Toward Monotasking in the Dental School Classroom?

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It is a given that the current generation of dental students is heavily invested in mobile computing platforms. Notebooks, laptops, tablets, smartphones, phablets, and other yet to be envisioned web-connected devices will play an ever increasing role in the future of education. At the same time, as educators, we've all stood in the back of a classroom, looking at a sea of screens opened to a myriad of sites, many of which have no relevance to the ongoing classroom discussion.

Curiously, these distractions are regularly referred to as "multi-tasking"; by implication, representing perceived desirable qualities in today's society obsessed with immediate communication. However, while many individuals believe that they are able to perform multiple tasks without impairment of any of these activities, evidence suggests that perhaps less than 3% of the population is truly able to effectively multitask (defined as the ability to perform two attention-demanding tasks without incurring substantial performance costs)[1]. On a lighter note, one of my colleagues recently sent me a link to a TED talk that humorously illustrates the potential pitfalls of multitasking (Paolo Cardini: Forget multitasking: try monotasking[2]).

There is of course, the opposing view, namely that the human brain is not well suited to monotasking, and that there is little value in trying to hold mankind to "some mythical standard of sustained, focused attention[3]." There is also no doubt that the ability to multitask is a requirement in the private practice dental setting (think of the busy dental surgeon restoring an implant on her patient while at the same time talking to a receptionist who just got off the telephone with a patient in discomfort, and also reviewing radiographs taken by the assistant for the emergency patient in the adjoining operatory). However, while multitasking has obvious evolutionary advantages, one could argue that it is the non-productive, or distractional type of multitasking that is of greatest concern (e.g. the busy oral and maxillofacial pathologist who is trying to sign out biopsy cases while trying to watch game 5 of the World Series).

Regardless, we need to fully consider the effects of these multiple diversions on the dental educational process. There is no dearth of data supporting the potential negative effects of multi-tasking on the process of learning, understanding and skill development. Individuals make less efficient use of their time when repeatedly switching between tasks, particularly when one of the tasks is complex or unfamiliar, which can be extrapolated to the development of new knowledge and skills in the dental education process.[4] Learners who engage in distractional multitasking are also prone to inferior information recall[5], as are students who are in direct view of a multitasking peer[6] (this latter observation raises the question as to whether modern classrooms should have distraction-free zones for those students who wish to concentrate on the material being presented). The adverse effects of multitasking appear to be particularly noticeable in the earlier phases of clinical training and skill development. Dubrowski and colleagues[7] showed that junior surgical residents with lesser clinical experience had a decreased ability, compared to their more experienced senior colleagues, to learn new cognitive information under multitasking conditions. Of even greater significance to the developing

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clinician is the observation that students engaged in distractional multitasking appear to be less able to understand underlying concepts and to critically apply this information in new settings[8].

This is where the real challenge lies. As faculty members, we must strive to find ways to channel our students' energies in productive directions, while directing their attention away from the ubiquitous "background" temptations in today's internet and cell phone-enabled classroom: texting, web surfing, email, looking at updates on social media sites, online ordering, and watching missed television shows, just to name a few of these activities.

There is a perception, especially among individuals with less exposure to teaching in the web-enabled classroom, that it is primarily the faculty member who is at fault if his/her students are engaging in electronic distraction. It is true that, in many cases, as faculty members, we must accept some degree of accountability for this. This is especially true in those foundational level courses, in which large amounts of material must, by necessity, be "offered" to our students, or during the first year of the traditional dental curriculum, when our students are all too often scheduled for uninterrupted successive hours of didactic lectures (if you've ever been assigned a three hour lecture slot on a Friday from 2:00-5:00 PM, to teach sophomore oral pathology, enough said). However, that is not the entire picture. It is also not an issue exclusive to our students. I have attended very interesting and interactive lectures taught by colleagues of mine in which large numbers of attendees, the majority of whom were non-students, were nevertheless engaged in non-constructive multitasking activities. Instead, I venture that, as a society, particularly over the past decade, we have been conditioned to seek out these multiple diversions, whether it be to remain in constant communication, or because of a perception that if one is not multitasking then one is not making effective use of time, or, alternatively, as a diversion to avoid or postpone taking on unpleasant or difficult tasks (such as learning or applying new knowledge).

If one then accepts the proposition that these activities are generally not productive to the educational experience, the question becomes: how do we "discourage" these forms of non-productive multi-tasking in the dental school setting? Simply stated, I don't claim to know the answer.

