INTRODUCTION AND BACKGROUND

In modern society, knowledge-intensive services industries have surpassed manufacturing as the fastest growing sector of the economy. The service sector has become the place of burgeoning economic activities representing approximately 70 to 80% of the economy of the world’s developed countries and is rapidly growing in developing countries (Hsu, 2009). Service jobs around the world exceed those in manufacturing and agriculture (IFM and IBM, 2008). Although previously seen as low-waged, unproductive and un-innovative, the service sector is currently pioneering in innovations (Maglio, Kieliszewski, Spohrer, & Springe, 2010). Complex, knowledge-intensive services where value is added intangibly play a pivotal role in the evolving innovation economy. In the United States, for example, educational services contribute 10% to the nation’s GDP (Larson, 2009, p. i). Globally, higher education continues to experience a spectacular growth with more then 132 million students enrolled (Raychaudhuri & De, 2007). One of its fastest growing segments is online education, or e-learning.

Due to advances in information and communication technologies, along with the increased demand for continuous “just-in-time” training and education, e-learning has become

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an indispensable part of life for knowledge workers (Grice & Hart-Davidson, 2002). At the same time, general theories of learning have moved from a behavioural approach towards a learner-centred, constructivist epistemology grounded in the concepts of situated learning, distributed cognition, and socio-cultural notions of the mind, providing a foundation for more effective instructional methods and techniques. As a result, innovative e-learning services and computer-based educational systems are successfully developed and applied for the enhancement of teaching, learning, and assessment. To remain effective, e-learning services must continue to provide high educational value to their customers.

However, there is still a paucity of scientific understanding underlying the design and operation of existing and evolving service systems. In response, the creation of a new interdisciplinary field of study—service science—has been advocated since 2004 by both industry and academia (Chesbrough & Spohrer, 2006; Hefley & Murphy, 2008; IBM, 2008). As a result, in 18 countries, governments started to provide direct funding for service science research and related curriculum development. Currently, more than 250 universities in 50 countries (Marketwire, 2009) are offering courses and degree programs in Service Science, Management, and Engineering (SSME). More specifically, SSME teaches how to design, build, operate, use, sustain, and dispose of service systems for the benefit of customers, providers and society with a focus on value co-creation.

The present paper addresses the importance of the service science perspective for higher education, specifically e-learning. It seeks to determine how the concepts of service science can be used for designing effective e-learning systems. The article begins with a brief overview of service science and service systems and proceeds to an examination of service dominant logic. A discussion on how the co-creation of value is useful in the development of educational service systems follows. Finally, the author introduces a service-driven model that can be applied to the development of effective e-learning service systems that will provide value to learners and all stakeholders involved.

**SERVICE SCIENCE: AN OVERVIEW**

Service science is a new academic discipline arising from the rapid development of complex service systems across the modern world and the need in service innovation. It is rooted in such fields as industrial engineering, business and knowledge management, computer science, information systems, mathematics, social and legal sciences. As a multidisciplinary area of scientific inquiry, service science aims “to bring together knowledge from diverse areas to improve the service industry’s operations, performance, and innovation” (Paulson, 2006). The goals of service science include addressing issues such as: to what extent organizations that provide services can be restructured, how to manage service innovation and optimise a high value creation. According to the IBM Corporation, which has pioneered service science research and applications, the purpose of SSME is to make productivity, quality, sustainability, learning, and innovation the backbones of the service sector (IBM, 2008).

There are many different definitions given to service (Zeithaml, Bitner, & Gremler, 2006). Vargo and Lusch (2006b) define service as “the application of specialised competences, such as knowledge and skills, through deeds, processes and performances for the benefit of another entity or the entity itself” (p. 4). Services play a key role in developed economies (Sheehan, 2006); however, industrial and academic researchers have paid insufficient attention to service research and innovation in comparison to the focus on technologies or specific products (Bitner & Brown, 2007).

In order to adapt to today’s constantly changing market realities, businesses and organisations need to “continuously reinvent themselves” (Coates, 2009, p. 4). For-profit and
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