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Get Ready For Gen Z, Our Next Generation of Medical Students

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Abstract

Starting with 2020, medical school will enroll a new generation of students born between 2000-2012, otherwise known as Gen Z which expects a very different teaching experience than what previous generations have found appropriate and acceptable. In this article, we summarize practical educational advice that is based on our experience of instructing Millenial/Gen Y medical undergraduates, noticing subtle changes, and anticipating the shift to Gen Z. We performed a systematic review of the literature regarding Z generation and teaching methods. We analyzed the data and we added our personal experience. We summarized twelve practical educational advices regarding: lecture contents, delivery and performance of the lecture content, flipped classrooms, changing roles during academic lectures, mini-lectures and micro-learning, gamification and student engagement tools, virtual patient simulations, surgical simulators, language and communication, feedback, mentorship and holistic approaches**.** The education of Gen Z should take place in settings and formats as digitally enhanced as their daily environments and circumstances, which requires teachers to master digital tools themselves and to engage more with social media as part of their relationship with Gen Z students.

Keywords: **g**eneration Z, net generation, Facebook generation, medical teaching, social network.

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Introduction

Currently, the majority of medical students, residents, and early career physicians belong to the Millennials, also called Generation Y, described by Howe and Strauss as individuals born between 1982-1999 (Howe & Strauss, 2007; Toohey, Wray, Wiechmann, Lin & Boysen-Osborn, 2016). Starting with 2020, medical school will enroll a new generation of students born between 2000-2012, otherwise known as Gen Z (Boysen, Daste & Northern, 2016). These are also called the iGeneration, the "net generation", the "Facebook generation" or the "digital natives". Generation Y and Generation Z share some characteristics, such as both are comfortable using technology and navigating a globalized world compared to their elders. However, because Generation Z were born into a sophisticated enviroment of ubiquitous digital devices and (social) media, they are even more tech savvy than the „Millennials". They are also considered to be more flexible and culturally tolerant on account of their global inter-connectedness (Singh, 2014). Gen Z has access to information, ideas, images, and sounds in a way that no generation has had before. More importantly, there are now websites, tutorials, and apps, which enable the youth to learn about and acquire new skills in almost any field without conventional expert instruction and supervision.

Throughout history, every generation had an impact on academic instruction and communication practices. Generation Z makes no exception and is about to challenge the current academic teaching paradigm in profound and arguably unavoidable ways. Gen Z expects a very different teaching experience than what past generations have found appropriate and acceptable. For instance, the education of Gen Z should take place in settings and formats as digitally enhanced as their daily environments and circumstances, which requires teachers to master digital tools themselves and to engage more with social media as part of their relationship with Gen Z students. Also, educational methods should cater for the Gen Z preferance for more hands-on experience and on-the-job learning as well for customized mentorship and immediate feed-back.

As educators, we have to demonstrate flexibility, adjusting our underlying assumptions and actual performance in order to engage (with) this generation. For optimal results, we must select, adapt or create a new appropriate educational approaches based on our students' continuously evolving profile of needs, and interests. In this article, we summarize practical educational advice that is based on our experience of instructing Millenial/Gen Y medical undergraduates, noticing subtle changes, and anticipating the shift to Gen Z.

Lecture contents

The "digital generation" are used to access information anytime through electronic resources and devices. Consequently, what they need is not necessarily "en bloc" information possibly confined to the pages of a book, but rather information that can be searched and accessed as in real life. The contents should include authentic materials and the teachers should provide guidance in terms of effective information retrieval, analysis, and application. The learning objectives and content of lectures should be adapted to real-life scenarios of relevance and usefulness in order to capture and maintain the interest of Gen Z. Also, the teachers need to play a mainstay role in helping students navigate the digital resources that are external to the course, but nevertheless appropriate to the target situation. Importantly, we have noticed top universities such as Massachusetts Institute of Technology starting a trend of sharing the syllabi, video lectures and related materials as free, open courseware for anyone with an interest in the topics, while making their paid degrees and programs more about the practice experience, tutor interactions, assessment and feedback. The traditional lecture format will leave auditoria empty while Gen Z students will be watching video lectures and tutorials online.

Ideally, lecture materials and e-notes should be kept on an online platform so that the students can access them at their convenience, having the options to pause, revisit, and adjust speed to suit personal styles and needs. This also enhances the feeling of greater control over the study experience, which is highly valued by Gen Z (Appleyard, 2019). Concurrently, e-learning platforms are beneficial not only for the students but also for the teachers. The teachers can expand their educational impact beyond the classroom session and the limited face-to-face contact (Goh, 2016).

