
THE URBAN GAME MOBIGEO: STUDENTS PERCEPTIONS ON POTENTIAL AND CONSTRAINTS OF AN MOBILE OUTDOOR EDUCATION

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Introduction

Mobile technologies are increasingly rooted in society and, therefore, intuitively, teachers begin to take advantage of devices that students carry with them daily in a logic of 1:1 bring your own device (BYOD) (Herro, Kiger & Owens, 2013). In fact, as mentioned Vieira and Coutinho (2013) “The evolution of the society gave to the mobile phone an importance that goes behind the typical communication between people. It becomes imperative to use this media to promote/increase new activities that are motivating and challenging for students”, but BYOD programs are controversial, as schools grapple with technical support for nonstandard devices, concerns over equity, issues of classroom management, and pedagogical approaches (Dahlstrom & di Filipa 2013).

Our research arises due to the emergence of a new paradigm for learning “just in time” and “anywhere” featuring the Mobile Learning that, as suggested by Kukulska-Hulme and Shield (2008), Moura (2010a) or Sharples et al. (2009) point to constitute an opportunity to go beyond the classroom barriers and extend the process of teaching and learning to a custom context where the virtual and real worlds merge.

According to a literature review (Vieira, 2014) and agreeing to Kukulska-Hulme and Shield (2008) and O'Malley et al., (2005) mobile computing activities are mostly confined to the classroom and this is reductive, so is necessary to frame the context shared by the device itself and the user/learner mobility. Thus, according to O'Malley et al., (2005) Mobile Learning occurs when the learner “is not fixed” and when you take advantage of the learning opportunities that mobile offers.

This was the inspiration to create the MobiGeo, an Urban Game implemented in a basic school, with Geography subjects, involving pupils and teachers and also policy makers in the region where the study was implemented. Sharples (2010) emphasizes that the knowledge of learning in context and out of the classroom is small and if we add mobile technologies, then we have an even more weakened frame, in terms of what is the investigation and that justifies the contribution of the study performed.

The aims of the research was to design, implement and evaluate an Urban Game with Qr Codes and thus allow for teachers to rethink and innovate their teaching methods based on a the adoption of mobile computing, and in that sense “understand that being a teacher is feeling the need to adapt our teaching method to reality, full of emerging technologies and with which students like to deal with” (Cruz & Meneses, 2014, p.283).

The research question that guided the project was to understand whether the implementation of an urban game – Mobigeo – that enhanced collaboration and interaction among peers could influence the process of learning geography in an outdoor education context.

After reviewing emerging research on m-learning, this article presents the results of two open-questions of a survey implemented to 173 students who played the MobiGeo

Mobile Location-based Games

Mobile computing allows for new educational activities that combine technologies and contextual learning. Accordingly to Sharples et al. (2009, p.4) context “is a central construct of mobile learning, not as container through which we pass like a train in a tunnel, but as an artefact that is continually created by people in interaction with other people, with their surroundings and with everyday tools”.

One of these educational activities is “mobile location- based games” who relate to the location/mobility of user raises and are mediated by mobile phones (Avouris & Yiannoutsou, 2012). A typical example of these games is the “urban game” or “street game” that are a phenomenon of modern societies. According to Avouris and Yiannoutsou (2012) “these games are played in physical space, but at the same time, they are supported by actions and events in an interconnected virtual space”, which can be classified into three categories: i) the ludic that are games created just for entertainment; ii) pedagogical: games with well-defined learning objectives, which may occur in and out of school; and iii) hybrids that include both the educational and entertainment aspects, conducted in informal learning environments that normally is associated with cultural and historical aspect of society. According to Silva and Delacruz (2006), being in direct contact with the contents to assimilate and move in a real context, students have a more significant learning and this enhances the mobilization of knowledge in different contexts.

