, their oral health-related knowledge and skills improved. For example, their ability to recognize dental caries in children (from 15% to 94%) and gingivitis (15% to 76%) increased, and their knowledge about performing oral exams (0% to 82%) and providing fluoride varnish (9% to 94%) and oral health education (15% to 100%) increased significantly. The nursing students' ratings of the importance of having a better understanding of the relationship between oral and systemic health, having clinical skills, considering oral health in clinical settings, and recognizing dental caries, gingivitis, and abnormal intraoral pathologies improved significantly as well. However, the importance ratings of dental students who participated vs. did not participate did not change significantly over time. The nursing students had higher RIPL-teamwork/cooperation and professional identity scores than the dental students and pediatric dentistry residents. This finding is important because these RIPL scores correlated significantly with the students' values concerning the importance of nurses having oral health-related knowledge and skills. Conclusion: This new educational program was very successful in changing nursing students' own oral health-related behavior, knowledge, skills, and attitudes. After the rotation, nearly all nursing students had a foundation knowledge about pediatric patients' oral health issues and basic skills needed to engage in oral health promotion activities and were exceptionally positive in their attitudes concerning nurses' involvement in this context. However, the dental students who participated did not change their values concerning nurses' involvement in providing oral health-related care

for pediatric patients, nor were the pediatric dentistry residents and dental students in the control group. In addition, their readiness to learn about interprofessional collaboration was lower than the nursing students' readiness. Future IPE activities with dental students should be prepared by educating dental students about the crucial importance of IP collaboration. Once the dental students work side-by-side with nursing students during rotations in clinical settings, it might be important to engage them in active interactions.

**PO-093. OSCE Examination Assessing Preclinical Understanding of Complete Dentures and RPDs**

Jeffrey L. Perry, Christine Halket, Gilda Ferguson, Laura Nichols, Midwestern University-Arizona

*New Program*

The purpose of this program was to utilize a method to evaluate student comprehension of complete dentures and removable partial dentures. Methods: Upon completion of the preclinical curriculum, dental students enter the clinical years and are assigned patients with varying needs. Due to improved oral health care in the aging population and the growing popularity of implant retained fixed prostheses, the denture patient population is declining, leading to less clinical denture experience for dental students. By the time the preclinical curriculum is complete, many students have already forgotten what has been learned about dentures. Time elapses before many students work on denture patients, resulting in students forgetting even more about denture procedures. Adding demonstrations and live denture patient encounters in a simulation clinic center setting during the second-year curriculum partially addresses this problem. Students gain hands-on experience with key denture fabrication steps that were presented in their lectures. At the end of the second year, an objective structured clinical examination (OSCE) on complete and removable partial dentures is taken by the students. An examination known as Denture OSCE was prepared for the D2 class by several preclinical faculty members to be included in the end of year examinations prior to entry into the clinic in the D3 year. The examination was given to the entire D2 class of 111 students on April 29, 2013. Composed of 100 fill-in-the-blank questions, 111 stations were set up in the Simulation Lab with 11 rest stations placed approximately 10 stations apart. Students rotated from station to station at one-minute intervals. The examination was graded on a pass/fail basis with 75% needed to attain a passing score. The results were made available one week later. Ninety-nine students passed the examination while 12 failed. The highest grade achieved was 93%. Subsequently, it was decided to add seven points to each student's grade, which resulted in one failure. The student who failed was remediated, and a retake OSCE was prepared that the student passed. Questions were printed out on paper with one question per station. Stations contained dentures, casts, pictures, RPD frameworks, custom trays, wax rims, equipment, or denture setups on articulators. Categories included but were not limited to the following: treatment planning, impression evaluation, lab work evaluation, anatomical landmark identification, and RPD framework components. Results: The results of the OSCE were reviewed, and the questions were analyzed for the level of understanding of different concepts. Using this information, questions were reformulated for the next OSCE and for implementing changes to future lectures. Curriculum changes have been made as a result of the OSCE.

**PO-094. Establishment of Formal Faculty Mentorship Program at University of the Pacific Arthur A. Dugoni School of Dentistry**

Bernadette A. Fa, Chan M. Park, Nader A. Nadershahi, University of the Pacific Arthur A. Dugoni School of Dentistry

*New Program*

The purpose of this poster is to present a case report describing the establishment of faculty mentorship program at University of the Pacific Arthur A. Dugoni School of Dentistry. Methods: Students are often presented with the idea of mentorship to help with their process of learning while at dental school. Faculty often consider themselves as lifelong learners, yet mentorship is sought out but not always readily available. In June 2012, the Academy for Academic Leadership (AAL) held its first Compass program for early and mid-career faculty. Faculty members in attendance were from various health professions schools including dental, medical, pharmacy, and veterinary from all parts of the globe. This two and a half day session was held in Atlanta and discussed topics that would help guide junior faculty in a direction of growth. One of the key discussions included mentorship and the benefits of having a mentor for junior faculty throughout their academic career. During a faculty development day at our school in San Francisco, faculty members were given a brief presentation describing benefits of a faculty mentorship program and objectives for the creation of such a program. Afterwards, a preliminary survey asking the faculty about their interest in participating in a mentorship program was distributed. Questions included simple demographics, department, and if they found themselves becoming a mentor or even a mentee. From the response, a follow-up email was sent to faculty containing an online link asking for more specific information. Faculty members who expressed interest gave their name, contact email, area in which they could mentor other faculty, or need as a mentee, including area in which guidance is needed. In addition to the meeting, those in attendance were reminded of the objectives of mentorship programs and given recommendations how to manage a mentor/mentee relationship. A secured online site was created exclusively for the pilot group with information regarding mentorship and faculty development. This site also provides an opportunity to engage in a forum with others in the pilot group and to encourage others to post articles regarding mentorship. Results: Thirty-nine members of the faculty participated in the survey. Ninety percent indicated they were interested in a mentoring program. Seventy-four percent indicated they see themselves as a mentee. Of those who stated that they saw themselves as a mentee, they indicated desire for guidance in four categories: 49 percent were most interested in a mentor to help with research, 23 percent indicated needing guidance in pedagogy or course directing, 33 percent sought guidance in career and academic advancement, and 26 percent felt a mentor in life balance would be helpful. When asked what aspects of a mentor interaction would appeal to them as a mentee, 26 percent selected an appeal for a shared vision, 44 percent selected receiving support, 21 percent selected accountability, and 18 percent selected life balance. Although still in its preliminary stages, the establishment of the program has been beneficial for current junior faculty members as they begin their growth in faculty development. For mentors, teaching is also part of learning and in a way revives enthusiasm as a senior or mid-career faculty member. Finally, the constant focus on humanism that is a strength at Pacific is fostered by this program. With an official program available, resources are more readily accessible, the science of learning does not appear unattainable, and its focus helps build upon humanism within the walls of the dental school.

### **PO-095. Not Everyone Gets a Trophy: Preparing Students for Feedback**

Jan K. Mitchell, Ralph A. Gillies, Georgia Regents University  
*New Program*

While a certain amount of stress is beneficial to learning, neuropsychology research shows us that learning is negatively affected if there is too much stress, particularly if students feel personally threatened or attacked. First-year dental students' previous

educational experience usually contains little exposure to the level of face-to-face feedback that is a staple of dental education. On the contrary, their usual experience of feedback is actually summative evaluation (grading), which is an emotionally charged, high-stakes activity. When put in an environment of frequent personal feedback, many students find the situations stressful and threatening, and many react defensively or emotionally, which is a significant barrier to learning. The intervention we developed includes discussion and activities designed to increase student readiness for faculty feedback, to introduce the concept of deliberate practice, and to help them see feedback as a part of their professional development and career. Increasing student awareness of their emotions and cognitions related to seeking and receiving feedback was a major focus of the intervention. Methods: Recognizing that this situation was primarily a mismatch of expectations, a half-day seminar was developed for first-year dental students to be delivered during their orientation week to set appropriate and realistic expectations around feedback. Prior to the seminar, the students were asked to read a classic article on feedback in medical education to introduce the background concepts and experiences in a professional setting. The seminar consisted of a twenty-minute background lecture on deliberate practice in skill acquisition and the role of feedback in deliberate practice. The students were then divided into small groups for a series of activities. First, based on the reading assignment and students' experiences, they explored the emotional impact of feedback vs. evaluation. Second, each student was given origami paper and instructions and self-assessed using an evaluation sheet. Next, they passed their origami project to a classmate for peer evaluation. This served as a basis for discussion of the value of self-assessment and peer evaluation and how they will be used in dental education. Third, students read an abstract on an article on feedback in surgical knot tying that showed effective feedback was not as popular as praise with students, which led to a discussion on the transition from fact-based education to developing internal judgment in the process of becoming a professional. Fourth, a list of cognitions allowed the students to decide if they tend to be more or less likely to seek feedback, leading to a discussion on learning situational judgment on seeking feedback in dental school. Finally, all groups met back and discussed their group conclusions for 30 minutes. De-identified student evaluations were collected and analyzed for all sessions in orientation as a routine quality assurance administrative practice. IRB exemption is pending and will be determined by the presentation date. We used a five-point Likert scale with 1=strongly agree, 2=agree, 3=no opinion, 4=disagree, 5=strongly disagree. Of the 80 students who participated, 77 evaluations were collected. The average score for the feedback session was 1.38 (SD 0.58). The question that asked for their overall rating of orientation activities received an average score of 1.51 (SD 0.61), while the average of the other program ratings individually averaged 1.67, 2.20, 1.95, 1.63, 1.33, 1.46, and 1.64. Conclusions: Student feedback showed this feedback session received the highest student rating of all sessions despite the fact that it added an additional day to orientation. In addition to student evaluations and comments on the intervention, the anecdotal observations of the faculty members who served as small group facilitators during the intervention were collected. After this intervention, faculty development sessions were warranted to ensure faculty members are aware of the content of the half-day training, the language used, and how to follow through. The impact of this intervention on student response to feedback later in clinical should also be evaluated. After the students have had six months' experience with high-stress feedback, a follow-up survey will explore whether they felt the seminar prepared them for their first-year experience.

### **PO-096. Patient Evaluation: Applying Assessment Used in a Specialty to Another Discipline**

Glenn K. Rochlen, Bruce A. Brandolin, Aaron M. Soeprono, June Weiss, David Hershkowitz, New York University  
*New Program*

Today's dental student has an array of choices in documentation of dental cases. After the decline of film cameras, digital photography is now routinely used in planning esthetic cases from the initial visit, to documenting progress, to the final result. Dental students are introduced to the fundamental requirements of dental photography in our simulation lab. It is expanded when they begin their course in orthodontics and begin learning Invisalign. In this course, students learn exactly how many photographs are necessary to evaluate a patient and the proper way to capture the image. The required views are of the occlusal, maxillary and mandibular, interdication, palatal/lingual views, extraoral profiles, and full face. They are taught to evaluate the photographs for discrepancies in symmetry, degree of tooth reveal, smile line, and gingival contour. Students are required to practice and master these diagnostic skills on each other. When dental students begin their clinical training, often they are confronted with cases that require esthetic rehabilitation. In order to plan a complex case, they must complete a series of diagnostic procedures. A smile evaluation form combined with the study models, radiographs, and photographic documentation are all required for diagnosis. Digital photographs are also used as treatment progresses to evaluate waxups, provisionals, and ceramics. Students can critique the images alongside the patient and faculty member to discuss how to optimize the result. Students utilize the photographic skills learned in their Invisalign course to obtain the necessary views and the correct method of photographing the patient. Methods: The methods used to teach students the evaluation relationship between several disciplines is addressed in the orthodontic simulations lab, where students are taught the fundamental principles of digital photography for the dental patient. This includes the number of photographic views needed, which includes intra- and extraoral pictures. Following the photographic documentation, students examine the pictures and assess for symmetry, smile line, and gingival contour. Once this course is completed, they use these exact principles to evaluate patients for and esthetic assessment. This exercise teaches students that the assessment used in one discipline is easily applied to another discipline. Conclusion: The true test of students' mastery of skills learned is when they can apply them to multiple platforms. In the orthodontics curriculum, students are taught the number of photographs and views necessary for an evaluation. These skills are then seen being utilized when those students must treatment plan an esthetic case during their clinical education. Bridging the space between a simulation lab and clinical implementation is the verification that didactic knowledge is translated to clinical implementation.

