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**DIGITAL HISTORY EDUCATION APPLICATIONS
ON MUSEUM WEBPAGES**

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**ΨΗΦΙΑΚΕΣ ΕΦΑΡΜΟΓΕΣ ΙΣΤΟΡΙΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ
ΣΕ ΙΣΤΟΣΕΛΙΔΕΣ ΜΟΥΣΕΙΩΝ****Maria Rinou / Μαρία Ρήνου***

ΠΕΡΙΛΗΨΗ

Το παρόν κείμενο επικεντρώνεται στα αποτελέσματα έρευνας που διεξήχθη στο πλαίσιο μεταπτυχιακής διπλωματικής εργασίας (Πανεπιστήμιο Θεσσαλίας 2014) και μελέτησε εάν οι εκπαιδευτικές ψηφιακές εφαρμογές με ιστορικό περιεχόμενο σε ιστοσελίδες μουσείων βασίζονται σε παραδοσιακές ή σύγχρονες αντιλήψεις ως προς το μουσειολογικό υπόβαθρο, ως προς την προσέγγιση της ιστορικής εκπαίδευσης, ως προς τα προσδοκώμενα μαθησιακά αποτελέσματα και ως προς την αξιοποίηση των σύγχρονων τεχνολογιών. Βασική υπόθεση ήταν ότι οι ψηφιακές εφαρμογές που περιλαμβάνονται σε ιστοσελίδες παραδοσιακών μουσείων θα χαρακτηρίζονται ως «παραδοσιακές» ως προς τις παραμέτρους που εξετάσαμε, ενώ εκείνες που προέρχονται από «μοντέρνα» ή «μεταμοντέρνα» ως προς το μουσειολογικό τους υπόβαθρο μουσεία θα διαθέτουν αντίστοιχα «μοντέρνα» ή «μεταμοντέρνα» χαρακτηριστικά. Μάλιστα διατυπώσαμε την υπόθεση ότι η «παραδοσιακή» τάση θα είναι πιο εμφανής στα ελληνικά μουσεία σε αντιδιαστολή με αυτά άλλων δυτικών χωρών. Για την ανάλυση των ψηφιακών εφαρμογών που συλλέχθηκαν από ιστοσελίδες μουσείων της Ελλάδας και

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άλλων χωρών, ως προς τις 4 παραμέτρους που μελετήθηκαν, σχεδιάστηκαν 4 αντίστοιχα Συστήματα Κατηγοριών Ανάλυσης. Η ανάλυση των δεδομένων οδήγησε στην παρατήρηση ότι το μουσειολογικό υπόβαθρο των ψηφιακών εφαρμογών επηρεάζει τις υπόλοιπες παραμέτρους και ότι οι περισσότερες εφαρμογές που προέρχονται από παραδοσιακά μουσεία της Ελλάδας ακολουθούν κυρίως «παραδοσιακές» προσεγγίσεις, ενώ οι περισσότερες εφαρμογές μουσείων άλλων χωρών ακολουθούν «σύγχρονες» («μοντέρνες» / «μεταμοντέρνες») τάσεις. Τα ερευνητικά αποτελέσματα υποστηρίζουν τη θέση ότι πολλά μουσεία, και κυρίως τα ελληνικά, δεν αξιοποιούν πλήρως τις εκπαιδευτικές δυνατότητες των σύγχρονων τεχνολογιών, και ότι το περιβάλλον ψηφιακών εφαρμογών στο οποίο αξιοποιείται υψηλή τεχνολογία δεν οδηγεί, απαραίτητα, σε ουσιαστική συμμετοχή του χρήστη ή σε εφαρμογή σύγχρονης προσέγγισης της ιστορικής εκπαίδευσης. Στο παρόν κείμενο παρουσιάζονται τα αποτελέσματα της ανάλυσης των ψηφιακών εφαρμογών ως προς το μουσειολογικό τους υπόβαθρο, ως προς την προσέγγιση της ιστορικής εκπαίδευσης και ως προς τα προσδοκώμενα μαθησιακά αποτελέσματα.

