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The evaluation of the Cultural Journeys in the Information Society environment as an educational aid

Georgios John Fakas [a,*], Iasonas Lamprianou [b], Andreas Andreou [b], Maria Pampaka [b], Christos Schizas [c]

[a] *Department of Computing and Mathematics, Manchester Metropolitan University, Manchester, UK*
[b] *Department of Education, University of Manchester, Manchester, UK*
[c] *Department of Computer Science, University of Cyprus, Nicosia, Cyprus*

Abstract

The *Cultural Journeys in the Information Society* is a dynamic hypermedia environment, which proposes the *Electronic Roads* as a meta-form for exploring cultural information that can form *Cultural Journeys*. The Electronic Roads meta-form facilitates travelers to explore the information space in a natural and continuous way similar to the exploration of physical roads. This meta-form is advantageous over existing cultural exploration approaches, which usually apply only to discrete information spaces, failing to provide users with continuous explorations and as a result users may lose their intended destinations. The proposed environment provides extendable cultural and historical content for three Mediterranean countries, i.e. Cyprus, Jordan and Egypt.

Such a system could be ideal for teaching history and culture; therefore several *Learning Activities* have been developed in this context. The learning effectiveness of the environment was evaluated in primary schools in Cyprus, where pupils were asked to complete specific Learning Activities by either using the Cultural Journeys in the Information Society environment or a static hypermedia system. The results showed that the pupils found our environment to be easier to use, compared to the static system and that the performance of the pupils that used it was significantly higher.

Keywords: Cross-cultural projects; Interactive learning environments; Multimedia/hypermedia systems; Navigation

* Corresponding author.
E-mail address: g.fakas@mmu.ac.uk (G.J. Fakas).

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1. Introduction

Hypermedia systems are based on hypertext, which is a non-sequential, non-linear method for organizing and displaying text (Jonassen, 1989). During the last decade the World Wide Web (WWW) has become the dominant application of hypermedia. Web hypermedia systems are basically the most popular form of Computer-Based applications used in education globally (Liao, 1999). Researchers and educators have noted the importance of hypermedia in education (Jonassen, 1994; Oliver, 1995). For instance, Trotter (1989) indicates that hypermedia employs a strategy that is advantageous for students since the learner is in charge and can use a variety of media to approach the subject. Moore (1994) also points out that hypermedia systems are able to combine multimedia, interactive opportunities for the learners, and to pursue cross-references. Jonassen (1991) also states that hypermedia systems exemplify constructivist approaches to learning, where learning is regarded as the formation of mental models. According to this view of learning, the students actively construct knowledge by interacting dynamically with the learning environment. Hypermedia systems are a suitable delivery mechanism for courseware as they are structured to allow the learner to take greater control of learning.

There are many cultural hypermedia systems and a lot of multimedia content available over the Internet, which is dramatically growing day by day. For instance, i-irasshai is a Japanese cultural learning environment where students can walk through 20 locations ranging from a school, shrine, sushi restaurants to residences (Jones, Cole, & Quay, 2001); the LeMo is an environment based on 20th century German history where visitors can navigate through 3D spaces to the various museums exhibits (Asmuss, Scriba, Reiche, & Nentwig, 2001); the Argos environment (Beavers, 1999) covers the ancient and medieval worlds. However, these multimedia systems apply to discrete data spaces only, failing to provide users with a means of continuous exploration in the related information space that often spans multiple data spaces. As a result, users may lose their intended destinations if they cannot describe a desired journey explicitly. Thus, there is a strong need to address this problem and to provide information guides that would allow a coherent exploration of information; an exploration that can be viewed as a structured journey in the available information (Fakas et al., 2000).

The *Cultural Journeys in the Information Society* (CJIS) Environment is a dynamic hypermedia system that proposes the novel concept of Electronic Roads (ERs) as a meta-form for exploring cultural information that can form Cultural Journeys. ERs can be regarded as the underlying fabric of the space of information and the Information Society at large. ERs create an information map with spatial, temporal and context or more generally semantic associations amongst different information elements.

The application of such an environment in education, we contend, would be ideal for the teaching of history and culture. For this reason, the pedagogical partners of the project (i.e. school teachers – members of the CJIS consortium) have developed a number of Learning Activities. The tool and the Learning Activities were introduced in several primary schools in Cyprus.

2. The Cultural Journeys in the Information Society environment

The primary objective of the CJIS educational environment is to achieve a network of information in which the students can explore the information space in a natural way where the in-

formation offered remains continuously interesting. The system achieves that by employing intelligent navigation algorithms, which combine user exploration mode, preferences and Information Units meta-data. For this purpose the system maintains:

- *User Profile* to model users such as age, depth of interest and interest preferences such as historic and time period, geographic area, etc. (Bollacker, Lawrence, & Giles, 1998; Meng & Chen, 1999; Widyantoro, Ioerger, & Tu, 1999).
- *Meta-Data* in order to link, structure and organize Information Units together such as cross-links, user groups, language, district, Historic and Time Period.

The proposed system is described in more detail in our earlier work (Fakas, Kakas, & Schizas, 2004).

