Advances in Medical Education and Practice

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PERSPECTIVES

The value of mobile tablet computers (iPads) in the undergraduate medical curriculum

This article was published in the following Dove Press journal:
Advances in Medical Education and Practice

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Abstract: The deployment of mobile tablet computers in medical teaching and learning is viewed with mounting interest. Medical educators are embracing insights from technological advancements to ensure that students are equipped with the necessary tools to flourish as physicians. Here, we reflect on the benefits and challenges of the tablet learning experience within undergraduate medicine and how students may make the best use of it.

Keywords: tablet computers, iPads, undergraduate, medicine, learning, teaching, textbook

Introduction

The value of mobile tablet computers in medical education is an area of growing interest among medical schools and hospitals. Ease of use, access to a wealth of resources, and portability are just a few of the many features which have garnered popularity. It is no surprise that many institutions are now willing to provide and incorporate tablets as learning tools within undergraduate curriculums. Indeed, the *NMC Horizon Report 2017* suggests that online, mobile, and blended learning are inevitable, and goes so far as to suggest that institutions that fail to integrate digital approaches to learning are unlikely to survive.[1] In this paper, we present a brief overview of key uses of iPads in undergraduate medicine, with several examples from Imperial College London. We also highlight some of the positive and negative aspects of mobile tablet-assisted learning, in general.

Mini iPads at Imperial College London

Between 2013 and 2015, Imperial College London trialed a pilot scheme to issue mini iPads to Year 5 and 6 undergraduate medical students.[2] The intention was to offer key utility to students and to provide the following: serve a means of recording directly observed procedures during clinical attachments; interactive clickers for use during lectures; iBook textbooks; ease of access to updates from clinical sites; as well as course material on Blackboard. Following the successful trial, all Imperial College medical students are now issued with iPads.

A subsequent study used iPads to support a blended learning Respiratory Medicine tutorial for Year 1 medical students.[3] In this study, iPads were used to carry out pre- and post-tutorial tests, and to participate in a group learning activity. In terms of how useful the iPads were, feedback suggested that students regarded them as being a useful personal learning tool but felt that most features of the iPad could be found elsewhere.

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Dovepress
http://dx.doi.org/10.2147/AMEP.S163623

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The second Imperial College study comprised two courses, one on neurotransmitters and the other on neurodegenerative conditions, which were both part of the intercalated BSc in Pharmacology taken by Year 4 medical students.[4] While the primary aim of the study was to test the effectiveness of blended learning, as with the previous study, student iPads could be used to facilitate the electronic tasks associated with the course. The students considered that the study was successful largely because of the high quality of the digital material provided, the animations, and the interactive quizzes, but that "blend" was key and preferable to "stand-alone" online learning, not least because it maintained the element of personal contact and communication with other students and tutors.

Going forward, the challenge at Imperial and other universities will continue to be how iPads can be used best, not just to replace textbooks, or to act as an add-on to learning such as facilitating easy access to recorded lectures but to seek to provide a range of active learning opportunities that will transform learning.[5]

Positive features of mobile tablet-assisted learning

Various studies from a wide range of institutions found the iPad to enhance student learning experience, in general.[6–8] In particular, one survey with 209 students found high levels of engagement with iPads correlated with higher levels of learning.[7] Another study of first-year students studying anatomy through games, quizzes, and applications showed that the group using iPads achieved better grades because learner retention was improved.[9] Also, feedback from this study suggested that iPads increased enjoyment of learning and that students preferred the more interactive experience, compared with the traditional lecture-based format.[9] Other studies found the iPad to be an indispensable tool for providing feature-rich content such as Google Scholar, Blackboard, and ready access to specific learning modules.[10,11] In addition, a number of studies showed that the iPad can refine time management and organization skills, through use of productivity applications such as calendars, emails, notes, and cloud-storage platforms.[10,12] Other positive features of mobile technologies, in general, include the following: opportunities to design learning for students with dyslexia, utilizing voice-based command interactions, and speech rendition of documents.[13] As shown with the Mobile Oxford project, the consistent format can be helpful for users with visual impairment.[14]

Many, if not all, of these generic features of mobile learning are likely to facilitate and enhance education for undergraduate medical students, although not all of these features have yet been specifically investigated in this group of learners. Moreover, while the literature on the role of iPads in preclinical learning is growing, a year-long study by Nuss et al[15] also argued their importance in clinical learning and decision making. Specifically, the seamless integration of medical reference applications, e-textbooks, and library databases into the daily workflow enabled students to improve their perceived expertise in mobile technology and their confidence in clinical decisions.[15] In summary, a role for the iPad as a tool to facilitate and enhance undergraduate medical student learning seems very promising.

Limitations and drawbacks of mobile tablets in medical education

As always with advancing technology, caveats are certainly a given. In general, a recurrent theme across several papers found that iPads could serve as a potential distractor to education owing to their multimedia capabilities.[11,16] Despite these concerns, students in one study felt that although iPads could be used for personal entertainment, it did not divert them from goal-orientated learning but rather facilitated it.[17] Thus, the objective of promoting student learning on what some consider an entertainment device appears to have been achieved.

Another contentious issue surrounding the use of personal mobile technologies is the notion of data discretion, or lack thereof. Crotty and Mostaghimi[18] discussed in detail the dangers of confidentiality in a digital age. Students and physicians are constantly reminded of the risks of personal devices wherever patient details are concerned. Recommended methods of safeguarding data include encrypting devices with passcodes or other security-tracked methods, as well as disabling automatic photo backup or sharing features. In addition, care should be taken when dealing with social media interfaces. Anonymizing patient data and opting for applications which utilize end-to-end encryption appear to be the best approaches to minimizing data breaches and maximizing patient confidentiality.[19] As all forms of passing on patient data, be they digital or paper format, carry the risk of patient confidentiality breaches, some of the responsibility must rest with individual users to sufficiently anonymize information. On a positive note, one study, albeit not concerning medical undergraduates but qualified medical staff, suggested that using iPads and reducing paper actually

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enhanced Health Insurance and Portability and Accountability Act compliance.[20]

Finally, there will and should always be the concern about universal access to high-quality online and ideally mobile education. The Pew Research Centre reported that mobile penetration in emerging economies lags behind but is, at least now, increasing and that in some fields, such as education itself, innovative projects are providing greater access to higher education.[21] Specifically, in undergraduate medicine, studies from Kenya and Botswana suggested that mobile tablets are popular with students and provide regular access to up-to-date medical information,[22,23] the main drawback being inconsistent internet access.

Conclusion and the future

Overall, while data surrounding mobile tablet computers in undergraduate medical learning outcomes is in its infancy, there is common consensus surrounding the perceived value of the iPad in the curriculum. Thus, while iPads ought not to replace classical pedagogical methods in a substantially practice- and skills-based discipline, in our opinion they serve well as an intermediary to expedite student learning processes. As more and more technologies come to fruition, students are likely to benefit from further innovative modalities of teaching and active learning provided that they are integrated in meaningful ways. In conclusion, the outlook for technology and subsequent medical learning is one which seems infinitely encouraging.

Author contributions

All authors contributed toward data analysis, drafting and critically revising the paper and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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