

The Dissemination & Promotion of Cultural Heritage Sites to People “on the move” Employing Digital TV.

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Abstract

This paper examines the CHIMBS (Cultural Heritage Interactive Multimedia Broadcast Services) research project that endeavours to create cultural heritage related service scenarios. The aim is to promote and disseminate Europe’s cultural heritage sites to people “on the move” employing the CISMUNDUS system architecture and application tools (DVB-T, UMTS/GPRS), empowering the cultural heritage visitor with real-time, access of a range of synchronised media at remote locations through portable devices.

KEYWORDS: Cultural Heritage Sites, Interactive Digital TV, European Culture Dissemination, Location Broadcasting, User Profiling.

1. Cultural Heritage and IT: Current Situation

Nowadays, the new technology employed for presenting cultural heritage is limited mainly to museum exhibits. Cultural heritage visitors of archaeological sites are constrained in using obsolete maps and in the best case scenario, tour guides to navigate through the site. Bearing in mind the physical obstacles in fully understanding an archaeological site; they are often been inhabited by different civilisations with diverse cultures, most or the

artefacts are stored in other museums or are not available to the public, many of the building monuments are still unexcavated and what is left is in most cases a “bunch of rubbles and ruins”, as believed by many visitors, further necessitates the promotion and dissemination of their cultural wealth.

A closer review of the European Union cultural project (DigiCult) validates the above remarks. More precisely a categorisation (see Appendix 1) of the DigiCult projects http://www.cordis.lu/ist/ka3/digicult/projects_ac.htm reveals that from the total number of cultural heritage related EU projects 13% refer to the research and development of tools and application for presenting and promoting the museum exhibits. A much smaller percentage of projects (5%) deal with the creation of tools for the promotion and dissemination of open-air cultural heritage sites, such as archaeological ones.

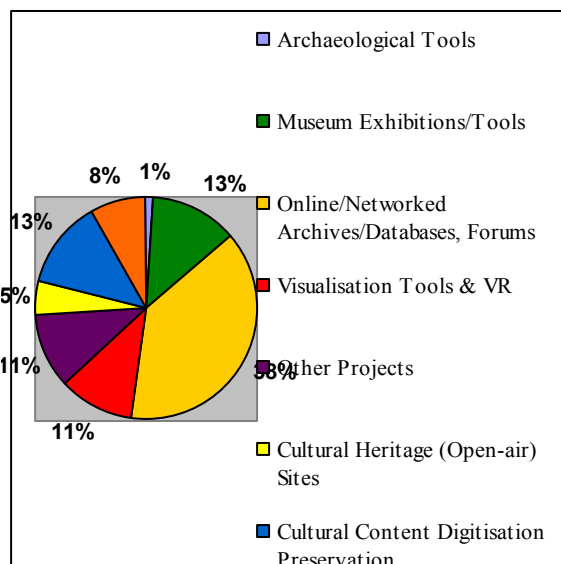


Figure 1: DigiCult Projects’ Categorisation

2. Convergence of the Computer and TV: New Opportunities for Cultural Heritage

The above EU projects clearly illustrate the convergence of cultural heritage and Information Technology. Though current research shows that another form of convergence is evident in the field of IT, which in turn assists and enhances the promotion and dissemination of cultural heritage.

To begin with, until several years ago computers and the TV were seen as separate media communication devices. TV was characterised as a medium for presenting mainly news and enhancing entertainment whilst the PC was and is the principal medium for accessing information and performing various tasks (word-processors, accessing the Internet, etc). Nowadays, though, the convergence of TV and in particular Interactive Digital TV (IDTV) and multimedia forms an irreversible and well-acknowledged

video is segmented and indexed so that each scene calls up related synchronised media, such as 3D reconstruction models, video clips, panoramas, Internet pages, a quiz, a virtual museum and games, that the user can access either while watching the main Programme or at the end of it. The user is able to access these media using a pen-tablet PC (with a DVB-T and GPRS card attached to it) that he either owns or rents from the cultural institution he is visiting. The system involves two main scenarios:

a) *Programme Indexing* (introduced above) and b) *Location Based Indexing*, where the multimedia content that the user can access to is relevant to his/her location on the archaeological site area (location-based broadcasting).

