

BRIEF COMMUNICATION

Participation in an existing massive open online course in dentistry during the COVID-19 pandemic

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic presented unprecedented challenges and interruptions to education at all levels. As many across the world were required to stay at home, virtual educational resources were developed and relied upon to provide all levels and subjects of instruction. Introduction to Dental Medicine, a massive open online course in dentistry, experienced an increase in enrollment during the start of the pandemic and learners displayed a positive reception to the information provided. Introduction to Dental Medicine was particularly well positioned as a resource during the pandemic given its availability, established nature, and the wide accessibility of course material. As disruptions to normal activities continue, this and other virtual educational methods may continue to play a central role in education and exposure to dentistry.

KEYWORDS

COVID-19, education, instructional materials/methods, faculty, distance learning, massive open online courses, professional interest, predoctoral, professional interest, technology, faculty development, virtual education

1 | THE COVID-19 PANDEMIC'S IMPACT ON DENTAL EDUCATION

Coronavirus disease 2019 (COVID-19), the disease caused by the highly infectious virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was officially declared a global pandemic on March 11, 2020.¹ By that time, the disease had spread around the world. The pandemic subsequently caused unprecedented changes to all areas of daily life. In recognition of the impact and spread

of the pandemic, the United States Centers for Disease Control and Prevention (CDC) recommended temporary closure of in-person education.² The American Dental Association (ADA) likewise recommended the suspension of in-person dental education and postponement of elective dental treatment. While closures were impactful at all levels of education, they had particularly substantial impacts on dental education, given the central roles of clinical skills and patient management. In response to interruptions to dental education in the United States,

the American Dental Education Association (ADEA) recommended using online curricula and “creative teaching methods” to continue dental education.²

With this shift, education was limited to virtual methods, which previously had not been widely used or accessible in dentistry, nor investigated for utility or efficacy across backgrounds and levels of education.³ While the options for providing information were decreased, the importance of providing high-quality material was greater than ever.⁴

Although virtual learning presented significant challenges to all educators, the abrupt shift to this modality also posed opportunities, including the development and dissemination of online materials relating to dental education and the chance for faculty to obtain additional experience and knowledge of these previously unconventional methods.⁵ Self-directed educational offerings moderated by experienced faculty, as often exist in massive open online courses (MOOCs), were found to be particularly useful methods of conveying content while allowing for student self-assessment.² In addition, the disruption to on-site education allowed dentistry to consider better preparation for future interruptions to education.² There is a growing consensus that virtual materials will be more significantly incorporated into dental and other forms of education in the future and that the COVID-19 pandemic may present opportunities for dentistry to proactively shape the way we face the future.^{6,7,8}

A new reliance on virtual educational methods also allowed for increased use of existing electronic materials. As educators attempted to transition in-person lessons online, resources already available that could be readily obtained and easily incorporated into novel virtual curricula mitigated pressure for the need to create new materials. Broadly available existing materials could also be used by students whose educational and other activities were interrupted and who were left without opportunities for ongoing education.

2 | ENGAGEMENT WITH INTRODUCTION TO DENTAL MEDICINE DURING COVID-19

Introduction to Dental Medicine (IDM) is a freely available MOOC hosted through the Coursera platform. IDM was developed by the University of Pennsylvania, was first published on June 15, 2015, and has been continually available to all audiences since that time. It is intended for any parties interested in learning more about the dentistry and particularly targeted to future dentists and healthcare providers, allied health professionals, and patients. The development and worldwide participation

in IDM from launch to March 1, 2020, has been covered elsewhere.⁹

Since March 1, 2020, IDM experienced an increase in visitors, enrollments, and course completions that may reflect the worldwide transition to online learning, increased time availability for some learners, and the significance of established and high-quality virtual educational resources for ongoing education during and after the pandemic. Specifically, between March 1 and September 1, 2020, IDM received 49,463 unique visitors and had 13,879 learners enroll. This represented an 86% increase in enrollment compared to the period between June 15, 2015, and March 1, 2020. A total of 1,554 learners completed the course during the same time frame, compared to 1,656 in approximately 5 years between course launch and March 1, 2020. The all-time maximum number of new enrollments (3,654), new visitors to the course (11,039), and learners starting the course (2,079) all occurred in March 2020. The maximum course completions to date (389) occurred in June 2020. An average of 36 learners completed the course each month before March 2020. Further illustrating the increased course completion during the pandemic compared with before March 2020, there had previously been a maximum of 111 learners who finished the material in a given month, which occurred in June 2015, the second month the course was available.

