APPLYING AUGMENTED REALITY TECHNOLOGY TO ESL TEACHING. A CASE STUDY WITH UNDERGRADUATE STUDENTS.

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Abstract:

In recent years, there has been a clear trend in the development of emergent technologies such as ubiquitous learning (u-learning), serious learning, or mobile learning as a teaching methodology (m-learning), and Augmented Reality (AR). Among these, the latter seems to be having the most applications. This is especially noticeable when it comes to education and particularly to the teaching and learning of English as a second or foreign language. It provides a very positive learning experience in which students are able to interact with the language in a way that is far from traditional.

Based on the principles of the Project Based Learning (PBL) and M-Learning
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This case study focuses on the implementation of the A.R. app “Aurasma” in the university course “English for Primary Education I” at the University of Extremadura. It aims to shed some light on the effect the implementation of AR in the English class has on their overall learning experience and motivation with the language. As a final course project, students had to work in groups to make an original, A.R. Travel book, about a city from an English-speaking country. Referring to the type of research carried out is of a qualitative type. Thus, two surveys were passed to the students, one at the beginning of the project and a final one when they finished it.

1. INTRODUCTION

The continuous development of Information and communication technologies today has been one of the most discussed scholarly topics in the last decade. The intrusion of the digital world in our daily lives has clearly made a substantial change in the way people face aspects of their everyday lives: socialization, studies, or the way we work. Given this situation, it seems to be paramount that teachers encourage the implementation of changes in the way subjects are taught and learned. In light of this, a scholar-to-be feels the unavoidable impulse to research about new technologies that may serve to add a little grain of sand to their use in educational contexts and provide a feedback that may boost their implementation in the near future. As a matter of fact, today’s generation of students often referred to as “millennials” or “digital natives”, make the implementation of technology in class easily and it is proved to make the learning process more motivating and inspiring for them. This is where AR Technology comes into play, as it is being proved to be so resourceful, motivating and a great help to the learning process.

When applied to education augmented reality technology has a great potential for all areas. However, when it comes to published research on the use of AR in ESL teaching, the number of papers written in this respect is astonishingly low. Bearing all of this in mind, this case study’s main objective was to implement level 01 AR to undergraduate Students, coursing the second year of Primary Education at the University of Extremadura. In light of aiming to accomplish this ambitious endeavour, this technology was specifically applied to the course “English for Primary Education I” during the second term of 2017 (February-May). Given the current situation in Spain, where the majority of students have a very low level of English, and some show lack motivation toward the subject, one feels the need to give augmented reality a go with the desire to improve students’ learning experience and set a good base for them to be able to apply such technology in their future. In keeping with this, one of the objectives for this research project was to ascertain if the process of using Augmented Reality in
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the English classroom actually improved students’ learning experience. Another goal was to determine if their motivation towards English and the use of ICT, improved after the project, and if they felt they could apply this technology in their future as teachers of primary education.

Regarding the methodology used in this project, it is influenced by two ESL teaching methods: Project Based Learning (PBL), and Mobile Learning (M-learning). This project, is therefore the fruit of a combination of both methodologies together with augmented reality. As the type of research carried out, it is of a qualitative type: two surveys were passed on to the students. The first one, dwells on their previous knowledge of ICT, and was handed in at the beginning of the project. The second focuses on the project itself and is passed to the students not only to get some feedback but to check if the most important objectives of the project have been achieved.

This paper provides a general literature review of augmented reality technology and its use in education. It provides therefore a comprehensive contextualization of the project, the procedure used, and the analysis of the results included in the aforementioned documents.

2. WHAT IS AUGMENTED REALITY?

When it comes to Augmented Reality Technology, also referred to as A.R, there are indubitably a great number of publications, as it is an innovative technology that is being applied to many areas of research. However, when applied to education it can be assessed that AR is still in its infancy, as it is now in the process of being researched and implemented. In this section, a conceptual approach to augmented reality, dealing with its types and its impact on education is carried out. As it will be contemplated in section 3, these sources combined with some research on Project Based Learning (PBL), and use of video podcasts as a tool in the English classroom, serve as the bibliographic pillars for this case study.

