THE ROLE OF GAMIFICATION IN CULTURAL INFORMATICS

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Abstract.

The prevalence of Information and Communication Technologies (ICTs) has intensified information and communication broadcast, both in digital and real life, while it raises several risks and concerns. In this respect, several types of research have shown that users' awareness increase is of major importance, focusing on the crucial role of educational

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and compelling interaction environments. Towards this, respective literature highlights the role of gamification- *the use of game design elements in applications that are not games*- in several domains such as education, marketing, health, showing that users' engagement in applications, where gamification techniques are applied, has been increased. Gamified applications aim to motivate users to use technology and to increase the quantity and quality of the given activities' output. This paper examines existing implications regarding gamification, focusing on the field of Cultural Informatics, since gamified applications are already utilised so as culture to be disseminated. The paper aims to enhance literature, by presenting gamification utilisation more methodically within Cultural Informatics.

INTRODUCTION

During the last years and specifically, after the second half of 2010, gamification has been implemented in several sectors, supporting user engagement and providing benefits, such as the increase of user activities, social interaction, quality and productivity of actions (Hamari et al.,2014). Although several attempts to define gamification have been done, yet a standard definition has not been provided. The most cited definition was published by Deterding et al. in 2011, who defined that *"gamification is the use of game design elements in non-game contexts"* and researchers' majority is based on it (Deterding et al., 2011). Gamified applications aim to increase users' motivation and awareness towards the use of ICTs, and the quality and quantity of the given activities' output.

Although the definition seems to be tangible, some further explanations are necessary. The terms "play" and "game" are used almost for the same reasons. In fact, their meaning differs. A play is a freer form with improvisational aspects, whereas a game is competitive, structured by rules and the aim is to achieve a goal (AlMarshedi et al.,2016). Deterding et al. point out that gamified applications are not characterised by the principles of the term "play" (Deterding et al., 2011).

In addition, gamification is based on motivational and behavioral factors. As the aim of this method is to engage users, developers of gamified services should consider users' needs, various characteristics, interests and preferences. The introduction of these factors in applications is a challenge, as developers have to combine psychological principles with software requirements. In that case, appropriate method for the designed of gamified applications are needed.

Among other domains, such as marketing and education, gamification has been implemented in Cultural Informatics. Culture concerns among other museums, music, theatre, art and social activities. Each nation has different characteristics, rules, habits, religion, so that, ICTs are related to them. Considering the benefits that are recorded in other domains, gamification can be utilised also in Cultural Informatics in order culture to be disseminated through a more entertaining and educational way. The aim of this paper is to enhance literature, by presenting the utilisation of gamification in CI more methodically, taking into consideration the culture principles that should be examined during the design of such applications.

The rest of the paper is organised as follows. In Section 2 game elements and the utilisation of gamification in several domains are described. In Section 3 the Cultural Informatics domain and the implementation of gamification within this domain is presented. Finally, Section 4 concludes the paper.

Utilising Gamification

In this section, the aim is to present how gamification has been utilised in several domains, presenting examples and the use of game elements in each case.

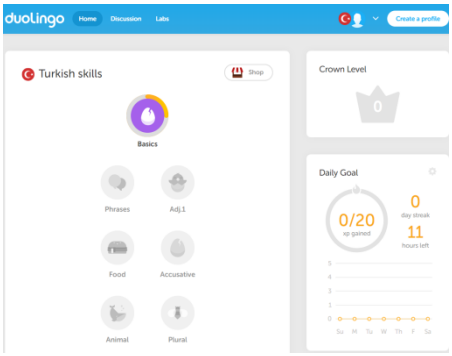
The difference between the gamified applications and games is mainly based on their aim and their interactive environment. Gamified applications aim to increase user engagement and on the other hand games aim to entertain users. ICTs that use gamification consist of game design elements, thereby provide «gameful» environments and experience to the users. Game design elements should be meaningful to the user and result in positive change in the user's mind in order to achieve user engagement. Such elements are the *profiles*, where users can represent themselves with *avatars* and create their own *role*, the *narrative context* of the application, the offered *alternative activities*, and the generated *feedback and progressive information* in order the user to be informed for his actions and status; moreover, *time constraints and challenges* intrigue users during the interaction with the applications. In addition, game elements include *scoring systems and leaderboards*, where users' results are compared, *competition* under explicit and enforced rules or team tournaments, where users have to complete group tasks and to *collaborate* in order to get *badges, trophies and rewards*, *points*' collection in order to pass several *levels* by answering, for example a *quiz*. *Notifications, communication parts* between users and *virtual worlds* with two-dimensional (2D) or three-dimensional (3D) graphics can be used to create a "gameful" environment, as

well (Seaborn & Fels, 2015; Mora et al.,2015; Morford et al., 2014). To apply all these elements in applications a number of published frameworks can be implemented and most of them where published in 2013 (Mora et al.,2015).