2.1. The CJIS main concepts

2.1.1. Electronic roads, Cultural journey

A Cultural Journey is an amalgam of the series of ERs that the user selected to explore (i.e. the series of Information Units the user explored). At every ER stop, a new set of dynamic ERs and an Information Unit are presented to the traveler. The user explores the Information Unit content and proceeds by selecting a new ER. The system presents ERs in groups:

- *Route Roads* continue the exploration of the information space in the same thematic direction by giving more specific information. For instance in the *Arabic Incursions* stop (Fig. 1), the Route Roads of *Arabic Incursions* are the *Raid by Moabia*, *Raid by Oualind*, *Raid by Al Rasind*, *Raid by Damianos*, and *Raids Consequences*.*Exploration Roads* continue the exploration in the information space in lateral thematic directions; the information presented is semantically related to the current ER road but of different nature, such as different time or locations. The system produces the following different types of Exploration Roads:
- *Historic Period Lateral Roads* present information of the same thematic context but of different historic periods. The historic lateral roads of the *Arabic Incursions* Road are *Events in Frankish Period* and *Events in Roman Period.*
- *Geographical Lateral Roads* present information of the same thematic context from different geographical areas.
- *Cross-Lateral Roads* present the cross-linked roads of the selected road. *Arab Incursions* are cross-linked to the *Emperor Fokas liberates Cyprus* and to the *Acreta Poetry* roads.
- *Previous Stops* is a list of stops where the traveler changes route by selecting an Exploration Road. For instance, in the *Modern Icon Painters* stop (Appendix B.2), Previous Stops are the *Kykos Monastery* and the *Icon Painting in the Turkish Period.*

2.1.2. Information unit

Information Units are the building blocks of the information of the system and consist of the actual content and an attached metadata index. The system contains thousands of Information Units, which are collected and entered to the system by the Cultural Experts (Miller, 1998; Weibel & Cathro, 1997).

2.1.3. Semantic Dictionary

The Semantic Dictionary structures the cultural information of the system (i.e. Information Units) in a hierarchical manner from general to specific and also captures the multi-contextual

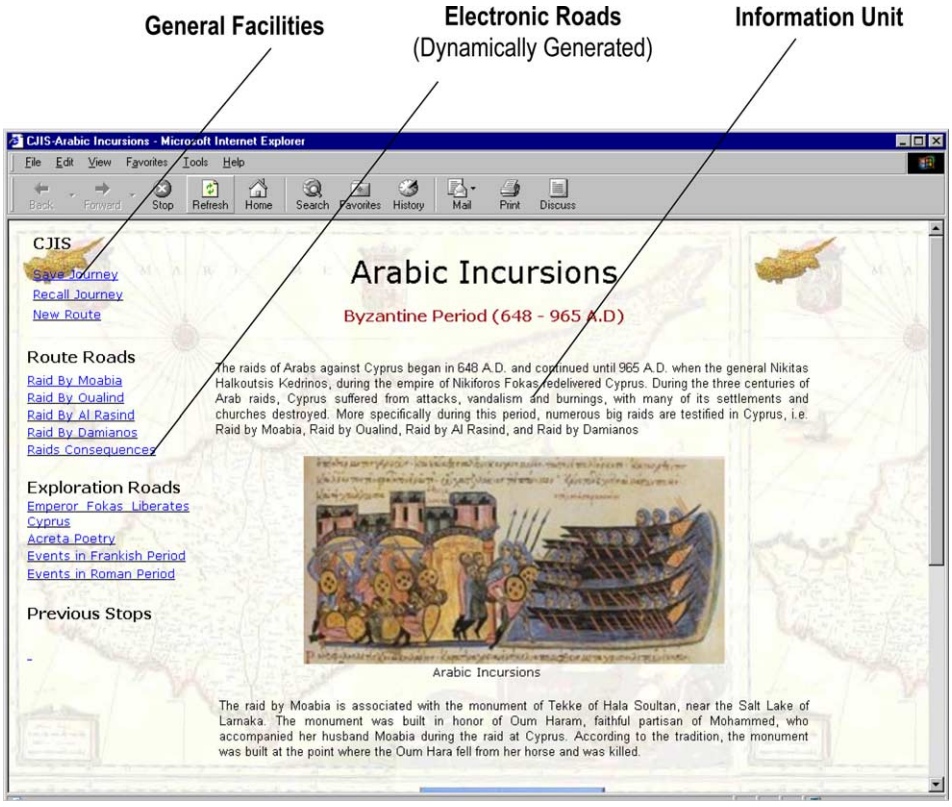

Fig. 1. The CJIS System (Arabic Incursions).

dimensions (i.e. cross-links) that each Information Unit may have. The system provides a user friendly Semantic Dictionary Entry Tool that assists the Culture Experts to easily construct it. A universal cultural Semantic Dictionary has been developed that could be applied to any country's culture (the one we developed captures Cyprus, Egypt and Jordan cultures). It is classified by *country*, *historic period* and a repetitive standard part that describes *science*, *architecture*, *arts*, *folk arts/food* and *history*. A detailed description is presented in our earlier work (Fakas et al., 2004).