The CHIMBS project is developing two main Service prototypes: a Pre-visit/Post-visit (Programme Indexing) and an On-site one (Location Indexing).

Therefore, CHIMBS multimedia service capabilities of incorporating and synchronising a vast range of media, allow it to act both as a dissemination tool for attracting people to visit cultural heritage sites as well as a tour guide by merging and providing textual, oral and visual information contributing to a better understanding/knowledge of the site. More precisely supported media include:

- **WWW pages:** can extend a heritage site beyond its physical walls and invite virtual visitors to explore images and text at their own pace and at remote locations (Appendix 2: Screenshot 05).
- Furthermore, in combination with the **Internet's** versatility and diversity of sources they can increase the amount of information about collections and attractions available to visitors (e.g. museum web sites, historical web pages etc), as well as promoting cultural heritage sites at a pre-visit stage [Not*97].
- **Video:** since *culture can be understood in terms of symbols and images that directly mould attitudes and behaviour* [Bar00] video plays an important role in presenting and promoting cultural heritage sites.
- **3D and VR images and interactive models:** compose an effective and attractive medium, which besides reconstructing ancient monuments that no longer exist, illustrating what it might have been like to 'walk through' the site (Screenshot 06).
- **Graphics (2D, digital images, clipart), text and audio:** provide digital access to reserve collections and objects that are not normally on display.

To demonstrate the potential advantages and feasibility of such project the archaeological site of Sagalassos in Turkey (also used as a test-bed by the 3D MURALE project, see <http://www.brunel.ac.uk/project/murale/>) is being used as test case. As indicated above, CHIMBS project focuses mainly on the promotion and dissemination of archaeological sites. Though it should be highlighted at this point, that CHIMBS could extend its services and

application beyond archaeological sites to also embrace a variety of European cultural heritage attractions such as the next European Capital of Culture (city of Graz in Austria). It could be also made available in tourist information centres as well as train stations and airports.

4.1 Problems & Obstacles in disseminating Cultural Heritage Sites amongst Europe

It is indeed very encouraging that heritage attractions, such as museums and cultural heritage sites (open-air sites), employ Information and Communication Technology to digitally *present* their cultural collections and exhibits. An issue though that arises is, does museums and heritage sites presentation imply *promotion* and *dissemination* of these cultural heritage attractions and their collections? What about the delicate issues involved in disseminating European Heritage sites?

"A hallmark of heritage is the problematic relationship of its objects to the instruments of their display" (Kirschenblatt-Gimblett, B [Kir98]).

If we wish to disseminate cultural heritage sites among people of different EU and European countries we must do more than merely design a fancy user interface with various graphics and culturally related information. From the above statement it is evident that an effort must be also made to resolve sensitive issues involved in mutual understanding and interpretation of cultures between individuals that belong to dissimilar cultural/national backgrounds and speak different languages.

Therefore, our goal is to seek possible solutions and "unravellings" in assisting users/visitors in understanding the cultural heritage an archaeological site represents, beyond a narrow national perspective but also in a European one, tacking into account the new opportunities that the European Union coalition has fabricated.

The issue that arises is how does this render possible in a culturally diverse and polyglot continent such as Europe. At large, Europe is often characterised as "*a linguistic and cultural mosaic*", where almost 45 autochthonous languages are spoken by its 368 million citizens [Ori98].

Should we remove the linguistic and cultural barriers, still dividing people and consequently move towards the adaptation of a single-unified language and culture, following the 'American Model' or adopt IST/DigiCult: Key Action III (<http://www.iol.ie/~libcounc/actionline3.htm>) objective in improving Europe's expanding repositories of cultural knowledge/awareness, while contributing to the creation of a sustainable cultural landscape?

Our goal is providing a harmonic mode of balancing between the polymorphism of EU citizens' cultural traditions and a common European cultural unity, through the presentation and dissemination of Europe's cultural

heritage sites strengthening the elimination of prejudice between people.