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ABSTRACT

The current paper presents the results of a research conducted in the context of my MA dissertation (University of Thessaly, Greece, 2014) which examined whether digital history education applications on museum webpages are based on traditional or contemporary ideas in terms of their museological background, their approach to history education, the expecting learning outcomes, and the use of new technologies. The major hypothesis was that the digital applications of traditional museum webpages would be characterised as ‘traditional’ in terms of the 4 parameters studied, whereas applications of ‘contemporary’ (‘modern’ or ‘postmodern’) museums would be characterised as ‘contemporary’ (‘modern’ or ‘postmodern’) in terms of the same 4 parameters. The study also focused on the hypothesis that ‘traditional’ approaches would appear more clearly or intensively in the digital applications of Greek museums than in the applications of museums in other western countries. For the analysis of the selected applications, 4 category systems were constructed on the basis of the 4 parameters mentioned above. Results revealed that the museological background tends to affect the other parameters. Moreover, most digital applications of traditional Greek museums were characterised ‘traditional’ in terms of all the parameters analysed. In contrast, relevant applications of the other western museums studied were characterised ‘contemporary’ (‘modern’ or ‘postmodern’). The research results

demonstrate that many museums, and mostly Greek museums, do not take advantage of new technology educational affordances, while the hybrid environment of digital applications in which high technology is used does not, necessarily, ensure users' substantial participation nor does it always relate to a contemporary approach to history education. The current paper presents the results of the analysis of the 13 selected applications in terms of their museological background, their approach to history education and their expected learning outcomes.

Introduction

Although museum webpages differ from real museums, they offer an enticing prospect for learning. Despite any differences in design, content or background, museum webpages reflect the philosophy of the corresponding real museum in most cases (Hawkey 2004). Their visitors are invited to choose thematic fields, to create their own personal paths in their learning approach, as well as to exchange ideas or data with others, and, thus, to enrich the social aspect of their experience (Nikonanou & Bounia 2012). For some users, depending on their personal interests, the possibility of 'free' navigation is preferable to other more traditional ways of visiting the museum (Economou 2004). At the same time, distance matters are resolved. Many museum webpages aim at skills development and knowledge construction as well as at the emotional, social and personal development of the user (Schaller, Allison-Bunell, Borun & Chambers 2002). In this context, the target of educational digital applications is to lay the groundwork for learning by accommodating users and simultaneously encouraging cooperation between them and the museum. These applications are inherently related to the type of museum in question and its collections. Moreover, they are offered on-line with a view to educating and entertaining the user (Hooper-Greenhill 1999a, Bakoyanni & Kavakli n.d).

The research framework

In the last few decades, museums have encountered several major challenges. The increasing exposure of the public to technology, combined with the prevalence of the Internet, has altered the way people communicate with each other and gain access to information. The broad use of technology in museums has aroused debate over the need for a more critical approach concerning how technology is being used to support the learning processes. The efforts of various cultural organisations, and especially museums, to follow the demands of society sometimes leads to neglecting the needs of their visitors or at least those needs not being fully met by the new on-line tools employed (Economou 2004). The issue which therefore arises is how to make optimal use of technology. The question is how to engage users in certain activities and what kind of experience they should have in order to be guided towards meaningful learning. Such activities are designed to construct knowledge through actively engaging with cultural objects and making them the focal point of the activity. (Hein 1998, Bounia, Economou & Pitsiava 2010, Nikonanou & Bounia 2012).

Several research studies have attempted to document the efforts being made to exploit the advantages of new technologies in terms of supporting the learning process in

museums and cultural venues (see, among others, Hawkey 2004). Furthermore, studies have been carried out in order to explore learning issues on educational museum webpages (Schaller et al. 2002) and the use of virtual reality in museums. A common denominator in those studies has been their focus on the description of the technology used and the basic elements of the learning experience, rather than an attempt to analyse the way in which technology is being employed: namely, the kind of learning purpose it serves and its role in supporting the learning process.

Recent studies conducted in Greece suggest that the majority of Greek museums and cultural organisations make very little use of new technologies for educational purposes (see Giannoutsou, Bounia, Roussou & Avouris 2011, Nakou 2010). According to Dimaraki (2008), in many cases, digital activities which focus on museological objects lay particular emphasis on the transmission and comprehension of information, something which contravenes pedagogical approaches to museum programmes and other educational materials which are employed in museums with the aim of using new technology as a means of exploration and personal expression. While these applications increase the potential of new technologies, especially by integrating extended information and data from different sources, user activity in the learning process is considered peripheral, since it is limited merely to exercises and games. The role of the user is restricted to a closed loop interaction which does not encourage more substantial learning. Research by Nikonanou & Bounia (2012) has pointed out that, in many cases, interactivity of the user through on-line activities constitutes a form of knowledge control (content-oriented knowledge) as far as the educational process and approach are concerned, meaning that a teacher-centred knowledge-based model is adopted. Moreover, it is noted that the affordances of new technologies to promote fruitful learning processes have not yet been exploited to a satisfactory degree, and, therefore, the way in which the museum content is approached remains traditional. Furthermore, concerning the potential of applications to provide incentives for further learning, the same study concluded that this is only accomplished in a small minority of cases.