In the same way, Benford (2005) considers that “location-based mobile experiences” offer several advantages and a great educational potential, including:

- Chance to learn in particular context, being able to choose where and when, for example, when students study questions related to the History of Art may access the thematic content when they are in front of a characteristic building;
- Data collection *in situ*, i.e. allows students during fieldwork examine or submit data on a site for further interpretation;

- Personalization of learning experiences, because the students can access content according to their own learning time, with no pressure from the collective.

Research guiding classroom implementation with mobiles is scarce and merely illustrative (Herro, Kigger & Owens, 2013) but there is even more need of research on the use of mobile computing in outdoor education that is the focus of the research presented in this article.

The teaching of Geography

The teaching of geography requires a variety of educative resources and geographical analysis tools. Traditionally, educational experiences were supported in the consultation and analysis of printed maps and atlases and statistical database. With technological developments, emerge the insertion of projectors, video/DVD players, satellite images, among others. However, although we examine the skills that are required of students (Ministry of Education, 2001), we find that the vast majority could be developed through the use of Geographic Information Systems (GIS).

Wheeler et al. (2010), mention that the fundamental tool of geography is the map and that over 75% of the world information is georeferenced, hence the geographical knowledge is fundamental.

Students faced with the GIS are “forced” to think spatially, automatically assimilate this notion, and also the interpretation that will provide the development of geographic reasoning.

David (2007), based on Wiegand (2005) and Mitchell (2007), states that geography must be taught with the use of all available technologies, following thus the very evolution of territorial research tools, with natural relief for GIS, and must be present in the education curriculum of Geography teachers.

Design of MobiGeo

The theoretical background of the Urban Game designed in our research is based in four pillars: Constructivism (the student takes an active role in the production/construction of knowledge), the Situated Learning (authentic context is a sponsor of knowledge); Connectivism (which puts mobile devices as a source of connections available for the acquisition of knowledge) and Conversation Theory (Vieira, 2014; Vieira & Coutinho, 2014).

The urban game “MobiGeo” was idealized for the research and had as main thread the history of the European Union and intended to combine learning and entertainment. Its preparation respected the principles suggested by Herrington et al. (2009) to:

1. real world relevance: use Mobile Learning in authentic contexts;
2. mobile contexts: use Mobile Learning in contexts where learners are mobile;
3. explore: provide time for exploration of mobile technologies;
4. blended: blend mobile and non mobile technologies;

5. whenever: use Mobile Learning spontaneously;
6. wherever: use Mobile Learning in non traditional learning spaces;
7. whomsoever: use Mobile Learning both individually and collaboratively;
8. affordances: take advantage of the characteristics of mobile technologies;
9. personalise: planning the use of the devices owned by the learners themselves;
10. mediation: using Mobile Learning to mediate knowledge construction;
11. *produse*: using Mobile Learning to simultaneously produce and consume/use knowledge.

The MobiGeo arose from a partnership between the Basic School (“Agrupamento de Escolas de Vila Verde”) and the Knowledge House of Vila Verde (Casa do Conhecimento de Vila Verde). In this Urban Game participated all classes of the 7th grade of the Public Basic School of Vila Verde, a total of 173 students (82 boys and 91 girls), with ages between 12 and 15 years. Each school class was divided in four teams – GeoFronteirs, PDA, Support and Wallpaper – and the geographical area was bounded between the school and the Central Square of Vila Verde a space with wireless system (Digital Plaza). Mobile phones were also available for each of the teams to communicate and receive instructions of the path to go (GPS) and the tasks were associated with QR codes. In the end of the route, the team that concluded all the points and performed all the tasks had to raise the European Union flag as a symbol of victory.

Method

To assess students perceptions on the MobiGeo the researchers developed and validated a questionnaire adapted from a proposal of Savi et al. (2010) entitled “Model to evaluate Educational Games”. The model takes into account the motivational model of Kirkpatrick (level 1) and embraces three major dimensions: Motivation/Interest, Interaction and Perceived Learning.

