Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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COVID-19 and Educational Engagement

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COVID-19

Coronavirus disease 2019 (COVID-19) represents an infection caused by the novel virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), resulting in fever, dry cough, fatigue, sputum production, dyspnea, myalgia, diarrhea, sore throat, headache, loss of smell, and chills. Whereas most COVID-19 cases result in mild symptoms, many cases have progressed to fulminant and life-threatening pneumonia, acute respiratory distress syndrome, multisystem organ failure, and death.

COVID-19 is primarily transmitted between persons in close contact and most often by aerosolized virus containing droplets as small as 5 to 10 μm produced during talking, coughing, and sneezing.[1] The production of these droplets may occur as part of in-person educational settings in oral and maxillofacial surgery (OMS), including those in the operating room, conference hall, and ward or intensive care unit rounds. Among other methods, social distancing, also known as physical distancing, and avoiding mass gatherings are commonly recommended strategies to reduce the spread of coronavirus. Social (or physical) distancing is achieved by a deliberate increase in the physical space, typically 6 ft or greater, between persons to reduce or eliminate the transmission of coronavirus.[1] Wearing a surgical mask or custom cloth face mask, when social (or physical) distancing cannot occur, also is recommended to reduce the transmission of coronavirus. Specific recommended elements of social (or physical) distancing include working from home instead of at the office, converting educational platforms from residential programs to online classes, and canceling or postponing conferences. Omer et al[1] have commented on the ill effects of long-term social distancing, such as poor mental and physical health and a declining world economy. To these ill effects, I add the negative implications on the educational process in OMS, specifically detrimental educational engagement. Stated differently, social and physical isolationism is intuitively disadvantageous to educational engagement and, therefore, effective education in general.

Educational Engagement

Engagement in learning environments has been formally defined as a learner's interest and participation in an educational initiative and is directly related to favorable educational outcomes including learning and behavioral change.[2] Nonetheless, engagement is one of the most widely misused, poorly understood, and overgeneralized constructs in learning. The concept of engagement is pontificated about and debated by educators of all disciplines. This notwithstanding, engagement can be experientially described as the recruitment of interest, the sustaining of effort and persistence, and the execution of self-regulation, all in the best interests of active (deep) learning. Stated differently, educational engagement takes place based on a framework of emotion. Emotions engage the brain and body. Emotions dictate what we seek, attend, perceive, and remember in terms of our education. Emotions represent motivating signals whereby a learner proclaims to the brain that something is worth learning and applying. Engagement permits the transfer of information from didactic teaching to lifetime application. Therein, lifelong learning probably represents the quintessential example of educational engagement. Engagement, however, depends on a wholly dichotomous relationship. The teacher must be engaged in teaching, and the student must be simultaneously engaged in learning. One engaged party without the other or, worse, neither party being engaged inevitably produces failure in the learning

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process. When properly executed, interactive teaching, specifically the Socratic method of teaching[3] with emotional intelligence,[4] is a prime example of educational engagement. Although Socratic teaching is traditionally performed as part of in-person education, experience shows that it can be accomplished virtually.

Under ideal circumstances, learning is accomplished with interpersonal contact to ensure effective engagement. An impersonal review of a PowerPoint presentation (Microsoft, Redmond, WA) by a learner rather than delivery by a lecturer, for example, refutes educational engagement and represents a passive (superficial), rather than active (deep), learning experience. By contrast, an enthusiastic teacher who personally instructs with interactive Socratic methods is likely to engage learners in an active learning environment when this learning environment is psychologically safe and is truly learner-centric. Such interpersonal contact permits teachers to perceive and appreciate effective learning by students by recognizing eye contact, head nods, and voice inflection and by students asking teachers thoughtful and insightful questions, thereby establishing and reinforcing engagement in the learning process. Educational engagement, therefore, involves 2 types of thinking, with executive thinking permitting the most effective form of educational engagement (Table 1).

The ability for an OMS faculty member to measure educational engagement, particularly effective educational engagement, is essential to foster an active learning environment in residency education. To this end, 7 signs of educational engagement must be assessed objectively. First and foremost, signs of goal setting by the resident must be observed by the faculty member. In doing so, there must be recognition by the faculty member of challenges established as goals by the resident. Second, signs of deeper information must be perceived whereby processing occurs as an investment in future performance. These signs can include note taking and highlighting of text by the resident with thoughtful reflection and retention. Third, the transfer of learned information can be measured as a sign of deliberate practice. Fourth, measuring signs of elaboration such as feedback and interactive discussion must take place. Fifth, signs of help seeking must exist. Interactive residents who seek assistance typically show more favorable educational outcomes than residents who do not seek assistance. Sixth, signs of self-checking must be assessed. Introspective residents who inquire of themselves as to their active learning are defining elements of educational engagement. Finally, signs of the resident's self-regulation (ongoing inner conversation) are important to ensure an effective educational engagement process.

Table 1. TWO TYPES OF CONTROL SYSTEMS (THINKING) FOR EDUCATIONAL ENGAGEMENT

Automatic	Executive
Impromptu	Strategic
Unconscious	Conscious
Rapid	Slow
Implicit	Explicit
Intuitive	Deliberate
Instinctive (gut feelings or reactions)	Planning
Emotional	Calculated
Recruits attention and effort	Recruits executive function
Center in brain is amygdala	Center in brain is prefrontal system
Multidimensional	Unidimensional
Passive (superficial) learning	Active (deep) learning

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Enter Zoom Videoconferencing

Zoom Video Communications (San Jose, CA) was founded in 2011 by Eric Yuan, an engineer from Cisco Systems (San Jose, CA), and began as a service in 2013.[5] Zoom reported 1 million participants by May 2013 and 10 million users by June 2014.[5] The number of individuals using Zoom Meetings, Zoom Video Communications' primary product, has now reached 40 million, with 65,000 subscribed organizations.[5] In early 2020, Zoom use increased 67% during the first 3 months of the year owing to the coronavirus pandemic as many educational organizations have converted residential instruction to Zoom Meetings.[5] The Zoom application was downloaded 343,000 times in 1 day, and approximately 18% of downloads were from the United States.[5] Zoom's penetrance increased by greater than 2 million users in early 2020 because of the pandemic.[5]

Zoom video conference meetings are a solution to maintaining engagement in OMS education, including that occurring in didactic sessions and interactive conferences during the coronavirus pandemic. These meetings support physical distancing to assist preventing the spread of coronavirus while maintaining relative social contact. The system enumerates participants in the meeting and enables collective or individual interactive typed chat discussions, muting of distracting background noise, sharing of documents, and selection of custom backgrounds to promote education. Measureable outcomes of educational engagement such as goal

setting, recording of deeper information, feedback, self-regulation, and help seeking by residents are capable of being assessed in a Zoom meeting. The objective of Zoom technology is not to create the essential element of emotion in the engagement process but rather to leverage that emotion. My experience with Zoom video conferencing during the COVID-19 pandemic is that Socratic teaching can occur with combined video and audio conferencing. Educators in our specialty should ensure that residents use video cameras during Zoom sessions to permit relative social contact while maintaining physical distancing, thereby increasing educational engagement that might otherwise not occur with exclusive audio conferences.

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