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**The methodology frame of utilization of cultural heritage in education
through the gamification strategy (Pedagogical frame, bibliography,
researches from Europe and Greece, Italy, Spain)**

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Mobile learning and Mobile devices

Mobile learning is a flexible learning model that supports the immediate delivery of personalised educational content, tailored to the needs and profile of the learner and the relevant environment (Brown, 2005). According to Van't Hooft, Swan, Lin & Cook (2007) mobile technologies support learning in a connected environment, with access to educational content from any place and at any time. Furthermore, mobile learning has been recognized as a form of technology-enhanced learning, which effectively supports the learner's interaction with the educational content (Moran & Dourish, 2001).

At this point, it is useful to present and analyse the key features and capabilities of

mobile devices (Clarke, 2001):

- *Ubiquity*: the ability of the user to access content available on the internet, at any time and from any place. This capability, in an educational context, can bring significant advantages and opportunities such as learning in any environment/place/moment, supporting formal and informal learning, thus increasing both the effectiveness and productivity of learners. Moreover, this possibility makes it possible to provide immediate feedback to learners.

- *Positioning*: The ability to identify the geographical location of the user. Through mobile devices, it is possible to identify the geographical position of the user. This possibility provides important opportunities in the field of education, such as the possibility to adapt educational content (for example, linking educational content to local culture). In addition, it offers educators the possibility to know the exact location of the users during their interaction with the educational content, and to draw useful conclusions about their preferences, conclusions which they can incorporate into their overall educational design.

- *Interactivity* (Kakihara, & S0rensen, 2001): the possibility of multiple interactions among learners and the instructor.

- *Personalisation* (Abowd & Mynatt, 2000; Lyytinen & Yoo, 2002; Rao & Minakakis, 2003): the ability to deliver content based on the user's preferences and profile.

As can be seen, mobile devices offer a plethora of possibilities and opportunities in the field of education and, if properly exploited, can significantly enhance the quality and effectiveness of any educational approach. The following are the key benefits that mobile devices bring to education:

- *Training can take place from any place, at any time* (Shuler, 2009). Nowadays, the majority of learners always have a smart mobile device with them, which has access to the internet. Therefore, they can access the educational content at any time, in any geographical location, and it is not limited to the agricultural boundaries of the classroom.

- *They support personalization* (Shuler, 2009 and Klopfer & Squire, 2008): smart mobile devices can support personalized educational content, based on the profile and needs of each learner, as captured and identified by their interaction with the mobile device.

- *Portability* (Pea & Maldonado, 2006): mobile devices, due to their size, are easily portable, while nowadays they can support complex and sophisticated functions that enhance the educational process.

- *Mobile devices support both formal and informal learning* (Peters, 2007).

The following table presents the basic characteristics of mobile devices and their matching with the gamification methodology.

Mobile device features	Gamification principles
Ubiquity	Providing formal and informal education Access to educational content at any time/from any place. Immediate feedback Strengthening critical thinking and problem-solving skills
Positioning	Providing appropriately formatted educational content Social factor of learning. Motivation
Interactivity	Enhancing collaboration and collective decision-making. Interaction with other learners and the educational content itself
Personalization	Providing educational content based on the needs and profile of the learner.
Users have control over mobile devices	Learners are able to track their progress and compare their performance with that of other learners. High learner engagement Minimize technical problems, familiarization with the learning environment.
They provide an immersive environment	The learning environment should be immersive

For the effective implementation of a gamified educational application in mobile game based learning environments, the following are required:

- the appropriate use of gamification mechanics to structure the educational game and enhance the learner's external motivation,
- the connection and exploitation of the features of mobile devices.

The proposed conceptual framework incorporates gamification principles by orchestrating principles of game based learning and self-paced learning for the emergence of high thinking skills by exploiting the specifications of mobile devices concerning especially “Cultural Heritage”.

The Platform H5P (HTML5 Package) – Activities

The platform which will be used for this digital game on “Cultural Heritage” is **H5P** (HTML5 Package). H5P offers an easy and fast way to create interactive content. H5P is based on HTML5 and the applications run seamlessly on tablets and smart phones. It is free open source software and can be used in at least 2 ways:

- creating an account on the H5P website, creating an activity and embedding it on the website
- installing the H5P plugin and creating content in wordpress, moodle and drupal, etc.

Template of activities

Depending on the activities to be chosen in the formation of the game, seven learning objects have been selected.

1. Single Choice Set

Description

Single choice set allows content designers to create question sets with one correct answering alternative per question, in just a few seconds. The user gets immediate feedback after submitting each answer.

Features

- Sound effects for correct and wrong (sound effects may be turned off)
- Fully responsive design
- Summary at the end showing the solution to all questions
- Single choice sets can be included in Presentation and Interactive video content types

2. Multiple Choice

Description

Multiple Choice questions can be an effective assessment tool. The learner is given immediate performance feedback. The H5P Multiple Choice questions can have a single or multiple correct options per question.

3. True/False Question

Description

True/False Question is a simple and straightforward content type that can work by itself or combined into other content types such as Course Presentation. A more complex question can be created by adding an image or a video.

4. Image Sequencing

Description

A free HTML5 based image sequencing content type that allows authors to add a sequence of their own images (and optional image description) to the game in a particular order. The order of the images will be randomized and players will have to reorder them based on the task description.

The Image Sequencing content type challenges the learner to order a randomized set of images according to a task description.

5. Image Hotspots

Description

Image hotspots make it possible to create an image with interactive hotspots. When the user presses a hotspot, a popup containing a header and text or video is displayed. Using the H5P editor, you may add as many hotspots as you like. The following is configurable:

- The number of hotspots
- The placement of each hotspot, and the associated popup content
- The color of the hotspot

6. Drag the Words

Description

A free HTML5 based question type allowing to create text based challenges where users are to drag words into blanks in sentences.

7. Drag and Drop

Description

Drag and drop question enables the learner to associate two or more elements and to make logical connections in a visual way (using both text and images as draggable alternatives). H5P Drag and drop questions support one-to-one, one-to-many, many-to-one and many-to-many relations between questions and answers.

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