

## Chapter 18

# Principles of Instructional Design for E-Learning and Online Learning Practices: Implications for Medical Education

**Erdem Demiroz**

*University of Missouri-Kansas City, USA*

### ABSTRACT

*The dramatic transition from the post-Flexnerian model to the models of 21<sup>st</sup> century requires pedagogical practices such as teaching techniques, methods, and strategies to be modernized in order to address the diverse needs of 21<sup>st</sup> century medical students. E-learning and online education applications provide enriched opportunities for redesigning health education, and they are widely discussed in life-long learning, self-directed learning, and competency-based instructional practices. Advancements in educational technology, and the best practices of integrating educational technology with pedagogy, are not clearly outlined in medical education although e-learning and online education have the potential to address the requirements of modernized medical education. The overall goals of the chapter are to discuss technology-supported instructional design practices in medical education by emphasizing learner characteristics, addressing principles of instructional design for online teaching practices, and providing evaluation tools that guide designers to develop better online learning practices for advancing medical education through technology.*

### INTRODUCTION

A dramatic change has taken place in medical student education, from the post-Flexnerian model of the university-based education supported by classroom disclosure, laboratory and anatomy learning, and late clinical experience

to the models of the 21<sup>st</sup> century: early clinical experience, life-long learning, self-directed learning, and competency-based instruction (Mahan & Clinchot, 2014). Such a vivid transition requires teaching techniques, methods, and strategies to be modernized in order to address the diverse needs of 21<sup>st</sup> century medical students.

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The shift from the traditional model of teaching to a technology-supported modernized model of teaching in medical education is not optional, but a necessity. As of today, the majority of the undergraduate learners are 21<sup>st</sup> century learners who do not have experience in a world without the interactive technologies of social networking, cell phones, or search engines (Maloy, Verock-O'Loughlin, Edwards, & Woolf, 2013). As active users of technology, these independent, highly-motivated, and self-directed new-generation learners have diverse educational expectations. Diverse educational needs of 21<sup>st</sup> century learners can be satisfied by designing technology-supported and student-centered (online) learning environments that are supported by principles of learning theories such as constructivism. The best practices of online education and e-learning applications have potential to support highly interactive learning environments in medical education for high level student achievement. Lewis, Cidon, Seto, Chen, and Mahan (2014) summarize that e-learning has potential to facilitate self-directed learning, to provide flexible and continuous learning, and to engage learners through collaboration. However, e-learning and online learning practices in medical education suffer in terms of instructional design.

E-learning and online learning are used interchangeably with many other phrases, like distance education, virtual learning and web-based learning in many educational settings, but they are slightly different. E-learning is a term that generally defines self-directed learning activities. Learners—individually—need to complete assigned online learning modules. Learners are independent, self-motivated, and self-paced to complete e-learning modules. In general, delivery of content is asynchronous and reading texts, case studies, and recorded lectures are the essential materials in e-learning settings. Interaction is limited to learner-content interaction in e-learning applications. When all these characteristics are considered, e-learning applications show similarities with computer-based educational practices. On

the other hand, online education is a broad term which defines a virtual learning environment in which learners interact with each other and with the instructor in addition to interacting with the content. Instruction is designed and managed by the instructor, and content is delivered through synchronous and asynchronous instruction. Learning management systems (LMS) such as Blackboard, WebCT, and Moodle provide opportunities for designing more interactive and enriched learning environments in online learning whereas such opportunities are limited in e-learning activities.

The core element of both e-learning and online learning practices is interaction. Lack of physical presence in virtual learning environments is the largest barrier to interaction in online learning settings. Instructional design has an important role in interaction, in addition to its impact on motivation to learn, and on engagement of the learners in these settings. All educational activities in e-learning and online learning practices should primarily be built on interaction between learner-content, learner-learner, and learner-instructor, if possible. In particular, e-learning practices could be analyzed as computer-based educational software rather than online learning environments because these practices are self-directed and individualized. As an educational software, e-learning modules should have certain design characteristics that support learner engagement and interaction with the content.

General and specific design characteristics such as usability, content, and interface design should be well-aligned with assessment practices that are developed based on well-defined educational goals and objectives. Feedback is an indispensable part of the assessment process, but feedback needs to be considered as an essential part of the interaction in e-learning applications. Online learning, on the other hand, is technically limited to what learning management systems (LMS) provide. However, LMSs provide more opportunities to design interactive learning environments than e-learning settings and give

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