The 21st Century Knowledge And Learning Heritage Experiences And The "Digital Native" Generation

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ABSTRACT
Children heritage education, knowledge, and awareness, through the conceptual approach of "Edutainment" and "Serious Games", should be considered as one of the most critical issues in our digital age. This paper describes the state of the art, the kind of existing initiatives, and comments about the main results achieved by the digital heritage multimedia. It aims at improving the awareness of institutions, curators, educators and producers about the potentialities and importance role of such a learning experience technology, in order to let children have a more active role in the enjoyment, appreciation of cultural heritage, and prepare them for future actions for heritage protection and preservation. The paper will discuss: Why should we develop methods to promote appreciation, knowledge, and care about cultural heritage issues among children. How we can better utilize the powerful and effective learning tools of digital heritage multimedia and serious games to inspire young children to learn more about cultural heritage, antiquities and conservation issues. Taking into consideration that there is a growing body of research on the effectiveness of online serious games, the paper attempts to illustrate what and how we should consider and seriously deal to reach the "Digital Native" generation through the application of technology to heritage to become a feasible recreation edutainment tool, a common project lexicon, support and promote access to and reuse of digital cultural heritage resources.

INTRODUCTION
As part of human history, all tangible and intangible heritage will be shared by all people. ICOMOS (International Council for Monuments and Sites) Charter in Article 3 says, "The protection of heritage should be considered as a moral obligation upon all human beings; it is also a collective public responsibility". In Article 9 states, that the archaeological heritage is the common heritage of all humanity and international cooperation is essential in developing and maintaining standards in its management. It also states that "There is an urgent need to create international mechanisms for the exchange of information and experience among professionals dealing with archaeological heritage management". The above mentioned may hardly be obtained if we take into consideration all the complexity of works regarded as protection, preservation, and conservation. According to Henning (2012, p.593) "Local commitment and participation should be actively sought and encouraged as a means of promoting the maintenance of the archaeological heritage". But what about children, the future heritage professionals, in all these scenarios?

Children become what they live. Heritage speaks experiences common to children everywhere. It has long been recognized that teaching children about cultural heritage and archaeology is essential to preserving history (Smardz and Smith, 2000). Actually, heritage themes could be also used even efficiently to teach children some principles of other social and physical sciences. For a child, digital media belong to his common life as part of socialization processes of knowledge. Digital technology is revolutionizing the ways in which we are communicating with each other and perceiving the environment around us. Currently, there is a great variety of ways in exhibiting and disseminating cultural heritage assets all around the word. This fact is generating new theories of learning like "Conectivism" or "Invisible" learning (Benito, 2012, p.651).

Unfortunately, heritage education and awareness remains largely undervalued, with most efforts relying on in-person experiences informal cultural institutions. Meanwhile, there have been many preliminary applications of heritage edutainment multimedia technology, it was not adequate to make the required and hoped change. However, with the rich resources of 3D imaging and interactive programming already at our disposal, we are well equipped to do so, given a coordinated effort (Haddad, 2014, 2016).
This paper describes the state of the art, the kind of existing initiatives, and comments on the main results achieved by TV programs, online e-games and Muppets animation. The paper attempts to clarify, explore and investigate why and how heritage edutainment Multimedia can make a significant contribution to the "Digital Native" children understanding, curiosity, appreciation and care for cultural heritage, that integrate enjoyment, fun, play, practical and discovery in to children’s daily lives. It also attempts to propose some ideas, if we make the appropriate plans, which is as entertaining as it is intellectually challenging for young children of the 21st century. Based only on a collaboration of a multidisciplinary and creative teams, we can be ready to encourage children, as also parents’ even educators to look, explore, mind and care for the wonders of our cultural heritage. The methodological approach of this research is based on the following questions:

- Why we should develop methods to promote appreciation, knowledge, and care about cultural heritage issues among children.
- How can we develop methods to promote appreciation, awareness, and care of cultural heritage issues among children.
- How Children's edutainment conceptual approach can better utilize the powerful of the digital multimedia of the serious games to inspire young children's to learn more about cultural heritage, antiquities and conservation issues.
- What and how we should consider and seriously deal to reach the "Digital Native" generation through the application of technology to heritage to become a viable recreation edutainment tool, a common project lexicon, and support and promote access to and reuse of digital cultural heritage resources.