2.2. The CJIS main components

The system consists of two main components, i.e. the CJIS system and the Semantic Dictionary Entry Tool. Both components are web based and can be accessed remotely over the Internet.

2.2.1. The CJIS system

The CJIS system presents an element of information (i.e. the Information Unit) and a set of dynamic ERs and facilitates users to explore the information space over the Internet by visiting the presented ERs (Fig. 1). The users can start a new journey, by selecting the "New Route" function where they define their profile (i.e. age, depth of interest) and interests (i.e. period,

district, keywords etc.), however a user profile is not obligatory. The users now can explore the current information and then continue their journey by visiting one of the ERs. This cyclic procedure – exploration of the presented IU and selection of a new ER – continues until users reach their final cultural destination. The system also facilitates users to save interesting and educational journeys by selecting the "Save Journey" function and revisit them or recommend them to others by using the "Recall Journey" function.

2.2.2. The Semantic Dictionary entry tool

The CJIS environment is based on an expandable information space. It is very important that the Pedagogical Partners (i.e. the teachers) and the Cultural Experts of the project are able to modify the content according to their educational needs, either by adding or removing content. For this reason, the Semantic Dictionary Entry tool has been developed for user-friendly maintenance of the system content (i.e. Semantic Dictionary, Information Units and their meta-data). For instance, if the Pedagogical Partners would like to assign a Learning Activity to students about *Arts in Cyprus* and there is some additional study material that they would like the students to consider, then they can use this tool to enter this material.

2.3. A Cultural Journey: Invasions in Cyprus

In this subsection, we present a representative journey that was created by the Pedagogical Partners of the project and was also used in students Learning Activities, i.e. the *Invasions in Cyprus*. The *Cyprus Invasions* journey starts from *Arab Incursions* (Byzantine Period) (Fig. 1 shows this stop) and continues until the *Turkish Invasion* (Independence Period). At the first stop, the *Raids Consequences* road is selected. At the *Raids Consequences* ER, again a Route Road is explored (i.e. *Capturing the Cypriots*), which gives more specific information about *Raids Consequences*. At the third ER, an Exploration Road is selected i.e. *Occupation Consequences 1974* (Independence Period). *Occupation Consequences 1974* is an Exploration Road and provides

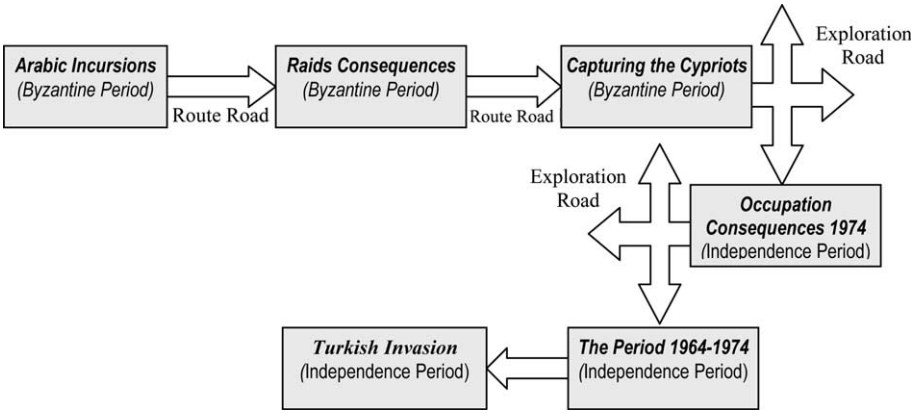

Fig. 2. A Cultural Journey: *Invasions in Cyprus*.

lateral content. At stop four, again a lateral link is selected (i.e. *The Period 1964–1974*). At the fifth ER, where also the journey ends, a route road is selected, i.e. *Turkish Invasion*. The following figure shows diagrammatically the ERs followed (see Fig. 2).

3. Learning activities

The pedagogical partners of the project have developed a number of different Learning Activities in the CJIS context. These Learning Activities cover primary school lessons for history and culture of the Euro-Mediterranean region. The application of CJIS and Learning Activities in these classes does not aim to substitute physical class lessons but to improve pupils' performance and attitude. The difficulty of Learning Activities ranges from introductory to advanced. Introductory activities (e.g. category A) aim to familiarize users with the system in contrary to advanced activities (e.g. category C) that aim to develop pupils' initiatives in using the system.

Generally, each Learning Activity consists of the activity objectives, study material (such as a predefined Cultural Journey), and the requested deliverables. The requested deliverables may be either the formation of a new Cultural Journey or a report. The Learning Activities could be categorized in three general categories.

3.1. Preparation of a report using a predefined cultural journey

In this first category of Learning Activities, students are required to prepare and submit a report about a requested subject that will include multimedia content extracted from a given Cultural Journey; the Cultural journey is created and saved in the system by their teacher before the activity takes place. These Learning Activities are very introductory and help students to get familiarized with the tool as they guide them by giving them to explore and study existing Cultural Journeys.

Cyprus was the target of many attacks because of the strategic importance that has due to its geographic positioning. The position of Cyprus in the easternmost corner of the Mediterranean had dictated its history due to its accessibility between both the East and the West. The objective of this lesson is to study the different invasions to Cyprus and their consequences.

