Optimizing Teaching Effectiveness in Dental Education for a New Generation of Learners

Christopher J. Walinski, DDS[1], Joe C. Ontiveros, D.D.S., M.S.[2], Fei Liu, DDS, PhD[3], Geralyn Crain, DDS, PhD[4], Saynur Vardar-Sengul, DDS, PhD[5]

1. **Associate Professor, Department of Dental Medicine, Touro College of Dental Medicine, 19 Skyline Drive, Hawthorne, NY 10532**

2. Professor & Head, Esthetic Dentistry, Head, Oral Biomaterials Division, Houston Center for Biomaterials and Biomimetics, Department of Restorative Dentistry & Prosthodontics, The University of Texas Health Science Center at Houston School of Dentistry, 7500 Cambridge Street, Houston, TX 77054

3. Associate Professor, Department of Biologic & Materials Sciences and Prosthodontics, University of Michigan, School of Dentistry, 1011 N. University Avenue, Ann Arbor, MI 48109

4. Assistant Dean, Innovative Faculty Development and Interprofessional Collaboration, Roseman University of Health Sciences College of Dental Medicine, 10920 South River Front Parkway, South Jordan, UT 84095

5. Chair and Professor, Department of Periodontology, Nova Southeastern University College of Dental Medicine, 3200 South University Drive, Fort Lauderdale, FL, 33328

Corresponding Author:

Christopher J. Walinski, DDS, **Associate Professor, Department of Dental Medicine, Touro College of Dental Medicine, 19 Skyline Drive, Hawthorne, NY 10532**

Phone: +1-858-208-9100, Fax: +1-914-594-2681, Email: christopher.walinski@touro.edu

ABSTRACT

Purpose: Today's dental students, Generation Z (Gen Z), are said to learn differently than those of previous generations. As generations of dental students vary, our teaching styles must keep up with unique and changing groups of individuals.

Methods: This article discusses learner-focused teaching methods including techniques that address the characteristics of the Gen Z learners. Blended learning methods that combine online media with traditional face-to-face sessions, team-based learning, and a flipped classroom format have previously been suggested as ways to increase learning effectiveness and student satisfaction.

Results: In this paper, characteristics and preferences of Gen Z students are described along with the challenges they create with conventional teaching methods. An implementation strategy using principles from organizational agility and Bolman and Deal's Four Frames Model is proposed for dental schools to transition to a more learner-centered teaching approach.

Conclusions: The suggested strategy can be customized and could be useful to schools who wish to enhance their teaching methods to meet the learning needs of Gen Z dental students and beyond.

KEY WORDS

Dental Education, Generation Z, Teaching Effectiveness, Computer Assisted Instruction, Flipped Classroom, Team-Based Learning, Curriculum Innovation, Institutional/Organizational Development, Generation Z, Blended Learning

1 INTRODUCTION

As we reflect on dental education through the years, much has changed in foundational sciences, dental materials, technology, and even the basic tenets of caries removal and tooth preparation. Evidence for changes in education are reflected in the U.S. Department of Education's influence on accreditation, including additions to the Commission on Dental Accreditation (CODA) standards of critical thinking, self-assessment, and other paradigm-shifting pedagogy. The ADEA Commission on Change and Innovation in Dental Education (ADEA CCI) identified domains having

global impact on healthcare and health professions education including the use of technology and trends in education supporting engaged and self-directed learners.[1] When one combines these changes with how dissimilar students of today are to those of even a generation ago, an argument could be made that as dental students continue to evolve, so, too, must our teaching styles. Teaching methods that worked "back in the day" might not be as effective with subsequently admitted dental school classes. An internal Microsoft research report stated that the average human attention span is just eight seconds.[2] This is how long 2,000 participants were able to focus on a task before their attention switched to another activity. In comparison, they state a goldfish can concentrate for nine seconds! A 2016 study found that the human attention span may be decreasing year-upon-year by up to 88%.[3] If this is the case, it certainly presents an ever-increasing challenge to educators who are intent on sharpening young minds.