#### **PO-097. Pediatric Dental Residents' Intent to Treat Patients with Autism after Graduation**

Andrea Boucher, Romer A. Ocanto, Oscar A. Padilla, Nova Southeastern University  
*New Program*

The purpose of this study was to identify second-year residents' level of confidence and intent to treat Autism Spectrum Disorder (ASD) patients after graduation from their pediatric dentistry program. Methods: The study was granted IRB approval in March 2013. A pretested 15-item survey was sent through SurveyMonkey to all enrolled U.S. and Canadian second-year pediatric dental residents. Only second-year residents were included because they had completed one year of residency and were expected to provide more accurate feedback about their postdoctoral program. The survey instrument was adapted from an instrument described by Weil and Inglehart, who examined dentists' perceptions of their dental education and

relationships among their educational experiences, attitudes, and behaviors concerning patients with ASD. The survey was divided into four sections. Section 1 addressed predoctoral training experiences of the residents and their confidence level at this time as well as education on ASD prior to entering specialty training. Section 2 had questions on characteristics of respondents' current specialty program, including type of program (hospital- or university-based), percentage of special needs/ASD patients they treated, and number of ASD patients they saw in a typical week. Section 3 gathered information on the curriculum in ASD of the residents' postdoctoral didactic training and clinical experience, including types of instructors and/or guest speakers on ASD, lecture topics, and techniques used in a clinical setting while treating an ASD patient. We also asked about any specific clinical arrangements the specialty program allowed for patients with autism. Section 4 assessed residents' intent to treat ASD patients after graduation from their current pediatric dentistry program. Questions addressed residents' experiences with ASD, including comfort level with autistic patients, personal experiences with autistic patients, reimbursement level, time needed to treat autistic patients, the set-up of an office to treat special needs patients, and staff knowledge and ability to treat ASD patients. Data were transferred from SurveyMonkey to an Excel spreadsheet to perform statistical analyses with SPSS software. Outcome variables were both intent or willingness to treat and the confidence level to treat ASD patients after graduation from their postdoctoral program. The main explanatory variables were both pre- and postdoctoral education in ASD. Descriptive statistics (frequencies and means) and bivariate analyses were used. Results: Response rate was 21 percent. Out of 450 invited participants, 30 declined to receive the email invitation. Results indicated that prior to entering into a pediatric residency program, 46.4% of the residents were somewhat comfortable but 32% were not comfortable at all treating patients with ASD. Only 56% had any didactic training in their predoctoral dental education on SHCN individuals, and only 18% received any kind of clinical training. More than 50% attended a combined residency program, and approximately 80% stated that patients with SHCN accounted for about a quarter of their patient base, with 73% seeing one to four patients with ASD a week. Results also indicated that personal experience with individuals with ASD has the strongest impact on pediatric residents' decision to treat ASD patients. If a certain training background appears to be more predictive of intent to treat, this information may be able to act as a guide for predoctoral education to include the didactic and clinical curricula needed to increase the number of dental practitioners who feel comfortable treating ASD patients. Current pediatric dental residents will be the future practicing pediatric dentists treating this population; therefore, understanding how to increase the number of practitioners willing to treat patients with ASD can greatly help reduce oral health disparities for this population. Even though almost 100% of those responding felt confident and had the intent to treat patients with ASD, all agreed that most general dentists are not confident or prepared for this task and therefore will be unwilling to treat.

#### **PO-098. Integrating CAD CAM Technology into Dental School Curricula**

Anthony G. Mollica, Richard S. Callan, Jeril R. Cooper, John S. Blalock, Georgia Regents University  
*New Program*

CAD CAM technology has been used in dentistry since the 1950s primarily as a means by which indirect restorations can be fabricated using digital impressions and digital design. Recent efforts have been directed towards utilizing this technology in the education of future dentists. The purpose of this poster is to highlight innovative applications of CAD CAM technology and its integration into a four-year dental curriculum. Methods: Capitalizing on the enthusiasm of

their new educational opportunity, CAD CAM technology should be introduced to students within their first week of dental school in Year 1. Demonstrating the most advanced technology currently available in their chosen profession will enhance their desire to learn and help them feel they are receiving an education on the cutting edge. First-year students can be taught the basics of image acquisition and image transposition for the purpose of comparison. This newly acquired skill can then be put to use throughout their dental education. Initially, this skill will be put to use in the dental anatomy course, where students will compare their wax-ups of various teeth with ideal teeth morphology. The capacity to visualize the difference between the two, by overlaying the waxed tooth image on the ideal, will improve the instructor's ability to describe discrepancies for it is easier for students to see the differences this way than in an instructor's verbal description or 3D drawing. Ultimately, students' potential to improve will be enhanced. Year 2 students are enrolled in preclinical restorative and fixed prosthodontics courses, designed to instruct them in the basic fundamentals of tooth preparations for restorative and fixed restorations. Students will implement the same skills as with the dental anatomy course, only now to compare their tooth preparations with ideal tooth preparations, be they direct or indirect. In addition, students will now be introduced to the design features of the CAD CAM software. They will be instructed on how to design a full coverage restoration on their various tooth preparations. By superimposing the proposed restoration over their tooth preparation, students can begin to appreciate the need for proper preparation design depending on the type of restoration and materials used for fabrication of that restoration. Depending on when in the curriculum it is introduced, the instruction of partial coverage indirect restorations can be enhanced in a similar manner. Crowns can also be milled using the Bob (acrylic) blocks with faults pre-designed to imitate areas requiring adjustment or alteration prior to cementation. These clear crowns will facilitate the learning of proper crown cementation and are much easier and less expensive to fabricate than full metal crowns. If desired, however, these acrylic crowns can be processed via conventional methods into full metal crowns and used for the same cementation exercise. Year 3 students will be able to carry the proficiency gained in the preclinical setting into the clinic, enhancing their skills through the design and fabrication of indirect restorations. It is also possible to scan a tooth prior to preparation for a restoration and then scan it after the preparation. By superimposing the pre-prepared tooth over the prepared tooth, students can evaluate their preparations and make necessary adjustments prior to taking an impression or making a provisional. Taking a conventional impression is a much-needed skill, and students can scan their preparation from their model, then design and mill the restoration. Now students will be shown how to characterize, stain, and glaze the restorations they have created. After taking the impression, students can scan the preparation intraorally, then design a provisional restoration for the tooth and mill it out of a provisional block. This protocol gives them the practice needed to take good conventional impressions, while at the same time extending their knowledge and experience in using what CAD CAM technology can offer. The majority of the final year in dental school is spent in clinic, providing care to patients. Students have the opportunity to increase their knowledge, refine skills, and gain necessary experience to become competent dentists. Armed with the expertise and experience gained from previous exposure, students will have the opportunity to maximize the potential of CAD CAM dentistry, delivering indirect restorations to their patients in a single visit. Conclusion: The confidence gained and skills acquired through continued use of CAD CAM technology throughout their entire dental education will prove most beneficial as students transition into their professional careers.

**PO-99. Dental Hygiene Transition Clinic: The Science Linking Education to Practice**

Joanna Asadoorian, Sheryl L. Slosower, University of Manitoba  
*Work in Progress*

**PO-100. Going Global: A Model Process for Bidirectional International Educational Program**

Judy Skelton; Wenlian Zhou; Karen P. West, University of Nevada, Las Vegas  
*Work in Progress*

**PO-101. Characteristics of Critical Incidents Occurring in a Teaching Practice**

Romesh P. Nalliah, Harvard School of Dental Medicine; Chun Hung Chu, University of Hong Kong; Melanie Boyd; Min Kyeong Lee, Harvard School of Dental Medicine; Veerasathpurush Allareddy, Children's Hospital Boston  
*Work in Progress*

**PO-102. Haptic Simulator Tuning Protocol: Method and Preliminary Results**

Emily C. Springfield, Mark Fitzgerald, Lynn A. Johnson, Sharon K. Grayden, Stephen C. Bayne, University of Michigan  
*Work in Progress*

**PO-103. Inclusion of Noncognitive Variables in the Admission Process**

Susan L. Long, Melissa G. Efurud, University of Arkansas for Medical Sciences  
*Work in Progress*

**PO-104. Decision Making in Technology: Institutional Process and Student Critical Thinking Exercise**

David G. Gratton, David C. Johnsen, Michael Spector, Julie A. Holloway, University of Iowa  
*Work in Progress*

**PO-105. Radiographic Imaging for Disaster Victim Identification by Dental Hygiene Students**

Tara L. Newcomb, Ann M. Bruhn, Old Dominion University  
*Work in Progress*

**PO-106. Online Calibration of Faculty and Students Assessing Restorative Dentistry Procedures**

Gail A. Krishman, Mark Fitzgerald, Stephen C. Bayne, University of Michigan  
*Work in Progress*

**PO-107. Interprofessional Collaborators: Faculty Embrace Critical Thinking and Interprofessional Education Theory**

Marcia J.M. Rushka, Anthony T. Nowakowski, Lorraine F. Glassford, Hong-Chun A. Kim, Laura L. MacDonald, University of Manitoba  
*Work in Progress*

**PO-108. Faculty Development Is a Science of Learning**

Mary Norma Partida, Jeff Hicks, William Hendricson, John Rugh, John Littlefield, University of Texas Health Science Center at San Antonio

*Work in Progress*

**PO-109. Student-Developed Exam Questions Lead to Higher Cognitive Level of Learning**

Carlos Gonzalez-Cabezas, Mary Wright, Olivia Anderson, Margherita R. Fontana, University of Michigan

*Work in Progress*

**PO-110. Enhancing Clinical Experiences Through the Use of Advanced Technologies**

Jennifer J. Barrington, Baylor College of Dentistry

*Work in Progress*

**PO-111. Characteristics of Fee Adjustments in a Predoctoral Teaching Practice**

Risha M. De Leon, Peggy Timothé, Sang Park, Romesh P. Nalliah, Harvard School of Dental Medicine

*Work in Progress*

**PO-112. Technology Incorporation: Curricular Management of Dental Innovation in Digital Restorative Dentistry**

Steven A. Aquilino, David G. Gratton, So Ran Kwon, Maria M. Hernandez Luna, Scott K. Arneson, Galen B. Schneider, David C. Johnsen, University of Iowa

*Work in Progress*

**Presented on Monday, March 17, 2014, 10:00 am-12:00 noon**

**PO-001. Legislative Advocacy Project**

Ellen J. Rogo, Leciel K. Bono, Teri Peterson, Idaho State University  
*Educational Research*

The purpose of this investigation was to determine the effect of a legislative advocacy project on the knowledge, values, and actions of dental hygiene students enrolled in a leadership course. Methods: Institutional Review Board approval (HSC #3594) was granted for exempt status from Idaho State University. A survey was created in SurveyMonkey, and the link to the survey was sent to participants' email addresses. No personal data such as email or IP addresses were collected to maintain confidentiality and anonymity of respondents. A quasi-experimental design was employed with a convenience sample of 21 undergraduate students (BS) enrolled in a two-credit spring semester leadership course on-campus in 2011 and 17 graduate students (MS) enrolled in a three-credit leadership course online in the 2008-11 spring semesters. BS students worked in groups of five or six to complete legislative activities, while MS students worked on projects individually. The purpose of the project was to link leadership theory to practice as students followed a health care bill through the legislative process. Helping students recognize their personal values and gain political confidence is an important educational objective.

