CASE REPORT

The use of the mobile application Actionbound in the teaching of local history

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Abstract: Technology in the 21st century forms an indispensable part of the everyday life of all ages. Today, portable devices are used daily for multiple purposes (entertainment, recreation, health, productivity, physical exercise *etc*.), while games found on portable devices based on a player's location have started to burgeon as well. Education could not remain uninvolved in these developments. Over the last few years, technology has been used more to foster students' education through programs and applications. The gamification of education looks to maximize student engagement. This current study aims to plan and create an educational teaching scenario as part of the teaching of the History subject. Using the multimedia tool Actionbound, students are guided into the place of interest (monastery). The school subject of history becomes more entertaining as students move into space through GPS locations, questions, tests, and rewards. Therefore, students are no longer passive receptors of new knowledge and information but explorers who discover their new knowledge by taking an active role in the teaching process.

Keywords: Actionbound, mobile learning, education, gamification, augmented reality

1 Introduction

Inquiry-Based Learning (IBL) is an educational approach in which students begin with a question, followed by the investigation of solutions, their examination, and the communication of findings to form new knowledge based on selected elements (Qureshi & Qureshi, 2021; Savery, 2015). Mobile learning (m-learning) is a learning process mediated by smart technologies such as smartphones, portable computers, and tablet devices (Burden & Kearney, 2018; Karakose et al., 2021). Learning through one's phone is a recent technology rapidly developed for online learning through personal portable devices without any temporal or spatial constraints (UNESCO, 2012). Learning through one's phone has become an umbrella term for integrating portable computing devices in teaching and learning (Grant, 2019). The flexibility and capacities of such mobile devices have captured much interest in education (Kalogiannakis & Papadakis, 2017a; 2017b). For instance, claims of enhanced collaboration and social interaction, on-the-spot collection and sharing of data, communication among peers, teachers and experts and the adjustments to student learning have been mentioned (Kearney et al., 2015). In the teaching of sciences, researchers have started to investigate the application of m-learning in various frameworks (Burden & Kearney, 2016) by supporting teaching approaches based on research (Song, 2014).

The use of mobile technologies in learning science offers opportunities to 1) support various levels of research and form new types of research (Edelson et al., 1999), 2) ease students' curiosity and motives (Tsoukala, 2021), and 3) facilitate continuous learning in a series of learning settings (Kong & Song, 2014; Song & Wen, 2018).

2 Literature review

2.1 Learning through gamification

The term gamification involves the insertion of elements related to the creation of games in environments that are not games (Deterding et al., 2011; Skaraki, 2021), such as objectives, rules, point reward system, elements of entertainment, feedback, offers, avatars, missions *etc*. (Kapaniaris & Zampetoglou, 2021; Toth & Tovolgyi, 2016). Prensky (2001) asserts that game-based learning develops skills while at the same time incentivizing and entertaining learners (Papadakis et al., 2020). Nevertheless, he notes differences between "digital natives" and "digital immigrants" in how they learn, play, communicate, work and form communities (Kastriti et al., 2022; Papadakis, 2020). In terms of education, gamification increases student engagement and

engagement by adding game elements to learning teaching, making it more engaging (Simões & Redondo, 2013). Roy & Zaman (2018) suggest that game-based learning offers incentives to learners as it satisfies 1) their need for autonomy, 2) their need for competence 3) their need for relatedness. Gamification has been shown to increase students' engagement in the learning process as well as their effort, resulting in increased performance (Gooch et al., 2016). Steinkuehler & Squire (2014) classify educational games into four categories: a) games as content when they are being used to transmit knowledge, b) games as "bait" when they are being used to promote critical thinking and learning, c) games as a means of implicating students and providing them with learning incentives and d) games as a means of evaluation. The most common gamification methods used by teachers are awarding points, using levels and using ''badges'' (Lamsa, et. al., 2018; Papadakis & Kalogiannakis, 2017).