Delivery and performance

Conventional lecture-based teaching is still the most widespread instructional method at university. In medical education, this model is used so that senior doctors can provide theoretical information and key clinical insights to the students. This can be perceived as boring and outdated in comparison with new, more immersive instructional technologies developed in others domains or available informally. Also, this approach requires an investment of time and energy that takes away from practical training, which is another blow to its attractiveness. Such considerations justify a revision of the classical, unidirectional model of delivery into a corpus of reference materials including textbooks and video lectures, which are shared and explored together with the students. Gen Z are highly visual learners because they spend a significant amount of their time viewing, posting and reacting to pictures and videos via their digital devices. They love to communicate through

images, memes, and emojis. The design of educational materials should therefore include charts, graphics, animation, videos, some lighthearted humor etc. packaged for different types of media. Also, being able to put on a good show can make a difference in working with Gen Z. The fact that teaching is, in a sense, an act is nothing new, but teachers' charisma is more consequential now than in the past. Teachers would do well to learn from actors and art performers about how to inspire their audience. They should not forget to share their own enthusiasm and passion for the content, but also take deliberate steps to connect at an emotional level.

Flipped classrooms

A flipped classroom is a teaching model that "flips" or reverses the traditional method of information presentation and application activities (Deshpande, Ritzenthaler, Sun, Rudert & Lewis, 2019). After they have processed the information before class, the students apply the knowledge under the guidance and supervision of the teacher. This new way of teaching encourages a more active learning of e-contents independently, followed by case-based discussions. Phillips and Trainor's survey regarding the experience of millennial students with flipped classrooms suggests this method may be an effective way to engage the next generation (Phillips & Trainor, 2014). A flipped classroom has several advantages including superior educator-student interaction, but it needs to be planned and implemented carefully in order to support effective learning (Moffett, 2015). For instance, a common challenge is when some students in the group come prepared while others do not read the reference materials in advance, for whatever reasons.

Changing roles

Inviting the students to teach each other is an effective way to bypass the aforementioned risk with flipped classrooms. Students can, individually or in small teams, take responsibility for delivering certain course contents on certain course dates, once the foundations have been laid out. The role of the faculty member is to support the students' preparation and performance by providing resources, expertise, didactic advice, feedback, and encouragement at different points in the process. In our experience, peer-teaching schemes works well both for preclinical disciplines and for clinical case presentations, with the added bonus of occasioning the integrated practice of a wide range of generic skills and attitudes.

Mini-lectures and micro-learning

Gen Z are used with distributing their attention span across a number of different simultaneous tasks. Thus, long lectures with large blocks of text and lengthy readings can test their patience and ability to maintain focus. The best way is to divide the material and deliver it in a progression of smaller, meaningful chunks and clearly targeted bursts using interactive presentation techniques and tools such as Mentimeter (www.mentimeter.com), Nearpod (nearpod.com), iSpring Suite (ispringsoution.com), ClassFlow (ClassFlow.com). The pauses between these sequences should also engage rather than interrupt the flow, e.g. quizzes, discussions or games (see below).

Gamification and student engagement tools

Z generation love to play so it is important to consider ways of bringing games in our classes, even at university and in relation to serious topics. Gamification has been defined by Chou as "the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities" (Chou, 2012). Gamification proposes an entertaining and active learning environment that makes learning fun, challenging, and exciting. A game structure may be used to introduce medical problems which require students to formulate and test hypotheses and suggest solutions while also learning from mistakes without negative consequences for real patients (Buttussi, Pellis, Vidani, Pausler, Carchietti, Chittaro & Buttussi, 2013). They are highly appreciated by the students who recommend their use in medical training (Jeffres & Biehle, 2017). For instance, electronic games played on the students' mobile devices can be integrated into classroom activities and used to follow up on face-to-face sessions, while making both in-class and out-of-class work more motivating and fun. Kahoot is one such popular platform useful for creating learning games or trivia quizzes in minutes. In the same vein, instant polling and quizzing applications like Mentimeter, ParticiPoll, or GoSoapBox, some of which can also be embedded in Powerpoint presentations, are easily customizable tools for student engagement, and they prove their worth especially when dealing with larger audiences. For more specific purposes, there are also medical mobile applications. For instance, students can use their cell phones and tablets to learn anatomy via 3D interactive anatomy models available through the iTunes Store and the Android Market Place. All these methods may objectively enhance Gen Z student engagement and motivation, both in the classroom and also in distance training, with embedded mechanisms for swift feedback and opportunities for students to practice clinical decision- making risk free (McCoy, Lewis & Dalton, 2016).

Virtual patient simulations

More complex than 3D models of the human body are interactive computer simulations of real-life clinical scenarios for medical training, education, or assessment (Ellaway *et al.,* 2008). Virtual patient simulations are designed to allow students to learn to solve real-world problems safely. In these scenarios, students try practical techniques and interact with virtual characters and objects. Unfortunately, simulations, which enable an immersive virtual experience of visualization and manipulation in 3D environments, are still expensive and require sophisticated software (Samadbeik *et al.*, 2018). Case-based presentations are, luckily, less technologically demanding. In these, students first learn of a patient's presenting complaint and then they have to draw on their knowledge and apply clinical thinking to establish a diagnosis and select the appropriate treatment. Their choices prompt the simulation to feed them information about how the patient is responding to the treatment. This process of generating a narrative has been shown to improve retention of important clinical information. It can also be practiced at different speeds and validated tests suggest that this approach can improve high-stakes performance, such as in trauma triage (Mohan *et al*., 2018).

