Conceptualization of Serious Games Used for the Dissemination of the Historical and Cultural Heritage in Colombia

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Abstract. Nowadays the use of new technologies of information and communication ICT, together with new paradigms such as the use of serious games, bring new elements in the dissemination of the cultural heritage of cities allowing it be addressed in a way different to those used traditionally, motivated by social and cultural changes for impact to society. This article presents a conceptualization of serious games applied or used in the field of the dissemination of the cultural heritage in Colombia, emphasizing the actors working in the area such as the development of dedicated software companies the creation of serious games whose purpose is to disseminate history and/or Colombian culture and local academic (universities and research groups) providing knowledge in the area, to achieve these objectives we did a search of scientific articles clasificandolos by the themes of the authors creating, an initial draft for the characterization of serious games focused on the dissemination of the cultural heritage, as results review is presented a set of focused serious games to the dissemination of the cultural heritage and a set of features basic operation that will be input to the future work proposed in this article.

Keywords: serious games, cultural heritage, edutainment, educational content.

1   Introduction

This article is based on a review of theoretical, where the main focus is the exploration of serious games, understood as a product of technology that seeks as well as the entertainment and fun as basic game elements, taking into account aspects as the information on a specific theme, product, or service. Serious games are introduced as a new modality, where the objective is to provide the user with an innovative and fun environment whose added value is, train, learn or even get advertising. According to Mercano B [1], this has allowed this type of technology to be applied in different fields such as: medicine, the military, education, research, advertising among many others. Serious games are classified according to their communicative purpose, oriented theme, target audience and/or work area explored and are focused to communicate, generate valuable information and some awareness about various themes. In this case we have

studied the games that seek to inform and disclose the historical and cultural heritage in Colombia. This type of game is listed under the category of Edutainment, which is understood according to [2] as a combination of methods and types of training that combines the presentation of educational information with elements of entertainment. Its objective is to motivate students in the learning process to increase the capacity of retained information and the ability to transfer to different fields of application.

In recent years, the dissemination of heritage in different countries and especially in Colombia, has taken importance and interest due to the progressive loss in new generations of knowledge of the history and the cultural aspects of the cities, losing an intangible tradition of identity of peoples.

The article is structured as follows: section II presents the conceptualization of serious game, cultural heritage and value of patrimonial serious games; section III describes the methodology that was followed in the process of exploration and finally, section IV presents the results of the review where they are different games and a description of basic characteristics, in which it was in both has developed products in Colombian companies focused on the development of this type of products and research groups with interest in serious games line.

2 Serious Games Fundamentals

This section sets out the general concepts on which is based the research: initially becomes a theoretical approach to the concept of serious play and the relevant elements framing, then a brief description is made of the important aspects of the cultural heritage and as they are regulated in Colombia and finally the third part presents serious games that have been used in the dissemination of the cultural heritage and some features as the platform and the availability of the game.

2.1 Serious Games

Serious games are a technological tool with a purpose that goes beyond having fun, including purposes as educate, train or inform as opposed to a common game, which only seeks to have a good time. The word 'play' is used to represent everything about fun, which in some scenarios could be interpreted away or in opposition to the concept of "seriousness", [3], the game is considered by some authors and sectors of society as a way of enjoy the time free [4] and attributed to him teaching elements that contribute to other fields of action. [5] [6], table 1: classification of types of game, mentioned four existing classifications according to [7] on the game.

The term "serious" indicates the responsibility, good sense, reality and actions included within the product; by joining these two concepts will get the term "Serious games": according to Ludus "these games can be played seriously or casually the interest will have an explicit sense by its educational purpose" [8]. This serious game concept allows users take a roll in from the mechanics and the dynamics that the game has immersed will have the opportunity to experience the success of achieving goals and overcome challenges, and in the case of errors, deal with it as a mechanism for improving and learning [8]. Serious games are used for several purposes, between what is: e-learning, training, simulation, collaboration, advertising, business model. They are

used in the industry and sectors such as: military defense, education, business, scientific exploration, health care, planning cities, engineering, religion, tourism and virtual conferences [9]. In Fig. 1: Serious games according to [10] relationship, the relationship of existing categories of serious games is presented.