Language is so closely related to our behaviour that we cannot separate it from the life and culture of the community which uses it. This is mainly due to the fact that the primary purpose a language is to communicating ideas and meanings as well as *how people see, apprehend and characterise the world around them* [AC97].

4.2 Possible Solutions

What is relatively odd is that although many of the European Cultural Heritage research projects compose EU ones, targeted at promoting and disseminating EU's and Europe's cultural wealth only few of them actually treat this matter. More precisely, the PAST (exPeriencing Archaeology across Space and Time) project is one of the few to really raise the issue of understanding cultural heritage a site represents in a global European perspective rather in a narrow local/national one. Even less of them touch the issues of Europe's cultural diversity and how to preserve it in the context of the common EU course/process.

One way of resolving the issue of Europe's cultural diversity, in the best manner, is what [Zet94] Zetterholm, S suggests, that is to *emphasise cultural variety against the background of a common cultural base, a common European civilization*.

The solution proposed to this problem is 'user-profiling'. That is presenting content and information that is relevant to the profile that the user has previously chosen. By 'profile' we refer to user's a) **age**, b) **purpose of visit** (tourist, educational, expert, etc.), b) **cultural background** and d) **language**. The user profiling takes place at the start of the program, but the user is also able to change his profile during the course of the rest of the program.

As far as the first profile is concerned, the CHIMBS service demo provides the user with two different user interfaces (UI) that characterize a person's age: a) *child (8-13)* and b) *teenager/adult (14+)*, which in turn offer different experiences in viewing the programme's content.

In particular in the teenager/adult UI adopts the TV metaphor, the user interacts with the system by means of a toolbar resembling a remote control (Appendix 2:Screenshot 04). The rationale behind the adoption of such metaphor lies in the fact that, primarily, can enhance user interaction, even amongst technophobes since it is based on something all people are familiar with and have used before; and secondly it relates to the display medium, since CHIMBS composes a service for interactive digital TV, enabling, in a sense, users to "view digital TV through their TV user interface".

The child UI on the other hand employs the time-machine metaphor (Appendix 2: Screenshot 03). The choice of this particular metaphor was made to subconsciously assist the cultural/historical notion of the project "taking children back to time", as well as keeping them stimulated.

It is, however, impossible to have a distinct user interface for every EU nation/country member, since this would increase the size of the programme, as well the effort and time put to render this possible. Instead what we can do is to provide the user with a number of custom user interface features and a series of ones that will change to reflect his selections. For instance in the CHIMBS simulation demo, the flag, the country map and the landmark of the user's country of origin change to match his choice and provide him with a feel of his cultural background in the application (see Appendix 2: Screenshot 2).

In addition to that, language diversity has implications in Europe's media. Because, as mentioned above, our research project will utilize digital video/TV to disseminate heritage attractions, a number of ways of tackling this problem are being reviewed and selected.

Hopefully, the importance of people of different languages receiving programmes in their own mother tongues was recognised at the beginning of the 1980s and several solutions have been proposed to this:

- a) *Multilanguage programmes*: Programmes that use subtitles or dub audio languages in order to be viewed in several countries.
- b) *Lingua-franca*: Programmes that use English or other popular language as a pan-European one to be distributed in European audiences.
- c) *Language-area programmes*: Programmes which involved a major language, e.g. German and were intended to be viewed in German speaking geographic areas, such as Germany, Austria, Switzerland [Sch*95].

Very soon, it was realised that lingua-franca and language-area programmes solution were left behind due to the high cost and the laborious nature of such productions.

The Multilanguage programmes concept that is being used up to now, is considered as the best solution. However this type of resolution has its drawbacks as well, which need to be considered and evaluated before being applied to the CHIMBS project. Multilanguage programmes major features that tackle the problem of the language barrier are *subtitling* and *dubbing*. Subtitling may affect comprehensibility, since viewers are required in reading, but they retain the audiovisual-integrity of the programme and are low in cost. Dubbing on the other hand permit undistributed reception of the programme, though falsify the audio-visual context of the production, are very expensive [Sch*95] and demand the employment of highly specialised professionals.

