

Chapter 5

Opportunities and Challenges of Adopting Artificial Intelligence for Learning and Teaching in Higher Education

Aniekan Essien

Department of Management, University of Sussex Business School, Falmer, UK

Godwin Chukwukelu

University of Manchester, UK

Victor Essien

Teeside University, UK

ABSTRACT

This chapter provides a sense of what artificial intelligence is, its benefits, and integration to higher education. Seeing through the lens of the literature, this chapter will also explore the emergence of artificial intelligence and its attendant use for learning and teaching in higher education institutions. It begins with an overview of artificial intelligence and proceeds to discuss practical applications of emerging technologies and artificial intelligence on the manner in which students learn as well as how higher education institutions teach and develop. The chapter concludes with a discussion on the challenges of artificial intelligence on higher education.

INTRODUCTION

Over the past two decades the term *artificial intelligence* (AI) has received an increased interest in academia and practice. Although the foundations for AI from assembly and procedural language, object-oriented computer programming, data mining, and machine learning have been laid several decades ago, some uncertainty regarding consequences of the full adoption of AI to the society and economy remains.

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Recent breakthroughs towards natural language processing (NLP), computer vision, image recognition, text-to-speech and speech-to-text have further accentuated the capabilities of AI.

AI adoption can result in significant social and economic benefits since computers can quickly analyse and learn from vast amounts of data at higher accuracy and speed. Furthermore, AI can improve efficiency in nearly all sectors of human endeavour, ranging from transportation, healthcare, industrial manufacturing, and financial sectors. In each of these sectors, research into the integration of AI to processes is on the increase to infuse methods for efficient and cost effective data-driven decision-making (Collins et al., 2018; Poonia et al., 2018; Wang et al., 2018). According to a report by Gov.UK, AI adoption could add an additional £630bn to the UK economy by 2035 (Hall and Pesenti, 2019). To this end, there is a shortage of AI experts in the UK, therefore teaching of AI in HEIs via industry-funded master's degrees and research in AI at leading UK universities should be increased (Hall and Pesenti, 2019).

AI is currently progressing and already has positive impacts on services within higher education. For instance, many universities already partner with IBM to provide cloud-based access to the emergent AI platform – IBM's supercomputer Watson – to automate simple, repetitive, and typically administrative tasks, such as attendance reminder, classifying feedback, and student support. Even though only the basic service is provided, it provides an illustration of the impact of AI on teaching and learning in higher education. From the foregoing, it is imminent to increase the adoption of AI for educational purposes, in order to equip students or learners with relevant skills that can fill skill gaps in domains. Furthermore, answers to the following questions can make clearer the hurdles that need to be overcome to adopt AI for higher education teaching and learning.

- i. How can AI be integrated to the teaching curriculum?
- ii. Can AI be used to assess and provide feedback to students automatically?
- iii. What impact will AI have to classroom size?
- iv. What are the ethical implications of integrating AI for HEI teaching / learning?

Addressing these questions will lead to better understanding and provide a discussion that can benefit higher education regulatory bodies that can improve the visibility of AI in the society and economy.

ARTIFICIAL INTELLIGENCE

The term artificial intelligence was popularized in the 1950s, when Alan Turing postulated an answer to the question of assigning the term 'intelligent' to a system designed by a human. In his solution, Turing presented a game known as 'the imitation game', a quiz that tests the ability of a human listener to distinguish if a conversation made is with a machine or another human. If this distinction is undetected, it can be concluded that we have an intelligent system, referred to as artificial intelligence (AI). According to Russell and Norvig (2016), artificial intelligence strives to build and understand intelligent entities. AI is typically described as a computer system that possesses the ability to accomplish tasks linked with intelligent beings. In lay terms, an AI is a machine that thinks, understands, learns, solves problems, plays chess, etc. As this definition arguably suffices for the term 'intelligence' and is tautological, AI can also be defined as a *scientific discipline*. AI has produced many significant outcomes in recent times, even at its infancy and although it is impossible to predict the future in detail, it is now apparent that computers intelligent systems can have a tremendous impact on everyday living.

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