Teaching Traditional Dance using E-learning tools: Experience from the WebDANCE project.

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Abstract

The WebDANCE project experimented with 3D animation and Web technologies, and created a web-learning environment and associated lessons for traditional dance e-learning. Two dances Karsilamas from Greece and Valentine Morris from England were used in order to test the approach in two secondary schools.

Experience from the WebDANCE project has shown that (a) the same conceptualization schema can be used to document different European traditional dances, (b) Web3D can be used to create attractive and functional dance resources, (c) there is a great interest from teachers / trainers in formal and informal educational settings that would like to use the WebDance platform and, (d) there is a great interest from content providers (traditional dance experts) to use the platform in order to document traditional dances and create teaching resources.

1. Introduction

Dance education has experienced numerous changes in content and identity through its history (Bannon, & Sanderson, 2000). Educators are always debating on how to best educate students. It is true that the curriculum must be meaningful, interesting, and appropriate for high school students. Dance as an activity can contribute significantly to the overall growth and development of students in the physical, intellectual, aesthetic, cultural, emotional, and social spheres. Therefore, it should be included as an integral part of the high school curriculum (National, Endowment for the Arts, 1998, cited in Fromel *et al.*, 2002).

According to Fromel *et al.* (2002), two major goals drive today's educational dance programmes for high school students. The first is that the selected activities should meet their needs and the second is that the activities should be well designed and taught in a positive way so that students develop positive attitudes towards life long-activities. Evidence has suggested that "successful instruction in educational dance involves the teacher and the students actively engaged together in the process and culmination of a true dance experience" (Werner *et al.*, 1992, p. 40).

In a culturally rich educational curriculum both spontaneous and formal dances should be included in the effort to meet students' needs (Bucek, 1992; Newnam, 2002). Children's dance, like other subjects, has it own content and forms that are studied, applied, and understood as part of a total education for life. As Hanna (2001) pointed out, "in addition to contributing to a healthy

lifestyle, dance is a 'language' with which to communicate emotions and ideas. Like vernacular and literacy language, dance embodies the human imagination, records our achievements, and distinguishes us as human beings" (p. 45).

In the school curriculum, dance appears in several forms: folk, creative, square, creative movement, rhythm, and line forms (Purcell, 1994). It has been observed that dance education programmes in schools provide opportunities to students for the development of critical thinking and analytical skills, cooperation and teamwork, self-expression and self-esteem, organisation and problem solving, cultural literacy, and communicating emotions through movement (Young, 2003).

New technologies can be applied in dance education, not only to support the traditional learning goals but also to provide new learning tools for the students. Additional means, like interactive media, are available for teachers to accommodate different learning styles and paces. New media provide new ways of learning that motivate students and help them do research on their own. Internet in particular, gives easier access to information for students with special needs and more opportunities to collaborate with peers for common research or production goals.

New learning tools, such as the Internet's network of library catalogues, campus information systems, directories, databases, archives, and other interactive media technology provide efficient, exploratory ways to research the contributions of dancers and choreographers, dance history, trends, and styles. Students are provided with valuable, new creative tools, such as film, video and sound equipment, which enhance learning by viewing documented performances of a dance in two or three dimensions, enabling them to study difficult movements in slow motion and in different perspectives (valuable in cases where balance difficulties cannot let its live demonstration in that speed) and clarify steps with complex alternatives, and also produce their own choreographic sequence. Students can also use new technologies to communicate with dance teachers and students around the world in online discussion groups, list-servs, bulletin boards, and e-mail. In addition to these, students have a new way to document and assess their learning, keeping computer journals and learning how to scan representations of their performances.

To this end, the WebDANCE[1] project experimented with 3D animation and Web technologies, and created a web-learning environment and associated lessons for traditional dance e-learning (Figure 1). Two dances, the Karsilamas from Greece and the Valentine Morris from England were used in order to test the approach in two secondary schools.

[1] WebDANCE: Web Dance for All using Advanced E-learning Tools. Project No: 101338-CP-1-2002-1-GR-MINERVA-M. The Project completed in January 2005.

