Connecting the English Class to the Internet of Things

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Abstract

It goes without saying that the World Wide Web drives learners/students to become more autonomous as it offers an array of tools that cater for students' diverse needs and learning styles. This paper connects the teaching and learning English for Specific Purposes to the ecosystem of the Internet of Things. More precisely, we explore the concept of Internet of Things and its characteristics and address seminal questions about its role in education. After analyzing the findings, we focus on the educative value of digital technologies to our practice as language educators. Drawing on our experience of teaching with web-based tools, we showcase a lesson plan that increased students' motivation, interaction and engagement. The paper concludes that teaching will definitely become more and more dependent on technology but policy makers need to consider proactively the use of digital technologies as pedagogical tools and to collaborate extensively with educators and technology experts/developers to create innovative strategies for education.

Keywords: English for Specific Purposes, Internet of Things, instruction, lesson plan

Introduction

Digging into literature we have found many definitions for the Internet of Things (IoT), which basically means a world of objects (cars, mobile devices, portables, etc.) that are connected through the Internet (Savu *et al*., 2017). Concerning its origin, it is worth mentioning that Kevin Ashton coined the term "Internet of Things" for the first time, during a presentation on supply-chain management in 1999 (Ashton, 2009; Khodadadi *et al*., 2016). ICT experts have reported that every 90 days, technology evolves significantly. The latest forecast from International Data Corporation (IDC) reveals that worldwide spending on the Internet of Things (IoT) will reach nearly $1.3 billion in 2019, from $698.6 billion in 2015 (Hernandez, 2015). Therefore, the IoT growth rate is exponential as shown by the forecast in

Figure 1 which estimates the number of active devices until 2021 (BI Intelligence, 2017):

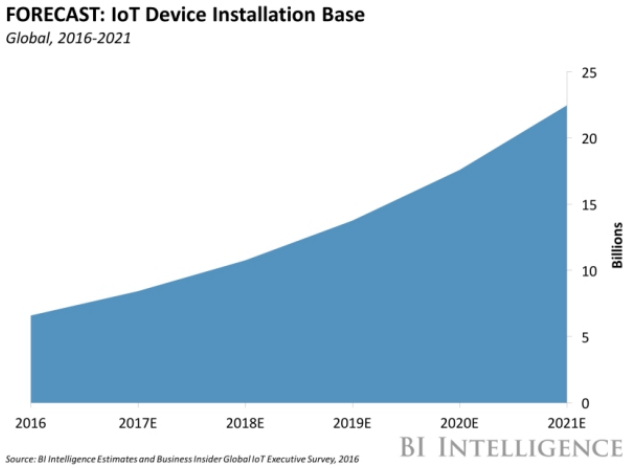

Figure 1: IoT growth rate

The most important characteristics of The Internet of Things are listed below (Savu *et al*., 2017: 8-9):

• Distributivity: the Internet of Things will evolve in an extremely distributed environment. Data will be collected from different sources and processed by several entities in a distributed way;

• Interoperability: devices originated from different vendors will have to cooperate to achieve the common goals. Systems and protocols will have to be designed in a way that will allow objects (devices) from different manufacturers to exchange data and work in an interoperable way;

• Scalability: the Internet of things predicts that billions of objects will be part of the network. Thus, systems and applications running on top of the network will have to manage a volume of unprecedented data;

• Shortage of resources: both the power and the computing resources will be extremely limited;

• Security: the existence of an external unforeseen control will generate frustration among users that would turn into a barrier to the implementation of the Internet of Things.

Recent definitions frequently use "smartness" as an essential characteristic of IoT, but researchers distinguish IoT from similar concepts such as sensor networks, and classify it into "object smartness" and "network smartness" (Khodadadi *et al*., 2016).

How, as language instructors and teachers, can we adapt to the ecosystem of The Internet of Things? Robbie Melton, keynote speaker and Associate Vice Chancellor of Mobilization & Emerging Technology of the Tennessee Board of Regents, explains how the internet of things, like apps and

devices, will help us be innovative in our teaching and learning programs, and recommends the following approach (Hays, 2016):

- Reassessing our audiences. He points out that we cannot presume the learners' level of knowledge or if learners are familiar with training content or platforms. Moreover, he considers that it is our responsibility to evaluate their skills before introducing technology into our programs;
- Acknowledge how important mobile is to learners as this can lead to new teaching methods by combining learning with the learners' existing habits;
- Validate the information discovered by, and the experiences of, our learners and reconsider our role of trainers/teachers so as to guide journeys rather than creating them from scratch;
- Think beyond the intended use of emerging technologies to make innovative learning and have creative approaches through mobile devices that can increase engagement.