If our goal is to become effective educators, how we deliver our message is as important as the message we are delivering. The students of today prefer instant answers through search engines and videos over traditional reading assignments and lectures. Confounding the issue, most dental educators do not have formal training in education or the use of technology in teaching, and many of us might not be intentional about adapting our teaching methods to new generations of learners.

There are practical reasons to improve teaching and learning in dental schoolsThose schools whose faculty is evolving with their students could result in enhanced teaching effectiveness, efficiency, and overall student satisfaction. Improved teaching efficiency is becoming increasingly important given the increasing costs of dental education and the trending dental faculty workforce shortage.[4] Taken further, improved teaching strategies and learner-focused learning could be reflected positively in a school's branding and in dental school admissions as applicants look for state-of-the-art educational programs.

In this paper, we address some questions regarding dental education and the Gen Z learner, namely, who are our current students and how can their learning be characterized, how can we as

educators best address Gen Z learner needs, and what specific strategies can we offer schools to better adapt to Gen Z in order to benefit both students and the faculty?

2 BACKGROUND

Who Is Gen Z and How Do They Learn?

To enhance learning, we must first understand our current audience, dubbed "Gen Z", the generation that includes those born between 1993 to 2016.[5] The exact cutoff dates vary according to author. Parry and Urwin describe a generation as a set of historical events and related phenomena that creates a distinct generational gap, therefore, we must examine the set of events defining Gen Z which make it unique.[5]

Technology

First, and probably most significant, the Internet emerged in 1995 which means that for Gen Z, the Internet has always existed. During their lifetime, the advancement in both technology and multimedia has been rapid and significant including the introduction of tablets and smartphones as well as social media which is now omnipresent. Gen Z is completely accustomed to connecting and interacting with the outside world at all times. Smartphones have literally and figuratively placed the world into Gen Z's hands and have therefore become a hub of learning and entertainment.[6] It is interesting to note that aside from sleeping, Gen Z is exposed to media more than any other daily activity with estimates ranging from eight to nine hours of media exposure every day.[7,8] The inescapable influence of technology during a Gen Z's lifetime has led to a generation of regular and avid consumers of the digital world and reliance upon technology for knowledge curation, communication, and interaction.[9] While Gen Z is quite comfortable with technology, the same cannot be said of most of their educators who are battling with learning and utilizing the same technology.[10]

Interaction, Convenience and Flexibility

As it turns out, Gen Z is not well suited to sit still in a lecture hall for hours on end. Cetin & Halisdemir have been suggested that education for Gen Z students should move away from a transfer of information via lectures to "filtering and interpreting" educational content.[11] In fact, Cho and colleagues demonstrated that during the Covid-19 pandemic, over 90% of plastic surgery residents reported a positive experience with virtual lectures due to increased interaction, convenience, outreach, and usability.[12] It is possible that some aspects of pandemic learning might be better suited than traditional learning methods for the current generation of learners; a happy accident, so to speak.

In 2020, Dost and colleagues suggested that medical schools should transition from face to-face learning to team-based learning where online platforms allow students to digest information at their own pace giving them flexibility and personalized learning opportunities, while students could gather face-to-face at a later time to constructively discuss the assigned material with their peers.[13] Singhi and colleagues reported that 100% of the medical fellows at The University of Texas MD Anderson Cancer Center appreciated the flexibility of online learning when asked. [14] Additionally, a survey of 2,721 medical students in the UK revealed that the greatest perceived benefit to online learning was flexibility. [13]

In a study comparing post-graduate prosthodontic residents' attitudes between web-based lectures versus traditional classroom lectures, post-graduate residents' attitudes were more positive than the presenters', where Gen Z learners responded significantly more positively when learning in an online format than the previous generations who were educating them.[15] However, herein lies the crux of this challenge: we as educators must adapt in a way that optimizes the learning of those who we are entrusted to teach.