Within this framework, the study of digital history education applications on museums websites was based on the following research questions: Whether and to what extent are museum digital history education applications: a) based on a ‘traditional’ or a ‘contemporary’ museological background, b) based on a ‘traditional’ or ‘contemporary’ (modern or postmodern) approach to history education, c) correspond to contemporary learning outcomes, namely to the “Generic Learning Outcomes” (GLOs), as these are presented by Hooper-Greenhill (2007), or to traditional learning outcomes that mainly concentrate on the acquisition of an informative type of knowledge?¹

Data collection

For the purpose of this study 13 digital history education applications were selected that are appearing on the websites of museums in Greece, the United States and the United Kingdom. The basic criteria for this selection related to the efficiency of the research procedure, the aim of comparing Greek museum online history education applications with relevant applications from other western museums, and the aim to study limited, albeit considerably representative relevant applications corresponding to museums of different type, both traditional and contemporary (modern or postmodern). More precisely, digital applications were selected from Greek museums in Athens and Thessaloniki, as their use of the Internet and new technologies was hypothesised to be more extended than of regional museums. On the other hand, relevant digital applications were selected from museums in the United Kingdom and the U.S.A., in part, since the use of English language enabled the necessary access and understanding, and also as a result of the hypothesis that both the use of contemporary approaches to history education and the extensive use of new technology in these areas would have direct impact on the design of contemporary digital history education applications.

Initially, digital history education applications of 4 museums located in Athens were selected, namely, of the Museum of the Acropolis, as it is the most recent archaeological museum in the country, of the National Archaeological Museum, since it is the first and largest museum of the country, of the cultural centre known as the Foundation of the Hellenic World, whose mission is the dissemination of Hellenic culture and history through the use of new technology, and of the Numismatic Museum of Athens, which constitutes one of the oldest public museums in the country and which aims to promote the history of coins along with the history of the Greek economy and civilisation. In addition, on-line history education applications of 1 museum located in Thessaloniki was selected: of the Museum of Byzantine Culture, distinguished by its modern museological orientation.

From UK, relevant applications of the British Museum and the Museum of London were selected: of the former as it is one of the oldest and largest national museums in Europe and the world, containing rich historical content and a wide variety of collections, and of the latter since it reflects the history of a modern capital in relation to its historical background and its multi-cultural society. From the U.S., relevant applications from two museums were selected: of the Smithsonian National Museum of American History, because it is a national museum which promotes American history and civilisation, and of the United States Holocaust Memorial Museum, because of its historical background and theme.

The analysis category systems

According to the 4 parameters studied, relevant 4 category systems were constructed in order to analyse the selected on-line applications.² The discussion in this paper refers to the analysis of the collected data in terms of the following 3 category systems: The category system of a) the museological background, b) the history education approach, and c) the expected learning outcomes.

The ‘Museological Background’ category system

According to Nakou (2009), museums could be schematically classified into three different museological types, according to their relative ‘traditional’, ‘modern’ or ‘postmodern’ epistemological background. The epistemological background of museums, among other things, seems to influence their ideas and perceptions of history and the historical narratives they articulate by their exhibitions.

Museums of the ‘traditional’ type, basically formed in the 19th century, are characterised by the assumption that the past can be known and be presented in objective terms. Therefore, ‘traditional’ museums display their exhibits in units that correspond to fixed historical periods, according to a strict linear chronological layout, and within an austere academic framework.

