Anatomizing IoT for 21st Century Education System

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Abstract

Much of the time is wasted while entering the classroom in queue, picking up their own materials, sit up and down while answering to questions and it makes very much difficult for teachers to handle huge number of students without any technology. On an average, an American student spends about 1025 hours each year just for following instructions given to him/her. Connected devices and emerging trending technologies will help teachers to focus on student's learning needs rather than wasting time for managing large group procedures because of which they cannot give enough time for developing some extra qualities in students. Connected devices would definitely help teachers to transform classroom experience. This paper consists of some practical scenarios of about how I.O.T can be implemented for a better classroom experience and how teachers can focus on student's skills and which will help to save the time of both.

Keywords:IoT, Smart Education, Smart Classroom.

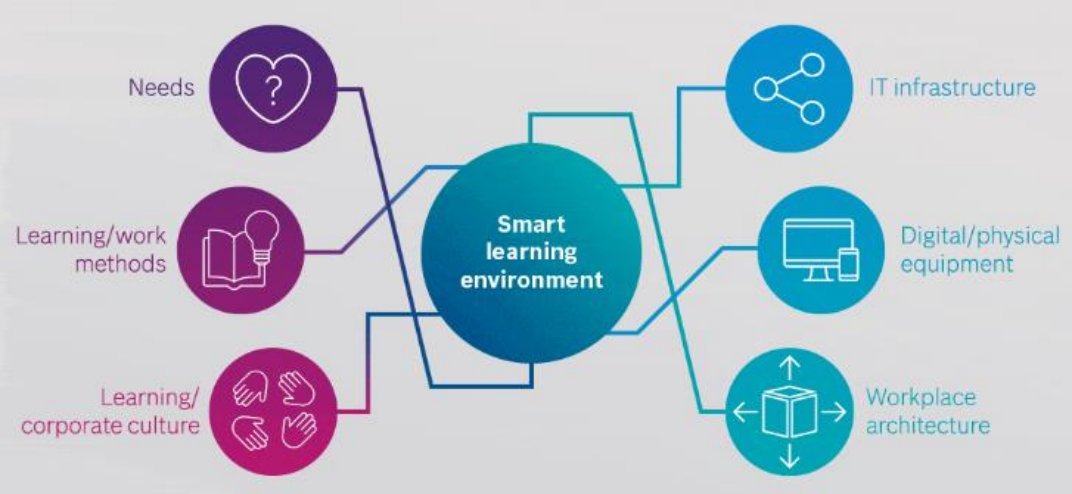
I. Introduction

The smart classroom concept has come into the literature as Internet based distance education system; or as intelligent environment issued with an assembly of many various types of hardware and software modules. In the process of everyday teaching, teachers or professors are usually trying to find out if the students (or more general the listeners) were satisfied with the lecture, which section of the lecture was interesting, which presentation techniques and methods were more effective and attractive than the others. Previous studies have exhibited that approximately or roughly after 10 minutes students' attention begins to decrease. And as a result at the end of a lecture, students remember about 65% of the information presented in the first ten and only around 25% of the last ten minutes.

Integrating the IoT technology with the social and behavioural analysis, a standard classroom can be transformed into a smart classroom that actively listens and analyze the voices, conversations, movements, behaviour, etc., in order to come to a conclusion about the lecturers' presentation and listeners' gratification. This will help the lecturers to consistently deliver good presentations and make a better impact, while the audience or students will benefit from interesting lectures thus making the overall learning process shorter, more efficient as well as more pleasant and even entertaining. The recent research that was conducted at MIT (Massachusetts Institute of Technology) shows that it is possible to combine computer and social science in order to analyze human behavior.

II. Smart Learning Environments

Smart learning environments (SLEs) are physical spaces enhanced with digital and context-specific components (sensors and actuators, for instance) that facilitate better and faster learning [1]. This allows for hybrid learning approaches that switch between formal and informal settings, independent and class learning, varying learning times and places, and analog and digital learning formats. These learning scenarios pave the way for hybrid synergies between the physical and digital world. Smart learning environments also adapt themselves to learners' needs by taking information from the environment, processing it, and using it to initiate appropriate steps such as recommendations.



If the Internet of Things is to be used in learning processes and smart learning environments, there are six main areas to take into account:

1. Human Centered Design

Smart learning environments should always begin with the needs of their users. In order to be able to cater specifically to individual associate needs and activities, the first step should be to carry out a comprehensive analysis of the needs, context, and environment [2]. This forms the basis for developing a personalized learning environment that supports independent learning and can be linked with formal learning scenarios.

