



The Opinions of Field Experts on the Usability of Internet-of-Things Technology in Open and Distance Learning Environments

Hakan Altınpulluk, Anadolu University, Turkey

 <https://orcid.org/0000-0003-4701-1949>

Hakan Kilinc, Anadolu University, Turkey*

 <https://orcid.org/0000-0002-4301-1370>

ABSTRACT

This study aimed to determine the usability of the internet of things technology in open and distance learning environments. In this context, the phenomenology method was used in order to get the opinions of field experts. The criterion sampling method, which is one of the purposeful sampling methods, was used in determining the participants. As a criterion, it is taken into account that the participants are experts in the field of open and distance learning. In this context, eight field experts contributed to the study. The findings obtained at the end of the study clarify how internet of things technology can be used in traditional face-to-face learning environments and open and distance learning environments, what benefits it can provide, what are its limitations, its future usage trends, and how it can be used outside of learning environments.

KEYWORDS

Field Expert, Internet of Things, Open and Distance Learning, Phenomenology, Usability

INTRODUCTION

Internet of Things technology has become one of the most popular technological concepts, especially with the rapid developments in the internet field. The Internet of Things (IoT) is a global network of devices that can be accessed and controlled online that detect data from environments in domestic, industrial, and scientific contexts (Davies et al., 2020). IoT is the process of equipping machines and objects with sensors, allowing them to communicate with each other via the Internet or Local Area Network (LAN) (Kılınc, 2020). As the Internet changes global human-to-human contact, IoT aims to innovate in human-to-machine and machine-to-machine communication. Advances in cloud computing, integrated networks, high-speed internet, and 4G / 5G internet protocols have enabled the internet to penetrate almost every corner of our physical space. This means that more and more objects can be integrated over the internet (Qazi, 2019).

According to a study by Juniper Research (2020), the number of IoT devices connected to each other “almost tripled” from 13.4 billion in 2015 to 38 billion in 2020. According to another research

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*Corresponding Author

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report called “IoT in Education Market” by Markets and Markets (2018), the global market size of IoT in education is expected to increase from \$ 4.8 billion in 2018 to \$ 11.3 billion by 2023.

Another area where IoT technology has started to become popular in recent years has been the field of education (Altınpulluk, 2018; Korzun & Bogoiavlenskaia, 2020; Shaikh et al., 2019). It is seen that IoT technology has the potential to transform education by profoundly changing the way educational institutions collect data, create interactive interfaces, and automate processes (ALE, 2018). According to An, Wang, and Wang (2018), when IoT technology is used in education, it enriches assessment processes, guidance, and learning resources. It also supports mobile and ubiquitous learning and positively influences educational management practices such as equipment management, school safety management, and digital campus construction.

According to ALE (2018), IoT is a new paradigm in education when combined with technologies such as user mobility and data analytics. Besides, It can create new ways for students to learn by supporting more personalized and dynamic learning experiences, such as interactive digital textbooks and game-based learning. However, IoT that increases the efficiency of the learning process with high performance and low energy (Tutorials Point, 2020), has the potential to help students, teachers and administrators interact with and connect with technology and devices in classroom environments, helping to improve learning experiences, improve educational outcomes, and lower costs.

In open and distance learning processes, there are some studies in which online education classes are structured using the Internet of Things technology. In the study carried out by Yang and Yu (2016), it was concluded that using sensors and embedded technologies, IoT increased the academic performance of students and the teaching abilities of teachers. Tobarra et al. (2019) created an approach using Web of Things platforms to develop distance learning scenarios in the Computer Science discipline. Bao (2016) found that more reliable assessment and evaluation processes are carried out by using the Internet of Things technology in the online learning assessment system. With a course structure called “My Digital Life” at British Open University, a design centered on student experiences was prepared by placing the Introduction to Computer Science curriculum on the basis of the Internet of Things, and many activities in this course, experienced by 2000 students, were carried out on the basis of collaborative programming (Kortuem et al., 2013). Deng and Sang (2010), based on the need to abandon traditional distance education methods, developed an interactive Internet of Things platform. In this context, online telescope control was given to students in primary and secondary schools in Wuxi city, and the opportunity to observe space was provided remotely. Besides, students were allowed to download the pictures they observed, share the data with other students, and collaborate in the learning process.

In summary, it is understood that open and distance learning applications that are directly affected by innovative technologies such as IoT will be used extensively in the future. In the related literature, although there are some studies in which IoT technology is used in various ways in the field of education (Abbasy & Quesada, 2017; Mertala, 2020; Yeh et al., 2020), there are no studies based on qualitative methods, especially in which the opinions of field experts in the field of open and distance learning are examined. It is thought that this study, which includes the usability of IoT technology in traditional learning environments and open and distance learning environments, what benefits or limitations it may bring if used, future usage trends and uses outside of learning environments, can reveal the current situation, contribute to the literature and shed light on future studies. Based on this point, the aim of the study is to determine the usability of IoT technology in open and distance learning environments according to the opinions of field experts. At this point, it is of great importance to examine the opinions of open and distance learning field experts. In this context, answers to the following research questions are sought:

- How can IoT be used in traditional learning environments?
- How can IoT be used in open and distance learning (with remote access)?
- What are the benefits of IoT technology for open and distance learning environments?

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