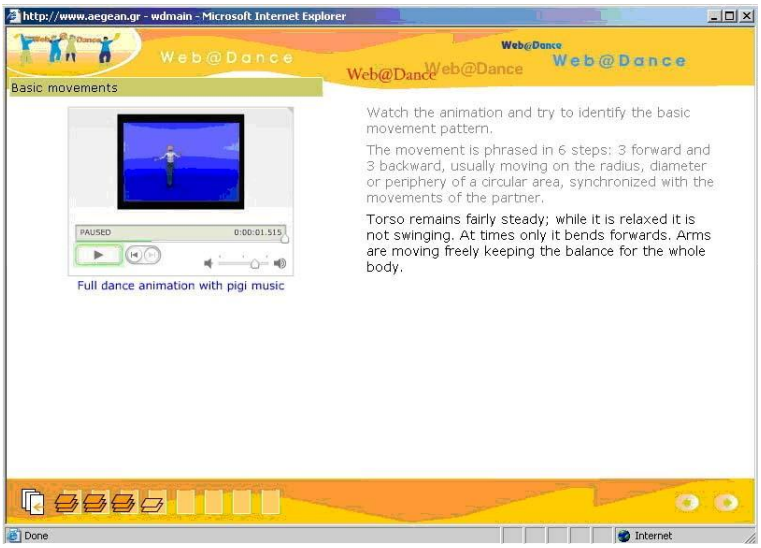

Figure 1. Interface of an electronic lesson of the WebDANCE application about a Greek traditional dance. A video of the animated dancing figure is shown on the right and information is provided on the left.

In WebDANCE, new technologies were used for the documentation, dissemination and learning of traditional dances. Based on a relational schema created with the consultancy of dance and education professionals, information on traditional dances were collected in a dance database. The content of the database consisted of written material and pictures from relevant bibliographic resources, photos and videos acquired from performances at local festivals and celebrations. Following, material was chosen and adjusted to form interactive learning modules (e-lessons) which born the same logical structure as the database schema. In addition to these resources, dances were digitised using motion capture technology to make a three dimensional model of the dancer, that was used as another interactive learning tool in the lessons. The e-learning lessons are available at the WebDANCE website (www.aegean.gr/culturaltec/webdance).

2. The WebDANCE e-learning environment

2.1 Curriculum

In order to create the WebDANCE lessons, a conceptual model of traditional dance has been developed (see Karkou, 2003). This was motivated by the need to face the concept of dance in a holistic approach without following the usual discrimination between movement and context (Royce, 1977; Zographou, 1989; Serpezis & Goulimaris, 2001), which only provided a fragmented view of the dance experience.

The dance conceptual model consisted of three types of concepts: concepts that focus either on the movement components of the dance, or the dance's context or both. These three categories are referred to as: Dance Activity, Dance Tradition and Dance Event, respectively. Each category is further divided into a number of sub-concepts and characterizes the entity of a Dance (see Kavakli *et al.*, 2003).

This model had been integrated in the WebDANCE Curriculum (shown in Figure 2). In particular, each sub-concept of the dance conceptual model formed a dance lesson in the WebDANCE curriculum which was further analyzed and the resulting descriptions formulated the different sections of a lesson. For example, the subchapter of Dance Event consisted of the following lessons: music, costumes and roles of participants. Similarly, the concept of Dance Costumes was analyzed in the following: common costume components, distinctive costume components, relationship of costume to movement and relationship of costume to everyday clothes that form the subsections of the corresponding lesson (see Kavakli *et al.*, 2004).