HERITAGE, MULTIMEDIA AND CHILDREN EDUCATION

We live in an information digital knowledge society. Heritage is not only a fascinating subject to learn, but also a vivid and real life experience, and without speaking about cultural heritage and "Serious Games", we cannot hope to provide the kind of education and schooling needed to carry us safely into the 21st century (Haddad, 2012, 2016). According to Susi et al. (2007, p.2) edutainment refers to "any kind of education that also entertains even though it is usually associated with video games with an educational aim". According to Anderson E. et al. (2009, p.1) the term serious games describes a relatively new concept, computer games that are not limited to the aim of providing entertainment, that allows for a collaborative use of 3D spaces, that are used for learning and educational purposes in a number of application domains.

Our nonrenewable cultural heritage resources are suffering and will continue suffering if we do not put forward the required and appropriate protections measures. However, the advances in multimedia and communications technologies continue to make the world a smaller place. Digital technology has changed our approaches to cultural heritage appreciation and promises to continue opening new horizons and opportunities. In addition, the rapid advances being made in delivering 3D interactivity e-games, over the internet, using Virtual Reality Modelling Language (VRML) is also making fast more feasible interaction with virtual historic monuments. Furthermore, Quick Time Virtual Reality (QTVR) software offers considerable promise as a visualization production system, as it is possible to incorporate interactivity, changes between scenes and sounds as a multimedia product (Haddad, 2013); this could play a major role to children, understanding, appreciation, and interpretation of cultural heritage.

In order to reach the "Digital Native" children, though, we must utilize tools already popular with them. From children's own perspective, during early years, play and learning are not always separate in practices (Einarsdottir, et al. 2009; Samuelsson and Carlsson, 2008). Children "Game experiences" are the most important part of their daily life, whether it be playing a casual game on their mobile phone and computer or playing a game with themselves. In fact, 2D and 3D animation, e-games, website games, outreach material and Muppet held children's attention. "Digital Native" children, actually, spend a considerable portion of their time playing e-games. E-games is one of the major forms of recreation because it is available in their mobiles, and can be done in indoor and outdoor spaces as well within the home environs. Game-based learning as new research in pedagogy is being rapidly developed. Shank and Kosma (2002) in their vision for twenty-first century education predict a model where schools, homes, the workplace, libraries, museums, and social services integrate education into the fabric of the community.

Due to digital technology, however, there is also an increasing gap between the traditional heritage experts and technical people and users involved in heritage digital multimedia. Meanwhile, cultural heritage research is increasingly aided by, and dependent on, digital multimedia, however, 3D heritage tools are still not popular among users in cultural heritage (Haddad, 2011). New technologies are sometimes difficult to rapidly assimilate by the multidisciplinary community involved in cultural heritage, while the practical aspects which most engage the user are both the interface and ease of access to data (Shank and Kozma, 2002).
WHY WE SHOULD DEVELOP METHODS TO PROMOTE APPRECIATION, KNOWLEDGE, AND CARE ABOUT CULTURAL HERITAGE ISSUES AMONG CHILDREN

Developmental accomplishments and cultural heritage manifestation are bound together, and, as a consequence, specific behaviours come to be synonymous with development itself. At ages 6–10 years, children shift from relying on visible racial cues and begin to understand cultural aspects of ethnicity such as language, food, ancestry and heritage (Ramsey, 2008). In the recent years, however, there has been a growing emphasis on the urgent need in involving children in heritage issues. In many EU countries, this particular effort of developing and bringing together culture and arts, education has been institutionalized by the creation of organizations and networks to promote arts and cultural education (Arts and Cultural Education, 2009). Yet, in many European heritages, childhood education communities’ cultural-historical theory has become increasingly influential for informing practice. Now, the notion of young children stepping out of the classroom to experience history, art and culture heritage as a living and breathing phenomena in their local environment has become alien to school life. Explorations of archaeology also have a great potential for encouraging children’s investigative skills and inspiring in them a curiosity and appreciation for our nonrenewable cultural heritage (Haddad, 2014).