2.2   Augmented reality and learning

Augmented Reality (AR) is an emerging form of experience through which the actual word (RW) is enhanced using a computer's content, linked to specific locations or/and activities. Over the last few years, AR applications have become portable and widely available on mobile devices (Skaraki & Kolokotronis, 2022). AR has become visible in audiovisual media (e.g., news, entertainment, sports) and has penetrated other aspects of our lives such as e-commerce, travel, and marketing in noticeable and fascinating ways. AR supplies learners with instant access to specific location information collected and provided by many sources easing ubiquitous learning (Yuen et al., 2011). Many studies have examined the benefits of using AR and VR in student learning with its possibilities for multiple educational uses. In a systematic overview of sixty-eight studies concerning AR that were published until 2015, Kavanagh and Akçayır mentioned an increasing number of studies which found enhanced learning achievements, positive attitudes, and students' incentives as a result of teaching through the use of AR. More specifically, a collaborative AR simulation system helped undergraduate students obtain knowledge in Physics to a greater extent than those who employed the traditional simulation system 2D. Also, the integration of augmented reality applications into the educational process, according to Georgiou & Kyza (2018), offer students immersive learning experiences, and research shows that there is a positive correlation between creating intense interest in students and learning outcomes. In addition, using an AR-based application positively affected the students' learning achievements and attitudes when taking part in environmental projects (Lazarinis et al., 2022).

2.3   ActionBound

Actionbound is an educational tool for games of scavenger hunts based on digital multimedia (Kissi & Dreesmann, 2017). Through this tool, it is possible to create quizzes with instant feedback and multimedia content and assign pictures, audio and videos. Participants are guided through the Global Positioning System (GPS) or satellite navigation system. The app was created in 2012 in Berlin for educational purposes. The tool offers the possibility to design interactive educational programs. Bounds can be designed for either external or internal use and are accessible even without an internet connection. Students become autonomous during play despite the eventual need for guidance. The app requires some digital skills to navigate both the students involved and the teachers.All the results can be accessed afterwards, and the media used by participants can be downloaded and shown in class (Rosdiana et al., 2020).

2.4   Efforts to use AR in Greece

The Greek bibliography mentions efforts to use Augmented Reality software in the educational process, for teaching local history. In 2018 Koutromanos and Labropoulous developed through the platform ARIS an Augmented Reality game about the local history of the last three grades of a primary school in Salamina. Likewise, in 2020 Koutromanos & Boudekas designed and developed the application "Plato AR", addressed to students in the fourth grade about the archaeological site of Plato's Academy.

The application Actionbound was also used for primary school students to design an interactive educational game about the local History of Naxos (Koutromanos et al., 2020) and the old city of Rethymnon (Anastasiadis et al., 2019). Concerning the city of Rethymnon, an AR game addressed to adults was designed and implemented by Stratikopoulos and Anastasiadis in 2022 through mobile devices.

3   The learning scenario

The scenario was created in connection with the 200th anniversary of the beginning of the Greek Revolution. More specifically, the main objective was for children to become familiar

with the history and events in the Arkadi Monastery through the application Actionbound. In Figure 1, one can view places he or she has to visit. For instance, to solve the riddles, one begins from the monastery's entrance, where one can see number 1 in the picture, and afterwards, learners go to number 2, where the Portal is.

Note: Holy Monastery of Arkadi. (01): Starting Point; (02): Portal; (03): Kelarika; (04): Olive Tree; (05): Powder Magazine; (06): Abbot's Cell; (07): Museum.

**Figure 1**   Learner's route into the Arkadi Monastery

As the child begins to learn about history, a girl aged 6, Lenio (Figure 2), appears on the phone screen. Lenio was born in 1860 in Crete and asked children to help her find the banner of the Revolution. Through tests such as questions, photographs, videos, recordings *etc*., children are asked to learn the local history and playfully discover the Revolution's banner. In Figure 2, one can see some of the events of this historical event that took place at the Arkadi Monastery, as well as the riddles showing children which direction they need to take. In addition, they can watch some short videos and afterwards respond to comprehension questions to collect points and continue the game by discovering other places inside the Monastery (Figure 3).
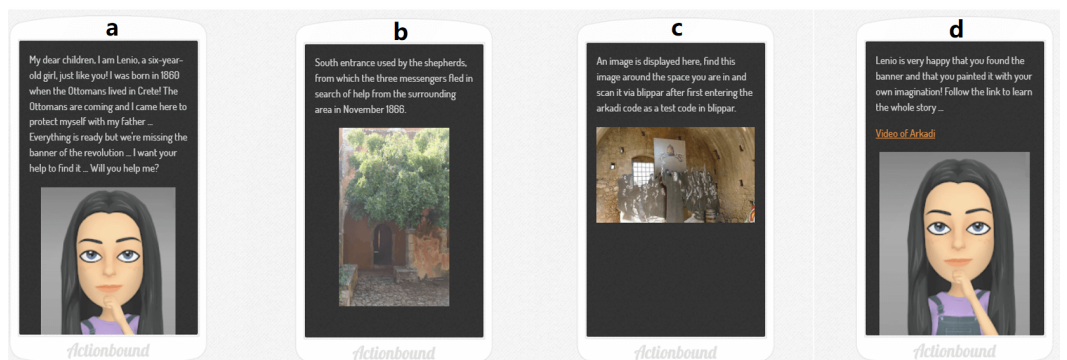
Note: (a): My dear children, I am Lenio, a girl aged six just like you! I was born in 1860 when the Ottomans lived in Crete! Ottomans are coming, and we have come here with my dad to protect ourselves. Everything is ready, but the banner of the Revolution is missing. I need your help in order to find it. Will you help me? (b) Southern entrance used by shepherds where three messengers sneaked in to seek help from the surrounding area in November 1866; (c) Here appears an image. Find this image in the area you are in and scan it through Blippar after you have inserted the password arkadi as a testing code at Blippar; (d) Lenio is very happy you found the banner and drew it with your imagination! Follow the link to learn about her entire history.