In light of the above we empowered the user with the option of enabling subtitles in his mother-tongue (main video programme) and be able to view other video clips (virtual video of Sagalassos, animated tutorials) in his desired audio language. (Note: Subtitling is available only in the Pre-visit, Post-visit service. The On-site service employs audio languages, in order not to distract users from the actual site).

Moving on, not all cultural heritage visitors have the same amount of time, interests and motivation, thus it is important to match individual preference with the content and piece of information that the user receives. To achieve that we divided the "purpose of visit" profile into three

following categories where the user can choose from and determine the specialisation and range of information that the user will obtain:

- a) **Casual Visitor/Tourists:** refers to the people driving by the archaeological site, who are mainly interested in getting a general view of the site and the related information and who like window shoppers browse the program's media/content until they find something that interests them.
- b) **Intentional Visitors:** They have some knowledge or at least a significant interest about the subject domain, are motivated and wish to learn more about it.
- c) **Specialists:** Specialists in the field, such as archaeologists and history students.

5.1 Task-Oriented Vs User-Centred Design Approach

It should be highlighted that the design of CHIMBS User Interface (UI) composed a very interesting challenge, since CHIMBS is required to form a bridge between information appliances (digital TV) and the computer.

Designing usable interactive products involves the following two key considerations: a) the target audience using the system and b) the context in which the product is going to be used. Those two dictate in turn the kind of tasks that users will expect to perform and the different types of activities, information, and user interfaces that users shall receive according to their personal needs and interests.

As a result of the above the design approach adopted was based on the Task-Oriented mode, since it is considered to be more appropriate for heritage attractions interactive multimedia systems, due to the fact that museum and archaeological site visitors' goals/roles (tourist, expert, etc.) and age background (children, adults, etc.) differs. In this respect Task-Oriented design can provide museum visitor with the most suitable multimedia presentation taking into account user's specific task model and purpose [PB97]. This is achieved by means of profiling the user at the beginning of the system (discussed in Possible Solutions).

Though as Wood, L successfully indicates, designing a user interface without involving users is *as impossible as designing one without a pencil, paper and a computer* [Woo98].

Initially the solution to that seems to be the User-Centred design approach, which adopts a strong involvement of prospective users in all phases of the design process, while others structure their UI and design according to the user's conceptual model of the possible activities that user will be involved with when interacting with the system.

Essentially, User-Centred design is very useful in positioning users as a testing and evaluation service for designers to ensure that user's needs, requirements and goals are met [Dru*99], but should be used mainly in this context and not in all phases of the design process. In particular, involving users in all phases of the design

process can facilitate the designer with large amount of feedback (what is good, bad, should be altered, etc.), though there is the risk that the kind of feedback obtained by users is based on reaction rather than initiation [Dru*99]. Furthermore there is a concern on how the designer will interpret and translate user feedback and reactions.

In light of the above, a productive combination of User-Centred design -as a mean testing and evaluating the multimedia design product- and Task-Oriented model -for designing the UI and profiling users seems as the best approach in designing user-accepted and effective interactive multimedia presentations/systems for museum and cultural heritage sites visitors and is the mode used in the design of the CHIMBS user interface.

5.2 CHIMBS Design Mental Concept & the Use of Metaphors

The usefulness of the adoption of design and UI metaphors in helping users to better understand and learn how to use a system is well echoed in literature [Lau99], [Woo98], [Pre*00].

CHIMBS design concept is based upon the wide use of metaphors. In particular the teenager/adult UI adopts the TV metaphor, where the user interacts with the system by means of a toolbar resembling a remote control (Appendix 2:Screenshot 04). The rationale behind the adoption of such metaphor lies in the fact that, primarily, can enhance user interaction, even amongst technophobes since it is based on something all people are familiar with and have used before; and secondly it relates to the display medium, since CHIMBS composes a service for interactive digital TV, enabling, in a sense, users to "view digital TV through their TV user interface".