In today's globalized environment, the importance of English for specific purposes cannot be underestimated as it is widely used by speakers of other international languages. Just as an economist needs to learn the economic terms, so a person who works in the ICT industry needs to know the language used in his/her communication with the foreign businesspeople. Companies are always implementing communication strategies because they need to make quick decisions, and faulty communication with others can have a detrimental effect on business collaboration /business co-operation or on the rapidity of launching new products on the market. Globalization has accelerated the adoption of English in the business environment and intercultural interactions and the use of business Anglicisms in other languages has been investigated by researchers for several decades. Tonkin expresses his view about the proliferation of English as: "a manifestation of a set of non-linguistic factors having to do with global economic integration and with significant changes in the way of life of a highly influential and increasingly numerous global elite, but the fact that this elite uses English gives the English-speaking countries, and particularly the USA, a certain competitive edge…English is the operating system on which the global economic network is based, and the owners of the system have a market advantage" (Tonkin, 2003: 322).

Mobile devices can be used by the language teacher to prepare educational and student activities during educational activities. Given the fact that all students have mobile devices, it is already an additional motivation for students to use these mobile devices during English classes and, at the same time, a developmental gain for the faculty because students use them as learning tools. The use of mobile devices as a learning tool can be achieved in a variety of ways, being conditioned only by the compatibility of each device

with the many existing applications, depending on the operating system of the device.

In this regard, we share Meyer's view concerning the impact of the Internet of Things on education: "Advances in emerging technology offer educators a chance to move beyond some of the challenges that have traditionally hindered effective technology use in the classroom, freeing teachers not only from their physical screens but potentially from administrative tasks too. Where many technologies remain a bolt-on to the classroom, connected devices could enhance teachers' core craft - and may even prefigure a different and exciting breed of edtech" (Meyer, 2015). Additionally, we would like to mention the role of platforms in integrating English language learning activities and student assessment. Moreover, they can be accessed using mobile devices and allow, for example, the creation of learning tools in the form of questions with two to four variants of answer that are administered as a competition, thus enhancing the spirit of competition among students.

Furthermore, mobile devices can be used to communicate information or web addresses in the form of QR Codes (quick response codes) to enhance listening activities which can be read by the QR Code Reader app available in the App Store (for Ipad or Iphone) or the Google Play Store (for devices that use the Android OS) with the camera. It goes without saying that mobile devices facilitate collaborative learning, creativity and assessment (or self-assessment). Indeed, the use of such devices is not simple for all language teachers, therefore training programs are paramount as they can help teachers understand how mobile devices can be used, experience the possibilities and limits of such devices, how they can create lessons or educational applications, and how students' innovation and creativity can be stimulated.

Teaching English for Specific Purposes (ESP)

Unlike traditional English teaching methods, English for Specific Purposes is an innovative method of teaching English which has been successfully applied and investigated scientifically for decades throughout the world. In a world dominated by cultural and professional mobility, the linguist David Crystal argues:

"Teachers need to prepare their students for a world of staggering linguistic diversity. Somehow they need to expose them to as many varieties of English as possible, especially those which they are most likely to encounter in their own locale…The absolutist concept of 'proper English', which is so widespread, needs to be replaced by relativistic models in which literary and educated norms are seen to maintain their place alongside other norms, some of which depart radically from what was once recognized as 'correct'."(Crystal, 2001: 60).

ESP is known as a variety of English language teaching in a learner-centered approach that uses English as a foreign language in specific study/occupational areas. When it comes to computer science students whose major is Economic Informatics, the specificity of this innovative method is that teachers/language instructors plan and develop courses for students, according to their needs and expectations, using authentic materials (professional magazines, reports, conference materials, interviews with experts, etc.), and the knowledge gained by them relate to the technological innovations and the most tackled phenomena in ICT so that it can be applied to achieve current and future work tasks.

Our lesson plans aim to develop professional language skills, with emphasis on specialized instances in the field of the Internet of Things. The main objectives are: acquiring and using specific concepts, strategies and working methods in this field (with linguistic support in English), focusing on the acquisition of a varied specialized vocabulary. Students will thus have the opportunity to understand the formats, structure and conventions specific to the specialist genres in this field, and to develop their ability to perform operations with linguistic structures that are specific to the above-mentioned field, in English.

The importance of technological progress is reflected by involvement of computer literacy in teaching and thorough analysis of the multiple effects on the way in which education takes place. The real impact of technology on the learning process of English is understood by clearly establishing the role of the teacher and the student in the pedagogical relationship, and by clearly establishing the educational objectives and the meaning of an education through the information and communication technologies (Marinescu, 2009). Additionally, the implementation of technological education requires the following measures (ibidem):

- Planning and financing the education,
- Organization of education, and
- Elaboration of curriculum.

