Chapter 9
Active Learning, Deliberate Practice, and Educational Technology in Professional Education:
Practices and Implications

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ABSTRACT

This chapter is an interdisciplinary literature review on pedagogical approaches and technological integration processes to facilitating active learning and deliberate practice toward expertise in professional education. The review covers selective domains that emphasize life-long learning, including teacher education, professional music education, athletic education, and medical education. The authors' review finds that concepts and principles of active learning are recognized in all of them and technology is frequently implemented to facilitate the process of active learning, but systematic and system-wide processes for incorporating active learning with deliberate practice are lacking, especially at the institution or curriculum level. To fill the gap, the authors discuss how the selected instructional design or established performance improvement processes in the educational technology literature can be applied.

INTRODUCTION

Active learning has been recognized as a foundational pedagogical concept in the last several decades. Despite the widespread use of the concept in various educational fields, its core elements and desired implementation in relation to educational technology in professional educational areas are not clear yet. Active learning is generally understood as a type of instructional strategy or method involving learners' active engagement in the learning process. Beyond passively receiving information from the instructor, active learners identify their own learning needs, seek learning resources, process and interpret information, and metacognitively manage their learning processes through reflections on what they are learning and doing (Bonwell, Eison, & Association for the Study of Higher Education, 1991). This learner-centered concept of active learning has been widely adopted and supported in professional education fields such as medical education. It is argued that instructor-centered curricula, such as lecture-based credit courses, insufficiently prepare students to transfer their school learning to clinical settings (Barrows, 2000). Particularly, problem-based learning (PBL), a contemporary instructional development method branched out of active learning, has grown in this context to promote students' active and deep learning experiences.

In PBL, lectures are not the central activities in the curriculum. Instead, PBL in medical education mainly focuses on students' learning in small groups and uses an authentic patient problem as an anchor to build up and measure students' knowledge. Thus, PBL typically involves a considerable amount of self-directed learning on the part of learners (Barrows, 1988, 2000; Barrows & Wee, 2007). In some schools, lectures are viewed as one of many available resources that students can access instead of required activities to attend. At others, lectures are still a foundation in curriculum to build upon clinical experiences.

Most importantly, there is little consensus on what active learning is in professional education and how it should be practiced.

Recent growing interest and exploration of flipped classrooms in medical education shows the imperative need for leveraging the concept of active learning in technology-rich environments (Han, Resch, & Kovach, 2013; Prober & Khan, 2013). Instructional strategies that emphasized student-centered learning have long existed (e.g., simulation, inquiry-based learning, inductive learning, and cognitive apprenticeship), but flipped classrooms provide additional innovative benefits in the curriculum in that the traditional primacy of information acquisition in classroom and subsequent problem solving outside the classroom are replaced by the students' authentic problem solving in class guided by teachers (Berrett, 2012). We believe that technology holds a key to advancing the notion and practice of active learning as well as curriculum innovation in professional education. The central tenet of active learning is for the learner to discover their knowledge deficiency and improve on it in the deep process and struggle of achieving their desired learning and performance goals. Effective learning environments tend to allow learners to safely struggle to fill their knowledge and skill gaps (Coyle, 2009).

Current discussion of educational technologies in professional education is largely limited to affordances and potentials that selective tools provide. Technology integration for active learning should address this need for students to struggle in the sense of identifying and constructing meaning and gain knowledge in a safe and authentic environment. Additionally, students require deliberate practice during deep learning to be professionally competent. Therefore, it is important to understand how the notion of active learning through technology integration should be extended to a discussion of deliberate practice in professional education. Given the value of outcome-based and competence-based education, deliberate learner

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