Importantly, as a result of Gen Z's preferred way of interaction and communication, many warned that Gen Z has underdeveloped social and relationship skills. They tend to rely on technology and digital communication. Consequently, face-to face communication

declines, which has a negative impact in the relationship development as an adult. [13,16,17]

Contemporary Teaching Methods

Contemporary teaching methods that are suited particularly well to the Gen Z preferred style of learning are blended learning, flipped classroom, and team-based learning. [18] Blended or hybrid learning is a style of education where students learn via electronic and online media in combination with traditional face-to-face learning. [19] Since Gen Z has spent their entire lives surrounded by technology and the Internet, most feel comfortable and even prefer online media for their learning while also finding benefit to in-person learning and interaction with others. [20] A flipped classroom is based on the idea that lecture or direct instruction is not always the best use of class time. Instead, in a flipped classroom format, students encounter foundational information before class freeing class time for activities that involve higher order thinking. [19] Team-based learning is widely used in health professions education and incorporates pre-class preparation using a flipped class format, small teams of students working together to apply concepts in clinical problem-solving activities, and immediate feedback from facilitators and peers. [21]

We have seen benefits of blended learning and the use of a flipped classroom in dental education. In 2020, a cohort study by Qutieshat et al. showed that blended learning and use of an online discussion forum had a positive impact (average 7.25 points higher grades) on dental students' performance and satisfaction compared to conventional learning. [22] In a 2019 study by Slaven et al, three teaching methods were compared using dental students: 1) Contemporary instruction with 20-minute mini-lectures and discussion groups; 2) 50-minute traditional lectures with videos; and 3) 50-minute traditional lectures without videos. Post-course scores improved in all three groups with no difference, however, the contemporary instruction using mini-lectures and discussion groups ranked highest in student satisfaction and perceived usefulness. [23] Nijakowski et al (2021) evaluated the effectiveness of blended

learning in endodontics. The majority of survey respondents reported increased learning effectiveness and most preferred remote learning in asynchronous (at your convenience) versus synchronous (set time and location) sessions. The authors reported an increase in efficiency and individualized pace as a result of blended learning, however, a disadvantage to this approach was the limitation of social contacts during the COVID-19 pandemic. [24]

Another study with dental students showed a flipped classroom model helped place greater learning accountability on the dental students which emphasized student-centered learning. [25] A systematic review of 17 studies showed that a flipped classroom model improved student satisfaction in most dental education classes. [26]

Leveraging the advantages of the learning methods summarized in Table 1, and allowing Gen Z the freedom to learn at their own pace, when appropriate, may increase efficiency and encourage students to assume greater responsibility with their own learning, redirecting the focus from teacher to learner, which lies at the center of learner-centered education.

3 METHODS

Altering teaching methods in dental education is not a simple task. When thinking about what might need to change to better meet Gen Z learners' needs, the faculty, the curriculum, and organizational factors need to be considered. In the next section, we will present an implementation strategy for schools to consider while addressing these challenges. Because schools vary in several ways, the strategy should be customized according to a school's individual needs. For example, how widespread is the need for faculty training in education and the use of state-of-the-art technology in teaching? What aspects of the curriculum need to be updated to meet the needs of the contemporary learner? In addition, what are the organizational factors such as the decision-making structures and political and cultural forces that might hamper or fuel the desired change?

The Bolman and Deal Four Frames Model

To think through the many factors when contemplating change in teaching and learning, we used the Four Frames model by Bolman and Deal.[27] The model suggests that complex organizations can be viewed through different lenses or frames to better understand a larger, more comprehensive issue. The four frames are the Structural, Human Resource, Political and Symbolic frames. Using the Structural frame to view changing teaching methods, we considered such elements as a dental school's organizational chart, decision-making structures, committees, policies, procedures, and other operational elements. When applying the Human Resource lens, we asked what type of support the faculty, both individually and collectively, need in order to feel supported and prepared for changing their teaching techniques. The Political frame implies that since there are competing priorities and limited resources throughout an organization, what items might need to be considered when thinking about negotiating the political landscape within the dental school as it affects a change in teaching Finally, when applying Bolman and Deal's Symbolic frame, we included elements that highlight the values, feelings, and emotions surrounding a change because from their work, Bolman and Deal found that when symbolic acts are omitted or ignored, the chance of success during a change is lessened.