By promoting enjoyment and interest in participating in cultural heritage practices, “Digital Native” children cultural heritage appreciation can be build up. Recent research and studies have highlighted the pressure for curriculum development in the arts in the 21st century, to include the study of multimedia in order to enable pupils to use Information and communication technologies (ICT) as part of the creative process (Haddad, 2012). This is a basic issue to create a generation that respect and be responsible for preserving their cultural heritage. However, there is currently a very limited number of e-games created for young children that target specific heritage developmental and edutainment needs in a quality manner. Meanwhile, some e-games use impressive heritage buildings, they do not directly discuss history or how to promote awareness in order to preserve and conserve heritage.

Most of the commercial games do not talk about the sites themselves but used them as settings to show heroes and bad people fighting and struggling each other (usually in a bloody way). Internet games, thus, greater aim are based on vandalism, war destruction and disasters (Haddad, 2016). Though, while these games teach children how to make tactics fight and win, they do not directly address issues of understanding and appreciating some aspects of cultural heritage. On the other hand, for digital native children, the traditional approach of introducing the local arts and crafts in their environment (e.g., pottery, mosaic, glass-work etc.), is not at all sufficient to understand and share with them the dangers facing our cultural heritage. As Plowman and Stephen (2003, p.160) note new technologies may lead to new concepts of play and learning especially as new ways are found of conceptualizing ICT so that the term does not simply denote standard computers. They actually need to teach lessons about cultural heritage, archaeology, and conservation more directly. By assessing the multimedia cultural heritage themes and tools, that addressing heritage, archaeology, and preservation, we can figure out from a quick literature review of heritage curricula, television shows, and games internationally, that these materials exist mostly in schools and museums.

HOW CHILDREN'S HERITAGE EDUTAINMENT CONCEPTUAL APPROACH CAN BETTER UTILIZE THE POWERFUL OF THE DIGITAL MULTIMEDIA OF SERIOUS GAMES

Heeter (1999) already had emphasized that we have only begun to realize the potential connectivity possible in a networked world. To inspire, however, young children to learn more about cultural heritage, antiquities, and conservation issues, taking into consideration that there is a growing body of research on the effectiveness of online “serious games”, there are some multimedia tools encouraging students directly to become archaeologists, but without emphasis on how to learn issues about preserving cultural heritage. For instance, the US National Parks Service (NPS) has a website for children about archaeology, how to become an archaeologist, and how to start your own dig (Haddad, 2014). The Archaeological Institute of America publishes a magazine for kids, called Dig, to promote youth interest in the field. There are, however, many such other interactive archaeology games online for kid, such as the British Broadcasting Corporation’s (BBC) “Dig Deeper,” which asks about ancient cultural heritage history (Haddad, et al, 2012). PBS also has a game called, “Be an Archaeologist,” where children have to fit together the pieces of a pot from a dig site. In the famous Sesame Street, which has aired for over 40 years and has been dedicated to addressing children’s critical development needs, and loved by children, respected by educators and trusted by parents, there is some cases precedent for archaeology and cultural heritage on the show. Sesame Street has also included brief discussions of archaeology, and many episodes incorporating holidays from various cultures. For example, in one episode explains also the profession of archaeology and several feature Indiana Jones parodies, as also “The Golden Cabbage of Snuffertiti” and “Ernie and Bert explore and Egyptian Pyramid”. In another
episode, “Big Bird in Japan”, he visits Japan, showing children the famous temples of Kyoto (Haddad, 2012, 2014). Although these projects teach children to understand and appreciate some aspects of cultural heritage and historical sites, they do not directly address issues of consciousness preservation and conservation. Sesame Street mostly uses heritage sites also for settings to teach lessons or tell stories, without addressing the history or the importance role of an archaeological excavation. Segments showing children or Muppets learning only about the profession of archaeology in not enough, while it is of importance to learn some basic information about the challenges facing our nonrenewable cultural heritage preservation and conservation. In addition, there are no attention of why and how children could be involved, by presenting some tips, that they can practice when visiting a heritage site. In fact Muppet characters that children already know, learn from, entertain and educate them, can offer countless possibilities as a platform for young children to explore and care about heritage and archaeological themes. Figure 1c shows an example of a virtual Roman audience reacting to a theatre play on stage after inserting some Sesame Street Muppets.