In this study, assessment, planning, and implementation strategies were used to assist students in extending their knowledge of being a change agent and becoming a health professional advocate. Active learning strategies were used to create a professional mission, vision, and values statement for the project, conducting a SWOT analysis, completing a strategic plan, developing an evidence-based fact sheet, and contacting state legislators through written correspondence. The data collection instrument was designed by the investigators with three scales (knowledge, values, and actions), a section on barriers to future advocacy actions, and two open-ended questions: what would encourage you to increase the probability of participating in legislative advocacy efforts, and is there additional feedback you want to share? The knowledge, values, and barriers variables were scored using a seven-point Likert scale based on level of agreement. Content validity of the instrument was established before it was administered. Students scored their pre-project and post-project status on the three scales. Results: Cronbach's alphas revealed internal consistency of the three scales at 0.95 or higher. Pre-project scores and post-project scores were analyzed by parametric tests and confirmed using nonparametric tests. Demographic results indicated 100% of the participants were female. The majority of undergraduate students were between the ages of 21 and 25 and the graduate students were 40+ years. Prior legislative experience revealed all the BS students were members of the Student American Dental Hygienists' Association (n=19, 90.5%) or leaders in that organization (n=2, 9.5%). The majority of MS students were members of the American Dental Hygienists' Association (n=8, 47.1%), some were leaders in that organization (n=4, 23.5%), and others were members of the student organization (n=4, 23.5%). One MS student was not a member of either association (6%). The majority of BS students were registered to vote (n=17, 81%) and voted in the last election (n=11, 52.4%). The majority of MS students were registered to vote (n=16, 94.1%) and voted in the last election (n=13, 76.5%). Results suggest BS and MS students' knowledge, values, and actions significantly increased after completing the project. MS students demonstrated a greater increase in these three areas than BS students. MS students completed the advocacy course online by themselves, suggesting active individual involvement with a vested interest in political awareness as practicing professionals. BS students completed projects in a traditional classroom group setting, thereby limiting individual involvement. Knowledge, values, and actions statements were statistically significant, but actions were rated lowest. Multiple barriers for future advocacy actions were identified; the top two were lack of time and lack of comfort testifying before legislators. Participant responses to open-ended questions expressed increased political awareness and action along with acknowledgment of the value of one's voice, increased political efficacy, and desire to have all health professions students complete a legislative advocacy instructional unit. This project suggests that a legislative advocacy project in an undergraduate or graduate leadership course can positively influence development of knowledge, values, and actions. Educators and mentors form the cornerstone that empowers students with the legislative knowledge needed to create a foundation for future leadership. This foundation becomes the keystone for entering the affective domain and cultivating advocacy in action.

**PO-001b. Comparison of Critical Thinking at Entry into a Master's Degree Program**

Linda D. Boyd, MCPHS University; Dianne Smallidge-Chadbourne, Lori Rainchuso, Forsyth School of Dental Hygiene

*Educational Research*

The purpose of this study was twofold: 1) to evaluate the critical thinking skills of students entering an innovative online associate degree (AD) to master of science (MS) bridge program at the beginning and end of the one-year curriculum, and 2) to compare

the critical thinking skills of AD to MS Bridge students to traditional graduate students at entry into an established online master's (MS) program. Methods: The Health Sciences Reasoning Test (HSRT) is a validated assessment of critical thinking skills of health science students. The HSRT is comprised of five subscales: induction, deduction, analysis, inference, and evaluation. Each subscale score is tallied to create an overall performance score for each student's critical thinking skills. The scale for the HSRT overall scores are interpreted as follows: 25 strong skills, 15-24 competent skills, 14 and below fundamental weakness in skills, 10 or lower extremely weak skills. HSRT scores are categorized into percentiles according to norms. Norms for dental hygiene recently became available and were used for this assessment. Institutional Review Board approval was obtained. The web-based format of the HSRT consisting of 33 multiple-choice questions was administered to two cohorts of entering AD to MS Bridge (n=25) and MS students (n=16). The AD to MS Bridge students repeated the test after completing the one-year bridge portion of the program prior to entry into the MS curriculum. Results: The mean HSRT score for the AD to MS Bridge students at entry into the program (pre-test) was 20 with a mean percentile of 36.18. The mean HSRT score for the AD to MS students after completing the one-year bridge program (mid-point test) was 21.83 with a mean percentile of 51.27. A t-test of the HSRT percentile for the AD to MS Bridge Student at entry and the end of the bridge coursework prior to entry into the MS program demonstrated a statistically significant increase (p=0.007). The mean HSRT score for the MS students at entry into the program was 17. An independent t-test to compare HSRT percentiles of the entering MS students (pre-test) and the AD to MS Bridge student beginning the graduate program (mid-point test) showed the bridge students were higher at entry into the MS curriculum (p=0.008). Outcomes of the HSRT for AD to MS Bridge students showed a statistically significant increase in critical thinking from the point of entry to the end of the one-year bridge curriculum. In addition, HSRT results suggest AD to MS Bridge students may have critical thinking skills equal to or better than traditional baccalaureate graduates entering MS programs. Further study needs to be conducted to include a larger pool of participants before definitive conclusions can be drawn.

#### **PO-002. A Look at Practice Management Confidence and Satisfaction Levels in Practicing Dentists**

Mert N. Aksu, Aziz Moukled, Fady Shounia, Michelle A. Wheeler, University of Detroit Mercy  
*Educational Research*

Practice management is an ever-evolving discipline due to changes in practice and business styles. In addition, practice management curriculum is difficult to deliver in a relevant format during dental school due to competing demands on the student. While exit surveys capture data on student satisfaction with the curriculum, little is known about perception once the graduate enters practice and has relevance for what they learned. The purpose of this pilot study was to evaluate a survey instrument to look at the attitudes of practicing dentists toward dental practice management and their recollection of the adequacy and level of satisfaction of their practice management experience during dental school. Methods: A survey consisting of 16 questions was administered to a convenience sample of practicing dentists during the 2013 annual meeting of the Michigan Dental Association, and 65 responses were recorded. The study was approved by University of Detroit Mercy IRB 03/15/13 protocol #1213-80. Results: Among the 65 respondents, 41 had graduated more than 20 years ago, and nearly 40% of those reported disliking the business aspect of the practice. Additionally, 15% reported that they were insecure in their ability to run the business of the practice. This is notable in that, after more than 20 years of practice, a significant

percentage of dentists reported these findings. Of the respondents with 15 or fewer years since graduation, 14.3% disliked the business aspect of practice, and 4.8% were insecure in their ability to run the business of the practice. This is a positive reflection on improvements in practice management education over the past 15 years. Of those dentists with 15 years or less since graduation, 47% agreed with the statement that they did not appreciate the relevance of practice management while in dental school; this compares with 41% of respondents who graduated more than 20 years ago. It is clear that a significant number of dentists report a lack of appreciation for the relevance of practice management courses, and this could certainly impact learning. Among our respondents, 52% with 15 or fewer years since graduation reported that the amount of time was inadequate. Of those with more than 20 years since graduation, 72% thought that the time devoted to practice management was inadequate. Of those with 15 years or less since graduation, 75% said they enjoy spending time taking practice management courses as compared to 39% of those who graduated more than 20 years ago. The business of dentistry has become increasingly important, and the formal incorporation of practice management in the accreditation standards over the past twenty years has improved the level of perceived security, but dissatisfaction and perceived inadequacy remain.

#### **PO-003. Dental Students' Clinical Performance and Productivity**

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*Educational Research*

Tufts University School of Dental Medicine (TUSDM) uses a discipline-specific evaluation system to determine which dental students should be promoted from third to fourth academic year and which fourth-year students should graduate. This system relies on points that students obtain by performing specific clinical procedures. This point-based system fails to promote patient-centered care and increases the likelihood that a student will discontinue the care of a patient as soon as the student meets the minimally required points for promotion or graduation. Thus, the student's sensitivity to the patient's overall dental health is greatly reduced. This leads to loss of learning opportunities for the student and negatively impacts the clinics' overall performance. In this study, we aimed to describe students' productivity and performance in the dental clinics at TUSDM. This study is the first step of a larger project to evaluate the effect of the point-based system at TUSDM on the performance and productivity of the dental school clinics. Methods: A retrospective cross-sectional study composed of extraction of students' records for the students enrolled in the classes of 2011 and 2012 was performed after IRB exemption status was obtained. Using the electronic health records (axiUm), 244 students' records were extracted and analyzed. A de-identified list was created of all students and the assigned patients, all the procedures performed by the students, the date of each procedure, and the points earned for each procedure during the students' tenure in the clinics. To assess performance, we evaluated the average number of patients treated by students and the average number of students each patient sees. To quantify the productivity, we assessed the breakdown of procedures performed along all of the dental disciplines at the school. Results: Descriptive analysis showed that 244 students had treated a total of 9,692 patients in the period from May 2009 and May 2012, with a mean of 47.0 patients per student and median of 46.0. The number of patients treated by any given student ranged from 22 to 66. Eighty-five percent of patients had their treatment completed by only one student, 12.2% were treated by two students, 1.9% by three students, and only 0.2% were seen by four students. A total of 86,099 point-earning procedures were conducted at the school by the classes of 2011 and 2012 over six disciplines (diagnosis, prevention, restorative, prosthodontics,

endodontics, and periodontics). Diagnostic procedures were the most commonly performed (28.8%) followed by restorative procedures (23.8%), while the least common was endodontic procedures with only 1.4%. This is an initial report for ongoing work describing the detailed distribution of the procedures among disciplines and the average points gained by each procedure.

#### **PO-004. Trends in Accredited Dental Hygiene Programs to Meet Economic Employment Forecasts**

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*Educational Research*

The purpose of this study was to assess changes implemented in accredited dental hygiene programs to meet the U.S. Labor Department's employment projections of future job growth in the dental hygiene profession to year 2020. The dental hygiene profession has been named as one of the best careers to enter based on the Bureau of Labor Statistics Matrix. Methods: Data from the 2010-11 American Dental Association Survey of Allied Dental Education, the most recently released report, was compared to results from the surveys released in the previous five years to assess changes implemented in accredited dental hygiene programs to meet forecasts of future job growth in the profession. Results: The 2010-11 survey reported that there are 323 accredited dental hygiene programs, an increase of 14 programs from 2009-10. Of these, 86.1%, or 278 programs, were classified as public institutions, and 180 programs (44%) were at community or junior colleges. For these programs, tuition costs were one-fourth (23.9%) as compared to programs in private educational institutions. For all programs in 2010-11, the first-year enrollment increased by 2.8% from the previous year and by 7.9% since 2006-07. In 2010-11, the capacity for enrollment increased to 6.2% from the previous year and to 16.3% from 2006-07. The grade point criteria in admissions processes have changed since 2007-08. There was a decline of 2% in considered overall college grade point average (GPA), 3% decline in considering college science GPA, and 3% decline used no college GPA, while high school overall GPA remained the same at 23%. There were no other significant changes. However, the number of applications decreased in 2010-11 by 18%, and there were 19% decreases in the number of students accepted from the previous year. Conclusion: Dental hygiene accredited programs have implemented changes to meet forecasts of future job growths in the dental hygiene profession from 2010 and 2020. There was an increase in the number of accredited dental hygiene programs to provide the opportunity for more potential candidates to receive an education and enter the profession. The majority of the accredited dental hygiene programs are public institutions whose tuition fees were one-fourth that of private institutions. These programs provide the opportunity to educate more potential candidates at lower educational cost. The grade point criteria for admission were lowered in some areas, while high school overall GPA consideration remained the same to attract students directly out of high school. The decrease in number of applicants may be attributed to the country's economic climate, rate of unemployment, and potential qualified students' affordability to attend college, while unqualified candidates were rejected. The next released survey will provide further information on changes implemented by dental hygiene accredited programs to meet forecasts of future job growth of the profession.

#### **PO-005. Evaluation of the Effects of Blended Learning Pedagogy on Student Learning Outcomes**

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*Educational Research*

The paradigm shift in health care reform has altered health care

delivery and subsequently the role of the dental hygienist. To meet these challenges, it is imperative for dental hygiene education to incorporate student-centered pedagogy to promote the critical thinking and problem-solving skills required for the profession of dental hygiene. The purpose of this Title III-Students First Grant funded research was to evaluate the effectiveness of blended learning (BL) pedagogy on successful learning outcomes of sophomore dental hygiene students as compared to learning outcomes of traditional face-to-face (F2F) teaching and learning. Forty-one dental hygiene students in an Associate Degree program were enrolled in an IRB-approved redesigned BL nutrition course required in the dental hygiene curriculum. Successful student achievement was evaluated by comparison of percent distribution of final course grades between the redesigned BL course and the F2F traditional course from the previous academic year. Methods: Student scores on unit exams, final exams, in-class audience response system (ARS) clicker assessments, and pre-class online quizzes and puzzles were examined for student learning outcomes. Student engagement was determined by evaluating interaction and attendance in all online pre-class activities. To monitor student perceptions toward the BL pedagogy, a mid-semester course evaluation was utilized. Students also completed an end-of-semester course evaluation to determine overall attitudes and perceptions toward the blended learning experience. Results: Results revealed that blended learning was as effective as traditional face-to-face learning in achieving successful student learning outcomes as evidenced by no significant difference between percent distribution of final course grades of A through C. Mean scores of unit and final exams illustrated similar results as compared to the previous year's F2F scores. Mean scores of in-class clicker assessments and pre-class online quizzes and puzzles demonstrated successful student learning outcomes. Value added benefits of blended learning as identified by this study included increased pre-class preparedness in course content, better attendance, enhanced student engagement, and active peer teaching and learning.