Table 1 . Overview on the classification of types of game [7].

Classification of Game Typologies	
Psychomotor Games	Body knowledge
	Sensoriomotor
Cognitive Games	Manipulative [construction]
	Exploratory or discovery
	Attention and memory
	Imaginary games
	Language games
Social Games	Symbolic or fictional
	Of rules
	Cooperatives
Affective Games	Role play or dramatic games
	Self-esteem

Fig. 1. Relationship of serious games source: TIA-017]

To better understand Fig. 1, it is necessary to understand the terms that make up the great dimension of serious games, initially appears the concept of e-learning, according to aunt [10], refers to the relationship between the education and training via the Internet. This type of teaching online allows the user interaction with the material through the use of various computer tools, concept that is supported through the development and the advancement of information and communication technologies ICT where the information society plays an important role as it seeks an interactive learning. by users (students) who finally are those who receive significant benefits such as the large number of accessible content to accelerate the training process, increasing access to training processes and reducing costs in most of cases; Similarly in the graph shown included the concept of gamification which indicates the application of mechanics and dynamics of the game which aims to motivate people. According to

[11], the gamification is an instrument linked to business and marketing used or applied to positively contribute to recruitment processes in different themes, promotion of products or services, even beyond this promote the its adoption, [10], the gamification and serious games, try to take the best from the games and video games to support different activities in the real world and generate useful applications to users through the dynamics and the game mechanics mainly in marketing and other areas.

Finally, in Fig. 1: Classification of serious games is summarized as follows by answering a basic response to the above at the beginning of the article: product can be considered as a serious? Serious games are a proposal that combines the previous tools. In a final formula might look like this (see Fig. 2):

Fig. 2. Composition of serious games.

The Gamification as motivational strategy seeks to strengthen it and so it has begun to include stories that will positively impact the process and contributing to the improvement of digital content.

The Fig. 3, according to [12], presents the classification of serious games, which will help to understand how located on them focused games at the culturlal heritage.
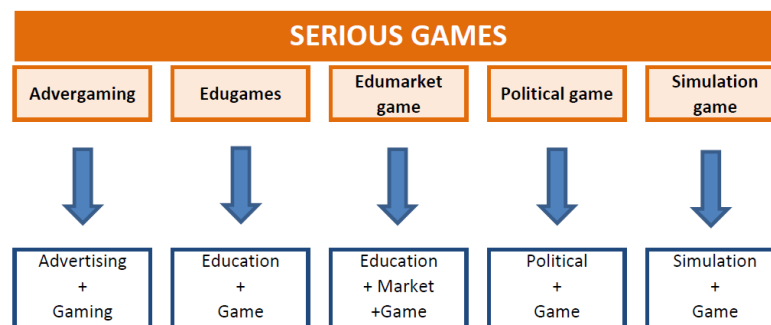
Fig. 3. Serious games for culturlal heritage.

According to Fig. 3, relates the familiarity of serious games in the category of educational games [13], and this close relationship is where it is considered position, classified at the same time in Edutainment. The concept of "Edutainment" [14] involves the incorporation of "educational resources" in teaching-learning processes to encourage and facilitate the achievement of the goals and in this way make fun and innovative process for who you are carrying out.

2.2 Heritage

In Colombia the entity that regulates everything related to heritage and culture is the Ministry of culture [15], but the regime or special regulation of the Cultural heritage of the nation, is now fully integrated in the 1185 Act of 2008, which refer this article as the law of heritage Cultural or, more briefly, as the law of heritage. It is a regulation aimed at developing the key elements of the heritage, and which designates as explicit objectives with respect to this acquis, the provide means of safeguarding and protection, recovery (solution to harmful trends or risk measures), sustainability (co-financing that now allow the presence of assets and manifestations and mechanisms in the future) and disclosure (knowledge, recreation and people's access to assets and manifestations and their contexts).