The child UI on the other hand employs the time-machine metaphor (Appendix 2:Screenshot 03). The choice of this particular metaphor was made to subconsciously assist the cultural/historical notion of the project "taking children back to time", as well as keeping them stimulated.

Moving on, the user interface can be mainly described as Graphical (GUI), though the user is able to interact using a Menu that can be toggled on and off, as an alternative mean of navigation.

Further more the UI is composed of a 800 x 600 pixel resolution (primary) window that contains the toolbar (navigation elements) and a series of smaller (secondary) windows that pop up when the user requires additional information. For functionality purposes, the navigation is more clear this way and the user can have access to both the main video and a range of media simultaneously, without having to navigate back and forth each time a new media or piece of information becomes available.

6. User-Trial Results and Evaluation

The first formal test of the CHIMBS project took place during the design of the program/service on the 8th of May in the Museum of London. The survey was

formulated by the completion of questionnaires based on standardised face-to-face interviews [Dea*99] involving fourteen people from different cultural backgrounds, nationalities, genders and age groups as well as observations of twenty visitors using the Museum of London's Multimedia terminals.

The results were very optimistic regarding the acceptance of such project and assisted us in the further development and design of the service. In particular, 79% of the people interviewed rated the visual design of the program and user interface with 4/5 and 5/5 (1/5 being poor and 5/5 excellent). Interviewees were very happy about the range of media with 93% of them rating it between 4/5 and 5/5. 71.5% of them appreciating the scope and objectives of such project voting 5/5. When asked whether they would use a portable device to assist them in the better understanding of cultural heritage sites 85% of the interviewees replied positively. Furthermore, 54% of them expressed their desire of purchasing a portable device that would display such service, despite the fact that a device like that would be expensive and 62% admitted that they would rent it from a cultural institution.

The real test, though, of the CHIMBS project was the user-trial that took place after the design of the program. During the first week of August 2003 (Monday 4th – Saturday 9th of August) twelve users from different cultural backgrounds (8 from EU members 4 from non-European countries), genders (7 male, 5 female) and age groups (from 18 to 48 years old) were asked to spend about 30 minutes in using the CHIMBS service demo and supply us with feedback in the form of a questionnaire.

The evaluation assessment was divided into four sections: a) *Program Evaluation*, b) *User Interface/Navigation*, c) *Documentation* and d) *General Remarks*, each one of them reflected in the questionnaire. The same users were also unobtrusively observed to gain a better understanding of their attitudes and usage of the program.

The overall program received very positive feedback with 58% of the users rating it with 5/5 and 42% 4/5. It is remarkable that although the rating system was set from 1/5 (being poor) to 5/5 (being excellent) users rated all of the program features from 3/5 to 5/5. In particular, when asked about the program's ease of use 83.5% responded that it was fairly easy to use with 75.5 of them rating it 4/5 and 8% 5/5. As far as the media diversity is concerned, 50% of the users voted 5/5, 42% 4/5 and 8% 3/5. In addition, the program was characterised as very interactive with 50% of the users rating it with 5/5 and the rest of them 4/5. Regarding the range of information that the user receives, interviewees found it as very informative with 75% of them rating it from 4/5 to 5/5.

The program's layout was rated highly, as shown in Graph 3, with 98% of users grading it from 4/5 to 5/5. User's views about the design metaphors the program incorporated (TV/remote control metaphor for adults and time-machine metaphor for children) were divided with 33% of them voting 3/5, 4/5 and 5/5 respectively. The user interface was complemented as being very attractive with 33.5% rating it 5/5 and 66.5 4/5 and the documentation/help was found as adequate and helpful with 75% of the users grading it from 4/5 to 5/5, where

user particularly appreciated the animated tutorial, at the beginning of the program as a quick start guide. Finally, users were very satisfied and praised the personalisation of information according to their age, purpose of visit and cultural background with almost 83.5% grading it with 4/5 and 5/5. Greek users also appreciate the choice of viewing most of them program's content in their mother-tongue by enabling the corresponding subtitles and audio languages.