Figure 2   Searching for the banner with Lenio
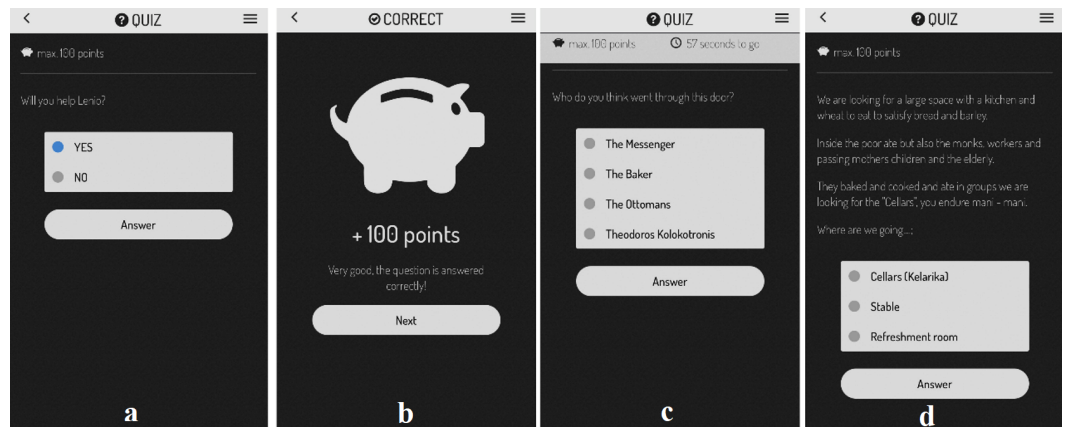
Note: (a): Will you help Lenio? (YES NO) Answer; (c) Whom do you believe walked through the door? Clue (1/1): He walked through the door to spread the news that the Ottomans were coming. (Messenger Baker Pasha Kolokotronis); (d) Whom do you believe walked through the door? Clue (1/1): He walked through the door to spread the news that the Ottomans were coming. (Messenger Baker Pasha Kolokotronis); We are looking for a prominent place with a cookhouse and wheat to eat and fill our stomachs with bread and barley. Poor people, monks, workers, and passersby such as mothers, children and the elderly used to eat inside. They used to bake, cook, and eat all together. We are looking for "Kelarika". Where are we going? (Kelarika Stable Refreshment Stand).

Figure 3   Questions used to collect points

4   Conclusion

Actionbound is a new application through which numerous studies have been conducted on adult learners (Anastasiadis & Stratikopoulos, 2022; Barianos et al., 2022). On the contrary, no studies have been conducted on children of primary and preschool age (Xezonaki, 2022). Opinions are divided on whether this application genuinely helps someone to learn, as users have mentioned various problems concerning using GPS or tablets (Papadakis, 2022a; 2022b). The main aim of our study was to see whether children of preschool and primary school age can use this specific application and learn about the history of Arkadi. We believe that through proper planning and guidance, children can learn by having fun and exhibiting excellent results simultaneously (Mamolo, 2022); we find ourselves in a digital age, which renders children's competent users-learners.

Conflicts of interest

The authors declare that they have no conflict of interest.

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