

Chapter 10

IoT Sustainability in Higher Education

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ABSTRACT

The widespread use of new information technologies has brought new challenges to society and in particular to forcing innovation in education and training by changing the paradigm of education. However, there still seems to be no consensus on how best to use new information technologies in educational practices. In this context, and because it is important to know, debate, think, and plan the future role of these new technologies in teaching/training, the authors conducted an exploratory study with the Delphi technique. The experience and creativity of a panel of experts will lead to a categorical scale and to the elaboration of an instrument with a preliminary list of indicators to be applied to students and professors and evaluate the sustainability of IoT in higher education.

INTRODUCTION

The Internet of Things (IoT) refers to the way Internet connectivity has expanded to include everyday objects and to how those everyday objects inter-operate with our daily lives (Sinha & Park, 2017). Things as “the inter-connectivity of our digital devices that provides endless opportunities to listen and respond to the needs of persons – with the right message, at the right time, on the right device” as defined by Wenjie Gong (2016). This provides a range of possibilities and has brought new challenges to society and in particular to forcing innovation in education and training by changing the paradigm of education.

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Among the different and varied technologies and devices available it can be highlighted the tablets, smart phones, interactive whiteboards, streaming audio and video, used as terminals for interacting with the user. But in IoT technologies we can add RFID, QR codes, barcodes, sensors, near-field communication, digital watermarking, so it not just a global network for communications “but a platform or devices to communicate electronically with the world around them” (AmalRedge, 2016, p.27)

The use of computers, smartphones and the Internet has led to the development of interactive teaching virtually models in all types of education. For example, at a time when social networks have gained their place in the everyday lives of our society so it can't be ignored their potential in promoting learning (Groff, 2013).

To follow up on the use and acceptance by students and professors of these new technologies and communication spaces, and to see if these users will also be motivated to participate and take advantage of these platforms as facilitators of their learning in higher education is a pressing issue.

In this context, and because it is important to know, debate, think and plan the future role of these new technologies in teaching / training, this chapter aims to present an exploratory study with the Delphi technique (Hsu & Sandford, 2007), which gives the opportunity to involve the participants in a more intense and interactive way. This technique has become a fundamental tool in the technological projections, since there is a growing need to information directly in the evaluation of the models that deal with complex problems faced by society, such as education and innovation. Traditional Delphi is generally applied to future trends and events, but has recently expanded its concept to incorporate the search for ideas and strategies with the Delphi Projection, designed to project variables, events, trends, which will support decision-making (Yousuf, 2007). The experience and creativity of a panel of experts, will lead to a categorical scale and to the elaboration of an instrument with a preliminary list of indicators to be applied to students and professors and evaluate the sustainability of IoT in higher education.

This chapter starts with a brief state of art of the concept of IoT and its impact on our future daily life society, followed by the justification of IoT importance in education and higher education, highlighting the potentialities, limitations and challenges of its implementation in higher education institutions. After it is presented the study made, the methodology used and the preliminary results and it ends with future research directions.

IoT IS Happening

In the 2016 report of the IERC - IoT European Research Cluster (Jamalipour, Nikookar, & Ruggieri, 2016), it is also defined as a global concept. Ray et al. (2016), understand IoT as an ecosystem that expands and exploits existing environments through embedded and connected devices. The authors argue that this technology will increase the ubiquity of the internet, by integrating all objects into an embedded system, consequently will originate an infinite network of objects communicating with humans and / or others objects. For O'Brien (2016), IoT allows to obtain information that will be stored and that will provide feedback and control, supporting decision making. The author considers IoT “the third wave of the Internet” (O'Brien, 2016, p.1).

The impact of IoT on society and the growth of the Internet is an uninterrupted process: just twenty-five years ago, the network connected just over a thousand computers and since then, its growth has been constant and today connects billions of people through computers and devices furniture (Evans, 2011). This path has undergone a gradual transformation, but now it has become faster. The potential of a network of computers interconnected in a network of objects, from books to automobiles, to household

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