The use of modern educational techniques is a financial, social and political issue that should occupy a central place in the concerns of governments and international organizations [ibidem]. Scholars investigated why educational institutions have not benefited from the opportunities offered by learning technologies successfully and identified five factors (Motteram & Thomas, 2010):

- Education systems are conservative networks that do not change or adapt at a fast pace.
- Educational leaders and administrators are not aware of innovative advances in methodology or technology.

- Education is less open to the commercialism that drives successful innovation in other industries due to a national and international political area determined by government policy.

- Due to this political context, the management structures of educational institutions tend to be more hierarchical, less entrepreneurial and less able to adapt to change.

- Instructors are rarely involved in policy decisions and therefore less able to innovate transformations in the processes of teaching and learning required by new technologies and new methodologies. (ibidem)

- Instruction is the most important component of offering quality education to all. Our vision for a systematic instruction within the area of ESP encompasses both the *holistic model of instruction* and the *cognitive model of instruction*. The Holistic Model of Instruction places the learner (Instructional needs, social needs, motivation and commitment) at the centre of instruction process which takes place in the following stages (Orlich *at al*., 2016: 23):

- Procedural aspects (Planning, Lesson design, Classroom dynamics, Instructional techniques, Assessment of learning, and Implementation of state standards)
- Learning Perspectives (Developmental, Behavioral and Cognitive)
- Attitudinal Aspects (Equity, Active learning, Supportive environs, Commitment)

On the other hand, the Cognitive model provides adequate experiences in which students structure the learning and teaching themselves. Obviously, students will need to have access to knowledge, know how to organize it, and be self-motivated to learn. The principles of the Cognitive Model of Instruction are:

- Students engage in active learning and problem solving;
- Students use a wide range of learning strategies;
- Time is allocated for students to apply new skills;
- Responsibility for learning and problem solving is transferred from teacher to student;
- Strategies to be learned by students are clearly specified;
- Rate of student learning is determined by the teacher;
- Teacher is responsible for instructional decisions; (Orlich *at al*., 2016: 29)

Connecting students to The Internet of Things

According to Helen Basturkmen, ESP teachers and course developers can usefully consider the following questions before course design and collection of data/texts (Basturkmen, 2010: 42-43):

- What language (skills, genres and features) do the learners need to know?

- Is information (data and descriptions) about these already available?
- If not, how can the ESP course developers collect data and investigate these?
- If so, how can the already available data and/or descriptions be used to supplement or replace the course developers' investigation? (ibidem)

Speaking of IoT as a catalyst to transforming education, we should not ignore the concept *the 21st century skills* (21CS) which is a special category of academic skills predicting professional and social success in contemporary society and, based on these skills, it is argued that one can also predict the adaptability level of an individual to the changes that will occur in the next decades in technology and society (Griffin *et al*., 2012). Researchers split the 21st century skills in four major categories as follows:

- Ways of thinking (creativity and innovation, critical thinking and problem solving, learning to learn and meta-cognition);
- Ways of working (communication, collaboration and teamwork);
- Tools for working (information literacy, digital literacy);
- Co-existence in the modern world (life and career management, personal and social responsibility) (ibidem).

Daniel Adeboye contends that the reason for all failures in edTech is not technology; it is the lack of digital pedagogy. Some teachers tend to place technology before education, allowing technology to drive the teaching. To eliminate failures we agree to his solution: teachers need to be trained and shown how to use technology they are used to in class and likewise students need be shown how to use technology to support their learning (Adeboye, 2016).

When we plan a lesson, we have in mind that the student has to acquire a professional or specialist culture. This can be understood as a set of specialized knowledge in a relatively determined field: scientific, technical, etc. which enables the student to perform a particular profession at a reasonable level of competence. It consists of specialized knowledge, specific skills, and a certain professional etiquette towards oneself and the surrounding environment (Frumos, 2008). In general, the learner knows the specialized terms in his native language; the student focuses on the vocabulary used in the chosen sphere of activity and develops communication skills relevant to the chosen field.

Our lesson plan aims to develop professional language skills, with emphasis on specialized instances from the ecosystem of the Internet of Things. The main objectives are: acquiring and using specific concepts, strategies and working methods in this ecosystem (with linguistic support in English), focusing on the acquisition of a varied specialized vocabulary. Students will thus have the opportunity to understand the formats, structure

and conventions specific to the specialist genres in this field, and to develop their ability to perform operations with linguistic structures in English.