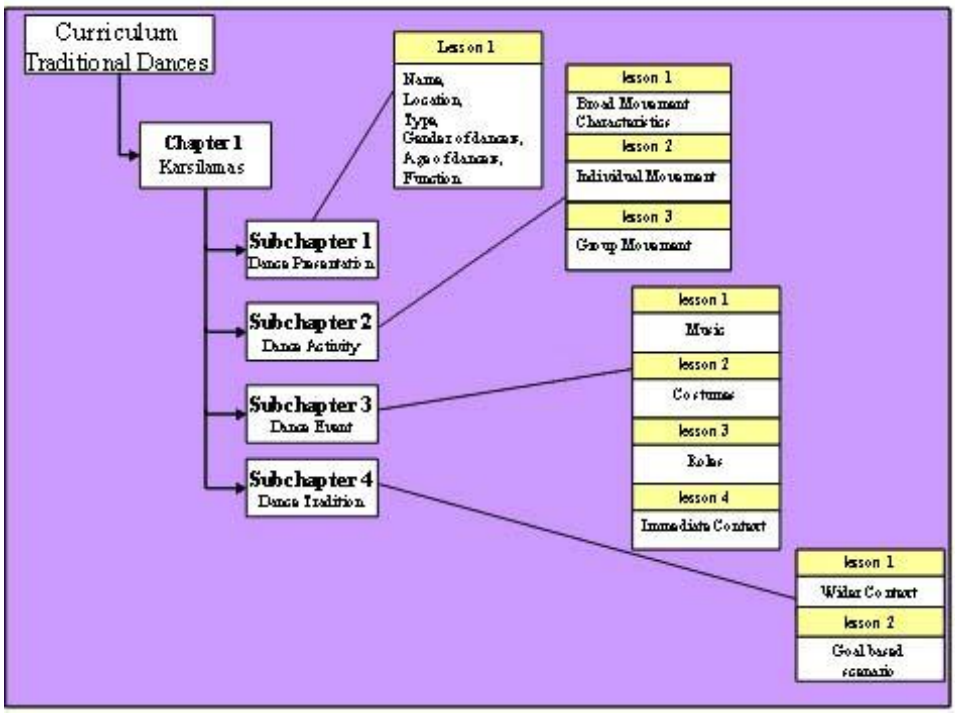

Figure 2. The WebDANCE Curriculum

The Curriculum defines the structure and content of the e-lessons. However, it does not prescribe a particular ordering of the lessons. In this sense, each lesson is seen as an autonomous unit which can be used on its own or in combination with other lessons, depending on the knowledge / skills that one wishes to acquire.

2.2 Educational Approach

Learning dance has been traditionally considered as a teacher orchestrated domain. However, WebDANCE took a different perspective following the contemporary thinking in teaching traditional dance. In particular, in the context of the WebDANCE e-learning environment, the role of the teacher was seen as that of an attentive leader helping students to clarify and/or select their goals and support them to carry out the related activities. This approach

enables the development of flexible relationships between teacher and students, something, which is appropriate for interactive subjects such as dance.

In particular, four types of learning goals were identified:

- To develop dance-specific skills
- To make compositions and performances of specific traditional dances
- To offer knowledge about the cultural, historical and social context of the dance
- To develop appreciative skills appropriate for the dance/s studied

To achieve these goals a number of activities were created. These took into consideration the nature of dance as well as the students interests aiming to provide a balance between intellectual tasks (reading, viewing) and interactive tasks as well as between group activities and practical experience away from the computer, in order to actively engage students and help them to both understand the dance context as well as to learn how to dance.

Examples of interactive tasks included:

- Quizzes
- Match picture with dance formation
- Recording rhythms
- Click on icon/ image to reveal relevant information
- Slide show

Examples of group activities included:

- Group discussion
- Practice dancing
- Costume design and fashion show
- Debate
- Write an article about a dance event
- Use of recommended resources (e.g., web pages, photo album, etc.)
- Role playing

Furthermore, the flexibility of the WebDANCE curriculum allows students to make connections across subject and content areas thus facilitating their creative thinking and enhancing learning in other subjects as well (e.g. music, history, culture, etc.).

2.3 The WebDANCE 3D Animation Viewer

A main objective in the WebDANCE learning environment was the development of a 3D platform visualising dance events in 3D virtual environments, making the learning process intuitive and more motivating. For the digitisation and visualisation of the dances, the motion-capture technique (shown in Figure 3) was chosen as the most appropriate and the one that enforced the learning result (see Kavakli *et al.*, 2005).