The observation of users was of most value, since it established the following:

- a) Users from different age group, even older ones and technophobes can navigate in the program with ease, especially after they have watched the animated tutorials.
- b) Older users enjoyed the games as much as the younger ones.
- c) The virtual walk-through video of the reconstructed Sagalassos was voted as the most entertaining and illuminating type of media, with users admitting having a completely new experience, as they could see how it would have been to walk through an ancient city.
- d) Some minor problems with the user interface and navigation were recognised and altered, to render the program more user-friendly.
- e) Users admitted learning informally about the archaeological site of Sagalassos, particularly enjoying the new experience that this multisensory service of edutainment offered them and help us realise that there is a high demand for a cultural heritage service.

7. Problems in Outputting the UI and Service

Multimedia designers and artists are not comfortable in designing user interfaces and services via programming languages such as Java, JavaScript, etc. On the contrary they prefer working with authoring packages, such as Macromedia Director. People in the broadcasting industry though do not wish to use packages such as Director because of the royalties they have to pay to Macromedia and other companies. Apart from that the UI and content should be outputted in a format that the Multimedia Home Platform (MHP) of the broadcasting terminal recognises. Director on the other hand is a very good tool for prototyping user interfaces and services. Therefore a possible solution to this obstacle is to prototype the service using Macromedia Director 8.5 and then output it into an XML file, which is supported by the MHP, employing CISMUNDUS User Interface XML Generator.

Therefore what is presented in this paper composes the first phase of the project, to create a demo simulation of a cultural heritage site and test it with a number of potential users to ascertain whether there is a demand for this particular type of service. The next phase involves the conversion of the service in a format that can be then put to the broadcasting terminal, so that we can take full advantage of the features that the technology offers (location broadcasting, interactive digital TV for portable devices).

Conclusion

In this paper we have presented a new cultural heritage service that aims in promoting and disseminating cultural heritage sites via interactive digital TV. We have also considered the issues involved in disseminating cultural heritage sites to people amongst the European Union/Europe and presented some solutions. Finally we have reviewed the CHIMBS user-trial results and discussed about the further development of the project. Archaeological sites compose the cradle of our culture. It is therefore necessary to make them more accessible to the public ascribing them the attention and acknowledgement they deserve.

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Appendix 1

The 92 DigiCult research projects have been categorised according to the following criteria:

1. *Archaeological Tools*: tools and applications that assist archaeologist's work in recording, cataloguing, indexing, retrieving and visualising archaeological artefacts and building blocks.
2. *Museum Exhibitions/Tools*: multimedia systems and applications for displaying exhibits and related information across space and time or (and) in virtual environments.
3. *Online/Networked Archives, Databases and Forums*: creation of online archives, databases, forums and applications/systems for empowering the citizen through better access to culture and electronic/digitised resources.
4. *Visualisation and Virtual Reality (VR) Tools*: tools for creating 3D-visualisations of cultural objects as well as augmented and virtual reality applications for presenting and promoting cultural heritage.
5. *Cultural Heritage (Open-air) sites Dissemination Tools*: Increasing people's cultural heritage awareness, promoting & disseminating Europe's cultural wealth by means of interactive mobile applications.
6. *Cultural Content Digitisation and Preservation*: software and tools aiming at the conservation and preservation of cultural resources through the digitisation of content.
7. *Learning Environments*: multimedia, knowledge education systems for stimulating and enhancing lifelong learning.
8. *Other*: Projects that do not fully fit into one of the above categories.



Screenshot 02: Promoting the EU and its Cultural Heritage Site



Screenshot 03: Children's UI (Time-Machine Design Metaphor)

Appendix 2



Screenshot 01: CHIMBS User Profiling System
Profiling users for a)Age Group, b)Purpose of Visit, c)Cultural background, d)Language.



Screenshot 04: Adult's UI (TV/remote control Design Metaphor). Main Programme with Subtitles.



Screenshot 05: *Main Programme with relevant Online/Internet Content.*



Screenshot 06: *Main Programme with relevant 3D Content ("Walk-through" video of reconstructed Sagalassos)*