This doesn't only mean that you must be able to appreciate it and enjoy it anytime, but it also means heritage, it should become an engine of economic and social development of the communities and should primarily affect positively in the quality of life of all Colombians who through projects and programs like however, it is necessary to point out that the law on Cultural Heritage focuses and develops a special regime of protection, safeguard, sustainability, in an integrated manner disclosure and stimulus to the real and personal property of that heritage which by its special values acquire, by using predefined procedures, the category of goods of Cultural interest, for which the acronym BIC can be used hereinafter.

Also focus on such a special regime in the demonstrations and activities of intangible heritage [sometimes called intangible, even though it's a discussion term] to be incorporated, given its special characteristics, and through a complex network of stages, to an instrument referred to representative list of Intangible Cultural heritage, for which the acronym LRPCI can be used thereafter. The special regime which is given to the goods of Cultural interest is called a special regime of protection, and special scheme for safeguard which is projected onto the demonstrations incorporated into the representative list of Cultural Heritage Immaterial, which involves the immediate adoption of a Special Plan for safeguarding - PES.

Llorenç Prats [16], defines the term heritage as those elements that represent social, cultural, and historical events which have generated an impact in a collective or social group considering not only the importance of their conservation but also the form is transmitted from generation to generation. Similarly heritage is considered is a social construction based on different ideologies, customs, experiences and stories [16,17]

2.3 Serious Games for Cultural Heritage

From the concepts presented by several authors, is considered the existence of a relationship between the serious games and the cultural heritage, according to Mortara *et al.* [18], deduces that all serious games for the architectural heritage and natural must include puzzles and puzzles, proposed including the gamification and playability that facilitaria understanding of issues, taking into account that the puzzles are intended to collect, combine and use objects allowing interact with other people, these games are enriching because the player meets with an approach of "learning by doing", i.e., the player learns through the construction of their knowledge to meet a significant activity in this approach the Player does not passively receive information but that is actively constructing new knowledge through it in moving the plot of the game.

Moreover Rhim *et al*. [19], concludes that, without heritage, the identity of the community is at risk; Therefore, the preservation of the cultural heritage is important within the social development. One of the best ways to preserve the legacy is to increase awareness of its importance for some people learn about heritage could become tedious if traditional techniques are applied which involves the protection of heritage is difficult or requires much effort. This reflection suggests an easy and entertaining method of for young adults. Serious games are an interactive way of transmitting learning [20]. For example the keepers is a serious game designed to be played on mobile devices. In accordance with Smartphone property report from 2013, 156 percent of American adults own a Smartphone of some kind. As indicated in the report, many people have mobile devices and research shows that mobile technology offers learning in a natural environment [21].

Therefore, playing serious games on mobile devices has the opportunity of learning. With the incursion of these technologies is would have the possibility of improving the process of learning about the cultural heritage in search of increasing awareness of people improving the willingness to participate in the preservation of threatened heritage.

3 Methodology of the Patrimonial Serious Games Review

The methodology proposed for the development of the work is composed of five phases: (1) identification of search, (2) selection criteria and classification of primary education, (3) develop a protocol for review, and (4) analysis of the results (see Fig. 4) is presented below, the description of the various phases of the methodology.
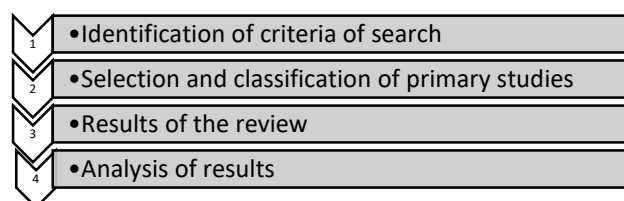

- 1 •Identification of criteria of search
- 2 •Selection and classification of primary studies
- 3 •Results of the review
- 4 •Analysis of results

Fig. 4. Phases of the methodology processes. (Source: author's own).