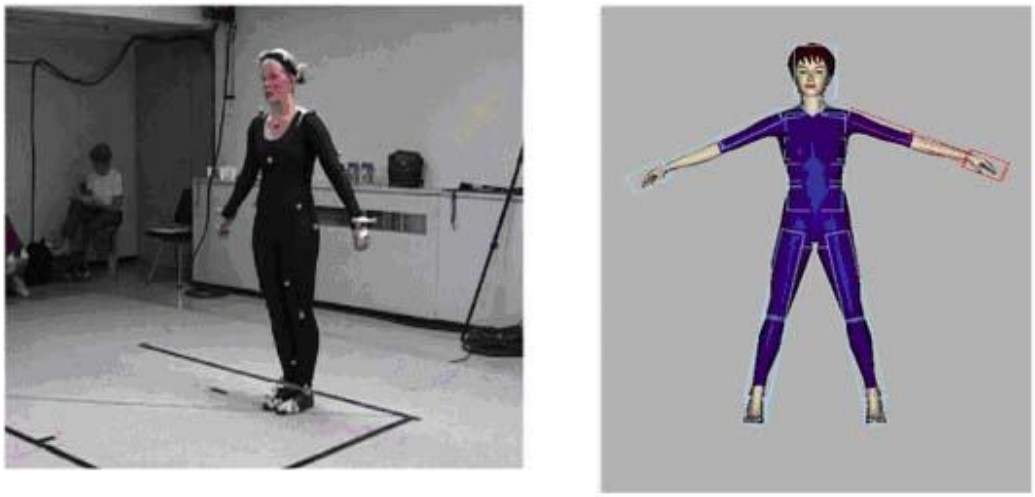

Figure 3. From real person to 3D dancer

The captured data were consequently fed into the WebDANCE 3D animation viewer (Figure 4) that allowed the manipulation of the 3D dancer, offering a number of functionalities (e.g., start, stop, Zoom in / Zoom out, Focus, Change camera position, etc.).

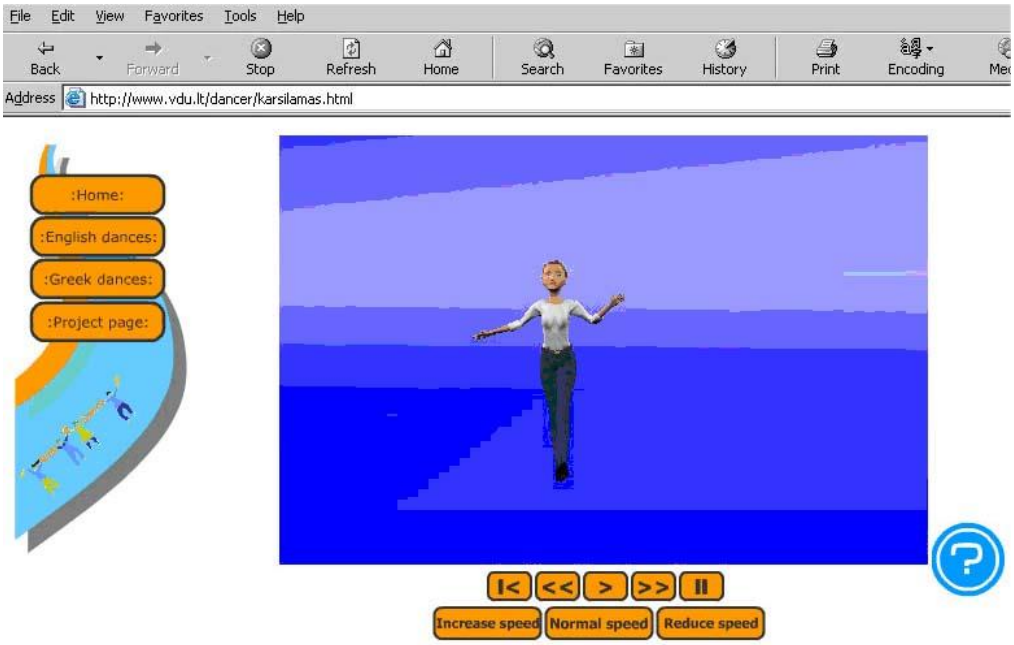

Figure 4. The WebDANCE 3D animation viewer

2.4 The WebDANCE Lesson Management Application

In the context of the WebDANCE project a series of self - paced lessons were created in two languages (English and Greek) and delivered to the students

through a Learning Management System (LMS) capable of providing the tutor with reports about student attendance and progress (shown in figure 5).