The questionnaire included both closed ended questions in the format of a 5 points *Likert* scale of 5 degrees of agreement (Completely Disagree, Disagree, Indifferent, Agree and Completely Agree) and also 2 open-ended questions asking students opinions on the MobiGeo game. The analysis was undertaken using SPSS software for closed items and content analysis techniques were used to categorise and interpret the open-ended questions. In this paper we focus the analysis of the qualitative data of the questionnaire that asked students to mention the strengths and weaknesses of the learning activity.

The exploratory content analysis carried out followed an emergent process of coding and categorization based on the answers provided by the students. Four categories were considered for the positive features of MobiGeo (use of technological devices, interaction, learning achievement and informal context of learning) and two for the suggestions to enhance the game (technological devices and activity organization).

Results

Table 1: Categories and sub-categories of the question of content analysis 1 of Section III of the questionnaire

Questions	Category	Subcategory	Frequency
Strengths of the Urban Game MobiGeo	Use of technological devices	Mobile Phone	64
		Computer	17
		Internet	14
		QR Codes	6
		GPS	4
	Interaction	Team Work	59
		Communication	8
	Perceived Learning	Learn geography/European Union	28
		Informal Learning	21
	Informal learning context	Activity outside the classroom	50
		Context of the activity	30

The results listed in Table 1 show that the main strengths of MobiGeo were the use of mobile phone (which are somehow associated the QR codes and GPS), the teamwork, the fact that it is performed outside the classroom (contextual) and the possibility it offered to learn geography in a different manner. What can be evidenced in their comments:

- “... The cell phone use led to the commitment of the group”;
- “... We can enjoy the activity to interact with our colleagues and learn”;
- “The MobiGeo activity allowed the cooperation between students ...”;
- “... Learn more about the European Union”;
- “... We have learned by playing”;
- “... Learning was easier”;
- “Be out of school made the activity different”;
- “Interacting with the environment ...”.

We can infer that the mobile phone with the GPS application had a leading role and served as the link between the real and virtual world. An important aspect was the context in which the MobiGeo was done because as regards Sharples et al. (2009), the context is crucial in the development of Mobile Learning because it is constantly under construction by the people and allows interaction of those acting on it.

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Table 2: Categories and sub-categories of question 2 content analysis of Section III of the questionnaire

Question	Category	Subcategory	Frequency
Suggestions for improving the MobiGeo	Technological devices used	Internet	50
		Mobile Phone	18
		Computer	10
	Organization of MobiGeo	Tasks / georeferenced points	33
		Activity duration	15
		Time of game	13
		Local	13
		Teams	12

The second question (Table 2) asked students to suggest improvements to the MobiGeo, so they mentioned, at the level of technological devices used, that the Internet and the mobile phones were items that need more attention. Also noted that the activity should be increased with more tasks and therefore last longer. It should be noted that 33 students mentioned that they had nothing to improve in MobiGeo. We support these results with some examples of student answers:

- “The Internet could be faster”;
- “Mobile network could be better in some places”
- “Enter more tasks to last longer ...”;
- “... Have more activities along the way”;
- “... Want it all day”.

Final Remarks

We consider that the data obtained allow us to say that the Urban Games, like MobiGeo are potential agents of motivation and interaction that predispose students to learn geography in an informal environment, as was our case. Mobile technologies offer a range of learning experiences that may involve and effectively educate students, we can still say that the success of Urban Game MobiGeo was due to the challenge of finding out what is hidden in the georeferenced location and mobile phone use to uncover this message, because as students mentioned “the use of mobile phone motivated the commitment of the group” also assumed in the strengths of MobiGeo, “the points are located at the GPS”, “the use of QR codes” and “have used wireless internet “.

This is why schools rather than prohibit, should create a culture of “mobile literacy” (Shuler, 2009) in which the primary consideration should be to develop a set of skills that exploit the potential of these devices and thereby bet in new teaching strategies. The roles of teacher and student, should not be abandoned but recycled and adapted to this new reality that requires a more personalized and diverse learning, as stated Moura (2010b, p.501) “the goal is for the student to participate in the learning game and that participation was effective, both in solving tasks, such as the activities of suggestion”.

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