The ability to electronically interrupt cell phone and Wi-Fi service has a certain appeal to it. If you have ever contemplated the use of jamming technology in the classroom, you are not alone. The United States Federal Communication Commission (FCC) even lists this question on one of their 23 FAQs on the legality, or, more appropriately, illegality, of jamming technology in the classroom ("Question #19. I am a principal or school teacher and would like to use a jammer to limit cell phone calls and texting during school hours. May I do so?[9]"). It is critical to emphasize that the use of any type of jamming technology poses an unacceptable risk to public safety, as jammers can't discriminate between "desirable" signals such as emergency calls to 911, and potentially less desirable uses, such as checking Facebook updates while in class. It is also illegal to operate cellphone and Wi-Fi jammers in the United States.

Several of my braver colleagues have taken a more thoughtful (and legal) approach: restricting the use of laptops, notebooks and/or cell phones during certain classroom activities; particularly during interactive or discussion-centered sessions. While these colleagues report, at least initially, some degree of discontent among at least a subset of their students, faculty who have tried this approach also report a perceived increase in student involvement. Having experimented with a non-laptop rule this past semester in a non-didactic, exclusively case-based discussion course that I give to senior dental students, I can certainly see the potential benefits of this approach, at least when used in the right setting. However, in the long term, this is not an ideal, or even viable, solution, as this flies in opposition to the profound changes that are occurring in both education and in society.

Instead, could we, by embracing technological change and developing new methodologies that incorporate the use of these devices into our teaching repertoire, encourage our students to focus on the educational objectives at hand, thereby potentially discouraging the natural inclination towards non-productive uses of these technologies (i.e. encourage monotasking)? Ideally, yes. But to which new methodologies/approaches am I referring? As someone who is enthusiastic about but certainly not unconditionally proficient in the use of technological devices, I again don't pretend to have the answer to these questions. As noted above, that is where the challenge lies.

I am not referring to common activities such as adding notes to a PDF copy of a class handout or the use of i>clicker™-like polling tools. While these can have a role in the learning process, assessing student comprehension of concepts or for monitoring class attendance, they suffer significant shortcomings (e.g. the necessity that questions be worded in the form of a multiple choice question). I am also not referring to current approaches to online education; although E-learning will certainly take on an even greater footprint in dental education as delivery capabilities improve and dental school faculty members and staff become more comfortable with this teaching modality.

Among the considerations that immediately come to mind is that of a modified wiki-like approach; faculty-initiated and moderated tools with an emphasis on student-contributed content. Ideally, such an approach would be platform and operating system independent, would work with both portable devices and more conventional computing platforms, and be based on currently available, but freely modifiable, tools. Essentially, this represents a BYOD (bring your own device)-type approach that capitalizes on the fact that the vast majority of our students are already bringing their own electronic equipment to the classroom. In addition to affording the flexibility to incorporate the latest and most innovative methodologies, a BYOD-approach reduces personnel and hardware costs to the dental school, while permitting students to continue to use their preferred hardware. As example, like almost all of my colleagues today, I carry a smartphone with me everywhere I go. Currently, it is a 5.5-inch screen Samsung Galaxy Note 2 Android-based smartphone, having recently upgraded from the first generation Samsung Note. In addition, I routinely use a 7-inch Nexus Android tablet, and for the Apple devotees out there, an iPad 4, an Apple TV, and the latest iteration of the 15-inch Retina MacBook Pro

hooked up to two 27-inch Apple Thunderbolt displays. I also have a Windows 7 PC, and a Dell laptop running Windows 8 (and am currently trying to persuade myself that I don't really need the new iPad mini or Nexus 10 tablet; although I suspect that by the time this editorial goes to print, I will have succumbed to the seductive lure of having the "latest and greatest" E-gadget). But I digress. The suggestion at hand is that, perhaps, by having the option to use these new educational technologies on the devices of their choice, our students would be more likely to embrace these approaches in the classroom. The University's requisite contribution is relatively modest: a classroom infrastructure that can accommodate the modern student (a robust Wi-Fi system, adequate desktop space, and individual chairside power outlets; already essential prerequisites for any dental school in 2013), some degree of protected faculty time and minimal start-up funds to explore these options.

Regardless of which approaches we ultimately select to encourage monotasking in the dental school setting, we have to accept the fact that, in light of rapid changes in technology, the solutions we come up with today may be of little to no relevance a year or two from now. But hopefully, by identifying, and encouraging the use of novel approaches to learning that can support and enhance the current educational paradigm while minimizing outside distractions, we can continue to advance our principal educational objective: that of helping our students to understand, analyze and interpret data, rather than simply memorizing large amounts of information, so that they can ultimately develop into outstanding clinicians.

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