Museums of the ‘modern’ type, basically formed in the 20th century, are characterised by their attempt both to promote their museum collections and to serve their audiences. The epistemological background of ‘modern’ museums perceives reality (of the past and the present) as a complex identity, a notion that does contradict the possibility of objective knowledge. Thus, ‘modern’ museums assume that knowledge is constructed by the thinking subjects, through an interactive process by which they study various aspects of the complex realities with which they come into contact. Within this framework, and in order to enable their audiences better understand museums and their content, ‘modern’ museums consent to the use of their collections to organise thematic exhibitions, in which exhibits are presented in their social context, in order to reconstruct aspects of the past. Consequently, ‘modern’ museums facilitate the establishment of a dialogue between the societies of the past and the present, an element which, among other things, potentially facilitates the construction of historical knowledge (Nakou 2009).

Finally, museums of the ‘postmodern’ type challenge thematic exhibitions that aim at enabling audiences better understand reconstructed realities of the past. ‘Postmodern’ museums, on the basis of postmodern assumptions about the deconstruction of reality, focus their interest on the presentation of museum objects -conceived as traces of a deconstructed and forever lost past- in the form of museological layouts that are open

to alternative interpretations, regarded as creations of a deconstructed multi-cultural present, and aim at meeting the needs of different groups of audiences (Nakou 2009).

More specifically, at the ‘heart’ of ‘traditional’ museums we find the actual museum objects (‘object oriented’ museums), on the basis of which museums construct their ‘objective’ narratives about the reality of the past.

On the other hand, ‘modern’ museums assume that the past can be reconstructed by a dialectic relationship between the people of the present and the objects of the past (‘object and people oriented’ museums).

‘Postmodern’ museums are primarily interested in their audiences (‘people oriented’ museums). In this respect, museum objects, as remnants of the past, are exhibited in ways that serve the expectations of different audiences and do acquire different meanings in relation to the needs of the present (Nakou 2009).

Table 1. The ‘Museological Background’ category system.

<i>Basic Characteristics</i>	<i>Traditional</i>	<i>Modern</i>	<i>Postmodern</i>
Epistemological Assumptions	Objective knowledge of reality	Reconstruction of reality	Deconstruction of reality
Time focus	Past	Past & Present	Present
Type of knowledge	Academic objective knowledge	Construction of knowledge	Alternative interpretations
Orientation	Object oriented	Object & people oriented	People oriented

The ‘Approach to History Education’ category system

For the analysis of the selected applications in terms of their approach to history education a category system was constructed in relation to differences appearing between ‘traditional’ and ‘contemporary’ approaches to history education. ‘Traditional’ approaches mainly aim at the cultivation of national conscience, in

accordance with the basic national narrative and in isolation from the international historical environment. Therefore, they ask students to reproduce a given historical narrative. On the other hand, ‘Contemporary’ approaches to history education mainly aim at the development of critical historical knowledge and thinking, together with competences for historical interpretation of different types of sources, so that students potentially can construct a flexible framework of historical reference that would enable them to understand the present and the past in historical terms.

Accordingly, ‘traditional’ approaches focus on the past, whereas ‘contemporary’ approaches focus on the relation of the past and the present. In the first case, students are considered passive recipients of ready-made knowledge, while in the second case they are perceived as active and thinking subjects, with physical, mental, spiritual and emotional abilities and needs.

Table 2. The ‘Approach to History Education’ category system.

<i>Basic characteristics</i>	<i>Traditional Approaches</i>	<i>Contemporary Approaches</i>
Aim	Cultivation of national conscience and identity	Development of critical historical thinking, knowledge and competences for historical interpretation
Orientation	Focus on the past	Focus on the relation of the past and the present
Main Educational Method	Reproduction of a given narrative	Use and interpretation of different sources as historical evidence
Students	Passive recipients	Active and thinking subjects

The ‘Expected Learning Outcomes’ category system

The category system that was built for the analysis of the selected applications in terms of the expected learning outcomes was mainly based on the 5 categories of the Generic Learning Outcomes (GLOs) proposed by Hooper-Greenhill (2007). These five categories represent different types of learning outcomes which modern approaches to education tend to anticipate: 1) *knowledge and understanding*; 2) *skills*; 3) *attitudes and values*; 4) *enjoyment, inspiration and creativity*; and 5) *activity, behaviour and progression*.

As Hooper-Greenhill argues, knowledge and understanding constitute the first category, which

includes learning facts or information and developing a deeper understanding, or grasping meaning more firmly, in relation to various specific fields. Well-known information may take on a new relevance or be understood in a new way during a museum, archive or library visit. Increased knowledge can be indicated by the ability to give specific information: to name things, people and places or give other relevant details. On the other hand, increased understanding can be indicated by showing connections or links, clarifying, describing in detail, making associations and offering assessments (Hooper-Greenhill, 2007: p. 53).

