

EDITOR'S NOTE

Teaching has changed ... but have the students?

Southeast of Quetta City, Pakistan, is an important archeological site of Mehrgarh. This is where human remains were found with the earliest evidence of dental treatment¹; 11 molars with evidence of drilling that date back to 7000 years Before Common Era (BCE). It represents the beginning of our dental profession.

Dentistry has its roots in unstructured apprenticeship. However, in 1723, the military surgeon, Dr. Pierre Fauchard, wrote the first dental textbook, *Treatise on the Teeth*. It was not until June 2, 1840 that the Baltimore College of Dental Surgery opened and became the first formal dental school in the world. Soon after in 1859, the American Dental Association (ADA) formed and has for 164 years continued to serve and represent the needs of dentists. It is important to note that the creation of the first dental school and the ADA occurred at a time when Black Americans and women were not permitted to vote. We must consider the exclusivity with which formal education in our profession began and evaluate what we are doing today as a profession to counteract this legacy.

In 1923, in a different world environment, the Association of American Dental Schools, later named the American Dental Education Association (ADEA), was founded, and this year we celebrate its 100-year anniversary. Soon thereafter, the *Journal of Dental Education* began publishing in 1936 and the science of dental education was born. As dental education became formalized, the traditional structure revolved around lectures, simulation, and patient care. So much has changed since ADEA's founding that if you took someone from 1923 and dropped them into modern society, they would be totally disoriented. That is, unless they went to a university where education was being delivered in a lecture hall where the person speaking was generally older than the audience absorbing the knowledge. In this regard, you might say nothing much has changed.

More recently, as evidence has demonstrated the benefit of problem-based learning (PBL), several schools transitioned to PBL models.²⁻⁶ As the cost of those endeavors became difficult to manage, some schools pursued a hybrid model that incorporates some lectures.^{7,8} Seeing how dental education science demonstrated the effectiveness of engaged group work, various other curricular innovations arose. For example, flipped classrooms,⁹ active learning

initiatives,¹⁰ and gamification¹¹ accelerated to feverish pitch during the COVID-19 pandemic.

Interestingly, while we have designed curriculum and, literally, built schools to suit PBL and other collaborative learning efforts, early research on Generation Z suggests they prefer independent work—not group work!¹² According to Pew Research Center, Gen Z is anyone born after 1997, which makes this demographic our current crop of dental students.¹³ Many of us have discussed how the COVID-19 pandemic and school closures affected the current cohort of dental students from the Class of 2020 onward; however, it's interesting to note that this also approximately represents the time of the transition from Generation Y (Millennials) to Gen Z dental students.

Compared to Gen Y, the Gen Z student is much less optimistic and more realistic, and they prefer independent work over group work.¹² Early research on Gen Z also suggests they are very private and much less likely to share personal information through social media interfaces, unlike Gen Y and Gen X. While Millennials pioneered digital communication, such as texting and video calls, early research on Gen Z suggests they prefer face-to-face communication.¹² This may have implications for the balance we seek in dental education as we return from COVID-19 restrictions and online learning. Meanwhile, dental curricula continue to fill with electronic learning skills. Using the electronic health record, digital dentistry, and being able to navigate curriculum management software have all become prerequisites for success at dental school.

We propose to readers that we, in dental education, have not done enough to understand our learners. Instead, we have built educational modalities, assessment strategies, and learning environments based on a variety of other factors. The current waves of students are not like previous ones. In dental education, there is a growing need to consider each unique student individually and customize learning plans.

The science of dental education has shown the effectiveness of various teaching methods, and a customized approach is needed for using the right method for the right person—a kind of “precision education” if you will. Gone are the days of one-size-fits-all education. Entrustable professional activities (EPAs) seem to bring some hope

for customized accomplishment of competency, if not customized learning. One of the strengths of EPAs is acknowledging that not every student accomplishes competency at the same time or through the same pathway.

We even see this in faculty promotion at dental schools, with one faculty publishing 100 papers and another with a strong service commitment struggling for just eight publications. To the best of our knowledge, the dental education community values these two critical individuals, and yet the reward system we have in place is not customized to recognize different forms of contribution. However, there is a critical need for customized consideration of individuals in dental schools. Additionally, with the rise of burnout among students, staff, and faculty, there is a great need for supervisors and mentors to provide close monitoring and initiate intervention when necessary.

Dental education has come a long way since its Neolithic origins and the Fauchard era, and it is the pursuit of new science and the ability to adapt to changing learning environments and learners that have enabled its evolution. As more and more dental schools emerge and class sizes in existing schools increase, we must not allow education to become a standardized offering. Rather, to position ourselves for the next 100 years of dental education, we should better understand our learners and apply the more customized approaches to education and the engagement we know they need.

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REFERENCES

- Jarrard K. On the origins of the dentist (with a stone-age drill). *The New York Times*. April 7, 2006. Accessed Feb. 3, 2023. <http://www.nytimes.com/2006/04/07/science/on-the-origins-of-the-dentist-with-a-stoneage-drill.html>
- Greenwood F, Townsend G, Joseph V, Wetherell J. Introducing Adelaide dental students to a problem-based learning curriculum. *Eur J Dent Educ*. 1999;3(1):15-19. <http://doi.org/10.1111/j.1600-0579.1999.tb00061.x>
- Susarla SM, Medina-Martinez N, Howell TH, Karimbux NY. Problem-based learning: effects on standard outcomes. *J Dent Educ*. 2003;67(9):1003-1010.
- Yiu CK, McGrath C, Bridges S, et al. Graduates' perceived preparedness for dental practice from PBL and traditional curricula. *J Dent Educ*. 2011;75(9):1270-1279.
- Rich SK, Keim RG, Shuler CF. Problem-based learning versus a traditional educational methodology: a comparison of pre-clinical and clinical periodontics performance. *J Dent Educ*. 2005;69(6):649-662.
- Shuler CF, Fincham AG. Comparative achievement on National Dental Board Examination Part I between dental students in problem-based learning and traditional educational tracks. *J Dent Educ*. 1998;62(9):666-670.
- Walton JN, Clark DC, Glick N. An outcomes assessment of a hybrid-PBL course in treatment planning. *J Dent Educ*. 1997;61(4):361-367.
- Whitney EM, Walton JN. Faculty and student perceptions of the success of a hybrid-PBL dental curriculum in achieving curriculum reform benchmarks. *J Dent Educ*. 2010;74(12):1327-1336.
- Gadbury-Amyot CC, Redford GJ, Bohaty BS. Dental students' study habits in flipped/blended classrooms and their association with active learning practices. *J Dent Educ*. 2017;81(12):1430-1435. [10.21815/JDE.017.103](https://doi.org/10.21815/JDE.017.103)
- Farah-Franco SM, Hasel R, Tahir A, et al. A preclinical hybrid curriculum and its impact on dental student learning outcomes. *J Dent Educ*. 2021;85(5):679-689. [10.1002/jdd.12517](https://doi.org/10.1002/jdd.12517)
- Licari F, Patil S. Game on! Gamification in dental education. *J Dent Educ*. 2022;86(12):1557-1558. [10.1002/jdd.13142](https://doi.org/10.1002/jdd.13142)
- Jenkins R. Generation Z versus Millennials: the 8 differences you need to know. Inc. January 19, 2023. Accessed Feb. 3, 2023. <http://www.inc.com/ryan-jenkins/generation-z-vs-millennials-the-8-differences-you-.html>
- Dimock M. Defining generations: where Millennials end and Generation Z begins. Pew Research Center. January 17, 2019. Accessed: Feb. 3, 2023. <http://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins>