

## IoT in Higher Learning Institutions: Opportunities and Challenges

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### Abstract

Education is now an active collaborative self-directed model because of the presence of technology influence making many institutions to plan to change their way of teaching and learning. The main aim of this paper is to identify problems arising in higher learning institutions around the world and explores the significance of the Internet of Things in providing solutions to these challenges. The paper also brings out various opportunities and challenges that result from the Internet of Things more so to higher learning institutions. The paper finally brings out future directions in relation to developing and implementing projects on Internet of Things on higher learning.

Keywords: Higher Learning Institutions, Internet of Things, Opportunities and challenges, Teaching and learning

### 1. Introduction

Education is now a vital combined self-directed model because of the presence of technology effect making many institutions to plan to change their way of teaching and learning (Bagheri & Movahed, 2016). There have been changes and magnifications in the educational processes as a result of different emerging technologies and due to large influence in ICT development, resulting to a variety of e-learning programme, virtual learning domain, tele-education structures among others (Uzelac, Gligoric, & Krco, 2015). As higher education regularly is in search for ways on how to increase the number of learners in a cheaper way and pass knowledge across (Daniel et al., 2015), worldwide there's is a lot on how to create a balance between the calls of quality, equity and funding with strong pressures for ensuring there is equality in enrolments and challenges of maintaining quality in the face of fast expansion (Schendel & McCowan, 2016). The education sector is therefore been constantly evolving because of this emerging technologies and theories bringing in the need to change there before frameworks to advance the learning and teaching in the 21st Century (Saritas, 2015).

However, the educational systems more specifically those of higher learning have failed to meet anticipated transition with respect to the capability brought by the incorporation of automation and virtual teaching/learning techniques, e-learning, m-learning, and u-learning (ubiquitous). In spite of these devices being used, educators have not adequately exploited their exceptional possibilities

and the reasons for being proposed and for that, there is feasibility now to introduce u-learning (ubiquitous), which conceptually has great capability, because it permits easy reach to learning material and combined learning domain, anytime and anywhere by linking physical and virtual spaces F. Moreira, Ferreira, and Cardoso (2017).

IoT is supporting transitions in higher education in areas of education and teaching, learning, management, experiment and training, school, campus building among others (Tianbo, 2012). Hence this creates a new opportunity where innovative options for learning can result from the change of concepts from ubiquitous computing and technologies (Gonzalez, Organero, & Kloos, 2008). Behind the Internet of Things (IoT) are the penetration and ubiquitous existence of the things or objects like the mobiles, sensors, radiofrequency identification (RFID) tags which produce huge data that is in need of storage, processing, and presentation in an energy-effective method (Shaikh, Zeadally, & Exposito, 2015).

This paper discusses the role of the Internet of Things in solving some challenges facing higher learning institutions. The first thing is the identification of the main difficulties endured by higher educational establishments and ascertains the significance of the Internet of Things in solving the changing trends. The second outline in this paper is bringing out the opportunities and challenges associated with implementing the Internet of Things in higher learning institutions. Internets of Things technologies are also mentioned. Finally, future directions are outlined.