

# Chapter 1

## The Impact of Cloud Computing on the IT Support Function: A Case Study From Higher Education

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### ABSTRACT

*The development of digital technologies has opened up new opportunities for e-learning in higher education. These technologies include cloud computing, which promises a scalable and reliable computing environment for both staff and students. This has not only changed the teaching, learning, and research environment, but also affected the way IT support services must now operate in the university sector. This chapter investigates the adoption of cloud computing in higher education through a case study of a major UK university and focuses on how this has affected the IT support function. The benefits and challenges of implementing cloud computing are explored, using questionnaires and interviews to generate data and analysis. The chapter concludes that cloud migration is a complex undertaking requiring a robust strategy that pays due attention to a wide range of issues, notably security concerns and the need for reskilling and the development of new support roles.*

### INTRODUCTION

The provision of high-quality teaching and learning is a key objective in most educational institutions, and cloud computing supports universities in improving their operations in both the academic and professional service arenas. Cloud computing has been defined as a “model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with

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minimal management effort or service provider interaction” (Mell & Grance, 2011, p.3). It has not only changed the way we access IT services, but it is arguably also more efficient and cost effective (Sanchati & Kulkarni, 2011). Cloud computing provides a more agile technical environment and increases access to remote systems over the internet.

Based on a detailed case study, this chapter investigates the adoption of cloud computing in higher education and how it is impacting IT support services. In the following section, recent literature is reviewed to establish some of the fundamental issues involved in cloud migration, support and maintenance. The research methodology is then outlined, focusing on a case study of a major UK university, for which the pseudonym “BCU” is used. The findings from the case study interviews are then presented, and emergent issues are discussed. The final section summarises the main findings and briefly discusses some possible future research directions in this field.

## **RELEVANT LITERATURE**

Sultan (2010) described cloud computing as large data centres and server farms, which provide on-demand resources and services over the internet, thereby providing access to applications and data without reference to the underlying hosting infrastructure. Such data centres are monitored and maintained by different service providers such as Google, Amazon, and Microsoft. The growth of cloud computing has been significant in the past decade. Computing Research (2016) concluded “the meteoric rate of growth in the use of cloud services, along with the sheer number of services which now depend upon it, mean that cloud has moved from being used selectively for only non-critical applications and workloads, to being a mainstream proposition for organisations of all sizes” (p.3). More specifically, Cloudian (2020) observe, “technology is shaping higher education. From applications that optimize data access, to online instruction videos, to the use of supercomputers for advanced research and analytics, institutions are using technology to expand knowledge, enhance learning and drive student success” (p. 1). In similar vein, Ifode (2020) recently concluded that “higher education institutions are particularly affected by the continuously evolving technology, and the need to create a synergy between technologies, teaching/learning methods, students’ preferences and needs” (p.236). However, due to the nature of higher education, each department or faculty has historically generated and stored its own data with particular requirements for access and update – creating the data silos that bedeviled the introduction of integrated corporate systems in the private sector in the last century. This presents particular problems for migration of such systems to the cloud and their on-going support and maintenance.

Recent research has highlighted the changing requirements for university technology support, notably in the area of cybersecurity (Rezaeian & Wynn, 2019). Cloud computing has been widely adopted by most higher education institutes to some degree, and this has presented support teams with new challenges, not least because of the variety of services available in the cloud. There are different types of delivery services, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), available from a range of service providers (Table 1). These include some of the so-called “hyperscalers” (Leopold, 2017, April 12), notably Amazon, Microsoft and Google. With IaaS, the provider manages just the servers, storage, networking and virtual machines in the cloud. PaaS, widely deployed in higher education, goes one step further, with the provider making available a development environment that enables users to create and run custom built applications supported by the provider, using products such as Microsoft Azure. The management of applications and data, however, remain the

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