Use the predefined Cultural Journey entitled *Invasions in Cyprus* saved in the CJIS system, composed by Electronic Roads of the *Arabic Incursions* and *Turkish Invasion* and their consequences in *Byzantine* and *Independence Periods* respectively in order to prepare a report about the Invasions in Cyprus and their Consequences.

Fig. 3. *Invasions in Cyprus and their Consequences* Learning Activity.

Fig. 3 shows a representative Learning Activity with subject *Invasions in Cyprus and their Consequences*. The Cultural Journey that was given to the students for this Learning Activity has been already described in Section 2.3, while Appendix A shows a representative Report delivered by one of the students.

3.2. Preparation of a cultural journey

In this Learning Activity Category, students are required to explore the CJIS system in order to form and deliver their own Cultural Journey about a required subject. These Learning Activities are also very useful in helping students to get familiarized with the system. Fig. 4 shows an example of such a Learning Activity, Appendix B.1 shows diagrammatically a Cultural Journey delivered by a student, and Appendix B.2 shows the first two stops of the student's delivered Cultural Journey (see Fig. 5).

3.3. Preparation of a report

In this last category of Learning Activities, students are required to prepare and deliver a report about a requested subject. In these Learning Activities, students are not given any initial Cultural

The main objective of this Learning Activity is the exploration of information about Arts in Cyprus. Arts in Cyprus include painting, icon painting, music, literature and poetry.

Use the CJIS environment in order to navigate through such Electronic Roads, and then prepare and deliver a Cultural Journey entitled as *Arts in Cyprus*. This Cultural Journey should cover various historic periods with an emphasis to the Independence Period of Cyprus.

Fig. 4. *Arts in Cyprus* Learning Activity.

The objective of this Learning Activity is the study of Kykos Monastery and its treasures. Kykos Monastery is very famous for its sub-monasteries, churches, and its museum that contains a big amount of the monastery's treasures. The CJIS environment contains a lot of information about the monastery.

You are required to deliver a report for *Kykos Monastery and its Treasures*. You should first explore the CJIS system and form a relevant preliminary Cultural Journey from where you can extract any useful information in order to prepare the report. You do not need to submit the preliminary Cultural Journey but only the report.

Fig. 5. *The Kykos Monastery and its Treasures* Learning Activity.

Journeys as the aim is to help them to develop their own initiative in using the system. The students must explore their own ERs and form the appropriate Cultural Journeys, from where they can extract useful multimedia information about the requested subject in order to prepare their reports.

4. Evaluation of the CJIS

For the evaluation of the learning effectiveness of the CJIS environment, a static hypermedia environment was developed that had exactly the same content as CJIS but lacked the electronic roads metaphor. In the static environment information was organised in a hierarchical structure with topics and sub-topics up to three levels. Appendix C shows the static hypermedia system, which is the static "equivalent" of the *Arabic Incursions* of Fig. 1.

The CJIS was compared to the static system by means of a quantitative study in a public primary school in Cyprus. One hundred sixth grade children were randomly sampled to participate in the research. Approximately half of them (56%) were asked to perform the Learning Activity of Fig. 3 using CJIS and the rest of them were asked to perform the same activity using the static hypermedia system which contained the same content. The children were of an average age of 11.5 years, with a minimum age of 11 years and 3 months and a maximum age of 11 years and 10 months. Sixty four percent of the pupils of the sample were boys. Information about the school attainment of the pupils was not released to the researchers for confidentiality reasons but the teachers allocated the pupils to the experimental (i.e. the CJIS) and control (i.e. the static) groups so that the two groups would be of equal academic ability. Moreover, there were an equal proportion of boys and girls in each group. The two groups were given the same time to perform the tasks, which were then marked by the same marker based on a pre-defined mark scheme. After the completion of the procedure, but before the marking of the tasks, the pupils were given a questionnaire to complete in order to measure their attitude towards the task. The evaluation aimed to investigate the effect of the novel characteristics of the CJIS on pupils' performance and their attitude towards the use of hypermedia systems.

4.1. The aims of the evaluation

This evaluation study aimed to identify whether the use of CJIS (compared to the use of the static hypermedia system) could affect both the attitude of the pupils and their performance. The study hypothesized that:

- the use of CJIS will improve the attitude of the pupils towards completing the tasks;
- the use of CJIS will improve the performance of the pupils.

4.2. Methodology – The instrument

The attitude questionnaire consisted of eight Likert-scale questions (Appendix D). It was developed at multiple stages with the cooperation of a number of school teachers. The questionnaire measured the attitude of the pupils towards the use of hypermedia systems during the completion

of Learning Activities. The early drafts of the questionnaire were initially piloted in a different public primary school and were administered to a small number of pupils. The findings of the pilot study helped to improve the questionnaire significantly. The responses of the pupils on the pilot were studied in order to modify or remove questions that did not contribute valid information. Questions that reduced the validity or the reliability of the instrument were improved or replaced. In-depth interviews with teachers and pupils during the development of the instrument indicated that the pupils understood what the questions asked and that they knew how to complete the multiple-choice questions. The teachers explained to the pupils that their responses would be treated in confidence.