Figure 5. The WebDANCE LMS

Each dance lesson which is the smallest entity of the curriculum, is structured in terms of learning goals, educational activities, associated assets and self-evaluation tasks. An asset is a single electronic file representing media, text, image, audio, or other multimedia file (e.g. a test or quiz), which assist students to complete their activities and achieve their goals. Assets can be combined and used in several ways depending on the teaching methodology followed and the specific learning objective that one wishes to achieve; when a holistic approach is taken then information about a whole dance (e.g. in the form of a video clip of the dance) may be used. Alternatively, when an analytical approach is preferred then the step-by-step analysis of the dance (e.g. using the 3D animation viewer) is more appropriate.

As mentioned earlier, each lesson can be used either in combination with other lessons or on its own. The WebDANCE LMS enables teachers and students in a school environment or individual users on the web to create their own paths to investigate the curriculum depending on their specific goals and their interests.

3. Evaluating the Usability of the WebDANCE Learning Environment

From the point of view of the people who need to use an interactive software system, usability is the most important aspect of the system. The ISO 9241 defines usability as “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO 9241, 1998). Usability plays a vital role for the success of traditional dance e-learning applications as well. If an e-learning system is not usable, the learner is forced to spend much more time to understand software functionality, rather than to understand learning content. Moreover, if the system interface is rigid, slow, and unpleasant, people are just as like to go away and forget about it. Forcing students to spend longer time trying to use poorly usable interfaces than understanding

the provided learning material is disruptive: distraction disturbs accommodation of new concepts and overall retention of what is being learnt (Costabile *et al.*, 2005).

In WebDANCE, usability evaluation played an important role and was involved both in the design and the development of the suggested educational environment. The aim of the evaluation process was both to prevent the appearance of problems as well as to improve the design, development and application, of the proposed WebDANCE e-learning environment.

The evaluation process consisted of the three phases: *Front-end evaluation* testing whether the application requirements truly reflect the users' needs; *Formative* evaluation conducted throughout the development phase: analysis, design, and programming; and *Summative* evaluation concerning the evaluation of the final product by its actual users.

The WebDANCE evaluation group included: internal experts from the participating institutions; experts from the English Folk Dance & Song Society (EFDSS); an external evaluator; teachers and students of the two pilot schools in Greece and in UK respectively; and finally, a number of high school teachers and students, as well as members of traditional dance related organisations that participated in the summative evaluation, in Greece and in the UK.

The evaluation criteria addressed the following aspects:

- Quality of content
- Presentation of content
- Pedagogical quality
- Use of multimedia (interactivity and usability aspects)
- Use of the 3D animated dancer (interactivity and usability aspects)

In each phase of the evaluation process a number of tools have been used including interviews, questionnaires, observations, review meetings, etc.

3.1 Front-end Evaluation

During the front-end evaluation in the two pilot schools, in Greece and in the UK, the interest in the WebDANCE e-learning tool was documented. Both teachers and students felt that the WebDANCE e-learning environment could be (a) an interesting and useful tool that could attract more students to traditional dance classes, offering a more holistic view of the dance, (b) a way of expanding knowledge and skills for dances they were not familiar with and (c) a means of offering choreographic ideas for other dance-making activities. Their main concern was to ensure the collaboration, teamwork and practical training that currently form an integral part of traditional dance teaching.

The findings of the front-end evaluation can be summarized in the following categories concerning: (a) convictions and attitudes regarding traditional dances, (b) methodologies for teaching traditional dance and (c) computer equipment and internet availability.