3.1 Development of the Methodology

In the process of investigation into the serious games focused on cultural heritage in Colombia search work was divided into five phases:

Phase 1: identification of criteria of search

A. search for scientific articles, PDF, books related to "Categorize + Serious Games + Heritage" search criteria.

This first stage refers to the identification of relevant games to the theme "cultural heritage" by conducting a search of scientific articles on serious games accessible through the World Wide Web., this stage consists of the following steps:

Search. to identify the set of lead articles: documents have been selected based on the key words "Categorize + Serious Games + Heritage". In the process of digital

databases search sheds large numbers of results, with those numbers take the first 20 and checked if these are consistent with the line of research that is developing. Below is a more specific search for the games in Colombia, thinking that some developments only count with the publication of the final product but there publications in revisstas and books.

B. search for Colombians serious games for cultural heritage "Categorize + Serious Games + Heritage".

Articles results: after the filter by words, reading abstract and introduction are deliberate and get 2 items correct and helpful for the construction of this article about Colombian serious games for cultural heritage; for this stage, it consists of the following steps:

- Identify the set of serious games: this is needed to have clarity of the key concepts for the search on web, trying to focus on the Colombian articles.

- After deliberating for names and location are obtained 3 articles that are in line with the theme of Colombian serious games for cultural heritage. We did a search pages directories of games development companies using as a basis a list of Colombian companies, software developers and was a filter according to the category of execution, this information can be found in table 2 Relationship of games found in Colombia, which presents important for the evaluation of the games features such as: availability, type of video game, durability and a brief description of it.

- For a correct selection took into account the different digital such as Google Scholar, DOAJ, IEEE, SciELO, OARE databases and other 30 bases free access on the internet, where the exclusion and inclusion criteria were selected the articles relating to the serious games for heritage project

Phase 2: selection and classification of primary studies. Once carried out the searches, are proceeded to select the material that contains important information and useful for the subject that is working, how long the process will use a reference management tool, which in addition to removing duplicates it provides access to any of them and generates a repository of references which can be consulted at any time. The time of execution of this phase was three months, used digital as SienceDirect, SciELO, ACM and IEEE among others databases.

Other collected information, was held also a classification of products was published in the application stores mobile and developments published on the internet for use without support of scientific literature, this genre also proximity with certain companies that develop such products, generating information value to the project.

Phase 3: results of the review. As the search results strengthens several examples of games and business developers in Colombia in the table 3 games found in Colombia, where the objective of the game is mentioned.

Table 3. Relationship of games found in Colombia.

Web site	Name	Availability	Types of video games	Information
	Museum Santuario de las Lajas	Yes	Educational arcade	It tells the story of the shrine of the Virgin of las Lajas and the apparition of the Virgin. The player must complete the proposed challenges during which is knowing the place and pick up the rewards.
12hitcombo	Santander	Yes	3D interactive virtual tour	Santander tourist is an interactive virtual tour in 3D, which presents 30 of sites representative of the Department of Santander, in Colombia, where the user explores and learns to close to them as you use the application.
Colombiagames.com		If for iOS 4.3 or later Compatible with iPhone, iPad iPod touch ad		The purpose of this application is to explore ecosystems and the creative culture of different indigenous ethnic groups of Colombia. Its aim is to introduce children to the mystic and natural world of the ancestors, using games with games.
Colombiagames.com		If for iOS 4.3		They narrate the indigenous stories where looking for users to know the ancient knowledge
Colombiagames.com		Yes for iPhone		Travel from different parts of the Colombian territory, looking for objects that have a deeper meaning in the myths and legends of the country.
Dinomotion.co	Heroes of the fatherland: The Pola	Yes [Android and PC]	Fighter	It refers to the historical fact of the independence of our country, in which re tells the story through the Pola, heroine of independence.
Dinomotion.co	Roots of Armero	Yes [Android and PC]	Virtual tour	It refers to one of the tragedies that has marked Colombia, in which in addition to a tribute to the victims recreates the architecture of the town erased by a natural disaster and thus their traditional stories.
Dinomotion.co	XTUR	Yes [Android and PC]	Virtual tour	X-Tur your Mystic offers a tour pro's Honda - Tolima. Known for its beautiful architecture.
Plantagamer.com	Balam TikTok Verdetopia	Yes [Android and PC]	SG heritage	It presents different games and virtual tours that provide not just from the safeguarding of the colonial heritage but also to the preservation of the environment in Colombia