This pilot led to a final questionnaire of good psychometric characteristics. The analysis of the final results showed that the internal consistency of the questionnaire was high (the Cronbach's index was 0.80). Values of 0.80 and above are considered to be satisfactory and are an indication of a reliable test. The item-total correlations of the items were high (in the area of 0.50–0.70).

It was decided that the questionnaire should be kept very short in order to encourage the pupils to complete it. The final version of the questionnaire consisted of only eight questions, which were scored on a scale of 1–5. Small scores on the questions indicated more positive attitudes towards the use of the hypermedia system. For example, on question 5 (''I found the software I used for the task...'') the Likert scale started from ''Very interesting'' (1 mark) and ended at 'Very boring' (5 marks). After aggregating the scores of the pupils on the eight questions, lower scores indicated more positive attitude and higher scores indicated less positive attitude.

The sample was split in two groups. The first group used the CJIS environment and the second group used the static hypermedia environment. Because in the latter, the links to the key concepts and information were scattered in the text it was very easy for the pupils to get carried away and lose their destination.

Both groups were asked to complete the Learning Activity of Fig. 3. The performance of the pupils on the given Learning Activity was measured on a scale from zero to 100 based on a series of pre-defined criteria. The higher the score, the more comprehensive and successful the completion of the task was. All the pupils completed the activity the same day and approximately the same time of the day. The conditions of the administration of the test were kept very much the same (e.g. the same computer labs were used, the same proctors were selected to supervise the completion of the Activity).

4.3. The results

The average performance of the sample was 57 (out of 100 maximum possible marks) with the minimum and maximum scores being 23 and 98 respectively. The average score of the CJIS group was 61.0 marks (SD = 18.0) out of a possible maximum of 100. The average score of the static group was 52.8 marks (SD = 12.2). An independent sample t-test showed that the difference between the performance of the two groups was statistically significant ($t = 2.578$, $p < 0.01$). Fig. 6(a) shows the means and the confidence intervals of the scores of the two groups on the Learning Activity. The figure clearly shows that the upper 95% confidence interval of the static hypermedia does not overlap with the lower 95% confidence interval of the CJIS group.

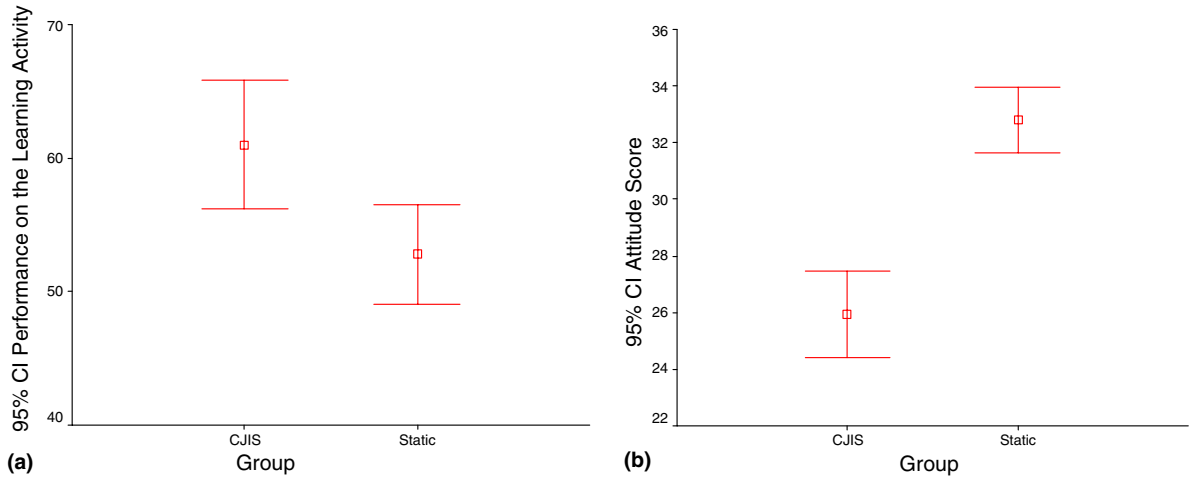

Fig. 6. (a) The Average Learning Activity Performance of Each Group and (b) the Average Attitude Score of Each Group.

The attitude of the pupils on the CJIS system was significantly more positive than the attitude of the children towards the static software. The average attitude score for the CJIS pupils was 25.9 marks (SD = 5.7) and the average attitude score of the 'traditional' group was 32.8 (SD = 3.8). An independent t-test showed that this difference was statistically significant ($t = 6.901$, $p < 0.001$). Fig. 6b shows the means and the confidence intervals of the attitude scores of the two groups. The figure clearly shows that the upper 95% confidence interval of the static hypermedia does not overlap with the lower 95% confidence interval of the CJIS group. Since lower scores mean more positive attitude, the CJIS group seems to have a statistically significant more positive attitude than the Static group.