The utilisation of gamification in several domains has been increased during the last years, offering varies benefits, depending the aim and the concept of each sector. Due to the large amount of them, the most cited applications in the literature of each domain were selected to be described in detail.

In *education*, the use of gamified applications increases users' interest and motivation, and consequently, users' awareness. A language learning application, named "Duolingo", was launched in 2012 by Luis Von Ahn and Severin Hacker with more than 4 million active users monthly (Yu-kai Chou, 2018). Several languages are offered and can be selected by users, who have to complete tasks in order to pass different levels and get rewards. In this application, game elements among others are the levels and rewards, and the 2D graphics with bright colours and icons, which make a more noticeable and entertaining environment for education (fig.1).

Figure 1. Duolingo-a language learning application



Other examples, among others, are the gamified applications *"GamiCAD"* , designed for beginners who want to learn how to use the design software application "AutoCAD", and the application *"StudyAid"*, a collaborative e-learning system which was developed for students to learn course material and study for a final exam. These applications include a number of gamification elements, such as missions, scoring (numerical and qualitative in the form of stars),game levels, time pressure, mini-games, rewards and others (Seaborn & Fels, 2015).

In *marketing* domain, gamification is quite useful, as it facilitates products' promotion. The rapid development of technology has prompted many companies to find new ways for the advertisement of their products. In 2012, Nike company introduced the Nike + Fuelband application (Yu-kai Chou, 2017). The application is associated with a bracelet, which contains a special technology that records the user's movements and aim to motivate users to exercise. Using this bracelet, the user can see his performance as it keeps record of user's data. In addition, users can challenge their friends and the results of this competition are presented on leaderboards. So that, challenges, tournaments, trophies, points, leaderboards are some of the game elements, used in this application (fig.2). Nike + Fuelband has been used by millions of people, supported the advertisement of the company and increased its income.

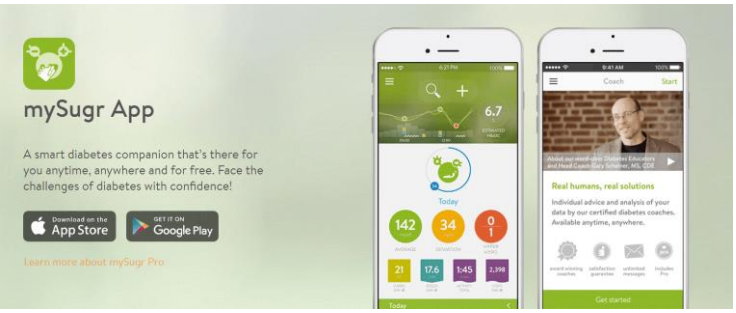
Figure 2. Nike + Fuelband application

Another example is the gamified application *"My Starbucks Reward"* of the Starbucks company, where users win stars and gifts by purchasing products (Yu-kai Chou, 2018). The application is well designed with attractively graphics, which represent the rewards, user's status and other elements.

Regarding *health* domain, an example is the application *"Mango"* which reminds users to take their medication by reminder alerts and then, patients earn points (Yu-kai Chou, 2016). As they follow the schedule, they earn larger rewards such as gift cards for several companies. In this way, users are educated, so that, their medication to become a daily practice. In addition, American Red Cross company in partnership with Disney created a children's application called *"Monster Guard"*. This mobile app prepares children aged 7-11 to deal with any health issue (Yu-kai Chou, 2016). Children can learn to protect themselves and are educated to be in readiness in case of an emergency. Users can also share their knowledge and experiences with their friends and in this way, they can educate each other.

Furthermore, Rose et al. studied the use of the *"mySugr"* (fig.3) mobile app to conform users' behaviour with diabetes (Seaborn & Fels, 2015). The results show that frequent sugar measurement was improved by 10-20%. Also, the quality users' life seems to have been improved and the 85% of the users continued to use the application. Avatars, 2D graphics, levels, points challenges are some of the game elements, these applications include. The use of gamified applications in health domain is of utmost importance, while several health issues can be diagnosed.

Figure 3. "mySugr" application



In *business* domain an example is the application "Samsung Notation" (fig.4). Samsung company aimed to increase its relationship with its consumers, so that, designed this application to engage users to participate in Q&A discussions with other users, watch videos, review products, and other activities. For this participation, users are awarded with badges (Stanley, 2014).

Gamified applications have been also designed for other domains, such as environment, tourism and sustainability. According to the above examples and the accomplished records of use, gamification is a method, which can be utilised in several domains and its principles can be adapted on the concept of each case. Varies benefits are offered, including among other users' education, products' advertisement, prevention of health issues and the promotion of different places.

Figure 4. "Samsung Notation" application

Disseminating Culture through Gamified Applications

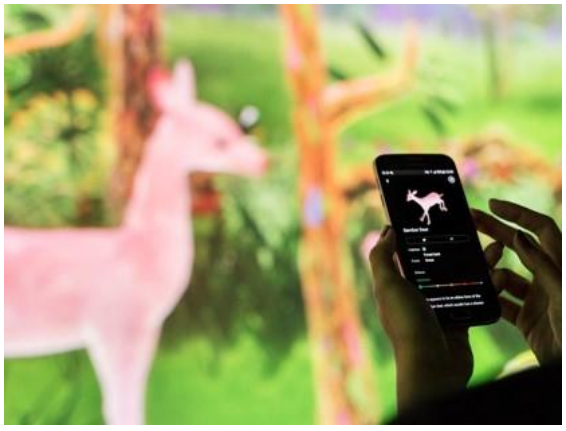
Once the method "gamification" and its utilisation in several sectors were described, in this section, the aim is to describe how gamification can be utilised more methodically within Cultural Informatics, indicating the necessity of users' awareness increase.

Hofstede defined culture as "a system of patterns that differentiates people of one group from the other." (Hofstede, 1997), and Usunier and Lee argued that culture is "a combination of shared habits and meanings, interpreted within a particular context" (Usunier & Lee, 2005). Among others, habits, customs, traditions, rules perceptions, motivation, learning, group influence, social class, female/male roles, attitudes and decision-making shape different cultures. Culture is a historical phenomenon. Each nation differs in the way of life, the language, the religion and so on. Even within the same nationality, groups have different characteristics and culture. Culture concerns architecture and monuments, literature, music, traditional and audiovisual artistic performing arts, traditional and digital plastic arts, photography, cinema, social and cultural activities, sports and games, aesthetics of nature and landscape (Vernikos et al., 2005).

All the above cultural categories are connected with Information and Communication Technologies. Cultural Informatics are those activities that primarily deal with cultural goods, whose value derives from culture. A huge amount of applications, whose main concept is culture, has been designed and used on a daily basis. In these applications, techniques, such as 2D/3D graphics and animation, augmented and virtual reality, have been implemented (Döpker et al., 2013). An example is the application *"Story of the forest"* (fig.4) , which is available at the National Museum of Singapore since 2016. Users shoot the items of the museum, using their mobiles and the application provides information regarding each item (WenYi, 2017).

Gamification is a method, which can be combined with such techniques, mentioned above, in order to increase users' motivation and awareness towards culture, engage them in cultural activities, and provide more educational and entertaining interactive environments. In gamified services, culture could also influence the way people relate to each other. According to Khaled competition, information sharing, normative activities, interdependence and sense of community are six components of relationships between people enhanced by gamified applications (Khaled, 2015). People have different psychological beliefs, perceptions and habits, so this can be expressed by the promoted dynamics of gamification. When designing gamified cultural applications, appropriation, cultural representations and the creation of subcultures are three classifications that should be considered (AlMarshedi et al.,2016). Cultural appropriation concerns the game's mechanics, storyline and interface of designers from a different culture (Vasalou et al. 2014). Cultural representations include the different colours, icons, symbols, pictures, time formats, jargon and abbreviations among different cultures (Bourges-Waldegg and Scrivener 1998). An example of a gamified application in CI domain is located at the Galata Sea Museum in Genoa (Italy). This application is a multimedia pre-show of the Nazario Sauro submarine. First, visitors have to complete their enrollment in the submariners' school and then, using touch screen interfaces, they learn about shipboard life and instruments (periscope, hydrophone, etc.). Users have to complete successfully simple tests in order to earn a "submariner diploma" (Pantile et al., 2014).

Figure 4. Story of the forest



The question is how gamification can be utilised more methodically within Cultural Informatics, so as culture to be disseminated through a more educational and engaging way. In fact, the design of gamified applications is a challenge for traditional software developers. This method is based on motivational and behavioral factors, so it is complex for developers to introduce such factors into systems in parallel with software requirements. Gamification is

more psychology than technology and the development of motivation is an important factor to consider. Motivation is defined as *"the desire to perform an action"*. There are two types of motivators; namely the "intrinsic" and "extrinsic" motivators. The difference between them is that intrinsic motivation concerns the internal desire to act out enjoyment, whereas extrinsic motivation occurs when people act expecting an outcome (Ryan & Deci, 2000). In gamification, both types of motivators should be used to keep the user interested in the activity and to drive user's behavior (Xu, 2012). In order to change or influence behaviour through gamification, it is important to understand how behaviours occur and what motivates the users. In the subsection 3.1, the aim is to describe how gamification cab be utilised more methodically within CI.

Application of Gamification in Cultural Informatics

As it was reported previously, the design of gamified applications consists a challenge for software developers due to the factors that this method is based on. The point of gamification is to motivate and engage users, and consequently, to achieve it, developers should consider users' preferences and interests (Nicholson, 2012). Thus, users' awareness concerning culture will be increased, considering the differences of each culture, as mentioned above. Although there are some frameworks for designing gamified services, they do not examine this challenge. Nevertheless, a method which examine this challenge was presented by Morschheuser et al. Namely, as detailed below, it concerns a complete method for engineering gamified software which include seven phases and 13 design principles, assigned to each phase.

The first phase of this method concerns the *preparation of the project*, where it is crucial to assess if gamification is applicable to the project. Other processes, such as the creation of the timetable, the budget, the identification and definition of project's objectives should be completed during this phase. The next step is to identify the context of the application and to focus on users. During this phase – *the analysis phase* – it is important to define the target group, including age, gender etc., in order to understand users' needs, interests and preferences. Through this process, developers will be able to understand how the product will motivate, engage users and consequently, how they will interact and behave with the product. In addition, the different cultural representations and appropriation, analysed in the previous section, should be considered for the design of a project regarding culture. The challenge of designing gamified applications, analysed previously, is examined mainly during

this phase. The third phase – *the ideation phase* – includes the brainstorming, where developers create list of ideas, focusing on user needs and involving users, as well. Once developers have completed the previous steps, the design of the prototype starts. This prototype should be evaluated in order to test gamification design ideas as early as possible, considering legal and ethical constraints; the different rules and habits between cultures can be considered in this step. During the *design phase* users can participate, as well. Next, developers decide the type of the *implementation* and apply gamification features. In addition, they use play testing to examine if the target has been achieved and share the pilot product to, afterwards, evaluate it through evaluation methods, such as surveys and interviews. During the *evaluation phase* it is important to investigate whether the developed gamified software meets its predefined objectives. After all these processes, developers should *monitor* the product in order to record a list of improvements and re-design the product if it is needed. All these phases are appropriate for the design of gamified applications in culture domain, as focus on users' needs, behaviour, assess their preferences and interests, so that, behavioral and motivational factors are examined (Morschheuser et al.,2018).

CONCLUSIONS

This study yields some interesting findings. First, the method of gamification is described, citing details regarding its definition, implementation, principles and benefits. Afterwards, the implementation of gamification in Cultural Informatics is examined. The game elements, the main principle of gamification, has been applied in varies domains, offering the benefits of this method. Implementing game elements in applications, a "gameful" environment is created. Gamified services aim to increase users' motivation, engagement and awareness. Such benefits among other are users' education, products' advertisement and prevention of health issues.

As it was mentioned, the main challenge for the design of gamified application is the combination of motivational and behavioral factors of gamification with software requirements. The solution of this difficulty is to consider users' needs, interests, preferences and different characteristics during the design. Regarding Cultural Informatics domain, such issues should be examined during the design in a combination with the principles of culture, as each nation has different habits, rules and characteristics. The paper aimed to enhance literature, by presenting gamification utilisation more methodically within Cultural Informatics, so as culture to be disseminated by a more educational and "gameful" way.

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