Organizational Agility

Organizational agility can be defined as the ability to respond to opportunities and threats in the environment with ease, speed and dexterity. [28] We focused on three principles related to organizational agility to help navigate some of the challenges schools might encounter with adapting to the Gen Z learner: decision-making, information sharing, and innovation. Organizational agility is increased when decision processes become less centralized or hierarchical, allowing those closest to a matter to make decisions about it. [29] An agile leader presents change as an opportunity and empowers employees to make decisions about challenges that affect them and the organization. [30] Agility is also enhanced with efficient communication, access to data, and when training is made available. [31] Finally, a culture that encourages innovation can help overcome organizational inertia by breaking the

normal routines that might otherwise inhibit agility. [32] These principles of organizational agility and Bolman and Deal's four frame perspectives are incorporated into a four-step implementation strategy for schools wishing to adapt their teaching to the needs of current students. Again, each school is unique and should customize its own strategy for the implementation of a plan that suits their own needs and that of their students. At its best, the proposed implementation strategy will spark conversations within a school about how best to serve Gen Z learners.

4 DISCUSSION

Implementation Strategy (see Fig. 1)

<u>Step 1. Leadership and Vision</u>

To make sweeping changes, it is often helpful to begin by viewing the process through the Political and Symbolic frames of Bolman and Deal's Four Frames model. As with most things political, we must start at the top with the Dean who shares the vision of improved student learning and satisfaction. If enhancing contemporary teaching and learning can be incorporated into the strategic plan, particularly if it aligns with the university's plan, the journey toward success will be considerably easier to implement and to track. A key message could be that learner-centered learning places more responsibility on the student, increases accountability, and teaches students to be successful learners throughout life. The focus moves from the teacher to the learner and is an ideal that leaders can project in their vision, planning, and positive messaging.

Because improved teaching and learning aligns with the values of the school and university, it creates opportunities for successes to be celebrated. As viewed through Bolman and Deal's Symbolic frame, leaders can take every opportunity to highlight its importance both publicly and informally through press releases, faculty meetings, teaching awards and public congratulations. Additional opportunities could include an Education Day where posters are presented along with other possibilities for publication and incentives. The Dean and others who emerge as leaders of the

initiative are positioned to generate inspiration, motivation and buy-in by explaining the change and why it is important. When the rallying message is that we care about our students' learning and satisfaction, that we are flexible, adaptable, and always growing, and that keeping up with contemporary educational practices positions the school as a leader among dental institutions, it becomes awkward to resist, particularly if structural support and resources are in place to support the change.

<u>Step 2. Curriculum Decisions</u>

As viewed through Bolman and Deal's structural frame, curriculum decisions about how to address the needs of a new generation of learners might be made more efficiently by a committee or task force whose charge is to scan the education environment outside of dental education to proactively address new trends in teaching and learning that have not yet made their way to dental education. Adopting a culture of being proactive rather than reactive would contribute to a school's ability to adapt to emerging education methods. The committee might identify an existing faculty member or invited expert with experience in contemporary learning modalities to work with the committee and the faculty in preparation for implementing changes. Rather than changing the entire curriculum, the committee could identify a strategy for piloting the implementation of a new educational format and to assess the outcomes for one pilot course. Course content and the time allocated for the course could stay the same or may be reduced due to increased efficiency. Similarly, facilities and space utilization might not be negatively impacted, and possibly even enhanced, especially if adequate Information Technology (IT) infrastructure already exists to support online learning.

Another structural element that could be employed to enhance efficient curriculum decision making, is that course director(s), curriculum committee members, those involved with assessment, IT and others, could be empowered to make decisions rather than the time it

takes for broader and more hierarchical administrative decisions to be made. For example, perhaps a few individuals could be given accountability and autonomy for making decisions about the pilot course and the results could be shared, and efforts can be fine-tuned as a basis for broader curriculum changes in the future.