#### **PO-006. Utilization of Web-Based Teaching Modules**

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*Educational Research*

Web-based teaching modules are ideal for self-directed learning, but the utilization patterns of self-directed methodologies among dental students are unknown. The purpose of this study was to investigate how dental students utilize self-directed web-based teaching modules. Methods: The IRB reviewed the protocol for this study and confirmed its exempt status. DENT 126, a first-year growth and development course, is primarily a self-study course with self-instructional web-based modules along with small group seminars. In addition to the web-based modules, an assigned textbook serves as a course resource. The course is divided into four units (A, B, C, D) with four unit examinations and a final examination. Prior to each unit examination, students meet in small seminar groups with graduate teaching assistants to review the unit content. Students accessed the online teaching modules with an email address and a self-generated password, which recorded the user name, date, and time. Dedicated self-study course time existed in the curriculum while unrestricted access to the modules was available at any time during the semester. Module access times were categorized as scheduled curriculum time: weekday (Monday-Friday 8AM-5PM), week night (Monday-Friday 5PM-12AM), weekday early (Monday-Friday 12AM-8AM), and weekend (Saturday 12AM-Monday 12AM). Access times were also categorized as 0-3 days, 3-7 days, and 7 days prior to the unit or final examination. Results: The mean number of module visits during the course was 10.85 (range 0-52) while the mean scheduled visits was 0.42 (range 0-10); 36.25% of the students did not have any scheduled curriculum time visits during the course. The mean

number of module log-ins was significantly different between the units as well as between the access times within each unit. At the start of the course during unit A, students accessed the material well in advance of the examination and less so in subsequent units. Access was highest during unit C (mean=15.3 log-ins) and prior to the final examination (mean=15.7 log-ins). Students accessed the modules more frequently during non-scheduled curriculum weekday or week night times throughout the course. The heaviest use occurred during weekday time (mean=8.4 log-ins) and week night time (mean=5.6 log-ins) before the final examination. Conclusion: Dental students did not fully utilize scheduled curriculum time to access the self-directed teaching modules but accessed the web-based material at other times during the weekday and week nights. More than one-third of the students preferred to use other resources to access the course material. Allocation of curriculum self-study requires careful planning to optimize use. Due to personal preferences, students should be given options by which to access course material in self-study courses.

#### **PO-007. Dental Course Survey: Development and New Approach to Analysis**

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##### *Educational Research*

Seeking students' feedback about courses is essential to ensure quality of education, help in the redesigning of existing courses, planning of future courses and faculty assessment, and conforming to accrediting bodies' requirements. Using surveys that are poorly designed may cause students to lose interest, not respond, or provide unreal responses so that invalid conclusions are made. Analysis of survey responses is as important as the design of the surveys themselves. This study describes the development of a survey to assess students' satisfaction with courses in the College of Dentistry at University of Dammam, Saudi Arabia. It also describes a method of analyzing and presenting students' responses using a statistical process control tool. Methods: To develop the course survey, similar surveys of other dental schools were reviewed. The standards of the National Commission for Academic Accreditation and Assessment (NCAAA) were further reviewed to identify aspects where it was necessary to collect students' feedback in relation to courses. A preliminary draft of the survey was prepared in Arabic, and the vice dean of academic affairs approved it. The final version of the survey contained 12 statements that the student was asked to respond to using a five-point Likert scale ranging from 5=strongly agree to 1=strongly disagree. A final statement was added to use as a global measure of survey validity; in it, the student was asked to express overall satisfaction with the course. Approval of the Research Ethics Committee was obtained, and the survey was distributed to the students enrolled in years 2-6. A total score was calculated by adding the scores of each of the 12 statements. Face and content validity of the survey were checked by soliciting feedback from a group of teaching staff members other than those involved in its development. The validity of the survey was also checked by comparing the total score with the score of the global statement, #13, in the questionnaire. Internal consistency was assessed using Cronbach's alpha. The results of the survey were analyzed by plotting the total score in an X-bar and standard deviation control chart. The control rules selected were points above and below the 3 sigma level to identify courses with total scores beyond 99.7% of the score range across respondents. The control chart was plotted using SPSS version 17.0. Results: The survey was judged by experts to have acceptable face and content validity. The total score was moderately, positively, and significantly correlated with the score of

the global statement (correlation coefficient=0.66), Cronbach's alpha for internal consistency=0.82. Out of all students enrolled in the five years (N=163), 142 responded to the survey (response rate=87.1%). They assessed a total of 33 courses received in the second semester of the academic year 2012-13. The total score potentially ranged from 12 to 60. Actual mean score was 36.3, SD=9.2, ranging from 12 to 60. The X-bar control chart identified 16 points violating the control rules. Of these, nine were above the 3-sigma level, and seven were below the level indicating courses that were rated exceptionally good and poor respectively by the students. The newly developed course survey had acceptable internal consistency. Using control charts to analyze the results of the survey helped the identification of courses that were beyond expectations in both directions so that recognition or corrective actions can be provided.

#### **PO-008. Assessment of Student Competence by Fink's Taxonomy**

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*Educational Research*

Fink's Taxonomy of Significant Learning is a means of assessing the change in a learner and confirming the instillation of knowledge. This methodology differs from others because its components are relational and interactive with each other rather than hierarchical. It possesses six major components as foundational knowledge, application, integration, human dimension, caring, and learning how to learn. Each component has a different description and interpretation to assess the acquisition of knowledge and skills that are expected by the end of each course. The purpose of this study was to evaluate student competencies in the diagnosis and management of an extraoral sinus tract using Fink's taxonomy. Methods: Following IRB approval, a vignette was presented to 54 volunteering 4th year students of the dental school. The survey was conducted on the 4th year because this was the period when students were recently taught about periapical diseases. It was anticipated that the survey would also serve as a repetition of a topic they had just completed and refresh their existing knowledge. The case scenario included a patient with extraoral sinus tract formation associated with a mandibular incisor. A radiograph and the photograph of the case were also presented as additional information. Questions focusing on the six dimensions of Fink's taxonomy were asked: fundamental knowledge, application, integration, human dimension, caring, and learning to learn. In the final dimension, students were asked to write down comments on the question that focused on self-criticism. The responses corresponding to the first five dimensions were scored out of a hundred, and averages were calculated. The results were evaluated using the one-way ANOVA test. Results: The average scores for the fundamental knowledge, application, integration, human dimension, and caring dimensions were 69.6, 68.5, 70.0, 82.1, and 86.0, respectively. The highest average score was obtained with the caring dimension, whereas the lowest was observed with application (86 and 68.5, respectively). A statistically significant difference was determined between the scores of human dimension and caring (4th and 5th dimensions) and the other dimensions ( $F=17.11$ ). The students generally seem to have acceptable competency levels in the dimensions defined in Fink's Taxonomy. It is rational to repeat such an experiment in the upcoming senior year to understand whether there are any differences between the results and whether repetition of this topic is necessary. An important topic such as periapical diseases, which the student is likely to encounter in clinical practice, should be regularly evaluated in terms of student knowledge and problem solving abilities. More focus on improving these aspects is definitely mandatory and should be given attention by the authorities.

**PO-009. Seeking the Optimal Teaching and Learning Model in a Clinical Setting: A Simple Survey**

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*Educational Research*

A comprehensive dental education involves many factors. An entry-level student in the clinic needs to develop cognitive processes, psychomotor skills, and behavioral acumen to eventually perform comprehensive treatment independently. In order to achieve this goal, the clinical experience must be one that enriches the student's didactic knowledge and at the same time establishes an environment and culture of mutual respect and commitment between faculty and students. The purpose of our study was to evaluate and compare the clinical educational experience from both the student and faculty perspective in the group practices at New York University College of Dentistry (NYUCD). The expectations of students and faculty regarding the best learning environment may vary considerably. In an attempt to bridge this gap, several factors may need to be considered. We explored these factors through the collection and analysis of survey data to formulate an optimal teaching and learning model. Methods: Surveys were distributed to third- and fourth-year dental students and the clinical faculty at NYUCD. The surveys were completed anonymously and returned to a collecting envelope in the group practice director's office. Data were collected manually and analyzed by two dental students and a faculty member. The survey qualified as exempted research by NYU's Institutional Review Board. Results: 55 faculty members and 111 third-year and 117 fourth-year dental students completed surveys. In the responses, 64% of students reported feeling that the transition from preclinical to clinical setting met their expectations regarding faculty guidance. The learning experience of NYUCD students averaged a 7 overall on a scale of 1-10. Similarly, the teaching experience of NYUCD faculty was 7. Faculty members rated fourth-year students' preparedness for clinic and ability to communicate with their patients as 7. Their ratings of third-year students' preparedness and ability to communicate were 5 and 6, respectively. In reference to performing a procedure for the first time, 70% of faculty and 84% of students felt that hands-on demonstration would be most beneficial. The survey showed that 65% of students needed to repeat a procedure two or three times before feeling confident enough to perform independently. The survey also showed that 73% of students felt that reading the clinic manual helped prepare them for the procedure. Analyzing the best way to give and receive feedback resulted in 84% of faculty and 87% of students believing that feedback is best given by compliment and correction. Students' and faculty members' perception of how frequently to check clinical treatment throughout a given session showed a great discrepancy: 59% of students wanted to be checked sometimes during a clinic session, while only 12% of faculty felt they should check sometimes. Communication between students and faculty in the learning process yielded a high percentage for both parties. The three most important qualities of an effective teacher were, according to faculty, constructive feedback 81%, knowledge 74%, and availability to students and enthusiasm, both 45%. According to students, knowledge, constructive feedback, and availability were the three most important qualities, ranking as 81%, 66%, and 58%, respectively. Conclusion: Our study showed that there exist some discrepancies between faculty and students in opinions regarding the optimal clinical learning environment. However, looking at the results in tandem, overall faculty knowledge, availability, constructive feedback, enthusiasm, and hands-on demonstration were considered the most effective behaviors to motivate students and maximize the learning experience.

**PO-010. Quality of Digital Periapical Radiographs Obtained by Predoctoral Dental Students**

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*Educational Research*

The purpose of this study was to evaluate the quality of digital periapical radiographs obtained by undergraduate dental students. Methods: The study design received approval from the Institutional Review Board of the dental school. A total of 244 digital periapical radiographs taken by third- and fourth-year dental students in 2012-13 were analyzed. The radiographs were obtained during the initial examination of patients who presented to the multidisciplinary student clinics for dental treatment. The quality of the radiographs was evaluated with respect to the positioning and technical errors. The radiographs that needed repetition were recorded. Performance of the students in terms of the interpretation of the radiographs was also scored. Results: Eighty-four periapical radiographs taken by third-year and 160 periapical radiographs taken by fourth-year dental students were assessed. Positioning and technical errors were found as follows. The percentage of error that was related to appearance of the apex on the radiography was significantly higher (25%) among the third-year compared to the fourth-year (14.4%). Fourth year students were significantly more successful in terms of the accurate angulation of X-ray beam (64.4%). The third-year students had a statistically lower (23.8%) percentage than the fourth-year (26.3%) related to the presence of cone-cut on radiographs. The radiographs that needed repetition were found to be statistically higher (41.7%) in the third-year compared to the fourth-year dental students (27.5%). Conclusion: Evaluation of the clinical performance of dental students is needed to identify deficiencies in the teaching/learning process. It is also important for improvement of the dentomaxillofacial radiology curriculum and patient safety.

**PO-011. Academic Advising/Counseling in Saudi Arabia: What Do Students Want?**

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*Educational Research*

Academic advising is part of the student support system that aims at anticipating, reducing, and solving problems students may face. The establishment of an advising system is an important step that needs to be followed by actual and mutual engagement in student-advisor relationship. This study analyzed factors affecting the academic advising system in the College of Dentistry, University of Dammam, as well as alternative paths the students use when seeking help in this area. Methods: A questionnaire was developed to assess whether students benefited from the academic advising services established by the college and actually met with advisors. Feedback was sought from the students about how well the advisors carried out various aspects of the advising process. In the last part of the questionnaire, the students were asked about their primary source of information regarding academic issues during the year (2012-13). The questionnaire was reviewed by teaching staff involved in the academic advising process, modifications were conducted accordingly, and the questionnaire was eventually approved by the Research Committee. The Arabic version of the questionnaire was distributed to students in years 2-6. Questionnaires were collected, and the responses were statistically analyzed. Results: The questionnaire was distributed to 136 students in years 2-6 and was returned by 108 (response rate=79.4%). Almost half the respondents reported having at least one visit with the academic advisor in the last academic year. During the last academic year, the

main source for obtaining information about academic issues was colleagues (48.5%), college booklet or website (21.3%), academic advisors (9.6%), and family members or other sources (6.6%). About 14% reported they did not try to get help at all. Being a senior (fifth or sixth year) or junior (second to fourth year) student was not related to visiting the academic advisor at least once ( $p=0.73$ ). However, a significantly greater percent of females visited their academic advisors. More students reported having visits to academic advisors if the advisor was available when student needed him or her, listened intently to questions and needs, or helped student with academic problems. Visiting an academic advisor was not significantly related to whether the advisor made the student aware of important dates, helped the student understand rules and regulations, or provided student with important information about courses ( $p=0.12, 0.21, \text{ and } 0.10$ , respectively). Only half the students paid a visit to academic advisors, and a far lower percentage reported academic advisors to be the main source of information related to academic issues. Most students sought information from colleagues. Factors significantly affecting making a visit for academic advising were being female and feeling that advisors were available and empathic (listened and helped in solving problems). Technical issues such as dates, rules, regulations, and courses were not significant factors that caused a student to visit advisors.

#### **PO-012. Evaluation of Student Competencies in Oral Medicine Using Fink's Taxonomy**

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##### *Educational Research*

The purpose of this study was to evaluate student competencies in the diagnosis and management of radiolucencies in the jaws. Methods: In the final exam, a case was presented to 52 volunteer fourth-year students of Yeditepe University Faculty of Dentistry in which a nine-year-old was detected with a large radiolucency in the maxillary left first premolar region during a radiograph taken due to his complaints of swelling. The involved teeth were vital and asymptomatic, and students were asked to answer a range of questions assessing their ability in the diagnosis and management of the particular pathology. The questions were categorized in six basic dimensions of Fink's taxonomy: fundamental knowledge, application, integration, human dimension, caring, and learning to learn. Answers to the first five categories were scored out of a hundred, and averages were calculated. The results were evaluated using the one-way ANOVA test. IRB approval was given. Results: The average scores for the fundamental knowledge, application, integration, human dimension, and caring dimensions of Fink's taxonomy were 19.25, 29.12, 24.94, 27.69, and 26.63, respectively. A statistically significant difference was not determined between the scores of the fundamental knowledge, application, integration human dimension, and caring dimensions. Students answering the last category indicated experiencing difficulty in terms of diagnosis. Conclusion: Though there seemed to be some confusion regarding diagnosis and treatment in the presented vignette, it might be attributed to the challenging characteristics of the particular case. Since correct diagnosis plays an essential role in the management of pathological radiolucencies as well as the prevention of unnecessary treatment, educators should place more emphasis on this significant component of oral diseases and surgery.

#### **PO-013. Evaluation of Students' Knowledge of Pain Management Using Solo Taxonomy**

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##### *Educational Research*

The purpose of this study was to evaluate the knowledge of graduating dentists with regard to management of pain related to teeth requiring endodontic treatment using the SOLO (Structure of Observed Learning Outcomes) taxonomy. Methods: SOLO is described as level of increasing complexity in a student's understanding of a subject. It also determines the surface and deep learning of students. It contains five levels: prestructural, unistructural, multistructural, relational, and extended abstracts. We established six learning outcomes according to the sublevels of SOLO. A patient scenario was prepared, and the scenario was extended with the addition of data according to learning outcomes for every SOLO level. After IRB approval, 61 students comprising the whole senior year participated in the study. The students were asked to answer the presented questions. One-way ANOVA and chi-square tests were applied for the assessment of the answers and determination of the general success level of the class. The answers for every SOLO level were assessed based on 100 points. Results: The mean scores were 41.8 for prestructural level, 38 for multistructural level, 37.5 for relational level, 48 for relational moderate level, 39.3/37.5 for relational high level, and 42 for extended abstracts level. There were no significant differences between the mean scores of SOLO subgroups. All scores were lower than 50, indicating that prestructural knowledge is not sufficient and the information given during the current lecture was not processed by students adequately. On the other hand, the students seem to experience difficulty in correlating information given in multidisciplinary courses. An additional lecture should be inserted to the curriculum to be given at an earlier stage. More emphasis should be placed on differentiation of pain and its clinical relevance during lectures related to diagnosis of pulp diseases and referred pain. Considering that 5% of the class received a score of 100 from all levels tested, focusing on teaching methodologies such as learning in small groups and case discussions rather than the content of the course can be recommended.

#### **PO-014. Evaluation of Endodontics Education Program and Student Learning Quality Using the Solo Taxonomy**

Figen Rabia Kaptan, Jale Tanalp, Meric Karapinar Kazandag, Inci Oktay, Yeditepe University, Istanbul, Turkey

##### *Educational Research*

A graduating dentist should have knowledge of the appropriate treatment strategies in patients with high risk due to systemic diseases and produce solutions in complicated cases. The purpose of this study was to evaluate the competencies of students in the treatment of patients with systemic diseases and endodontic treatment needs using the SOLO (Structure of Observed Learning Outcomes) taxonomy. Methods: SOLO is described as level of increasing complexity in students' understanding of a subject. It also determines the surface and deep learning of students. It contains five levels: prestructural, unistructural, multistructural, relational, and extended abstracts. We established 11 learning outcomes according to the sublevels of SOLO. A patient scenario was prepared, and the scenario was extended with the addition of data according to learning outcomes for every SOLO level. After IRB approval, 61 students comprising the whole senior year participated in the study. The students were asked to answer the presented questions. One-way ANOVA and chi-square tests were applied for assessing of the answers and determining the general class success level. The answers for every SOLO level were assessed based on 100 points. Results: The mean scores were 77.2 for prestructural level, 79.2 for unistructural level, 60.3 for multistructural level, 21.6 for relational level, and 40 for extended abstracts level. There were significant differences between the mean scores of SOLO subgroups. The highest score was obtained for the unistructural level (79.2)

whereas the lowest (21.6) was in the relational level. The ratio of correct answers showed a decline as the case got more complicated. According to the results of this study and the feedback received from the students, it was decided to organize additional education sessions on case scenarios and place more focus on asking comprehensive questions.

**PO-015. Who Is MCBC? Conceptualizing the Minimally Competent Borderline Candidate**

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*Educational Research*

Standard setting methods provide evidence for defensibility of determined cut-scores for high-stakes examinations. This is critical to their validity. The transparency of the standard setting process improves the optics and the credibility of the assessments. Many standard setting methods have been developed, but the Angoff method is considered the Gold Standard and is currently used worldwide for many high stakes examinations. Angoff's method has been thoroughly investigated, is easily explained to lay people, and is adaptable to a wide variety of testing formats. As with several of the other subjective standard setting methods Angoff's method requires a panel of subject matter experts (SMEs) to envision a minimally competent borderline candidate (MCBC) and estimate the probability of the MCBC answering an item correctly. The mean value of the probabilities assigned by each SME is calculated, and these are summed across items to determine the cut-score. The purpose of this project was to develop a process to create a touchstone image of MCBC that could be used during the rating process. Although many of the subjective standard setting methods stress the importance of this unified concept, the literature provides little direction for establishing a common vision of MCBC. If SMEs differ in their mental picture of MCBC, the probability estimates across judges will not be based on the same premise making the Angoff calculation meaningless. As each item is rated, the SME needs to be able to envision MCBC and what MCBC knows that makes him or her safe to practice and therefore competent. The challenge is the facilitation of this visioning. Methods: The process involved bringing together 50 purposefully selected SMEs from across Canada for a two and a half day meeting to estimate Angoff values for 850 selected response items. SMEs were given an orientation to standard setting and a consensus building session on envisioning MCBC. The bank was split into two halves so that each item was rated by 25 SMEs. A set of 40 common items was included in each booklet to allow for group differences and drift to be assessed. The yes/no modification to Angoff was followed. The panel of participants was chosen to include a range of people from those who were students recently to long-time clinicians and educators. All initially would have received a similar education to what was being tested. Prior to the workshop, participants were given the program outline to refamiliarize themselves with the curriculum and level to which it was taught. After a welcome and reminder of purpose and confidentiality, the session began with a discussion on the characteristics of the professional and the objective of the assessment which was to ensure safe hands. Second was a review of the stage at which the intended candidates would be in their education level when taking the assessment. This context is extremely important to include in the discussion as to whether mastery is expected or entry level skills. Next, some commonly used terms such satisfactory, competency, pass, and fail were defined and associated with MCBC. After this three-part general orientation, specifics to the profession were looked at using objectives and sample questions from the bank. Polls were taken, and individual participants defended the reasoning behind their ratings. This open and safe discussion led to a more grounded and confident envisioning of MCBC. At this point the participants were dismissed

for the evening. At the end of the session, participants were requested to complete a short evaluation of the session and their understanding of MCBC. A report including these comments was kept as additional evidence of a defensible process. Results: Based on the duplicate items, a repeated measures ANOVA was conducted to test for group differences and drift. Neither the interaction nor the main effects (group and day) were significant. This suggested that the calibration process was successful in establishing a common and stable vision of MCBC. Conclusion: A systematic process is required to develop the image of MCBC. Open discussion in a safe environment helps to enhance the understanding of the concept of MCBC. Although a time-consuming event in high stakes examinations, the ability to provide this in-depth evidence of the cutscore determination makes for a legally solid defense.

**PO-016. A Visual Assessment Tool Aiding Faculty-Guided Student Self-Assessment**

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*Educational Research*

Students in dental anatomy preclinical laboratory present a need to improve their ability to self-assess their own work. Self-assessment provides a means for students to privately reflect or bring their weaknesses to the attention of the faculty for analysis and review. The aim of this study was to develop a new visual teaching tool that incorporates well-organized digital core materials to help students focus on learning necessary information and developing new and necessary skills as well as assisting the faculty in challenging students in specific areas of their deficiencies and guiding them to learning. Methods: A self-assessment tool, using digital images in conjunction with close faculty guidance, was introduced to the first-year dental anatomy and occlusion course at the University of Maryland School of Dentistry in fall 2012. The Institutional Review Board for the Protection of Human Subjects approved this study (HP-00053238). One hundred and thirteen first-year dental students participated. Two anatomic waxing projects were presented to the students, #8 and #19, and separated by training exercises. Initially, they self-assessed, without faculty input, using a digital assessment tool with only verbal descriptors. However, during the training exercises the assessment tool contained the addition of clear images for guidance. After each project, the students received a faculty critique of both their waxed teeth and their self-assessment. The student was tested by waxing a tooth of each project: first #8 and then, after training, #19. Self-assessment, using the set criteria, followed each testing session. The student's waxed tooth was then graded by a faculty member using the same criteria that the students used to self-assess their test waxing. The data from both assessments were submitted to t-test. A comparison of student/faculty differences between the two examinations (tooth #8 and tooth #19) was made to evaluate student progress in self-assessment. Results: The results from students' self-assessment and faculty assessment for both projects presented a statistically significant difference. This visual tool was not able to promote student improvement relative to faculty assessment. Additional procedures and time are suggested as strategies to change students' perspective concerning the assessment of their own work. Using a teaching protocol incorporating an assessment tool with digital photography, clear criteria, close faculty guidance, and additional procedures and training, students may learn to analyze and satisfactorily self-assess preclinical procedures.