Phase 4: analysis of results. To conclude, at this stage, it is concluded that in Colombia several heritage serious games have been developed unfortunately some of the projects are not published and have a purely academic scope, which aren't available on platforms, as way there is no scientific publications and nor has its impact measurements, what is could achieve generating availability to be used in schools, universities, tourism, history, geography education where they take advantage of these resources. From the information contained in table 1, was conducted a review of companies with a response of the at where is allowed to obtain interviews with some

of them, highlighting the main features in the development of serious games whose objective is the dissemination of the heritage.

Initially the interviewees spoke about their experience of creating serious games for the Colombian cultural heritage, exponiento that his main goal is to tell the stories of Colombia in a different way, without losing its authenticity, from which is emphasizes the motivation that produces focus digital products to cultural heritage taking to another level the dissemination of the same, usually showing the history and culture of small towns, or villages disappeared by weather or disasters natural and its impact not only in the history of the country but also in the wealth of their traditions. The companies agree on the importance of "make known our stories", not only those Reals that occurred at times historically known as the conquest and the colony, but also those that belong to the oral traditions transmitted from generation to generation.

With respect to the target audience, in general the idea is to be school-age children, although any user is able to use the game, focus on this population and therefore in educational institutions, seeking sponsorship in entities NGOs such as the ministries of culture, the municipal authorities and the departmental governorates which foster the dissemination of information relating to the heritage or in some cases by looking for resources, this last aspect generates disadvantages for developments.

As for the team, it is necessary to have professionals in different discipline, although the selection of members is closely related to the type of product that is expected to develop, in general educational equipment is required historians, pedagogues, teachers of history and geography], programmers, graphic designers, animators, illustrators and experts in project management. In the majority of cases, firms hire part of the members of the team project, however, in the case of companies that already have a track record, the company's permanent staff is considered. In some cases, these people move to the geographic sites in which were the facts that you want to count on designed plays, in order to carry out research respects the facts, characters, and situations that surround it.

Within the relevant elements that highlight companies is that the construction of the story is considered of much importance, this consistency with the name and the design of the game, and the inclusion of the mechanics and dynamics of the game adapted to the story These elements are fundamental at the time of the design, construction and development of the game.

4   Conclusions and Future Work

Heritage serious games developed by Colombian research groups and companies appear to be interesting information of the architectural and cultural riches of our country, the oral traditions that are handed down from generation in generation and culture of the Colombian people, in a way attractive, interesting, striking and innovative, showing the talent that you have for this kind of developments aimed at safeguarding and dissemination the heritage and history of the country.

While there is a great potential in games seriously with respect to disclosure of the heritage and its care, exist in Colombia companies engaged in development this types of games however details of their products and measuring the impact that these they generate in the society and the public goal of their products is not found, despite this there is a great interest of the Government generated calls as MINTIC, creates Digital,

App, Digital living, who financed the development of this kind of applications, however requires that these applications are actually available to the greatest number of people, massive and not only in programs such as computers for education, where the percentage of people covered is very small, underused potential of these resource

Has begun a process of exploration of these types of games around the world, you will allow to establish as the development and dynamics of games, at what level this Colombia to other countries, than disclosure strategies are globally , and work can be done to increase the impact of these games in our country.

In addition, a guide of the characterization for the construction of serious games in the dissemination of the heritage and culture, projecting this work as basis for new ideas in creating serious games, is ahead at this time where would have a check list to the objective of the game is reached.

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