Chapter 6
Investigating the Roles of Neuroscience and Knowledge Management in Higher Education

Kijpokin Kasemsap
Suan Sunandha Rajabhat University, Thailand

ABSTRACT

This chapter explains the current trends in higher education, the overview of neuroscience, the multifaceted applications of neuroscience, the overview of knowledge management (KM), the perspectives of KM, the significance of neuroscience in higher education, and the significance of KM in higher education. Neuroscience is a multidisciplinary science that is concerned with the study of the structure and function of the nervous system. KM is the practice of organizing, storing, and sharing vital information, so that individuals can benefit from its use. The achievement of neuroscience and KM is required in higher education institutions (HEIs) in order to serve school administrators and students, increase educational performance, sustain competitiveness, and fulfill expected accomplishment in higher education. The chapter argues that encouraging neuroscience and KM has the potential to improve educational performance and reach educational goals in higher education.

INTRODUCTION

Higher education emphasizes the goal of promoting the reflective engagement among learners in order to engage the learners in the active learning for knowledge generation with self-reflection on their learning process and learning outcomes (Kong & Song, 2015). Higher education institutions (HEIs) aim to prepare the new generations with the skills, culture, and flexibility necessary to make their own contribution to society (Cranfield & Taylor, 2008). The current HEIs in overseas have adapted to their changing role in the knowledge-based society (Singh, 2010). Higher education is expected to meet three goals: to develop learners' mastery of expert knowledge specific for major disciplines; to promote learners' development

DOI: 10.4018/978-1-5225-0672-0.ch006

of generic competencies essential for the 21st century; and to stimulate the learners' reflection on the continual pursuits, especially the learning pursuits (Njenga & Fourie, 2010).

The relationship between neuroscience and education can prove most productive when it fosters a bidirectional exchange of educational ideas and approaches (Christodoulou & Gaab, 2015). Neuroscientists and educators have recently begun to evaluate how to transfer brain-based research to the classroom (Alibali & Nathan, 2010). It is time to consider the implications of neuroscience for education (Ansari, de Smedt, & Grabner, 2012). Neuroscience can contribute the obvious insights into education beyond traditional behavioral findings (Meltzoff, Kuhl, Movellan, & Sejnowski, 2009). The knowledge of the human brain has posed many questions about the potential for the knowledge of neural processing to be translated into the valuable knowledge that teachers and faculties can employ in their educational curriculum tasks (Clement & Lovat, 2012).

In the knowledge-based economy, KM is rapidly disseminated in both academic areas and the business world (Park, Jang, Lee, Ahn, & Yoon, 2013). In higher education, KM-related research is the key for knowledge creation and knowledge dissemination (Laal, 2011). Petrova et al. (2015) stated that KM becomes an educational strategy of management in the research university. KM strategy is an important factor that enables universities to have more effective role in relation to society with the international market and the political perspective (Trivella & Dimitrios, 2015). KM is important to HEIs, when the expectations of stakeholders (e.g., government, local employers, and students) are increasing (Demchig, 2015).

This chapter aims to bridge the gap in the literature on the thorough literature consolidation of neuroscience and KM in higher education. The extensive literatures of neuroscience and KM provide a contribution to practitioners and researchers by describing the theory and applications of neuroscience and KM in order to maximize educational impact of neuroscience and KM in higher education.

BACKGROUND

In the late 1980s, the advent of cognitive science brought cognitive psychologists and neurologists together for scientific collaboration for studying intelligence (Posner & Raichle, 1994). The development of neuroeducators was first proposed 30 years ago, based on the belief that brain science might transform and improve the practice of teachers (Cruickshank, 1981). Theories on cognition should be connected directly with brain and its functioning (Rumelhart, 1989). There are many efforts to connect neuroscience to education (Willingham, 2009). Neuroscience can offer the obvious understanding of how the brain learns new information and manage this information throughout life (Shonkoff & Levitt, 2010).

In the past two decades, the interest of neuroscientists in building bridges between neuroscience and education has considerably increased (Sigman, Peña, Goldin, & Ribeiro, 2014). Hermida et al. (2015) indicated that knowledge about neural development of cognitive and emotional processes can be incorporated and applied to learning and teaching. Advances in the neurosciences have many implications for a collective understanding of what it means to be human, in particular, notions of the self, the concept of volition, the questions of individual's responsibility, and the phenomenology of consciousness (Frost & Lumia, 2012).

The adoption of neuroscience to improve education has often been considered (Butterworth & Kovas, 2013). The connection between neuroscience and education can be guided by defining roles, approaches, implications, and applications (Christodoulou & Gaab, 2015). Neuroscience and education should be