2. Learning and work methods

Digital transformation calls for new expertise in areas such as communications, methods, media, and information. Increasingly, learning is complementary, on demand, and life-long, happening both in the workplace and on the move, and no longer exclusively in formal training sessions in traditional classrooms. Developing this expertise requires new learning techniques (e.g. independent learning or design thinking) that offer didactic variety while also being complemented by professional learning support, coaching, and mentoring. This means that formal learning time within a physical learning space merges with informal activities outside of the classroom, creating hybrid learning environments. Learning material becomes concentrated and more personalized, blurring the boundaries between learning, working, and an individual's private life.

3. Learning and corporate culture

Every organization has its own culture – varying work techniques, procedures, and processes that must be taken into account. Innovative learning scenarios rely on a culture of trust and feedback, as well as a high degree of individual responsibility.

4. Smart IT infrastructure

Smart IT infrastructure is the core of the smart learning environment and is currently referred to as a "digital agent" or "digital assistant." It comprises specific hardware and

software components as well as the accompanying interfaces, which form the basis of smart data exchange. The smart IT infrastructure gathers together available and required knowledge in a cloud; this is where all learning/work materials and learning outcomes are stored (in a partly automated process) and accessible wherever you go [6]. The integration of semantic concepts supplements and links learning content with further sources of information. For instance, a learner might enter the term "IoT." They are then presented with relevant search results according to category (studies, communities, presentations, congresses, etc.) and data of publication.

Access to high-quality content is enabled through connectivity both with internal learning platforms such as Moodle and external resources such as online libraries, specialist databases, and specialist forums such as ResearchGate. The smart IT system operates as the interface between internal and external datasets, and organizes all of the relevant information according to the user's needs. An example of an available prototype for "smart recommendation systems" is the OER EEXCESS project, which aims to connect valuable online resources and get content to users without them having to trawl through a variety of platforms to get it.

An important element of the Internet of Things is integrating technology into everyday items to make them "smart objects." The aim is to enhance everyday objects, for instance by equipping a window with sensors and actuators so that it can be automated to provide an added benefit (such as windows that open automatically when air quality is not conducive to learning).

5. Digital & physical equipment

A key part of designing a space is its equipment – furniture, technology, and even plants, to name but a few. First there are the traditional analog items such as tables, chairs, stools, sofas, flip charts, partitions, pens, paper, post it notes, etc. Then there is the technology such as PCs, projectors, audio and conference systems – and smart devices. These smart devices include smart pens, tablets, 3D printers, smartphones, smart TVs, power walls, smart boards, and smart windows, which open automatically to let in fresh air. These elements can be creatively combined, as in co-working spaces such as the Fab Lab Berlin or Impact HUB. On top of this, smart learning environments feature digital tools (software applications), which continually support the learning and work process.

One example are applications that share learning outcomes with an (internal) "community of practice," as well as pre-installed tools that allow users to create and edit photos, graphics, and videos during the learning process. Basically, it encompasses any application that aids information processing and contributes to connectivity with others (only if desired, of course). Every year, there is a good overview of tools relevant to learning and work practice compiled by Jane Heart – while an overview by Robin Good lists more than 550 work tools.

6. Workplace architecture

Workplace architecture has an impact on learning culture. Anyone can see the difference between working in a plain old office and, for instance, a Google office. Of course, these are two extremes – the key is to find the right balance. The key elements are a pleasant, modern design combined with multifunctional furnishings that can be quickly and easily adapted to a range of learning and work scenarios. It is also worth considering innovative concepts such as upcycling, in which for instance pallets are made into tables or shelves.

III. Conclusion

In this research paper, the smart classroom concept is described from a completely new perspective. The main contribution of this paper is an innovative approach to a smart classroom environment and multidisciplinary research subject. This perspective demands an understanding of problem statement so as to define parameters with further aim to create a

better prologue for the system implementation. Our paper mainly focuses on use of the monitoring and sensing technology to explore the listener's behaviour in an intelligent environment. The information collected can provide insight into classroom activity level by correlating the sound and the movement's existence and intensity. Such an intelligent environment could actively observe students' response to a lecture, and can be useful to a lecturer to improve the lecture quality.

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