**PO-017. Implementation of Simulation with Clinical Local Anesthesia Teaching: Pilot Study**

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*Educational Research*

The purpose of this study was to determine how a preclinical local anesthetic manikin mounted typodont simulation exercise could improve students' perception of learning, confidence, and stress level during their clinical local anesthesia exercises. Methods: An interdepartmental collaborative teaching method was implemented between Restorative and Oral Surgery at the University of Michigan School of Dentistry. IRB-exempt approval was obtained by our institution. A simulation exercise was used in conjunction with a clinical experience to teach second-year dental students about the local anesthetic for routine restorative procedures during their DENT 620 comprehensive care course. Students were required to watch instructional videos on maxillary infiltrations and the inferior alveolar nerve block to prepare for the exercise. Students presenting for anesthesia training were randomly divided into two groups based on random cubicle assignments. One group received the same simulation after their clinical exercise as a postclinical typodont simulation to reflect on their clinical exercise (Group A), and the second group received the simulation before their clinical experience (Group B). Students were asked to voluntarily complete an anonymous post-course survey self-assessing their knowledge, experience, and confidence concerning their assignments. The questionnaire addressed four competencies: 1) assembling of instruments, 2) recognition of anatomical landmarks, 3) maxillary local anesthesia, and 4) mandibular local anesthesia. Results: A total of 102 questionnaires were voluntarily and anonymously (n=102, Group A=43, Group B=59) completed. According to the statistical analysis (ANOVA), the knowledge component had overall higher ratings for all the students for both groups. Simulation after patient experiences for Group A had mean higher ratings than Group B in all parameters examined (non-significant statistically). When comparing competencies separately (1, 2, 3, 4), there were statistically significant differences for competency 3. Higher ratings were found for all other competencies for Group A. When students were separated into groups according to their stress level, Group L-low stress and Group H-high stress, Group L was associated with higher ratings for all four competencies (all non-significant statistically). For the question "How prepared do you feel?" students were separated into two groups. Group LP-less prepared and Group MP-more prepared showed correlation between Group MP and higher competency ratings (significant statistically for competencies 2, 3, 4, nonsignificant for competency 1). Standard t-test and the Levene's test were used. Conclusion: According to our results, there was a continuous trend for higher ratings of competencies for Group A. It seems in this study that the second-year students may prefer the simulation after the actual clinical experience. This may be consistent with a theory of adult learning, Kolb's four-stage learning cycle. The cycle involves four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. We can actually associate the use of simulation to an active experimentation procedure in the learning process. It seems that students who received a reflective simulation exercise after their clinical experience gave themselves higher competency self-assessments. More data and larger numbers of students (larger scale study) may be needed for statistically significant outcomes for this controlled randomized survey concerning the implementation of simulation for local anesthesia.

**PO-018. Relationship Between Leadership Domain Profiles and Interest in Academic Dentistry**

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*Educational Research*

There is always a select group of students in any DDS/DMD class who wish to pursue academic positions upon graduation. However, these students are often unaware of career options in academic dentistry or the skills and talents necessary for success. Our previous studies have

described three pathways to an academic dental career: 1) research path—primarily students, often in the combined DDS/PhD program, with strong interest in basic science research who plan to pursue a full-time academic career; 2) teaching/clinical research path—primarily students with strong interest in teaching and background in clinical research who plan to pursue full- or part-time academic careers; and 3) clinical practice/teaching path—primarily students with strong interest in teaching who plan to combine private practice with a part-time academic career. Each of these three paths emphasizes a different set of skills and talents. The Gallup Organization's talent inventory, the Clifton StrengthsFinder, identifies potential areas of strength in an individual. Its 34 talent themes are categorized into four domains of leadership strengths: executing, influencing, relationship building, and strategic thinking. The purpose of this study was threefold: first, to determine whether a leadership domain profile can predict interest in an academic career; second, to determine whether a leadership domain profile can predict interest in a specific path to academic dentistry; and third, to determine whether participation in an academic track can influence interest in an academic career. Methods: Data were gathered from two study populations. The first was from a leadership development event for the American Student Dental Association (ASDA). Forty-three participants completed the Clifton StrengthsFinder and a questionnaire indicating interest in various practice environments, including academic dentistry. Interest level was scored on a scale from 10=highly interested and 1=not interested. Participants were also asked to indicate which of the three academic paths they would pursue if relevant. The second population was from an R25 NIDCR-funded academic track program designed to recruit and provide teaching, leadership, mentorship, and learning community experiences to dental students exploring options for an academic career. Twenty-five participants completed the Clifton StrengthsFinder and indicated interest in one of the three paths to academic dentistry. Statistical analysis was performed to determine differences in leadership domain profiles and interest in academic dentistry. This study was certified exempt by the UCLA Institutional Review Board. Results: Among the subjects from the ASDA training event, there was a high level of interest in academic dentistry (mean 7.1 out of 10 vs. 9.1 for private practice). Of the 39 subjects who indicated a preferred academic path, thirty-two (82%) selected the clinical practice and teaching path, six (15%) the teaching and clinical research path, and only one participant (2.5%) indicated interest in the research path. No differences in leadership domain profiles could be determined for this population. Subjects from the academic track showed a higher level of interest in full-time academic careers. Although twelve (48%) intended to pursue the clinical practice and teaching path, nine (36%) were considering the teaching and clinical research path, and four (16%) intended to pursue the research path. Analysis of the leadership domain profiles of participants in the academic track revealed differences within each academic path. Students pursuing the research path had higher scores in the strategic thinking domain at a statistically significant level. Individuals selecting the other two paths were more similar, with no statistically significant differences in the four domains of leadership. Strategies for addressing the shortage of dental educators must take into account that academic careers in dentistry vary based on focus and skills emphasized. According to our data, leadership domain profiles cannot predict student interest in academic dentistry in general, but it may predict a student's interest in a full-time academic career on the research path. In addition, participation in a mentored academic track may influence a student's interest in a full-time academic career involving teaching and clinical research. Because there seems to be little difference in domain profiles for students pursuing the other two academic paths, other factors must be considered. Considering the shortage of full-time faculty members, greater efforts might be directed toward mentoring those who would

have pursued part-time or volunteer positions to increase the level of interest in full-time academic positions. This study was supported by NIDCR #R25DE018437.

**PO-019. Evaluation of Special Needs Curriculum: Pediatric Dental Residents' Knowledge and Satisfaction**

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*Educational Research*

Nova Southeastern University College of Dental Medicine (NSU-CDM), in collaboration with Mailman Seagal Institute, developed a didactic and clinical curriculum funded by the U.S. Health Resources and Services Administration to educate and train pediatric dental residents to acquire skills and knowledge in meeting the dental care needs of children with Autism Spectrum Disorders (ASDs). The didactic component of the curriculum (lectures and PowerPoint presentations) was developed and designed by a group of experts. A special needs pediatric dental clinic (PDC) was established to provide care to children with ASDs and to enhance the clinical competencies of the residents under the supervision of a specialty care dentist trained in treating and managing special needs children. The purpose of this study was to determine 1) the effectiveness of the didactic component of the curriculum on the pediatric residents' knowledge of treating and managing children with ASDs, and 2) pediatric residents' opinions and level of satisfaction with the didactic and clinical component of the curriculum. Methods: De-identified data for this evaluation was collected from 2011 on an ongoing basis from the postgraduate (PG) pediatric residents enrolled at NSU-CDM. PG first- and PG second-year residents underwent both didactic and clinical training. The didactic curriculum was organized into a series of lectures focusing on the following major domains: epidemiology of ASDs, child development, characteristics and needs of children with ASDs, behavior management of ASD children in dental office, methods to teach ASD children dental care skills, and pediatric dentists' role in successfully working with the family. Every resident enrolled between 2011 and 2013 rotated at the PDC for a minimum of 11 weeks. Two data collection strategies were used for this study. To achieve objective 1, pretest and posttest instruments were administered immediately after lecture presentations. To achieve objective 2, a 13-item resident impact survey was administered to the residents just before graduation to assess their opinions on and satisfaction with the curriculum. To achieve objective 1, paired t-tests were used to measure the mean change in class knowledge. A percent change in class knowledge was also determined. To achieve objective 2, both quantitative and qualitative analysis were performed. Results: A significant difference in mean class knowledge and percent change in knowledge during the posttests for each knowledge domain was observed among the residents. Among the pediatric residents who responded to the resident impact survey, 100% strongly agreed/agreed that the didactic curriculum increased their knowledge related to treating and managing children with ASDs; 100% strongly agreed/agreed that they received adequate clinical exposure; and 100% strongly agreed/agreed that the clinical exposure increased their confidence in treating children with ASDs. All (100%) respondents were overall very satisfied/extremely satisfied with the ASD training they received at NSU-CDM. The didactic and clinical curriculum enhanced pediatric dental resident competencies in meeting the dental care needs of children with ASDs. Pediatric residents were highly satisfied with both the clinical and didactic training and reported having acquired the required skills and knowledge to treat and manage children with ASDs.

**PO-020. Treating Patients in Preclinical Courses**

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*Educational Research*

Comprehensive patient care emulating general dentistry in private practice has long been taught at many dental schools. Some challenges educators face include the timing of preclinical teaching in relationship to students' need for course material in clinic and the ability of dental students to retain and recall the preclinical course material when necessary for patient care. The purpose of this study was to determine if dental students found case-based patient simulation projects helpful to their understanding and retention of preclinical course material and their patient care for the same subject matter. Methods: At Tufts University School of Dental Medicine, second-year dental students are presented with case-based patient simulation projects in their preclinical removable partial dentures course. All projects in this course are case-based. Instead of the traditional method of asking students to survey a standardized cast or to perform mouth preparations on particular surfaces of particular typodont teeth, students were presented with "patients" with social and dental histories, photographs, radiographs, and casts. Diagnoses and treatment plans were discussed, and students executed these as lab projects for their "patients." Steps included fabrication of inter-occlusal records, mounting casts, surveying, designing removable partial dentures, mouth preparations, impression making, bending clasps, setting up teeth, and waxing up dentures. Identical step cards and paperwork were completed for their "patients" in the preclinical course as those used in the comprehensive care clinic. Second-year students from two classes were questioned via an online survey using SurveyMonkey at the completion of their preclinical courses. A five-point Likert scale was used in this anonymous questionnaire. One of these classes was surveyed again after a year in which they treated their own patients in a comprehensive dental clinic. Students were asked if the case-based patient simulation projects were helpful to their understanding and retention of the course material and to the care of their clinical patients. The Tufts University/Tufts Health Sciences Institutional Review Board approved the study. Results: 116 out of 362 students responded for a response rate of 32%. In the one-year follow-up survey, 86 out of 176 students responded for a rate of 49%. Of those who responded right after their preclinical courses had ended, 86 (74%) agreed or strongly agreed that the case-based patient simulation projects helped them understand the course material, and 76 (66%) agreed or strongly agreed that the case-based patient simulation projects helped them retain the course material. Eight out of 14 students (57%) had found the case-based projects helpful to their patient care. Most students had not treated patients needing removable partial dentures (RPDs) at that time so did not answer this question. In the one-year follow-up of the original cohort, 71 out of 86 (83%) found the cases helpful to their understanding of the course material, and 52 (60%) agreed such projects helped them retain the course material. 32 out of 55 students (58%) who had treated patients needing RPDs found case-based projects helpful to their patient care, while 25% gave neutral responses and 16% did not find them helpful. Differences one year later were not statistically significant. Conclusion: Students believed that case-based patient simulation projects in their preclinical RPD course helped them understand and retain the course material and that such projects helped them when they treated their own patients. One year after the preclinical course had ended, students in the follow-up survey still believed the case-based projects were helpful to their retention of the course material and to their patient care. It is hoped that a two-year follow-up would yield similar results especially since 35% of respondents had not yet started fabricating RPDs for any of their patients in the clinic. As much time can elapse between preclinical study and treatment of patients for a given procedure, retention of course material learned and the ability to recall it would greatly benefit student dentists and their patients. It is hoped that seeing "patients" in other preclinical courses would also be helpful to students.

