Chapter 10
Bolstering the Pedagogies of Orthodontic Education Using Smart Technologies

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ABSTRACT

Learning has not only intrigued but has kindled human curiosity as it is the basis with which one interacts and exchanges emotions and shares societal values. To understand this innate ability we have devised theories, philosophies, and mathematical formulae. The same holds true to the field of health professional education, which seeks to as closely as possible emulate patient problems to serve as learning objectives for students. Although the traditional pedagogies in current use have trained students to become competent clinicians, the educational aspects of training are faced with challenges of content delivery, knowledge exchange, and a lack of technology-enriched learning environments. To overcome these, the chapter will introduce the readers to the concept of a smart hybrid learning environment and describe its features and suggest means for adopting this learning environment for the benefit of the learner in the context of orthodontic education.

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INTRODUCTION

Learning is a universal and continued goal of humanity. The process of learning has eluded many for centuries and yet we have never been able to understand this universal phenomenon. This process is in a constant state of evolution assisted not only by learning theories but by our biological systems of anatomy and psychology. The principles set forth by centuries of research have constantly been challenged by emerging technologies and instructional design. These challenges have created a platform for exploring this innate ability thereby helping numerous faculties of teaching and learning. One such faculty where learning takes place through a complex set of intertwining pedagogies is the clinical field of orthodontics, a specialty field in dentistry that deals with the diagnosis, interception, and management of craniofacial and dentoalveolar abnormalities or malocclusion states (American Association of Orthodontists, 2017). Orthodontic education is known to utilise a multitude of pedagogies to assist and support learning and knowledge transfer.

Learning in the context of orthodontic education has drawn from the fundamental theories of constructivism (Rao et al., 2020a) and behaviourism (Cooper & Higgins, 2015). However, an overarching and unavoidable effect is the influence of technology on learning and training in general and specific to orthodontic education (Gandedkar et al., 2021). This effect is not limited to computer-assisted learning and simulation-based learning but extends to the entire spectrum of teaching, learning, and evaluation. The knowledge transfer, uptake, and dissemination are gradually moving away from the traditional formats of delivery. The content creation, absorption, and utilisation too have been drastically transformed by technology and its numerous applications. When a concept in orthodontic education is discussed through the use of technology it is better suited to the current generation of e-learners (Patano et al., 2021). The use of multiple formats of interaction and engagement is accepted much more than the traditional formats of content delivery. The current generation who is always on the move needs instantaneous access and seeks out such means. This behaviour is what changes the perception of young minds to technology and their adaptation. The pace at which technology has progressed surpasses any changes in the pedagogical reasoning of health professionals' education. However, with smart technologies and smart learning, this aspect of a lag in pace can be overcome by infusing the existing pedagogies with technology. The acceptance of technology as an aid to support the complex training requirements of health professionals requires enormous effort. This lack of enthusiasm is partly due to the inability of the educators to rely on technology-supported learning as this removes the authoritative control away (Rao et al., 2020b). The pedagogies employed in orthodontic education are wide-ranging and include cognitive apprenticeship (Chris et al., 2017), narrative (Loftus & Higgs, 2008), didactic lectures (Turkyilmaz 2019), monologism and dialogism (Biesta, &