However, in order to interest children in these issues, it is essential to use the potentiality of digital multimedia tools. The creation, however, of cultural heritage applications for cultural heritage outreach material, digital edutainment e-games, even VR systems is a learned process with its share of challenges. Children TV programs should design a heritage-themed websites and games dealing with more about efficient use and management of cultural heritage. Actually, heritage themes and objects should to be used more efficient and creative ways to teach principles of other social and physical sciences in formal education. Therefore, there is a need to re-examine:

- How to create a balance between the content of heritage and the international cultural public in the knowledge industry? This could be started by addressing critical topics of cultural heritage resources, and to include more themes with the Muppets not only concerning archaeology, but also cultural heritage conservation and preservation issues and to explain why it is important.
- Why undertake restoration for heritage site? How to achieve restoration? How to suggest new ways to promote cultural heritage appreciation among young children in the future using multimedia resources, based on the different forms of "Digital Participation"; augmented reality, or App for Smartphone and tablets, social sharing to be used. Nowadays the digital resources are being used for open-air heritage sites or art museums (Benito, 2012, p. 651). The generation and reconstruction of historical and archaeological experiences, using the techniques of computer animation, can also raise public awareness, while it is not always so easy to visit the historic sites. For example, Sesame Street outreach material by their famous Muppets (see Figure 1c), with some modifications could be the foundation for many e-games allowing children to experience what is heritage, Archaeology, and conservation for?
- What are the problems and solutions? What technique? What material? In what state? what for? Though, we need to seek for new and more attractive content to teach the "Digital Native" children more about cultural heritage, archaeology and conservation issues through the digital cultural industry.

A general review of the range of projects in the field of ancient cultural heritage and archaeology described as virtual heritage, show numerous examples of virtual environments build as reconstructions of historic sites but many sterile and devoid of population. Up to the present, there have been few examples in the field of fully interactive, real-time models that have been published to the Internet (Haddad, 2014). However, Virtual heritage and archaeology, recently, start to play more significant role than before, in exploring issues involved in creating immersive cultural heritage projects. Thus, enhancing our perspective and understanding of the environments in which our ancestors lived and worked. A well designed, age-appropriate, and culturally sensitive educational and e-games activities during the early childhood years must be provided to facilitate positive interaction with the greater environment, and foster learning of an array of social, emotional and basic cognitive skills. VR hardware and software can play a major role in the creation of a number of educational and cultural heritage programs targeted at the widest possible audience on many levels (Gaitatzes et al, 2000). By mobilizing multimedia as a tool to expose children to the values and achievements of cultural heritage, appropriate e-games and activities, can help children gain positive social relation skills requisite to appreciating the diverse world cultures in which they live.

DISCUSSION AND SUGGESTIONS
Heritage knowledge is a unique key to understanding the world different cultures and human creative themes. Digital cultural heritage participation enable children communicating and interpreting heritage in creative ways. The question is: how can we give children the knowledge and skills to make informed decisions about their cultural heritage? Nobody can imagine that we invest 3 billion hours weekly playing online games
This also means that we invest daily about 0.43 billion hours, from which children actually spend a considerable portion of their time playing e-games. Gamification and learning design, represent a new, complex area of design development for the game world. The pedagogical approach of serious games is a new tool for presenting heritage multimedia information. A Google-search for edutainment in compression with serious games illustrate clearly the worldly wise position of the serious games. Table (1) shows that there is an extreme growing body of research on the effectiveness of online serious games as a creative learning tools and the subject of serious games is rapidly spreading. Van Eck (2006) and Susi et al. (2007, p. 2) considered that the edutainment software was a failure "since it resulted in what has been described as boring games and drill-and-kill learning".

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<tr>
<th>Date</th>
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<td>2007-01-03</td>
<td>serious games</td>
<td>1,1 million hits (Susi, 2007, 2).</td>
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Table 1: A Google-search on edutainment in compression with serious games, based on date and Google renders.