**PO-021. Comparison of Communication Styles in an Interprofessional Student Cohort**

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*Educational Research*

Communication between practitioners of different health professions is an integral part of the ability to work in interprofessional teams. While health professions programs are integrating interprofessional education (IPE) by co-educating students, the implication of differences in communication styles between students in different professions has not been addressed. In our IPE course, first-year students in ten health professions completed a communication styles survey in order to understand their own personal styles and to explore population differences in style between professions. The purpose of this study was to investigate the discipline-specific pattern of communication styles among students on an allied interprofessional health professions campus. With an increased emphasis on working in interprofessional teams, understanding differences in communication strategies in different health professions can help our students better adapt to these environments. Methods: After obtaining IRB exemption through Pacific University, all first-year students in Pacific University College of Health Professions were required to complete a brief questionnaire on communication styles as part of their campus-wide introductory IPE course. This questionnaire allowed students to rank their responses to four style types. First is Director: like to be in control. These students are results-oriented and possibility thinkers. They eagerly take on new, often risky challenges and are quick to set goals and work hard to achieve them. They are often selected as leaders and rail against rules laid down by others, preferring instead to blaze their own trails. Second is Presenter: know everyone who is important. These students love to talk to anyone about anything, anytime. Being animated, energetic, and spontaneous, they like to have everything they do be fun. They are excellent communicators and can be very persuasive. Third is Mediator: personable people whom everyone seems to like. They become experts in their field and are sought out for advice because of that expertise. They are extremely helpful and caring sometimes to a fault. Mediators make everyone in the group feel comfortable. Fourth is Strategist: the thorough, painstaking, hardworking tacticians. They are expert analysts and problem solvers. They follow the rules and think things through slowly and carefully, questioning and evaluating nearly everything and everyone. Strategists hate to be wrong and hate to make mistakes. The primary (highest scored) style was reported by students in each profession. In cases where two styles were tied, both were counted as primary. Mean scores for each of the PSCI dimensions by profession were calculated. To determine if there were significant differences in PSCI component scores between programs, a series of one-way ANOVA analyses were conducted. Results: Pharmacy and master's of health administration had the highest percentage of students identifying as Strategists. Other differences suggested that occupational therapy and audiology/speech language pathology students had unique style breakdowns, while the other health professions shared relatively similar profiles. Significant differences between programs were found for the Mediator dimension,  $F(9, 931)=2.61, p=0.006$ . Post-hoc analyses revealed this difference to be between the physician assistant (mean=13.47) and language pathology programs (mean=18.60). As universities strive to create IPE programs for students and as students are asked to work in increasingly interprofessional settings, the impact of communication on team dynamics becomes crucial for the quality of patient care. These results suggest that there are differences in the communications profiles of students in different health professions programs, which in the worst case may contribute to difficulties in communications, but, if tapped for its potential, could be used to increase team productivity.

It is important for students to be aware of their own personal styles as well as those of their coworkers and for educators to be aware of these differences to improve their management of interprofessional team education.

**PO-022. Teaching the Science and Clinical Application of Photocuring**

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*Educational Research*

The purpose of this study was to survey U.S., Canadian, and Puerto Rican dental schools regarding their policies and procedures related to teaching dental photocuring, as well as to obtain information related to the clinical aspects of curing light ownership and maintenance. Methods: A 16-question survey was approved by the Human Assurance Committee of Georgia Regents University. The survey was constructed to obtain information related to the teaching of dental photocuring (items related to the science of the topic, the clinical application methodology, and the pathophysiology of blue light exposure) as well as to the pragmatic operation of curing light use: light ownership and maintenance. The questionnaire was sent blindly to a single faculty member in 70 accredited dental schools in the United States, Canada, and Puerto Rico. The recipient requirement was that the person be a member of CODE with the request that if that person was not in charge or knowledgeable about these areas in his or her school, the questionnaire would be transferred to the individual at that institution who could validly respond to the questions. Recipients were requested to return the questionnaire (sent electronically via SurveyMonkey) within 72 hours. Results: Thirty-one recipients responded. Some of the major findings indicated that 93% of first-year students receive instructions in photocuring concepts, but that only 50% reinforce those principles in subsequent years. Half the respondents indicated that no specific chairside method of light-curing exposure is taught, other than trying to keep the light guide as close as possible to the target. Two-thirds of students are required to wear blueblocker glasses, but most patients are not, with less than half of faculty and staff required to wear them. Sixty percent of respondents indicated that, even though blue blocker glasses are advocated, operators are advised not to directly look at the target during exposure. One-third of students are advised to use a single exposure duration, regardless of restorative material or tip-to-target distance. Sixty percent of students are required to use barrier devices, while only 17% exclusively clean units with cold disinfectants. In 70% of the cases, the institution owns and maintains the curing light and dispenses it for a given clinical procedure. Conclusion: This survey indicates a very wide disparity in the fundamentals of light curing that are taught throughout the dental curriculum and also points to differences among light curing techniques and requirements for eye protection as well as for methods of patient-to-patient disease transmission.

**PO-023. Dental and Allied Dental Student Attitudes and Perceptions of Intraprofessional Education**

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*Educational Research*

Integrated approaches to learning are vital to emphasize evidence-based practice, quality improvement, and cost-effectiveness of patient oral health care. Predictions are that future models of care will emphasize integrated learning through intra- and interprofessional collaboration and practice. The University of North Carolina (UNC) School of Dentistry will soon implement vertically integrated patient care clinics integrating dental assisting, dental hygiene, and dental

students into a team-based design. The goals of this study were to evaluate the impact of an intraprofessional clinical design on students' perceptions and attitudes towards their role as a health care team member. Methods: A survey adapted from the validated Readiness for Interprofessional Learning Scale (RIPLS) was created and pilot tested. The survey included 19 questions in Likert scale and was designed to assess the students' attitudes and perceptions regarding the intraprofessional integration of the curriculum. IRB consent was obtained. Senior dental (N=79), senior dental hygiene (N=32), dental assisting students (N=20), junior dental students (N=81), and junior dental hygiene students (N=33) were asked to complete this survey prior to vertical integration in the clinical curriculum. Mantel Haenszel row mean score test was used to compare the responses for each item among the five groups. Results: Student response rates were senior dental 54.4% (N=43), senior dental hygiene 100% (N=32), dental assisting students 95% (N=19), junior dental students 51.8% (N=81), and junior dental hygiene students 100% (N=33). There were statistically significant differences among the five groups; in general, the dental hygiene students felt more strongly about intraprofessional education than the dental and dental assisting students. However, 94% (N=160) of all respondents agreed that intraprofessional learning would facilitate being a more effective oral health care team member. Individual group agreement percentages were 86% (N=37) senior dental students, 95% (N=40) junior dental students, 100% (N=32) senior dental hygiene, 100% (N=33) junior dental hygiene, and 94% (N=18) dental assisting students. Ninety-four percent (N=160) of all respondents agreed that patients would ultimately benefit from intraprofessional care: 93% (N=40) senior dental students, 93% (N=39) junior dental students, 94% (N=30) senior dental hygiene, 100% (N=33) junior dental hygiene, and 94% (N=18) dental assisting students. Seventy percent (N=116) of all respondents agreed that it is necessary for dental and allied dental students to learn together: 64% (N=27) senior dental students, 67% (N=28) junior dental students, 66% (N=21) senior dental hygiene, 79% (N=26) junior dental hygiene, and 74% (N=14) dental assisting students. Fifty-four percent (N=91) of all respondents agreed that the function of the allied team member is to provide support for dentists: 78% (N=32) senior dental students, 68% (N=28) junior dental students, 34% (N=11) senior dental hygiene, 12% (N=4) junior dental hygiene, and 84% (N=16) dental assisting students. Conclusion: Students in this study were eager and positive about intraprofessional learning. They agreed that an integrated learning design can improve communication between team members and enhance patient care.

#### **PO-024. Assessing the Dental School Learning Environment and Cultural Climate**

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##### *Educational Research*

Most educational programs monitor educational outcomes and implement curricular changes as needed. However, the educational learning environment and perceptions about fitting in and feeling supported can also have significant impact on students' ability to learn and progress through their academic program. Ongoing review of the educational learning environment is recommended, especially in times of curriculum change. In preparation for our 2013 accreditation site visit, the Stony Brook University School of Dental Medicine (SDM) has implemented significant curricular changes over the past several years. The purpose of this study was to obtain a baseline assessment of the educational learning environment and cultural climate of the School of Dental Medicine. A questionnaire was developed using established instruments. The student questionnaire assessed both the learning environment and perceptions of diversity and the cultural climate. The faculty and staff questionnaires assessed diversity and

the cultural climate only. Data on gender and age were gathered for all participants, and students were also asked about their current year in school (DDS 1-4). This study was deemed Quality Assurance by our Institutional Review Board. Methods: SDM predoctoral students, faculty, and staff were invited via email to participate in the study by completing an anonymous, online questionnaire. Staff responses were excluded from analyses due to low response rate (7%). Data were analyzed using SPSS 19. Greatest participation was among faculty (55%) and second-year dental students (38%). Participation of females and males was approximately equal (52% and 48% respectively). Results: On the issues of diversity and cultural competence, students and faculty believed that diversity is beneficial (81%), leads to acceptance (68%), and should be actively promoted through curriculum integration (79%) and cultural competency training (69%). Specific areas to improve were also identified. For example, only 1/3 of participants (34%) reported that the school has created a safe and open forum to discuss diversity and cultural issues; more than half (52%) were unsure whether the SDM adequately responds to issues of perceived racism, and the majority (86%) reported a lack of coordinated activities such as cultural celebrations. Perceptions of the learning environment were mixed, especially regarding teaching and the faculty. Students reported that the faculty are knowledgeable (93%) and provide clear examples (69%); students are encouraged to participate (56%), and believe that the teaching will help them develop competence (59%) and confidence (54%). There were also a number of issues identified including the perception that learning environment is teacher-centered (57%), the faculty are perceived to be authoritarian (55%), and that the support system for stressed students is lacking (52%). This study was an attempt to assess baseline perceptions of the educational learning environment and provided insight into both perceived areas of strength and those in need of improvement. Findings are being used to launch initiatives to promote diversity and enhance the educational and cultural climate at the SDM.

#### **PO-025. Introducing a New Method of Setting OSCE Pass Scores**

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##### *Educational Research*

The OSCE is a commonly used performance-based assessment format that provides an objective measure of clinical competence. When OSCEs are used as part of an evaluation process, determining a scientifically set passing score becomes germane. The strength of the OSCE comes from its objectivity by employing checklists to capture candidate performance. Rubrics are constructed, and examiners are calibrated to help ensure objectivity. The OSCE also provides an opportunity for the examiner, usually a professional in practice, to make a holistic, global rating of the candidate's performance. Given the two scores from the OSCE, it makes perfect sense to try and combine them to establish a pass score. The literature reports that a few methods of standard setting that combine objective and subjective data have been applied to high-stakes OSCEs. The Borderline Regression method seems to be emerging as the method of choice; however, unfortunately results to date have been variable and inconclusive. The success of the Borderline Regression method depends on an adequate sample size and satisfying several key stringent assumptions upon which linear regression is based: specifically linearity, normality, and homoscedasticity. If these assumptions are not met, the inferences drawn are suspect. For example, a commonly used rule-of-thumb for determining an adequate sample size for linear regression analysis suggests a minimum of 51 subjects (50 + number of predictors). However, when conducting OSCEs, the groups of candidates being examined are often far less than 50, thereby causing concern for satisfying the underlying

assumptions. Fitting a resistant-line provides a non-parametric method of curve fitting that can be used to set pass scores with few model assumptions. The method involves fitting a line to medians rather than to means and is free of calculations based on correlations or variances or assumed distributions. This study compared pass scores based on smoothed resistant-lines to those set by the borderline regression and borderline group methods. Methods: An eight-station OSCE was administered to the 28 fourth-year students at the University of Alberta. Pass scores were determined for each station using each of the three methods: Borderline Group, Borderline Regression, and Resistant Fit. Results: Different approaches to standard setting result in differing pass scores. When the regression assumptions are satisfied, pass scores are similar. When the data have outliers or long tails or do not satisfy regression assumptions, pass scores are less similar, suggesting that those determined by the resistant-line method may be more reliable. Conclusions: Using a resistant line to set pass scores has promise, but further work needs to be done. Subsequent research involving this method needs to examine the effect of smoothing the resistant line, exploring the effect of extrapolation, and developing computer-based applications to perform the necessary calculations quickly and efficiently. In addition, new and better ways of envisioning and identifying borderline performance need to be developed. Regardless of the method used, it is critical the consumers understand the underlying assumptions and are comfortable that the end result reflects the desired minimal level of competence.

