# Chapter 3
# Promoting Critical Thinking in the Modern Learning Environments

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## ABSTRACT

*This chapter explains the overview of critical thinking (CT); the emerging trends of CT in the modern learning environments; CT in nursing education and health care; reflective judgment and CT; constructivist learning and CT; metacognitive strategies, cognitive strategies, and CT; and the promotion of CT in the modern learning environments. The promotion of CT is essential for the learning organizations that seek to serve educators, increase educational performance, strengthen competitiveness, and achieve continuous success in the modern learning environments. Therefore, it is required for the learning organizations to promote their CT and develop a learning plan to regularly check their practical advancements toward satisfying educator requirements. The chapter argues that promoting CT has the potential to enhance organizational performance and reach strategic goals in the modern learning environments.*

## INTRODUCTION

Critical thinking (CT) is an important goal of modern education (Ku, Ho, Hau, & Lai, 2014). CT is one of the most important skills deemed necessary for college graduates to become the effective contributors in the modern learning environments (Liu, Frankel, & Roohr, 2014). CT is an ability to utilize reason to move beyond the acquisition of facts to reveal the deep meaning (Weissberg, 2013). CT is an essential competency that is a priority for teaching and learning in an increasingly digital learning environment (Yang, Gamble, Hung, & Lin, 2014). The combination of human capital and competency is crucial for modern business to achieve better organizational performance (Kasemsap, 2016a). CT skills are required in order to contribute as a member of society, operate effectively in post-secondary institutions, and be competitive in the global marketplace (Carlgren, 2013).

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CT is a metacognitive process, consisting of a number of sub-skills and dispositions, that, when used appropriately, increases the chances of producing a logical solution to a problem or a valid conclusion to an argument (Dwyer, Hogan, Harney, & O'Reilly, 2014). CT is the intellectually disciplined process of active conceptualization (Martincová & Lukešová, 2015). CT skills are essential to meeting the economic, sustainable, and social challenges of the future (Carmel-Gilfilen & Portillo, 2010). Leading critically is defined as applying CT skills to decisions about leadership actions in different situations and is a challenge for leaders, followers, and educators (Jenkins, 2012). Student perceptions of organized instruction are positively associated with gains in CT (Loes, Salisbury, & Pascarella, 2015).

Educational robotics is introduced as a transformational tool for learning, which promotes the learning of computational thinking, coding, and engineering, all viewed as the critical elements of STEM (Science, Technology, Engineering, and Mathematics) learning in K-12 education (Eguchi, 2016). Regarding the development of CT skills, robotics programs in K-12 settings can build the habits of mind (e.g., educational and social perspectives) that are valued in both formal and informal learning contexts (Gomez et al., 2016). Robot platform and a web-based cyber-infrastructure delivery system provide teachers with a flexible curriculum structure (Grandgenett, Ostler, Topp, & Goeman, 2014). Nowadays, young people enjoy robotics activities, appreciate the collaboration with others, and become deeply engaged in design experiences regarding artificial intelligence toward enhancing CT skills (Bernstein & Crowley, 2008).

Generating knowledge-based structural metadata can be done through using natural language processing (NLP)-based machine learning and artificial intelligence (Liu, Guo, & Zhang, 2014). The data becomes an asset that requires the cost-effective innovations in information processing that enable process automation, enhanced insight, and decision making (Kasemsap, 2016b). The analysis of educational results and the comparison of behavior displayed by human and artificial agents regarding artificial intelligence allow students to identify the significant role played by the perspectives affecting the agent/environment interaction, the relationship between category and action development, and the role of cognitive biases related to CT skills from previous knowledge (Morlino, Gianelli, Borghi, & Nolfi, 2015).

This chapter aims to bridge the gap in the literature on the thorough literature consolidation of CT. The extensive literature of CT provides a contribution to practitioners and researchers by indicating the advanced issues and implications of CT in order to maximize the educational impact of CT in the modern learning environments.

## BACKGROUND

For centuries, philosophy has been considered as an intellectual activity requiring complex cognitive skills and predispositions related to CT (Daniel & Auriac, 2011). Flores et al. (2012) indicated that various definitions of CT are examined to develop a general variable to guide the discussion as CT is linked to constructivism, leadership, and education. CT arises when the learners begin to work at a concrete problem (Dewey, 2004). CT is the main outcome of higher education and a key factor in program accreditation (Staib, 2003). The development of CT skills is high on the agenda for higher education establishments (Kovalik & Kovalik, 2007), and educators' teaching methods need to be adapted to build on the students' current CT skills in order to develop them further.

CT is a highly valued educational outcome throughout the educational spectrum, but particularly so in relation to higher and professional education (Daly, 2001). Success in bringing a substantive concept of CT to college faculty requires the well-planned professional development based on the multiple dimen-