By mobilizing multimedia as a tool to expose the "Digital Native" children to the values and achievements of cultural heritage, appropriate serious games, can make possible children gain positive social relation skills requisite to appreciating the diverse world cultures in which they live. In fact, we are only at the beginning of the rapid evolution of serious heritage games technology. A growing number of projects are currently based on Augmented reality (AR) integrated platforms, exploring a variety of applications in different domains of cultural heritage. However, meanwhile many serious games make use of impressive heritage buildings and monuments, there is still gaps on research on how novel ubiquitous computing can be developed and deployed to heritage e-games, and augment the museum educational experience for children. In addition, they do not consider heritage issues such as promotion, awareness, preservation and conservation. In fact, Serious games are attracting growing interest even from educators; they allow learners to experience situations that are impossible in the real world for reasons of cost, time and safety, and involve users who are not keen on cultural activities while being fond of video games (Bellotti et al., 2012, p. 2). They came into wide use with the emergence of the "Serious Games Initiative" covering the same goals as edutainment, and has been described as the use of computer and video games for non-entertainment purposes, and as simulation approaches and/or technologies for primarily non-entertainment purposes (Susi et al., 2007, p.5).

The 21st century knowledge and learning experiences need to reflect the lives of 21st century heritage workers. For that, an appropriate heritage serious games can play a considerable role in engaging the "Digital Native" children in observing the wonders of our cultural heritage world, promote a sense of appreciation and develop national identity, a sense of national and personal pride, even acceptance of other different peoples and cultures. On the other hand, despite today of the plethora of the digital tools, instruments and applications that are available in the cultural heritage domain, a little attention is still paid by Governments, Ministries towards educational strategies and policies dedicated to children, especially in the developing countries containing plethora heritage sites and monuments. Heritage multimedia and serious games, if we make the appropriate plans, can encourage children, parents, even educators to look for, explore and care for the wonders of our cultural heritage. Institutions of informal education, such as museums, research and cultural centres, are now in a better position to make use of such advanced systems and investigate their educational potential while effectively shaping how they deliver public entertainment and education.

Therefore, there is a need to suggest new strategic ways to promote cultural heritage appreciation, and to seek for new and more creative and attractive content to teach children more about cultural heritage. Actually, there is a need to plan and develop a strategy based on a creative pedagogical approach for the informal cultural heritage edutainment programs for students outside school, with alternative methodologies in edutainment multimedia. It should be emphasized that in this strategy the edutainment heritage games scenario/ storyline do not really have to be directly and strongly concerned with the heritage subject matter that the game is supposed to express and state, but it must deal and respect the 3C (Content, Concept and Creativity) (Haddad, 2016). However, humanities aspects must have equal weight with the technical aspects in the subjects represented through all
stages of the game blot and in the game design process. On the other hand, the thousands of 3D model documents of 3D models like of the 3D laser scanning and photogrammetry (Figure 1a, b) should be used not only as tools for preservation and conservation, but also as the initial material in children heritage edutainment serious games themes and activities, as directed by a multidisciplinary team of archaeologists, historians architects, CRM specialists, professional conservationists, arts educators, artists, creative and art directors, IT experts, and local arts foundations (Haddad, 2012, 2014). Another application is to use 3D and archiving to serve tourism Virtual tours. The interactive tour, and games (Thomas et al, 2000), can be a good tool for children understanding many cultural heritage issues; meanwhile the possibility of creating an interactive tour in the website can assist the child interest to be sensitive and positive to the significance of our cultural heritage.

If we address and define a wide range of educational objectives, these serious games approach is a dynamic tool to present critical learning opportunities for young children, and can serve as a positive model of how heritage multimedia can be used to foster educational cultural heritage, archaeology and conservation aims. This also can assist in producing new ideas for heritage edutainment multimedia, with the aim of establishing the needed children and family awareness and care for our significant and unique heritage legacy.