A low but statistically significant correlation was also identified between the performance of the pupils and their attitude towards the software ($r = -0.228$, $N = 100$, $p < 0.02$) indicating that the more positive the attitude towards the software, the better the performance. This correlation, however, does not provide any information in a cause-effect format: it is only indicating that there is a relationship between the two, it is not known for example whether the positive attitude is causing the high performance or whether the high performance is causing the more positive attitude.

As far as the gender is concerned, no statistically significant differences were found between boys and girls either on their performance on the learning activity or on their attitude measures.

5. Discussion and conclusion

In conclusion, the CJIS tool is a dynamic hypermedia environment that proposes the concept of Electronic Roads as a meta-form for exploring information that can form CJIS.

This paper describes the application and evaluation of the CJIS environment as an educational aid in primary schools for the teaching of history and culture of the Euro-Mediterranean region.

The application of the tool in the primary schools has been very encouraging so far. More precisely, the students have approached it very positively and they have been very enthusiastic in using it in order to complete their Learning Activities. The Pedagogical Partners were also very satisfied by both students' enthusiasm and also the quality of the results of their Learning Activities. The evaluation of the project indicated that the CJIS environment can, indeed, add a new dimension to the use of the Internet as a learning/teaching aid.

We are currently studying further work in two different directions. Firstly, we plan to develop more Learning Activities for the culture of each country but also develop new Learning Activities that will cover cross-national subjects covering the three Mediterranean countries. Secondly, we plan to introduce the tool into more schools in Cyprus and also in the other two Mediterranean countries, (i.e. Jordan and Egypt). The University Of Cyprus partner in collaboration with the Ministry of Education and Culture (Cyprus) will also make available such a system to the Embassies of Cyprus and the Cypriot schools all over the world, where possible.

Acknowledgements

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Appendix A. A Sample Student Report

A.1. Invasions in Cyprus and their Consequences

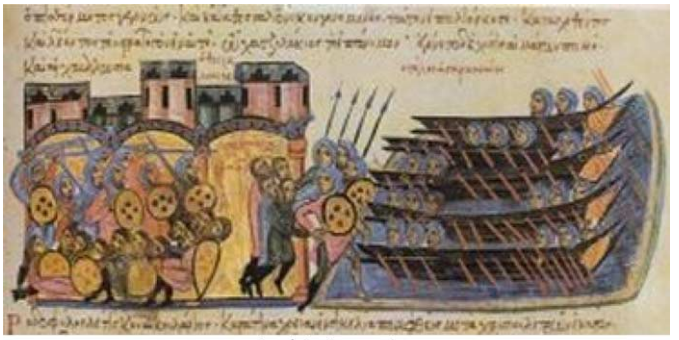
This report gives a brief description of the Arabic incursions against Cyprus during the Byzantine period, the Turkish invasion in Cyprus in 1974, and their consequences for Cypriots.

A.1.1. The Arabic Incursions

The raids of Arabs against Cyprus began in 648 A.D. and continued until 965 A.D. when the general Nikitas Halkoytsis Kedrinos, during the empire of Nikiforos Fokas redelivered

Cyprus. During the three centuries of Arab raids, Cyprus suffered from attacks, vandalism and burnings, with many of its settlements and churches destroyed. The advance of Seljuk Turks, precursors of the Ottomans, in Asia Minor had taken over the banner of Islam and the city of Jerusalem from the Arabs and were threatening the Byzantine Empire.

More specifically during this period, numerous big raids are testified in Cyprus, i.e. Raid by Moabia, Raid by Oualind, Raid by Al Rasind, and Raid by Damianos.



Arabic Incursions

The second raid by Moabia is also associated with the monument of Tekke of Hala Soultan, near the Salt Lake of Larnaka. The monument was built in honor of Oum Haram, faithful partisan of Mohammed, who accompanied her husband Moabia during the raid at Cyprus. According to the tradition, the monument was built at the point where the Oum Hara fell from her horse and was killed.

Consequences of the Arabic Incursions. The consequences of the Arabic Incursions were very painful for the island. The trade and the economy were seriously damaged and the population had decreased perceptibly because of the continuous population movements by both Byzantines and Arabs.

During this period, for the first time a small number of Arabs settlers were brought to the island. While thrived cities such as Pafos and Kourio, as well as appreciable monuments were destroyed. Despite that, the religious and cultural physiognomy of Cypriots remained inalterable.

A.1.2. The Turkish Invasion – 1974

Turkey, under the pretext of the coup against President Makarios on the 15th of July 1974, invaded in Cyprus on the 20th of July 1974, with marine and air forces. On the 23rd of the same month, a cease-fire was agreed and until then Turkey achieved to install bridgehead in the region of Keryneia. From the bridgehead the Turks began to pour in material and men and on the 14th of August, the Turkish forces of invasion started a new attack and they finally placed under control about 37% of the Cypriot territory.

Turkey tried to present the invasion as a peaceful operation that aimed the re-establishment of the constitutional order in Cyprus that had been forced by the coup d'itat. Nevertheless, after the re-establishment of the constitutional order and the return of President Makarios in December 1974 to Cyprus, the Turkish troops remained and also promoted the Turkish plans for the settlement of Cyprus by Turks as a first step to the annexation.