Learners participating in IDM also showed sustained high levels of engagement during this 6-month period, with a minimum of 16 active learners each day at the beginning of March, which increased to over 100 active learners each day from March 16 to August 22, 2020. The first six months of the COVID-19 pandemic saw a maximum of 331 daily and 2,462 monthly active learners, with both measures increasing significantly in mid-March and showing sustained elevations above historical levels through the end of this period (Figure 1).

Course ratings and reviews are commonly used in MOOCs to determine learner satisfaction and course material reception. During the period of March 1-September 1, 2020, course feedback reflected a continued appreciation for the IDM material across backgrounds and education levels. During this 6-month period, the course received 82 new reviews with an average of 4.86/5 stars, 13 new learner stories, and 97% of learners rating the course “thumbs up.” Examples of reviews left during this time period reflected learner appreciation of the material (“HANDS DOWN THE BEST COURSE FOR DENTISTRY ESPECIALLY LEADING UPTO UNIVERSITY !!!!” [sic, emphasis in original]), particularly in the context of the pandemic (“it was not too hard and gave me a good reason to get up and do my work every day”). These reviews suggest that learners were grateful to have an available virtual opportunity that allowed them to learn or review dental

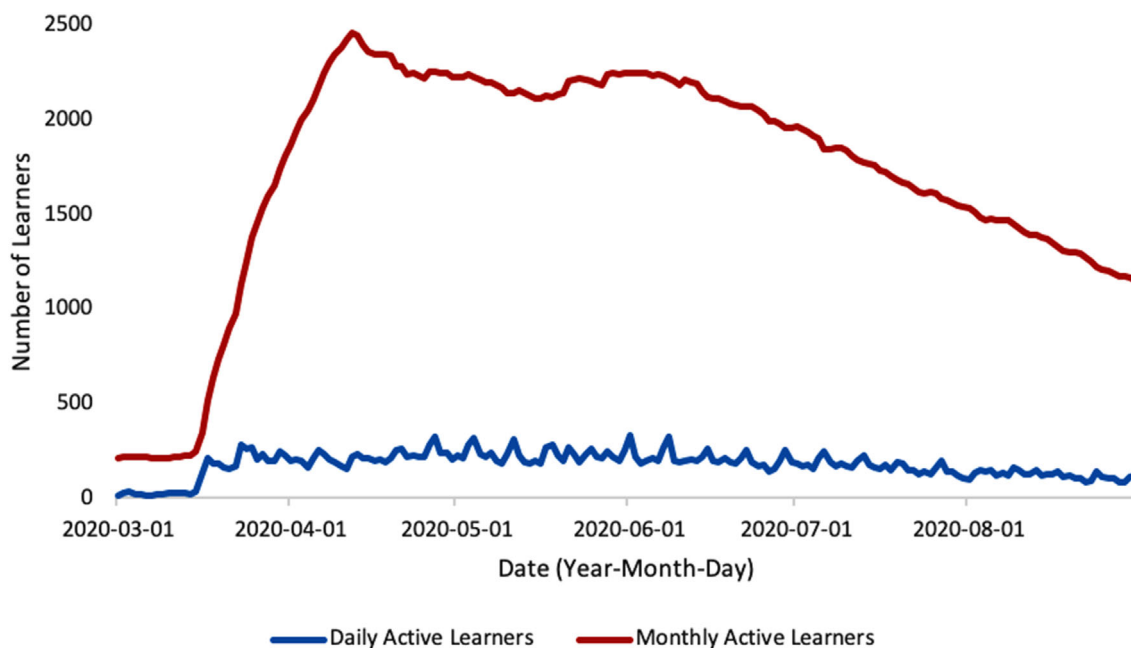


FIGURE 1 Daily and monthly active learners in Introduction to Dental Medicine between March 1 and September 1, 2020, showing significant increase in engagement in mid-March 2020 corresponding to the intensifying of the COVID-19 pandemic with those levels remaining elevated over the following six months

concepts. This suggests an ongoing role for widely available high-quality virtual dental material. It is additionally worth noting that this increase in participation occurred with no additional marketing or changes to the course itself, and instead, given the timing, may have been directly related to increased virtual learning and engagement, as well as increased time at home due to the COVID-19 pandemic.