Dealing with heritage education requires sustained interactive access to the cultural themes and objects (Addison, 2000). However, arts and cultural heritage education is a communication process, which is based on the joyful and intense engagement with artwork or cultural artifacts, but also with cultural values and symbolic systems. Developing an interest in heritage themes requires a redefinition of the recipient and mediator guidelines, taking into consideration the radical changes opened by the serious games and edutainment multimedia (Haddad, 2014). In addition, an analysis of constructivism in Computer Science education leads to the following conclusions: (a) models must be explicitly taught, (b) models must be taught before abstractions, and (c) the seductive reality of the computer must not be allowed to supplant construction of models (Ben-Ari, 2001). For the application of the serious game technology to heritage to become a viable recreation and edutainment creative tool we should answer simply the child and consider the following:

- What is the role, we desire, from the heritage multimedia for the "Digital Native" children communication of heritage knowledge and for diversity cultures? A combination of technological, economic and creative challenges, suggest that 3D models should be used in more effective and creative ways to improve interpretation in museums, and virtual museums, children TV productions, e-games, as well as in the classroom.
- How child process heritage information? Why we undertake restoration for an archaeological site? how could heritage knowledge best be imparted? What is the appropriate time for children to play within this new knowledge? This knowledge offers a base for exhibition and for education.
- With and for children we should develop these heritage awareness material; by using a spirit of inquiry, wonder, and imagination, where cultural heritage and archaeology should be used as tool to exercise skills in making children think, where the past can be related to daily life. However, user tests and a balance is needed to meet the two major technical and user/stakeholder requirements.
- Empowering the personal expression, by asking how to expose the "Digital Native" children to different styles of the various cultural heritage forms as a form of personal expression? how to encourage the child to identify, explore, discuss and appreciate different forms of heritage? How to encourage children to develop and create their own visual cultural e-games through the existing website material (e.g.,
drawing, painting, collage, sculpture). How to develop some concepts of personalization of content, like "I am a Heritage Artist", "I am a Heritage Scientist", and "I am a Heritage Conservator"?

- The need to define a strategy based on guidelines for the expected role of children heritage edutainment multimedia enhancement, and to design serious games programs and campaigns to help young people and children retrace their lost cultural heritage, in order to deepen their appreciation of cultural assets focusing on the playful side (Roussou & Efraisoglou, 1999).

Any strategy should be developed through a consultative process to engage all relevant stakeholders. To that end, a consultation workshop shall be done which will be the building block for the development of the implementation of this strategy in order to design a heritage multimedia model for the related institutions governments and game companies. Given also the need of defining guidelines of the role of multimedia in children cultural heritage enhancement for sustained engagement, the highly entertaining tools of serious games and virtual realities are particularly important. The strategy guidelines should consider the main following issues:

- The need to prepare a teacher-oriented authoring tool that abstracts the common traits of adventure games in order to support the development of such games (Bellotti et al, 2012, p.4) in the formal education, after reviewing and evaluation the different heritage curricula.
- The need for assessment of heritage e-games, cultural heritage virtual reality and community cultural heritage educational and entertainment programs not only from educators but also from the point of view of the cultural heritage expert.
- The need to archive all 3D digital models documents in order to evaluate their potentiality of reusing and recycling them in different children multimedia programs to produce a new heritage edutainment serious games content.

In conclusion, reaching the 21st century "Digital Native" children requires a re-imagination of conventional educational pedagogy, accounting for their changing interactions with the world around them. In order to expand the public utility of the developed 3D digital achievements, e-games Institutions and pioneers companies must rethink of how they should address the youngest cultural citizens cultural needs. Thus, in endeavoring to secure our cultural legacy, these Institutions and companies should be involved in weaving specific projects stunningly truthful games with captivating storylines and loveable characters, creating a basket of tools, controlled by educational and heritage authorities and communities. In designing these programs, the communities involved in children's heritage edutainment multimedia must first establish pupil's educational deficits and curiosities, to be accomplished by formative and summative testing user research. A special research team shall control the current e-games curricular assets, teacher’s favored pedagogy, and student’s own knowledge of heritage. Simultaneously, they have to evaluate the learned specific values for any informational e-content of the most published serious games of the market. Based on the findings, the community team will be ensured that each game delivered is rich in edutainment content, but also commercially feasible for a broad international market (a feature missing amongst most "educational" games). Though, initial controlling edutainment serious games projects can led to preliminarily design the games, spanning children’s different interests and levels of development. Each game can be built with designated learning outcomes in mind. Collectively they can introduce children to digestible bites of world history, anthropology, architecture, ancient technology, conservation and preservation exciting the future generations about some of the world’s greatest treasures. The idea is to present content from different perspectives and according to the various pedagogical views and objectives (Bellotti et al. 2010).