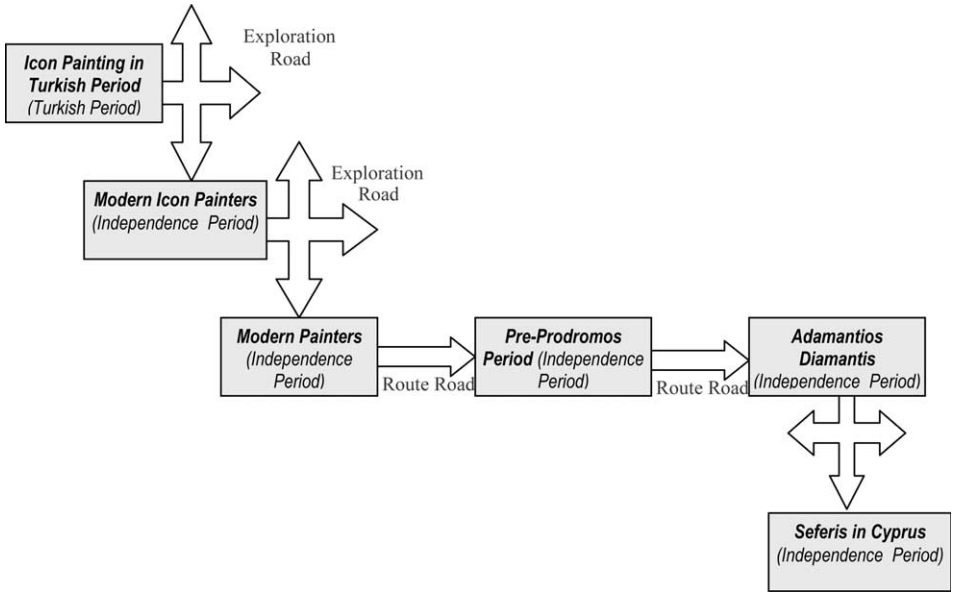
Consequences of the Turkish Invasion. The Turks by using violence forced 200,0000 Greek Cypriots (40% of the total Greek population of the island) to abandon their homes in the occupied region and to become *refugees* in their own homeland. Off-hand lodgings, tents, homes of relatives or friends but also trees offered "roof" to the refugees.

After the Turkish invasion, *1619 persons are still missing*. Innocent children, women and old people, and soldiers for whom there exists a testimony that they had been captured by Turkishtroops of invasion have never returned to their families.

The invasion had many effects in Cyprus Economy; 70% decrease ofwealth-producing resources, occupation of 65% of hotels and tourist lodgings, occupation of 40% of school buildings, 48% decrease of exports of rural productsand 46% of industrial production

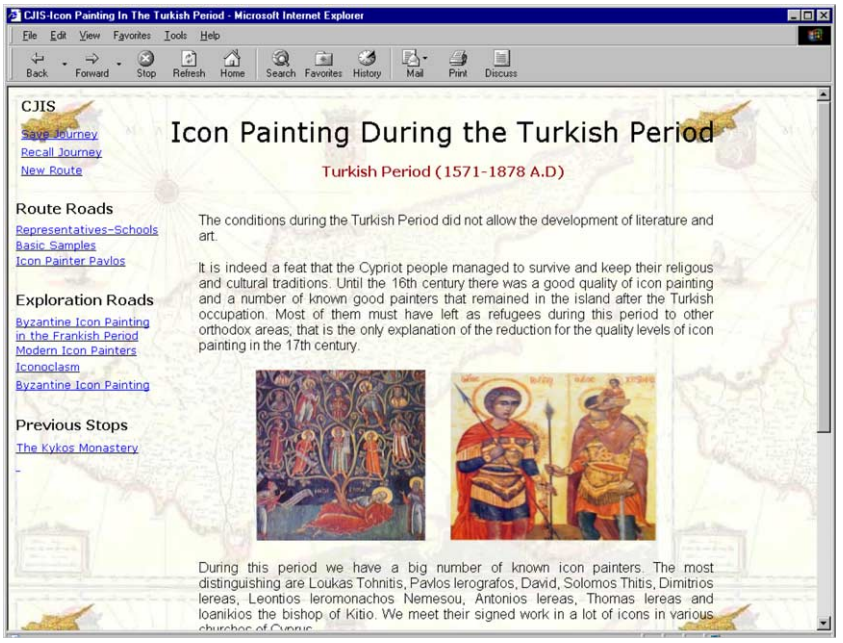
Appendix B

B.1. Cultural Journey: Arts in Cyprus



A Diagrammatic Presentation of the *Arts in Cyprus* Cultural Journey.