“Skills” refer to knowing how to do something.

Skills outcomes result from the actual experience of doing an activity. Skills can be broadly divided into cognitive/intellectual, social, emotional and physical dimensions”. Attitudes and values are developed by learners as an integral part of their learning in both formal and informal environments. As new information is absorbed, attitudes to that information are developed, and these attitudes contribute to the formation of the values that inform the decisions people make about how to live their lives. Museum visits can result in shifts or changes in attitudes and can sometimes be seen to alter the values that people hold (Hooper-Greenhill, 2007: p. 54).

According to Hooper-Greenhill, enjoyment is considered as an outcome of learning, while “Activity and behaviour refer to actions.

Enjoyment as an outcome of learning is likely to lead to the development of positive learner identities and to the desire to repeat the experience. When learning is enjoyable, it is easier, and may sometimes take people by surprise. [...]

The things that people do, their actions and activities, are the result of their learning. Learning outcomes include the way people balance and manage their lives, including their work, study or family contexts (Hooper-Greenhill, 2007: p.56).

On this basis, a relevant category system for the analysis of the selected applications was constructed that includes 8 categories which correspond to ‘*traditional*’ and ‘*contemporary*’ learning outcomes. The System is presented below in Table 3.

Table 3. The ‘Expected Learning Outcomes’ category system.

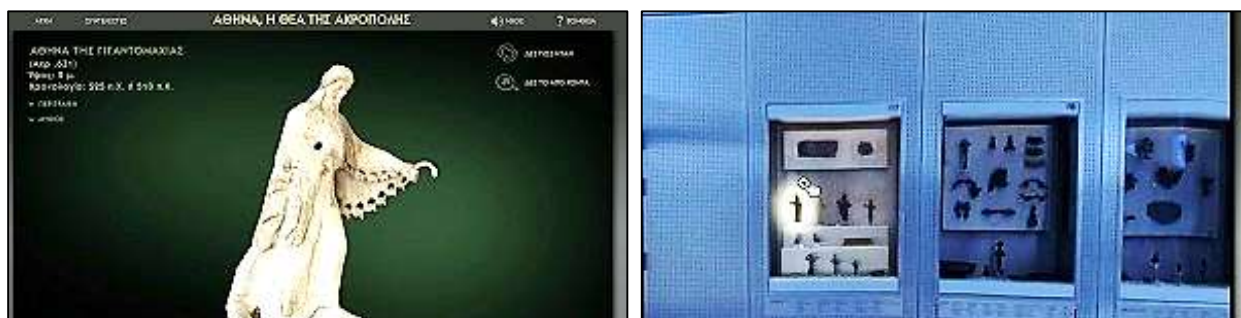
Traditional expected learning outcome	Contemporary expected learning outcomes						
Transmission / reproduction of given knowledge	Construction of knowledge and understanding	Skills of using & interpreting sources	Attitudes & Values	Entertainment	Creativity & Inspiration	Activity / active participation	Behaviour Progression

Discussion

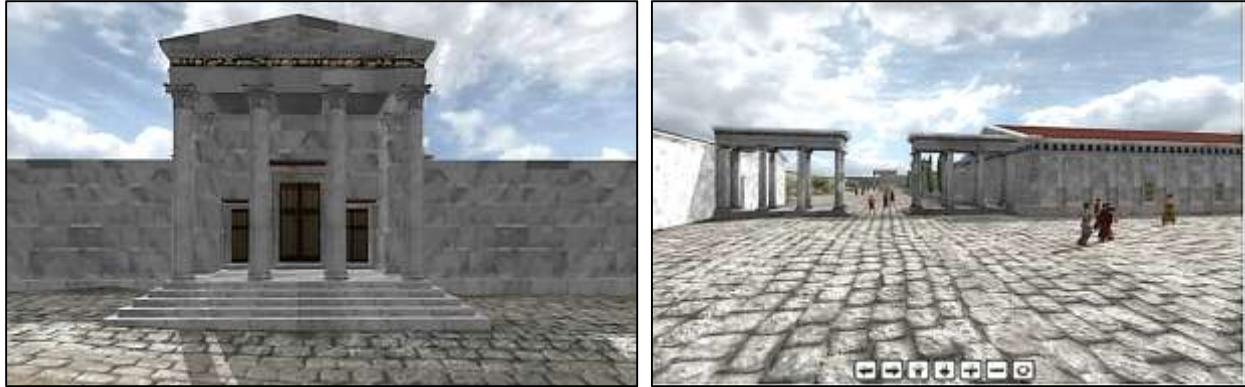
The discussion is based on the analysis of the 13 selected applications in terms of their museological background, their approach to history education and their expected learning outcomes.