SUMMARY AND CONCLUDING REMARKS
Heritage multimedia provides benefits for heritage protection and for education. Taking into consideration that there is rapidly growing a body of research on the effectiveness of online serious games as effective learning tools, the 21st-century knowledge, and learning experiences should be reflected in the requirements of our nonrenewable heritage, such as challenges and opportunities. A sustainable alternative model, encompassing multi-dimensional socio-cultural and economic benefits for fostering school learning for heritage protection net program should be designed and developed. For that, an appropriate heritage serious games can play a considerable role in engaging the "Digital Native" children in sharing the wonders of our cultural heritage world. The conceptual approach of the serious games, with the appropriate content if controlled by the educational and heritage community, can promote a sense of appreciation and develop a national identity, a sense of national and personal pride, even acceptance of other peoples and cultures. As we have argued in this paper, the information and communication technology (ICT) offer magic networks to the heritage diversity knowledge. However, there are many challenges of scientific and pedagogical mediation regarding the conceptual approach of edutainment multimedia and serious games to make a significant contribution to children’s appreciation and care about cultural heritage. The suggestions presented in this article open up further research questions and perspectives.
Nowadays, however, advances in industry in computer hardware and sophisticated 3D modelling packages allow creating compelling visualizations of static objects. However, research in virtual reality (VR) and archaeology is a relatively young field which has shown considerable growth in the recent years. The rapid development of workstations makes it feasible to animate them in real time, which is required for Virtual Reality, Interactive Television, and Video Games applications. As a result, 3D models will be used more effectively to improve interpretation in museums, virtual museums, e-games, children TV productions, as well as in the classroom. Therefore, digital heritage knowledge communication, IT, and pedagogical sciences should be given more emphasis for the content from the child community.

The challenge will be to give further emphasis on improving access, establishing meaningful narratives for collections and displays and story-led interpretation by the expected development of the virtual museums in the coming few years. Another challenge is to support the multidisciplinary awareness needed for providing a comprehensive framework for the accessibility, preservation, participatory and sustainable preservation of cultural resources and assets, based on a holistic, social understanding of the human cultural story and cultural heritage preservation challenges. The main problems are the huge development costs in relation to their limited reuse and recycle till now. However, now more than ever, we have computational and communicational tools to build an intelligent system which will be able to operate with huge heritage datasets for the communication heritage production tools to increase the access to exchange knowledge between the various cultures.

A rapidly growing number of projects are currently exploring a variety of applications in different domains of cultural heritage. For that, the thousands of 3D models documents conducted around the world should be studied and evaluated to start to be reused and recycled in edutainment multimedia to create and design 3D animation heritage serious games and activities. With and for children we should develop cultural heritage awareness serious games material. The cultural heritage expert who had prepared the content and observed the user tests, then, can suggest possible improvements on the implementation of some serious games. However, these games should be designed with the appropriate educational content from a multidisciplinary and creative teams together with the childhood and heritage specialists. In addition, the heritage serious game scenario/storyline should not really be directly concerned with the main heritage main message that the game is supposed to express and state, but it should deal and respect the 3C (Content, Concept, and Creativity). However, virtual heritage applications should give more emphasis on the theoretical content side regarding the educational goals, experience and create an engaging storyline, besides the technological aspects such as graphics, hardware or interface.

In addition, collaboration framework and collaborative approach between the different players at a policy-making level in formal and informal organizations is a must, to support and control projects promoting the “Digital Native” children cultural heritage edutainment e-games programs. As we argued in this paper, for application of ICT in a construction of children heritage edutainment knowledge, actually, there is a need to plan and develop a strategy by a special pedagogical approach for informal programs for students outside school, with emphasis on the game experience and user interaction. When preparing contents for the cultural context it should be exciting and attractive in order to create suspense and expectation. The strategy should also consider alternative methodologies to enhance the child’s interaction curiosity for the future of cultural heritage challenges. In conclusion, in order to enable an intelligent processing, we need the two main components of heritage multimedia “education and entertainment”— which are almost ignored by many educators — to be re-discussed, re-assessed, developed and totally integrated together in a productive creative approach, in which a balance to the content heritage and the cultural public is a must. The link between these two communication components poles, should be based on developing a management of international thematic heritage knowledge.

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