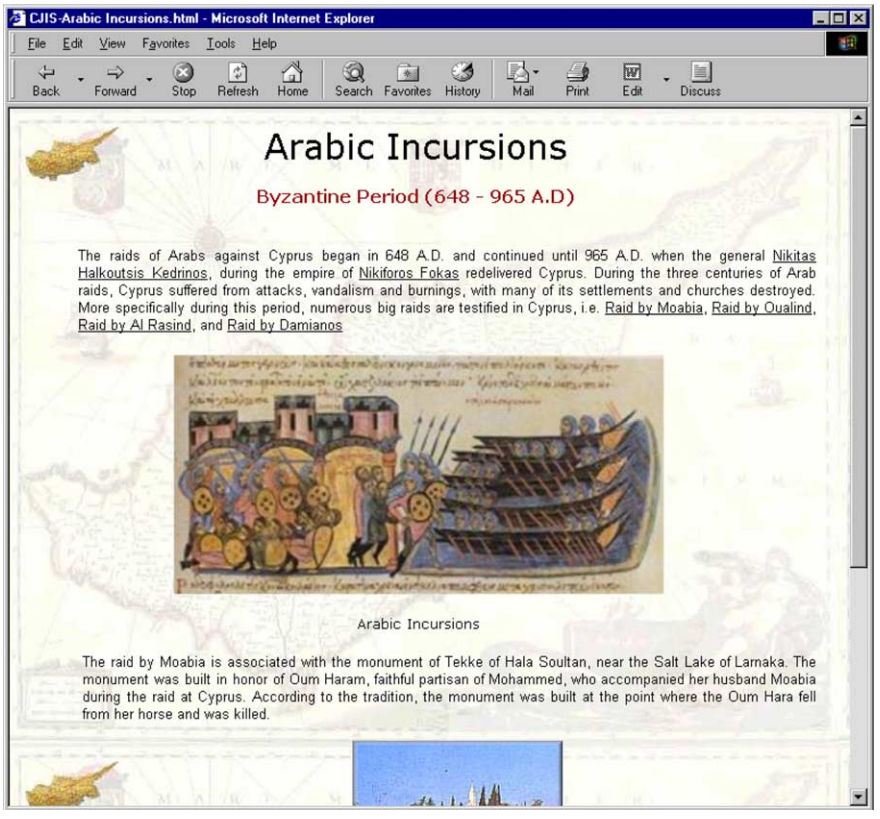
B.2. Cultural Journey Stops: Arts in Cyprus



Icon Painting During the Turkish Period (Stop 1 of the *Arts in Cyprus* Cultural Journey)

Modern Icon Painters (Stop 2 of the *Arts in Cyprus* Cultural Journey)

Appendix C. The Static Hypermedia System (Developed for the Comparison with CJIS)



Appendix D. The Questionnaire

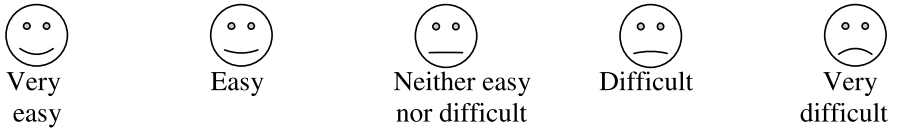
1. I found the learning activity

Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult

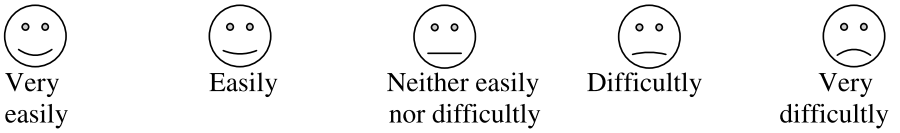
2. If I was asked to do similar exercise again, I would feel

Very nice	Nice	Neither nice nor bad	Bad	Very bad

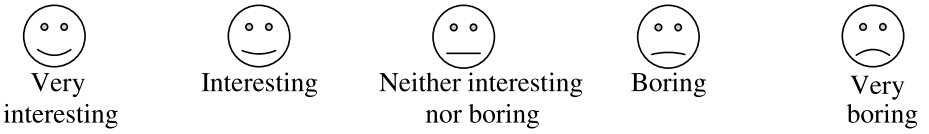
3. I think that the exercise I did is



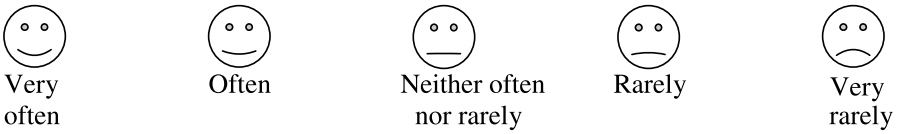
4. I gathered the information I needed for the exercise



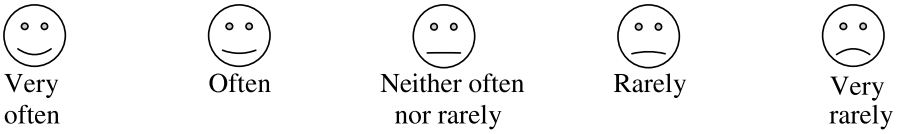
5. I found the software I used for my exercise



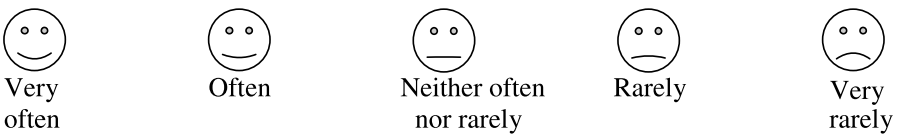
6. I would liked to be asked to do similar exercises



7. I use a computer



8. I use the Internet



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