2.1 Conceptual Approach

Nowadays, emergent technologies such as gamification, cloud computing, mobile learning, the internet of things, to name but a few, have been acquiring ever more strength over the last few years. This is possible thanks to the importance the web 2.0 has been acquiring over the last few years, and the widely spreading use of mobile devices (phones, laptops), that “have had an undeniable in influence of the relocation of such technologies” (Cabero, J. and Barroso, J. 2016:4). Augmented Reality is amongst these ones, and as it is
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stated in Horizon report, it is bound to have an ever-growing implementation in all areas of education. Other sources as Times magazine have placed this technology in the fourth place amongst the top 10 technological trends. (Times, 2015:5). Concerning the Company Gartner Research, which is considered to have an important impact factor in the Information and Communication Technology world, identifies AR as one of the technologies that are very much prone to having a bigger impact in the years to come; they include a use forecast of almost 30% of mobile devices users, (Cabero, J., and Barroso, J. 2016:4).

In light of the different definitions of AR, the various consulted sources define it as the direct or indirect visualization of elements from the real world combined with virtual ones created by a computer, giving birth to a mixed reality (Cobo and Moravec, 2011:105). There needs to be a clear distinction with Virtual Reality or VR. Whereas the latter submerges the user into a completely computer-generated virtual world, Augmented reality "aims to present information that is directly registered to the physical environment." (Schmalstieg, D., and Höllerer, T., (2016:3). Authors such as Gómez-G, M. 2013; Cabero, J., 2013 and Cabero, J., and Barroso, J. 2015, define AR as the environment in which there is an integration between what is virtual and real, building a mixed context that is both: augmented and enriched. In fact, AR does not substitute the real world; on the contrary, what it does is complement the latter with virtually superposed information. The user is therefore allowed to perceive stimuli from a real-life context and to interact with a virtual content in the meantime. In this line, other studies like Azuma, R. (1997) define it as the technology that enables the combination of virtual and real-life elements. According to this study, Augmented Reality is only present if there is a combination of real and virtual elements, the experience is interactive in real time and it is registered in 3D.

All in all, in analysing the different definitions it can be asserted the ultimate goal of this technology is to convince the user that the virtual world is as real as the physical one. It allows the user to perceive information that couldn't be otherwise observed with the natural senses, as that it is not directly visible.

3. THE PROJECT

When AR is applied to a team project and students become producers and designers of their own materials, this allows them to use that media as tools to study the world around them and express themselves. Indeed, referring to some
of the advantages of its implementation, there are basically 3 main ones:

- The High motivational level and creativity boost it produces.
- A coordinated distribution of work and increased digital competencies: Writing a script, voice over, software management, using video cameras.
- Good classroom atmosphere.

The project takes place in the Faculty of Education, at the University of Extremadura, in the Primary Education Degree, in the English For Primary Education I course.

At the beginning of any English course, it is always a good idea to ask students to introduce themselves, in order to break the ice, start getting to know them, and assess their needs. Thus, one of the questions that was asked the first day was “why do you study English?”. Although it is true, many of them stated that they studied it because it is compulsory and necessary; many others claimed that it was useful to travel around the world and get to know people from other countries. Indeed, if this fact is exploited properly it can be a good source of motivation for students. This is basically how the idea of coming up with a team project called “Making an Augmented Reality Travel Guide”, came into life.

As part of the continuous evaluation of the course, students were asked to create an augmented reality travel guide. Based on the project based learning features, they were given the possibility to choose their own teams and topics (any city from any English-speaking country in the world). The teams were created online using Google Docs.