In more detail, a large number of Greek students found traditional dance classes exciting and enjoyable and enjoyed the social aspects (teamwork) of the dance as well as the movement skills and the knowledge about the history, social aspects and music they acquire. Most Greek students thought of traditional dance as an important dimension of the Greek tradition that needed to be preserved, however they also recognized situations in their everyday lives where traditional dance still played an important role. English students preferred to learn about movement and the cultural/artistic aspects of dances, but dance was seen as an art form and as such the social and historical aspects were valued less in comparison with the creative and artistic side of dance forms. For the English students, traditional dances were less integrated within their everyday life and there were fewer experiences to relate them with. Although there was a sensitivity/interest towards dances from other cultures, English dances were less valued than dances from around the world.

Traditional dance teaching in Greek schools mainly relied on the teacher. No teaching aids like videos or textbooks were provided. Therefore teaching was mainly based on the analysis of the movement of individual dancers whilst no holistic view of the dance event could be easily provided. Finally, teaching took place in open spaces (the school yard, the gym or a big classroom). It was mainly considered a sports class, and no use of computers was foreseen. In English schools, teaching methodology was quite rich, following both analytic and holistic learning and using a number of prompts and stimuli (e.g., videos, music, photographs, poems, narratives). However, the main challenge in this context regarding introducing traditional dances was the overall disinterest in this form of dance, especially as far as English traditions were concerned. In England dance was taught indoors in purpose-built spaces, such as halls, theatres and the gym. There were possibilities of having computers in these environments, especially when laptops were available in the school.

In both schools visited, there were computer labs, with internet connections. All computers were equipped with CD ROMS and had multimedia capabilities. Most students were computer literate as far as the use of internet was concerned. However, in the Greek site, the internet connection of the computer lab was rather slow and not all computers had been recently updated / replaced which meant that some of them had slow processors. In Greece, teachers preferred educational CDs to internet applications, because they avoided download waiting time and it was easier to control the material viewed by students. In England, the use of the internet was part of daily practice for most professionals. Despite efforts to develop educational material (e.g., books, music, videos) from organizations such as the EFDSS, available resources for traditional dances were limited and none was readily available to teachers.

3.2 Formative Evaluation

During the formative evaluation phase, initial versions (prototypes) of the WebDANCE environment (e-lessons and 3D animated figure) were tested by the members of the evaluation group. In particular, evaluation took two forms: (a) Evaluation by experts and (b) test in the classroom setting.

During the formative evaluation of the WebDANCE learning environment by experts both electronic discussions in forum that was set up for this purpose, as well as face-to-face meeting were used. In addition, review sessions were organised where comments were consolidated and decisions for amendments and refinements of the WD learning application were made.

In fact, after the formative evaluation several refinements of the WebDANCE lessons were made in terms of the content and didactical approach (i.e., learning goals, associated activities and resources used), as well as presentation and interactivity features. Special attention was given to the content in order to ensure that: (a) there was a right balance in the way the different aspects of the dance event were treated, (b) Greek and English dances were presented in similar ways assisting students to identify similarities in European traditions, and (c) traditional dance was treated as a part of everyday lives rather than a feature of the past.

To this end, texts were re-written, and great effort was made to find resources of current traditional dance events. Often that meant that we had to create our own resources taking photographs and filming traditional dance festivals, school performances, fetes and celebrations in which the selected dances were practiced. These were consequently processed in order to become in a form which could be transmitted over the internet. In a similar way, interactive activities were often redesigned in order to best fit the specified learning goals and also fit the age group and teaching environment that there were intended. The refined prototypes were tested again in consequent sessions before reaching a version that satisfied the experts group.

Furthermore, formative evaluation took place in the pilot schools during school visits, at pre-arranged time and date, during which observation of teaching sessions and collecting data from teacher and students took place. This allowed us to evaluate integration of the WebDANCE in the teaching process and observe the students' response to the use of the WebDANCE environment. It allowed us to assess the performance of the e-lessons in a real setting and to review the interactive activities and extended tasks provided, in order to best fit the students' interests.

Summarizing, the formative evaluation was a very important phase, since in that stage modifications and enhancements was made, thus improving the final product. It provided useful experience and comments from both expert and user groups which fed into the production of the final version of the WebDANCE learning environment.