The analysis results in terms of the applications’ museological background

Three out of the 6 digital applications of the Greek museums studied were characterised ‘*traditional*’, according to their museological background, namely the “*Athena, Goddess of the Acropolis*” of Museum of the Acropolis (see Pictures 1 & 2), the “*A 360° Virtual tour in Ancient Miletus*” of the Hellenic World Foundation (see Pictures 3 & 4), the “*Learn about the oil-lamp*” of the Museum of Byzantine Culture (see Picture 5).



Images 1 & 2. “*Athena, Goddess of the Acropolis*”.
Museum of the Acropolis application: <http://www.acropolis-athena.gr/>

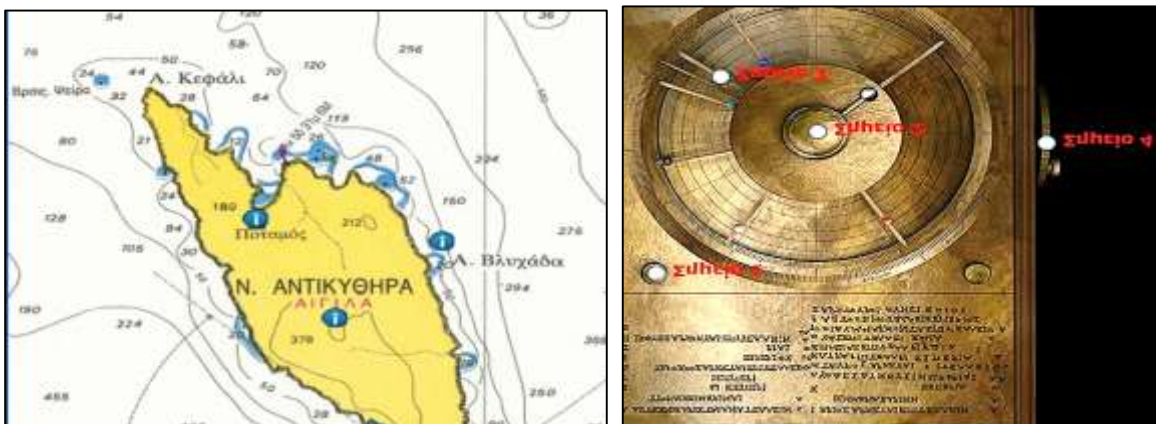


Images 3 & 4. “A 360° Virtual tour of Ancient Miletus”.
 Foundation of the Hellenic World: <http://www.fhw.gr/choros/miletus/360vr/gr/>



Image 5. “Learn about the oil-lamp”.
 Museum of Byzantine Culture: <http://mbp.gr/edu/ekpaideytika-programmata/1m/paixnidia-on-line>

Two of the collected applications in Greek museums websites, the “*Mysteries of the Antikythera Mechanism*” of the National Archaeological Museum (see Pictures 6 & 7) and the “*The forest with the symbols*” of the Numismatic Museum (See Pictures 8 & 9) were characterised ‘modern’.



Images 6 & 7. “*Mysteries of the Antikythera Mechanism*”.
 National Archaeological Museum: <http://antikytheramech.culture.gr/el/node/6>



Images 8 & 9. “The forest with the symbols”.

Athens Numismatic Museum: <http://www.enma.gr/kids.coins/app.htm>

Only one Greek museum digital application, the “Colour the Peplos Kore” of the Museum of the Acropolis (see Picture 10) was characterised as ‘postmodern’.



Image 10. “Colour the Peplos Kore”.

Museum of the Acropolis: <http://www.theacropolismuseum.gr/peploforos/>

On the other hand, five digital applications of other (non-Greek) western museums, namely the “Time Explorer” or the British Museum (see Pictures 11 & 12), the “Londinium” (see Pictures 13 & 14), and the “Great Fire” of the Museum of London (see Pictures 15 & 16), the “Kristallnacht” of the Holocaust Memorial Museum (see Picture 17), and “You be the historian” of The Smithsonian Museum (see Pictures 18 & 19), were characterised ‘modern’ in terms of their museological background.