Another aspect to improved decision-making is the sharing of data and information with others who can provide input to the process. Information about student outcomes in a course, board scores, and data from student and faculty feedback could be shared with committee members, course directors, administrators, and others in order to improve data-informed decisions moving forward. In fact, an important step in any change process is to develop a communication plan that not only keeps people informed but facilitates bidirectional communication and feedback. An effective communication plan could include information about proposed changes in procedures, resources for supporting faculty and students, and could be utilized to solicit feedback, address concerns, and amplify positive messaging surrounding the change.

Step 3. Resources to Support Faculty

As viewed through Bolman and Deal's human resources frame, support in the form of faculty development is crucial to facilitate more effective teaching and learning and might include the understanding of student-centered learning and specific training on how to lead team-based discussion groups, prepare case studies, record and upload short lectures to a curriculum management system such as Blackboard or Canvas, and gain competency in the use of Zoom or similar platforms to host and record lectures. Schools might consider the use of faculty mentors to work with clear guidance from the curriculum committee to train designated faculty members, while structures could be put in place to acknowledge and reward those who actively participate in trying the new model.

As with most changes, some resistance can be expected, however it can be mitigated. Support from the Dean through development, mentoring and dedicated course preparation time, at least initially, would demonstrate support and minimize resistance. Further positive reinforcement could be attained through faculty annual evaluation and the pathway for promotion.

Finally, those who develop an implementation strategy would be remiss if they did not include ways to help some of our faculty members to identify as an educator as well as a clinician or researcher. Because many dental schools maintain sizable part-time and adjunct faculties whose members are still active in the practice of dentistry, making the mental shift from dentist to educator is another touchpoint that must be effectively negotiated to ensure the success of a learner-centered initiative.

Step 4. Evaluation for Continuous Program Improvement

This final evaluation step utilizes both Bolman and Deal's structural and political frames by suggesting processes and the political leverage that could be associated with their implementation. For example, to ensure continued success, it is important for a school to develop a plan to monitor and evaluate the efforts made to adapt teaching to the Gen Z learner. Processes and outcomes can be assessed to identify changes and to demonstrate impact and innovation within the curriculum. The school might consider administering student feedback surveys on both traditional and the newer learning modalities. Outcomes such as grades, first-time board pass rates, student and faculty satisfaction, and outcomes that address CODA accreditation standards could be regularly evaluated. The planning committee could make necessary changes based on the evaluations for continued improvement and report to the Curriculum Committee and Deans. In addition, there could be opportunities to utilize outcomes to generate future educational research and grant applications in collaboration with others, particularly if the dental school belongs to a university with a school of education or participates in interprofessional education.

In summary, this four-step implementation strategy utilizes Bolman and Deal's four frames as a method to view the complex challenge of adapting teaching and learning to best serve Generation Z and future generations of learners. One can see that there might be overlap in how the Structural, Political, Human Resources, and Symbolic perspectives apply to each of the four steps in the implementation strategy. This overlap provides flexibility that allows for the customization of the four-step strategy presented here to be implemented according to the needs of an individual institution.

5 CONCLUSION

Because today's Gen Z dental students are thought to learn differently than previous generations, the responsibility for keeping up with best methods for teaching falls upon us. Contemporary learner-centered educational methods including blended learning, team-based learning, and a flipped classroom format have been suggested as ways to improve communication and learning among this generation of students. Potential additional benefits include enhanced dental school branding, admissions, and efficiencies that address faculty shortages which is a growing concern in dental education.

A four-step implementation strategy was proposed that incorporates principles from organizational agility and Bolman and Deal's Four Frames to systematically view an organization, as a framework that schools can customize when contemplating changing teaching methods within their own settings. The four steps in the framework are not rigid in their order nor are they prescriptive or comprehensive. Instead, schools are encouraged to use the four-step strategy as a framework for thinking through what changes might be needed, and what challenges might be encountered and therefore, proactively addressed, when considering making changes to support Gen Z learner preferences.