For example, Figure 6 presents the initial layout of the module describing the Role of Musicians. During the formative evaluation by experts, it was decided that the layout should prompt the students to think and discover by themselves the right answers rather than presenting all the information from the beginning. So in order to better attract the interest of the students, it decided to become more interactive and the revised layout is shown in Figure 7.

Figure 6. Initial layout

Figure 7. Revised layout

3.3 Summative Evaluation

The main objective of this final phase of the evaluation process was the collection of information regarding the final version of the WebDANCE product and its usage, from the experts group, the pilot schools that participated in the project, as well as from other potential users of the WebDANCE learning environment.

Once again, the evaluation took two forms: (a) Evaluation by experts and (b) Evaluation by potential WebDANCE users. Towards the former, a summative evaluation report was conducted by the external evaluator, who made interesting comments, improvements and suggestions of the WebDANCE environment regarding the evaluation criteria that already mentioned above.

A focus group was also formed and discussions coordinated by the external evaluator took place after a demonstration of the WebDANCE environment. The objective was both to provide constructive criticism regarding the WebDANCE application as well as to explore its potential use in other areas of arts and arts education.

Towards evaluation by potential user groups, WebDANCE summative evaluation questionnaires for teachers and students were collected by a number of secondary school teachers and students in Greece and the UK, members of the EFDSS and members of traditional dance groups in Greece, England and Scotland. So far we have collected over 50 questionnaires, but we expect to receive several more in the future.

Following the results of the summative evaluation in the pilot schools a few comments can be made regarding overall use, content, presentation, users interface, and use of multimedia and 3D animation.

Users have enjoyed using the WebDANCE application and felt that it encouraged them to participate more in class. A limited number of users would prefer to use it on their own. This is not surprising due to the dynamic, social nature of traditional dance. They found the content interesting and not hard to understand. Most of them were able to relate to the content offered. They liked the presentation of the lessons and the variety of information provided. Some commented that they would have liked more vivid colours. They could navigate easily inside the lessons' content, but some would like to

be able to choose to view specific screens of a lesson without having to progress sequentially from the first to the last screen.

Based on the teachers' comments the application and the provided interactive and extended activities assisted the attainment of learning goals. They also found that it encouraged learning, which was creative, exploratory, collaborative and active.

The user interface was easy to learn and made users want to participate. In fact, users liked the interactive activities, such as slide show, quizzes, but mostly enjoyed recording of rhythms. Users found the use of multimedia elements interesting and that they helped them to learn. The quality of multimedia components was acceptable, but they would have preferred larger window size and better image resolution for the videos. Although this could be easily done, it would dramatically affect download time making it almost impossible to use over the Internet.

Finally, the 3D animated dancer received very positive comments, regarding its effectiveness and usability. Most users found that it assisted them in learning the steps of the dance. They also made interested suggestions regarding extra functionality they would like to be added. These included the ability to move the dancer in space; the ability to trace the dancer's movement; and the ability to use different costumes for different dances.

4. Conclusions

The implementation of the WebDANCE project has shown that (a) the same conceptualization constructs can be used to document different European folk dances, (b) Web3D technologies can be used to create dance resources for the web, (c) there is a great interest from teachers / trainers in formal and informal educational settings that would like to use the WebDANCE e-learning platform, and (d) there is a great interest from dance experts (content providers) to use the platform in order to document traditional dances and create teaching resources.

Currently, we are working on a new project, OpenDANCE, which builds upon the technological results and the experience gained through WebDANCE in order to (a) increase the functionality and interactivity of the web-learning environment by allowing users to add dance content and create dance lessons on-line (b) further elaborate the dance digitisation and animation methodology by exploring the use of different 3D edutainment applications (i.e. game-based learning) (c) broaden the scope of the teaching resources offered including information on traditional dances of several European countries, (d) expand the number and type of users of the web-learning environment and create an on-line traditional dance learning community and (e) further evaluate the use of e-learning tools in multicultural dance education.

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