3 | IMPORTANCE OF HIGH-QUALITY VIRTUAL MATERIALS, PARTICULARLY DURING THE COVID-19 PANDEMIC

As an established and continually available educational resource developed and disseminated before the COVID-19 pandemic, IDM may have been well-positioned to provide education and advancement to learners in light of the global challenges caused by the pandemic. IDM had received positive recognition for quality and accessibility during its first years of availability and its accessibility allowed learners to enroll and complete the material at will. Given the lack of training and experience of dental faculty relating to virtual education and technology, the immediate availability of a resource as disruptions to daily life began provided an opportunity for interested learners.² In addition, a new offering did not need to be developed, and additional university resources were only used to respond to learner questions.⁶ The MOOC

set-up of IDM also allowed learners to progress through the course material at will, which has been suggested to increase confidence.⁴ While students in dental settings have expressed concern about the quality of online instruction, years of reviews suggest that quality expectations will be met by participating in IDM.⁵ The course also provided availability of subject experts and engagement with these experts as well as peer learners, meeting Reddy's suggestions for visibility and ventilation of educational materials and concepts as ways to maintain resilience during this time.¹⁰

4 | OPPORTUNITIES FOR THE PRESENT AND FUTURE

IDM is designed as a basic overview of subjects in dentistry intended for a non-expert audience. Given its availability and accessibility, it has been completed by many adolescents and young adults interested in future careers in dentistry or allied professions. As traditional pre-dental activities, such as volunteering, shadowing, and even traditional education change to incorporate limitations of the COVID-19 pandemic, MOOCs such as IDM and other online educational resources, may continue to prove impactful in accessing information on dentistry. Many younger students possess both comfort and experience with online learning environments and may suffer particular concerns about the impact of the pandemic on their current and

future educational endeavors.⁵ Some younger students may not succeed in online-only formats, however, and will gain more benefit from blended offerings that allow additional direct feedback.¹¹ Additionally, non-traditional students considering careers in dentistry and allied professions may also benefit from the accessibility of freely available online materials. These resources may then prove particularly beneficial for these populations and should be combined with other types of introductory materials on dentistry to ensure continued service to future dental professionals.

In addition, IDM may reflect an increasingly common mode of education at all levels. Its uptake and positive reception during the first six months of the COVID-19 pandemic reflects the importance of developing this type of high-quality accessible education and measuring its efficacy both during and after any changes to the “normal” order.² IDM presents one opportunity for education that could, in the future, be combined with other resources to provide additional preparatory material for pre-professional students. This may include both synchronous and asynchronous offerings, blended modalities, and other ways to provide a wide variety of material in accessible formats. Dental schools, ADEA, and other stakeholders may, in the future, consider how to aggregate such materials for the optimal benefit of all learners. While many dental students, pre-dental students, dentists, and colleagues across the spectrum of careers are currently experiencing significant increases in uncertainty, resources that can educate, provide structure, and increase access to high-quality information will likely continue to be sought after and add benefit.⁶ IDM and other MOOCs can help lay out one option for how to disseminate that information to a broad audience.

DISCLOSURE

Katherine France: Employment, University of Pennsylvania; Member, Board of Trustees, The American Academy of Oral Medicine. Uri Hangorsky: Employment, University of Pennsylvania; Delegate, American Dental Education Association Policy and Research Advisory Committee; Member, American Dental Association Council on Dental Education and Licensure. Chia-Wei Wu: Employment, University of Pennsylvania. Thomas P. Sollecito: Employment, University of Pennsylvania; Member, Board of Trustees, The American Academy of Oral Medicine;

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