Students were taught how to implement the AR technology during a total of 3 weeks, using the 2 hour weekly seminars they are expected to attend.

3.1 IMPLEMENTING AR INTO ESL TEACHING. USING AURASMA

Bearing in mind the fact that both PBL and M-Learning principles set the base for this project, it is now paramount delving into the process of implementation of AR into the project. Two weeks were dedicated to the teaching and implementation of AR into their projects. These lessons took place during the 2h Seminars per groups of 15-20 students. Thus, there was a total of 8 lessons focused on this technology.

As for the content of the lessons, it’s rightly connected with this project. The didactic that was used was the following:
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### English File Pre-Intermediate:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1D</td>
<td>Hotels</td>
</tr>
<tr>
<td>2A-B</td>
<td>Holidays. Prepositions of Place</td>
</tr>
<tr>
<td>3A-B</td>
<td>Airports. Verbs+ prepositions of place.</td>
</tr>
</tbody>
</table>

### English Result Pre-Intermediate:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A, B and C.</td>
<td>Tourist attractions (facts, opinions, the weather)</td>
</tr>
<tr>
<td>3A, and B.</td>
<td>Adventure Sports, abilities.</td>
</tr>
<tr>
<td>10 A, B, C, D.</td>
<td>Places, journey times, air travel</td>
</tr>
</tbody>
</table>

As can be seen above, all the vocabulary and structures studied in class have a connection with the project itself.

In applying the knowledge acquired in class to their travel guides, students successfully learn, and end up feeling more motivated with the subject.

It was during the second seminar in week 5, that students had a first contact with Aurasma and created a first video podcast using their phones. As the groups were already created and the participants appeared on the Google Doc file, students were asked to sit together with the members of their teams and
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use their mobile phones. The process was the following:

- First of all, students where directed to go to www.aurasma.com. After signing in students had to download the “trigger”\(^1\) image for the AR content.

- Then, students where directed to click on “make a new aura”, where they had to upload the picture they chose.

- The third step was selecting the masks. These are the areas of the picture that need to be specified to help the mobile phone recognise it and load the AR content.

- In the following step, they had to upload the video they had previously recorded using their phones in class. Once it was uploaded to the server, they could choose the areas of the picture where they wanted the video to pop up in augmented reality.

As expressed in section 3, the fact that they had to record themselves, was proved to be very successful. Many students showed a great creativity and had fun in doing so.

**3.2 RESULTS**

After these seminars based on AR, students had 1 month and a half to hand-in their projects. The creativity, effort, time organization and division of work was entirely up to them. The image below is the result of one of the projects handed in by one of the teams. Should the reader want to give it a go and see the images in AR, it should be borne in mind the Aurasma app should be

\(^{1}\) See chapter I, for definition of trigger image.
4. GATHERING DATA. METHODOLOGY AND EVALUATION OF RESULTS

As a means of gathering data and feedback from the students, a survey focused on the project and AR experience itself was passed on to them.

Some of the questions on this survey were based on the Likert scale: completely agree, partially agree, indifferent, partially disagree, and completely disagree. The reason behind using this scale is that it allows data analysis to be more complete. There was also one multiple-choice question and eight compulsory ones where students had to answer with at least one line. As for the results, here is a summary:

- 47.7% of students completely agreed they had had fun doing the video-recording activity (Analysing these results, it can be stated that
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they are very much in keeping with the fact that the level of English of the majority of them was of an A2+ and many feared speaking it in public. Therefore, it is normal that most predominant answers were “partially agree” instead of “completely agree”, as they did not feel 100% comfortable using the language outside the classroom.

- Aurasma was a difficult and challenging app to use.
- A majority of students claimed it helped them develop their speaking skills, as opposed to their listening skills.
- Most students agreed it had helped them with their English and had improved their motivation.
- Most students think the project had helped them consolidate the contents studied in class.
- Most students think they can apply this knowledge in their future careers.

5. REFERENCES


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