Ultimately, many of us have felt the personal satisfaction when we realize that our students have thoroughly grasped a concept that we have taught to them. Embracing more contemporary

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teaching methods has the promise to continue to reach generations of students and extend this personally rewarding profession far into the future.

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Table 1 Learning activities and their benefits that address the characteristics of the Gen Z learner.

Activity	Benefits
Flipped Classroom	- Active learning - Critical thinking - Maximum use of time together
Face-to-face Discussion Groups	- Increased interaction - Individualized pace of learning - Increased accountability for own education
Blended Learning via Short video lectures	- Can be accessed remotely, either synchronously or asynchronously - Access to online resources - Team-based discussion groups
Team-based Learning	- Preferred by Gen Z - More effective *A class might include face-to-face instruction with multiple questions or case studies, a spokesperson from each group reports back to the whole class online or in person. Case studies might facilitate preparation for integrated board exams or preparation for clinical care.

Dean Shares Vision:
- Improve learning and satisfaction
- Plan and brand as leaders in the field

Involved Leaders:
- Inspire
- Motivate
- Create buy-in

Committee or Task Force:
- Plan a pilot with one or more courses
- Utilize outcomes data for further curriculum changes
- Design a communication plan

Faculty Development & Training:
- Develop content and techniques
- Mentor and calibrate faculty
- Create protected time for training and implementation
- Reward faculty who take an active role

Plan to Evaluate Program:
- Administer student and faculty feedback surveys
- Report to Curriculum Committee and Dean with continuous refinement
- Assess outcomes required by CODA
- Use outcomes to generate educational research and grant opportunities

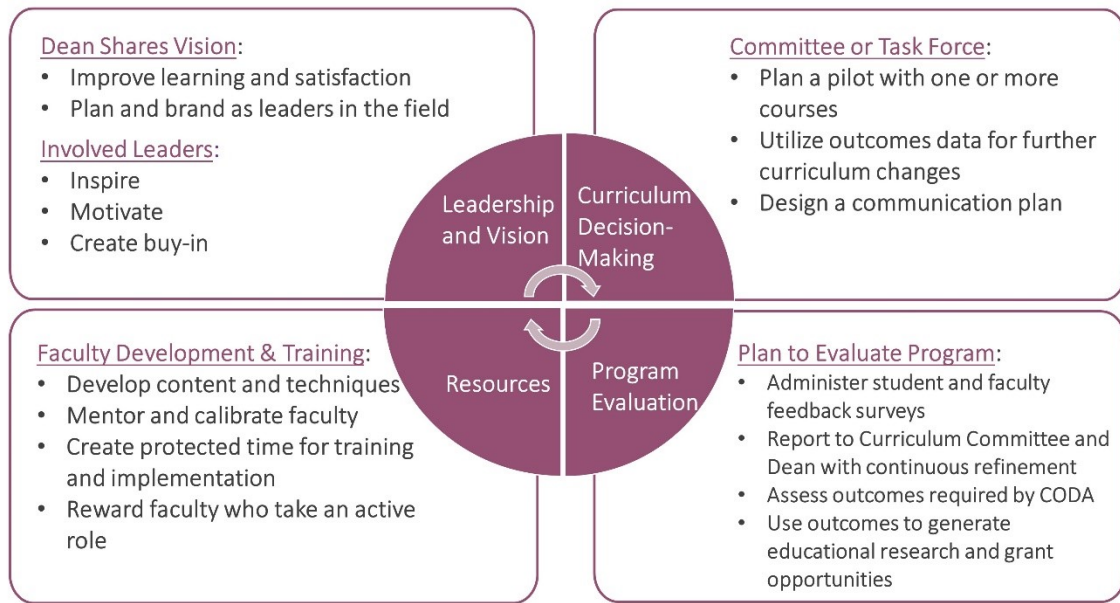Leadership and Vision — Curriculum Decision-Making — Resources — Program Evaluation

Figure 1 Four-step Implementation Strategy. Steps can be taken in any order or concurrently and should be customized for use in individual settings.