Images 11 & 12. "Time Explorer"

British Museum: <http://www.britishmuseum.org/games/GreatCourt.swf>



Images 13 & 14. "Londinium"

Museum of London:

<http://www.museumoflondon.org.uk/Resources/microsites/londinium/index.html>



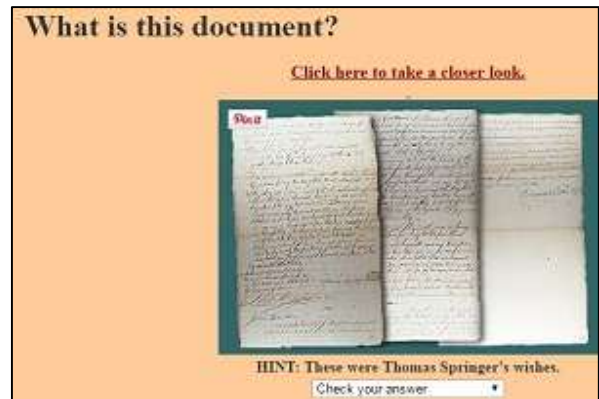
Images 15 & 16. "The Great Fire"

Museum of London: <http://www.fireoflondon.org.uk/game/>



Image 17. “Kristallnacht”

Holocaust Memorial Museum: <https://www.ushmm.org/information/exhibitions/online-features/special-focus/kristallnacht/synagogues/how-was-kristallnacht-carried-out>



Images 18 & 19. “You be the historian”

The Smithsonian Museum: <http://americanhistory.si.edu/springer/00clues.htm>

Nevertheless, two digital applications of the British Museum, the “*Museum Run*” and the “*Little or Large*” were characterised ‘*traditional*’.

These results led us to the hypothesis that digital applications of traditional museums tend to be characterised by a ‘*traditional*’ museological background. However, this observation does not seem to apply in the case of one application of the Archaeological Museum of Athens - the “*Mysteries of the Antikythera Mechanism*”- and one application of the British Museum -the “*Time Explorer*”- which, despite their ‘*traditional*’ museological background, could be characterised ‘*contemporary*’ in terms of all the other parameters studied.

The analysis results in terms of the applications' approach to history education

Five out of the 13 digital applications that were examined were characterised '*traditional*' in terms of both their museological background and their approach to history education. This finding confirms our initial hypothesis, that digital museum applications which are characterised '*traditional*' in terms of their museological background are also characterised '*traditional*' in terms of their approach to history education.

On the other hand, analysis has shown that '*contemporary*' approaches to history education appear in eight applications characterised as modern (or postmodern) in terms of their museological background, of which three belong to Greek museums, the "*Mysteries of the Antikythera Mechanism*", (National Archaeological Museum), the "*Colour the Peplos Kore*", (Museum of the Acropolis), "*The forest with the symbols*", (Numismatic Museum), and five to other western museums the "*Time Explorer*", (British Museum), the "*Londinium*" and the "*Great Fire*" (Museum of London), the "*Kristallnacht*" (Holocaust Memorial Museum), and "*You be the historian*" (The Smithsonian).

These applications seem to constitute an open learning environment via exploration, giving users the opportunity to control several formats of information (digital management of text, sound, picture and video), thus enriching the development of visualisation. Alongside this, they seem to encourage the development of basic skills which are connected with history, such as the choice and use of references, use of sources etc. that potentially lead to historical interpretations and the cultivation of historical thinking (see Kouneli 2004, Giakoumatou 2008, Chen & Choi 2010).

The analysis results in terms of the applications' expected learning outcomes

One of the basic aims of the study was to investigate whether and to what extent digital applications of museums relate to '*traditional*' or '*modern*' expected learning outcomes. Five applications that were characterised as '*traditional*' in terms of both their museological background and their approach to history education -three applications of Greek museums the "*Athena, Goddess of the Acropolis*" (Museum of the Acropolis), the "*A 360° Virtual tour of Ancient Miletus*" (Foundation of the Hellenic World), the "*Learn about the oil-lamp*" (Museum of Byzantine Culture) and two of other western museum the "*Museum Run*", and the "*Little or Large*", (British Museum)-were characterised '*traditional*' in terms of their expected learning outcomes, as well. And this, because they do not help users to construct knowledge with understanding, they do not encourage creativity and inspiration, and they neither aim to develop skills for using and interpreting sources, nor do they aim to develop values or attitudes that will lead to a change of behaviour.