We believe that learning English for specific purposes can be described as a reality-building process, a process involving networks, existing cognitive schemes, and a favorable context. If the assimilated information has nothing to do with the current interests and needs of the learner, then it will remain on hold, and then, for lack of interest in it, it will be forgotten (Albulescu, 2014; Siebert, 2001). Many researchers have reached the conclusion that developments in technology are impacting on research and language pedagogy in multiple ways that are relevant for both teachers and researchers (Goh, 2013: 68). Moreover, they emphasize that information technology plays a significant role as the Internet becomes central to student activities and teacher support (ibidem).

The English curriculum at the Faculty of Computer Science for Business Management concentrates on the description of communication and language use in economic situations and ICT. The practice lessons are tailored to provide realistic descriptions of discourse derived from empirical investigations so that students could have a better understanding of communication and language use in the mentioned specialist fields (Basturkmen, 2010). In the following lines, we discuss the stages and tasks of a lesson that we planned for our upper-intermediate students:

The first stage involved the search and use of texts from the students' subject area, in other words authentic texts written by journalists and experts which tackle the topic "The Internet of Things". This choice of texts is justified by the fact that only texts that are written for purposes other than language teaching and learning can involve the language our students need [ibidem]. For example, the task given to students was to read the article "*Where the smart is*" in the online newspaper The Economist. Some students were familiar with a few issues about IoT but they found the article very resourceful because the author managed to depict all the current issues related to the ecosystem of The Internet of Things. Afterwards, we asked students to open a multiple choice quiz with the app on their smart phone by scanning the QR code to enhance retention of the material read and assess the students' mastery of details and ability to synthesize information.

The second stage combined speaking, listening and writing tasks. First, we started a conversation with the whole class about the issues they learned from the previous task to make sure they understood all expressions, and we asked them to provide definitions for the term "smart" and to predict how "smart" a "thing" can be in the near future. Second, we invited them to watch a presentation about The Internet of Things, delivered by Dr. Ted Barrett (see Fig. 2.) to talk in groups the content of the video and compare it with the

content of the article using the expressions that we discussed in the previous task.

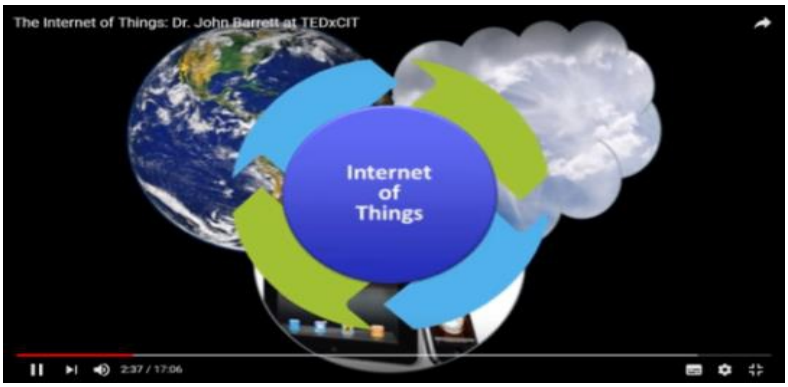

Figure 2: Presentation "The Internet of Things"

The last task focused on creativity and practice of writing skills in the sense that students were asked to write the features (in terms of functionality and advantage) of their smart phones in the context of the Internet of Things. We invited three students in front of the class to present the written material, and we encouraged the other students to interfere, comment on their presentations and cast their vote to choose the best presentation.

Conclusion

Considering the requirements of pedagogy nowadays, the term of English competence can no longer be limited to the individual's ability to express his/her opinion about a thing, on the basis of a thorough knowledge of the issue, in an informative sense, while minimizing the pragmatic aspect of pedagogical knowledge, although it scientifically justifies an action. Acquisitions, as an ensemble of pedagogical scientific knowledge, provide theoretical basis, but the students' way of acknowledging current issues and learning about them will lead to mobilization and application in practice, exercising cognitive capacities, strengthening independence, autonomy in their rational approach, along with specific educational skills, dubbed by attitudes of responsibility (Frumos, 2008).

Our view is based on the premise that in a continually moving world, where people's intercultural and professional communication, and their participation in decision-making processes have become essential, there is an increased need to be permanently connected to more sources of information.

Therefore, it is imperative that university management structures and especially policy-makers establish new paradigms in education that connect all educators and students to the Internet of Things through openness, intensive training programs and mutual learning exercises. Our paper reveals the fact that ESP teachers can be responsive to students' needs by: bringing materials

that relate to their specialist field and managing to connect the class to the Internet of Things through a comprehensive lesson plan that includes digital technologies.

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