**PO-026. Effective Teaching Principles Utilized in a Radiographic Interpretation Course: From Shell to Structure**

Kristina V. Okolisan-Mulligan, Ashok Balasundaram, University of Detroit Mercy  
*New Program*

Education and training in radiographic interpretation are an essential part of the dental hygiene curriculum to help students learn interpretation of diagnostic images. The volume and method of teaching the radiology curriculum, when taught only once, in itself might be a deterrent to learning. The hippocampus of the brain has been shown to convert short-term memory storage to a long-term one. The synapses in the brain strengthen the information when it is repeated. This ensures that students retain information better when repetitive information is taught in the form of group projects, student response mechanisms, and intuitive learning methodologies. The brain performs complex tasks to convert short-term memory storage to a long-term one to enable test-taking and apply interpretation skills, suggesting that information repeated in a comprehensible manner helps develop the students' ability to think conceptually. The only way this can be achieved is if the information provided initially in didactic radiology courses is capped off with a review of salient topics including important radiographic interpretation skills. The purpose of this poster is to describe teaching strategies utilized such as study cases, group projects, critical thinking, and problem-solving skills to review topics related to radiographic interpretation. The problem-solving and critical thinking skills developed through this course are effective means to facilitate learning necessary to function as a competent health care professional. This review course in radiographic interpretation uses multiple teaching strategies, thereby developing skills that will help the dental hygiene student beyond the classroom. The goal of this review course is for the student to apply the principles of radiographic interpretation, identify radiographic anatomy and differentiate it from common pathological lesions, and understand radiographic diagnosis of caries, periapical inflammatory lesions, and common pathological lesions as presented on dental radiographs. Methods: The radiographic interpretation review course includes an automated response system to assess

learning in the classroom, study cases, group projects, hands-on lab sessions, and question-answer sessions coupled with effective lectures on important topics such as radiographic interpretation of caries and periodontal disease to sharpen the student's skills on radiographic problem-solving. The shell of this review course was constructed from the didactic radiology course, and the structure could be reinforced with all strategies available to the faculty. The specific instructional objectives allow the students to recognize the normal anatomic landmarks as seen on dental radiographs, recognize dental developmental anomalies, detect dental caries and restorations as they appear radiographically, identify periapical and periodontal lesions on radiographs, identify other common pathological lesions of maxillofacial region, and recognize the usefulness and limitations of radiographic diagnosis. The evaluation methods included class projects, self-evaluation, proficiency exams in the hands-on laboratory, quizzes, midterm exam, and final exam. Conclusion: This course can be integrated into a curriculum-based dental hygiene program to incorporate practical applications of active learning. The adoption of this review course as part of the curriculum would enable students to approach the test-taking skills related to radiology in high-stakes nationalized tests. The outcomes of this review course, if placed at an appropriate time in the hygiene curriculum, would also improve students' radiographic interpretation skills in the transition to private practice. Anecdotal evidence from outcomes assessment of this course reveals that students viewed this type of active learning as invaluable and believed that resources contributed positively to their learning. They stated that experience in this course helped them blend various dimensions of competence into an integrated performance for the benefit of the patient while the assessment process focused on measuring their overall capacity to function as an entry-level dental hygienist.

**PO-027. Enhancing Interprofessional Collaborative Practice Between Nursing and Dental Students**

Dedra M. Hayden, Wendy S. Hupp, John F. Firriolo, University of Louisville  
*New Program*

The purpose of this poster is to describe existing assessment methods and new measures used to evaluate student competencies and outcomes of a technology-enhanced interprofessional education (IPE) program for ANP/FNP and dental students focused on the oral-systemic health connection. Methods: The first portion of the curriculum focuses on IPE core competencies and is delivered in face-to-face seminars along with online, web-based peer-to-peer problem-based learning exercises for ANP/FNP students in their first year of course work and to sophomore dental students. The web-based Smiles for Life: A National Oral Health Curriculum is also used. Pretest-posttest measures collected in this phase and at the end of the program include a team-developed knowledge assessment questionnaire based on the core competencies of IPE, Readiness for Interprofessional Learning Scale, Team STEPPS, Teamwork Attitudes Questionnaire, and self-efficacy in functioning as a member of an interdisciplinary team scale (team developed). Students also take an integrated interdisciplinary physical health assessment course together and work in interdisciplinary teams to practice their skills. Peer evaluation of team member effectiveness is assessed at the end of the course using the team member effectiveness questionnaire (team developed). Each team member (groups of 3 or 4 members) rates themselves and other members of their team; feedback is provided in aggregate form. Physical assessment skills and competencies in oral communication are evaluated via the Standardized Patient (SP) Program, which uses highly trained educators to portray patients with a wide variety of symptoms and illnesses. Students perform physical

examinations on SPs including an extensive oral, head, and neck exam and take a medical history. Faculty evaluate students' performance in conducting the exams using the Skill in Conducting a Head-to-Toe Checklist, developed by School of Nursing faculty. SPs also give detailed feedback to each student. At the end of each course, students complete standard university course evaluations. They also complete the team-developed Student Satisfaction with the IPE Experience Scale. ANP/FNP students begin clinical rotations during their second year and document patient health histories, medications, physical assessment findings, and written consultations using the Typhon Group Nurse Practitioner Student Tracking System, LCC; data on dental assessments performed, dental problems identified (ICD-9 codes), and dental referrals made are collected. Oral/written/electronic presentation of clinical data are assessed by ANP/FNP faculty using the Faculty Evaluation of ANP/FNP Student Clinical Performance in Practice Sites Form (team developed). Additional variables and their measures include number of student practicum experiences in an interprofessional environment in federally funded health care settings and with underserved populations, typhon tracking system annual performance data. Results: Data analysis from a comparison cohort that did not participate in the program were collected in February 2013. Data from the first cohort to participate in the IPE Program (IPE Seminar and Integrated Physical Assessment courses) were collected in May and August 2013 and are currently being entered and 100% verified. Data on evaluation of program outcomes and the psychometric properties of scales used will be reported as will recommendations for future methods of assessing competencies in IPE learning. Conclusion: This technology-enhanced IPE program has the potential to increase quality, access to care, and health care delivery. Our team developed new tools to evaluate competencies of ANP/FNP and dental students. All measures used are in the public domain, are easy to integrate into IPE education, and assess competencies at the individual, team, and organizational levels. The effects of the program and its evaluation methods may lead to a change in practice patterns to include a thorough oral health assessment that will contribute to recognition of oral-systemic health problems, patient education on the importance of care and need to access oral care, and collaborative management of chronic oral-systemic diseases by nurses and dentists.

#### **PO-028. Innovative CAD/CAM Restorative Dentistry Curriculum**

Sharon C. Siegel, Marvin Golberg, Mauricio Guerrero, Jay Walls, Stan Hack, Nova Southeastern University  
*New Program*

Computer-aided design/computer-aided manufacturing (CAD/CAM) technology has been utilized in dentistry for over two decades. Dental laboratories are utilizing digital dentistry to fabricate restorations at increasing rates due to the lack of new dental technicians entering the field and the increasing accuracy of the technology. Dentists of the 21st century will need to have didactic and clinical training to use this technology and in particular the scanning/impression component. The purpose of this program is to present the newly developed curriculum to provide didactic and hands-on educational experience in CAD/CAM restorative dentistry to the entire senior class of 130 students at Nova Southeastern University, College of Dental Medicine (NSU-CDM). Methods: As a pilot, an elective course was available to 30 selected students to introduce the CAD/CAM concept for three years. Following this, a curriculum action form was presented to the Curriculum Committee at NSU-CDM to implement a 16-hour lecture course and laboratory-based, three-day, hands-on component for each senior student, in groups of 30. The Curriculum Committee accepted the proposal as a pass/fail course, and in the summer of 2013 the course was implemented. All CAD/

CAM restorative systems were introduced with a focus on the CEREC Acquisition Blue CAM System (Sirona Dental Systems, Inc.) with dedicated milling units. Sirona Dental Systems, Inc. provided six CEREC AC units using the 4.0.3 scanning, design, and milling technology from its gifting program. The hands-on course was organized such that each of the four groups of 30 students self-selected to be in units of six for the scanning, designing, and milling. One faculty member was available for each group, but students were encouraged to work with the technology such that faculty members had minimal intervention unless called upon. Much of the learning by the students was facilitated by the students teaching each other. The students prepared two crowns and two onlays on typodont teeth that were digitally scanned after a demonstration by the course director. The students designed the CAD/CAM restorations using the AC units as well as their laptop computers with Sirona software and upgraded from the Internet. Encrypted drives were used to transfer data from the AC units to the computers. The students milled two restorations: one from a Sirona CEREC VitaBloc (Vita Zahnfabrik, Bad Sackingen) and one from an Ultimate Block (3M Espe, St. Paul, MN). These were then characterized and glazed or polished and characterized as appropriate. The students then evaluated the course and their products. Results: The lecture course was a mandatory attendance course with one quiz and one final exam. All students passed the didactic course and the hands-on portion of the course. The testing center student evaluation returned the course evaluation with a response rate of 52%. The overall course evaluation was 3.31 out of 4.0. All question but one ranked the course as 3.3. The highest ranked question was #5 ("I'd like more courses taught this way") at 3.4 out of 4.0. Numerous comments by the students were expressed as highly complimentary of the course teaching and interactions with the faculty. Conclusion: Students ranked the CAD/CAM restorative dentistry course highly as seen in the course evaluations. The highest ranking was given to the format of the course, which allowed for student group self-selection and self-teaching.

#### **PO-029. Using CAD/CAM Technology in Preparation for the Dental Licensure Exam**

Nancy B. Young, Richard S. Callan, Anthony G. Mollica, Jeril R. Cooper, John S. Blalock, Stephen W. Looney, Georgia Regents University  
*Work in Progress*

#### **PO-030. Bringing Abstract Didactic Knowledge into a Clinically Useful Framework for Dental Emergencies**

Aaron M. Soeprono, Glenn K. Rochlen, New York University  
*Work in Progress*

#### **PO-031. Obtaining Resources for Implementing Health Information Technology and Achieving Meaningful Use in Dental Schools**

Andrea C. West, Michael Conte, Erin B. Bauzyk, Jacqueline M. Schroeders, Arnold H. Rosenheck, Cecile A. Feldman, Rutgers School of Dental Medicine  
*Work in Progress*

#### **PO-032. NBDE Effective Question Writing in a Multidimensional Format**

Debra L. Willis, Jonathan F. Sprague, Catherine M. Burns, American Dental Association  
*Work in Progress*

## 2014 ADEA Annual Session: Poster Abstracts (cont.)

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### **PO-033. Creating a Model for Success: DentPath**

Ken M. Sigler, The Ohio State University  
*Work in Progress*

### **PO-034. The PAC Program: Expanding Dental Student Education Through a Foster Care Partnership**

Elizabeth A. Best, New York University  
*Work in Progress*

### **PO-035. Teaching Complete Dentures with Standardized Patients in the D2 Year**

Christine A. Halket, Gilda P. Ferguson, Jeffrey L. Perry, Bradford Smith, Midwestern University-Arizona  
*Work in Progress*

### **PO-036. Pilot Survey Designed to Understand Faculty Perceptions on the Linkage Between Building Design and Learning**

Mert N. Aksu, Christopher Purdy, Robert M. Trombly, Michelle Wheeler, University of Detroit Mercy  
*Work in Progress*

### **PO-037. Using Computer-Based Testing to Improve Dental Education Assessment Techniques**

Jennifer L. Murphy, Tufts University  
*Work in Progress*

### **PO-038. Learning from Hands-On Activities and Competitive Game in Anatomy Show and Tell**

Penprapa S. Klinkhachorn, Mark Radow, West Virginia University  
*Work in Progress*

### **PO-039. Analysis of Admissions Criteria as Predictor of Program Success**

Joy B. Osborn, University of Minnesota  
*Work in Progress*

### **PO-040. Aiding Students Applying for Residency Programs: Collaboration Between Office of the Dean and the Library**

Annie M. Hughes, Zarita Abbott, Rena Pacheco, University of Southern California  
*Work in Progress*

### **PO-041. Development of an Online Comprehensive Treatment Planning Tool to Enhance Student Learning and Patient Care**

Julie M. Coe, Andrew C.K. Olson, Virginia Commonwealth University  
*Work in Progress*

*PO-042 on this day was cancelled.*

### **PO-043. Pioneering Toolkit Pilot Course Enhances Student Research and Learning Experience**

Addy Alt-Holland, Eileen H. Doherty, Tufts University  
*Work in Progress*

### **PO-044. Students' Perspectives on Community-Based Dental Education**

Michael D. McCuniff, Chris D. Rice, University of Missouri-Kansas City  
*Work in Progress*

### **PO-045. Longitudinal Assessment of Dental Students' Vision During Dental School**

Adriana V. Green, University of Texas Health Science Center at San Antonio  
*Work in Progress*

### **PO-046. Assessing Ethical Sensitivity and Reasoning During a D1 OSCE**

Zahl A. Zahl, Odette Aguirre-Zero, Wendy Senour, Stuart M. Schrader, Lawrence P. Garetto, Indiana University  
*Work in Progress*

### **PO-047. Reinforcing Ethics and Professionalism: From Academe to Practice**

Donna F. Homenko, Cuyahoga Community College  
*Work in Progress*