Surgical simulators

The traditional approach to learning surgery directly in the operating room has evolved dramatically in the last years. Residents now use a wide range of tools to practice and assess their surgical skills: bench-top models, laparoscopic simulators, simulations of new surgical technologies, and simulations for nontechnical surgical skills (de Montbrun & Macrae, 2012). The use of simulators enables the acquisition of surgical skills necessary in the operation theatre, but from the safety of the university lab. Simulators also have the great advantage that they can be used anytime and without the clinical, legal and ethical implications of practicing on actual patients. This type of training is likely to become mainstream as well as mandatory, so gen Z will undergo it as part of their curriculum and appreciate it for being both hands on and ethically straightforward. They will also experience surgical simulators as a welcome progression from their innate appetite for video simulations and tutorials at the expense of the tedious study of textbooks. To prepare, teachers and trainers of surgical disciplines should collaborate to collect and curate electronic libraries of surgical operations.

Language and communication

Gen Z are comfortable interacting online and are used to obtaining immediate replies through texting, which is very different from academic discourse. They

respond better to short messages using abbreviated, informal, made up vocabulary and simplified grammar spiced up with allegories and humor, including by visual means (emojis, stickers, memes etc.). Although they use e-mail, they may perceive it as more formal (in our experience, our newest generations of medical students may even forget to check their emails while they concurrently enquire about the same issues via messenger and social media). Teachers should neither ignore these patterns nor give in to them entirely, but rather use them to make their discourse more relatable and be more responsive online. Many colleagues now regularly set up social media contact lists and discussion groups with their students from the beginning. This fits in with how we already use texting language and social media tools for private purposes but also to be in touch with colleagues, share knowledge and engage in continuing education (Panahi, Watson & Partridge, 2014). It can be overwhelming at first, and it takes some trial and error before effectively building bursts of communication into the daily workload without losing concentration. A noteworthy added bonus is the fact that these initial student contacts may continue well into the future, facilitate further interactions, foster a sense of community and develop into lifelong friendships. However, one important issue to consider, and which has not yet been resolved to our collective satisfaction, is that of privacy and data protection. We should bear in mind that, whenever we use social media to discuss personal student matters or share course materials and assignments, it is neither us nor our institution that are in full control of the information.

Feedback

Feedback is undoubtedly an essential part of medical education. The main role of feedback is to promote progress by providing objective information regarding students' performance and ways to improve it (Chowdhury & Kalu, 2004; Leggett, Sandars & Roberts, 2017). Timeliness is important for feedback to be effective, and for Gen Z this translates to immediate feedback, ideally. In terms of the content, however, because Gen Z are used to receiving positive reinforcement from parents, they are less emotionally prepared to take criticism. For Gen Z, feedback needs to be very specific and clear, as well as frequent and behaviorally responsive (Eckleberry-Hunt & Tucciarone, 2011). In our experience, the focus and wording of negative feedback should be about the process and the product, never the person, so as to allow students to step away from their performance and join in the appraisal without feeling judged. Feedback should encourage recipients to "think strategically" about a certain (clinical) approach or technique that is clearly defined beforehand, self-monitored during the actual performance, and reflected upon afterwards (Leggett, Sandars & Roberts, 2017).

Mentorship

The Internet has given Gen Z early and unprecedented access to information as well as the means to connect digitally with more experienced peers and accomplished experts who may gain their respect and become their mentors regardless of institutional affiliation and credentials. Many youth do succeed nowadays in building less conventional yet fruitful relationships starting from social media and email interactions, or by reacting to blogs, podcasts and video tutorials (Singh 2014). If Gen Z do not find the desired level of availability and interest in sharing from the experts assigned to teach them directly, then they will seek and find mentorship elsewhere.

Holistic approaches

Gen Z are driven by the meaningfulness they can find in working to affect change on a wider social and environmental scale. Equally they expect institutions to be more socially engaged and demonstrate their commitments to the greater good. In terms of recruiting, educational establishments that partner with communities, advocate for social justice, and incorporate global health may be more attractive to Gen Z. Moreover, the members of Gen Z want to be educated in a university that stands up for these principles while also catering to the individual beyond the obvious academic needs. Students will be looking for healthy environments with counseling services, wellness programs, fitness facilities, healthy food etc., especially as these upcoming groups of learners are sometimes failing to maintain emotional health. Given the known challenges of the medical profession and new ones derived from having to keep up in a rapidly changing world, undergraduate as well as residency programs should provide authentic wellness promotion and holistic support programs. At our university, for instance, the student counseling service has recently been experiencing a sharp and overwhelming increase in appointments from junior students struggling emotionally with the complexities of their new circumstances.

Conclusion

Teachers and pedagogical processes have to continuously adapt to cater for the needs and interests of new generations of students whose identities and aspirations are shaped by new circumstances and prospects. Generation Z makes no exception and promises to challenge how we design and deliver higher education and training. It is our responsibility as educators to understand what they bring in terms of assumptions, skills, and expectations in order for our teachings and communications to engage them fully. Some of the required adjustments are more

technical in nature, while others reach much deeper into our core concepts of us as teachers. By sharing our collection of tips, many of which will be not be new to our peers, we invite reflection, dialogue, and collaboration towards educational futures that will be satisfy and reward our students, ourselves, and our community at large.

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