On the contrary, all applications that were characterised '*modern*' or '*contemporary*' in terms of their museological background and their approach to history education, were also characterised '*contemporary*' in terms of their expected learning outcomes. Thus we could hypothesise that the expected learning outcomes of museum digital applications closely relate to their museological background and their approach to history education.

General observations

Based on the results, we could proceed to some further observations, as follows:

From the 6 applications of the Greek museums, half of them (3) are characterised by both their '*traditional*' approach to history education and by their '*traditional*' museological background. This observation confirms our initial hypothesis that digital applications of Greek museums usually follow '*traditional*' museological and historical tendencies. However, this observation does not apply in the case of the digital application "*Mysteries of the Antikythera Mechanism*" (National Archaeological Museum), since it is characterised by '*contemporary*' approaches as far as its museological background, its approach to history education and its Generic Learning Outcomes are concerned.

More generally, results led to the observation that in most digital applications the type of their approach to history education relates to their museological background. The majority (5/7) of digital activities offered by the non-Greek (other western) museums, were characterised by '*contemporary*' or '*modern*' tendencies, in respect to their museological background and their approach to history education. Thus, we observe that in contrast to Greek museums, western UK and US museum digital applications tend to follow contemporary museological and historical approaches.

Moreover, 8 out of 13 digital applications that were characterised by their '*contemporary*' approach to history education appear to create an open learning environment and to encourage the cultivation of skills for historical interpretation.

As far as the expected learning outcomes is concerned, the research results allowed us to deploy hypotheses for a tendency that predominates in Greece, in contrast to other western countries: namely Greek museums digital applications tend to focus on the transmission/reproduction of provided historical knowledge. This hypothesis, though underpinned by the targets set in school learning, requires further investigation. Moreover, digital applications characterised as '*traditional*' according to their museological background and their approach to history education, tend to expect '*traditional*' learning outcomes, whereas those registered as '*contemporary*' ('*modern*' or '*postmodern*'), in terms of their museological background and history education approach, were constructed as to expect contemporary learning outcomes.

Conclusion

The aim of this paper has been to present part of the results of a study which examined whether digital history education applications on museum webpages are based on ‘*traditional*’ or ‘*contemporary*’ (‘*modern*’ or ‘*postmodern*’) ideas in terms of their museological background, their history education approach, the expecting learning outcomes, and the use of new technologies. Applications characterised by a ‘*traditional*’ museological background seem to be also characterised by respective ‘*traditional*’ tendencies in terms of all the other parameters studied. In these cases, the use of new technologies does not enable users to construct knowledge according to ‘*contemporary*’ approaches to history education, but leads them to a sterile accumulation of the virtual representation of pictures, objects, and written facts. In contrast, applications characterised by a ‘*contemporary*’ (‘*modern*’ or ‘*postmodern*’) museological background seem to be associated with correspondingly modern tendencies in terms of all the other parameters studied.

One of the basic limitations of the study was the small number of the selected digital applications. Thus, a future research would focus on the analysis of a greater number of applications from different museums and countries, addressing children and youngsters of different ages.

The study was conducted with the scope to better understand the implications of museum digital implications to history education, and to promote the production of applications that would allow the active construction of knowledge by the users. This would mean that users would be considered as active thinking subjects. If we consider the impact of technology to our everyday life, it would be beneficial for students to use digital applications that approach history in ‘*contemporary*’ museological and educational terms.

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Σημειώσεις

¹ In the relevant research the following question was also investigated: Whether and to what extent do museum digital history education applications allow users’ ‘presence’, ‘embodiment’ and ‘interactivity’, namely, users’ active involvement in initiatives, both on a practical and a decision-making level, promoting alternative paths of thinking and two-way communication in their hybrid environment (Rinou 2014).

² According to the 4 parameters studied, relevant 4 category systems were constructed in order to analyse the selected on-line applications. The category system of a) the museological background, b) the history education approach, c) the expected learning outcomes, and d) users’ ‘presence’, ‘embodiment’ and ‘interactivity’.

