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WebDANCE

Web Dance for **A**ll usi**N**g advan**C**ed **E**-learning tools

Traditional Dance e-learning Handbook

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Traditional Dance e-learning Handbook

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A Preface

The objective of this report is to produce a set of guidelines for European traditional dance e-education. It draws from the experience gained during the analysis, design and development, as well as the evaluation of the WebDance e-learning environment, in order to provide a "Traditional dance e-learning Handbook" for designing and evaluating e-learning tools in dance education. Our objective is to highlight the important issues that one should take into consideration when designing and developing an e-lesson for traditional dance. To this end, this handbook discusses different, though interrelated, views including pedagogical and didactical concerns, usability requirements, training requirements, technology considerations (use of metadata, interactivity, open specifications, etc.).

A1 Defining Traditional Dance

There are a number of terms that are closely linked with the dance of the people, such as traditional and folk dancing, folkloric dance, ethnic or national, popular and social, historical or early dance. However, there is no agreement amongst scholars on what each of these terms stands for. The picture becomes even more complicated by the fact that in each European country different terms predominate with similar or often with very different meanings. In an attempt to select relevant dance forms for this project, a number of terms have been considered, definitions have been studied and certain terms have been redefined as follows.

A1.1 Traditional and Folk Dance

The most important terms for this project are: 'traditional' and 'folk'. The former term has been associated with dances with magical or economic functions and/or non-professional dancers (eDionysus, 2003). Others define the same word as a set of dances that have passed from one generation to another (Raftis, 1993), or as "the dances of the country that evolve spontaneous from everyday activities and experiences of its people" (eDionysus, 2003). In this project the term **'traditional'** is defined as:

> "Dances that have evolved spontaneously from everyday activities and are informally passed from one generation to another"

The term 'folk' is even more complicated and difficult to define than traditional dance. One of the definitions found in the literature refers to gay and recreational dances of various nationalities (eDionysus 2003). However this definition is somehow incomplete. For example, what about dances that do not have a recreational character, e.g., ritualistic dances, and what about dances which are not 'gay'? Another definition refers to folk dance as a form from which the art dance of a nation inevitably grows. In places like Japan, India and Andalusia, the art forms of the region have been indeed a natural outgrowth of

their traditional dances (eDionysus 2003). However this definition is inappropriate for most European traditions where folk dances did not, or only marginally, influence the predominant dance art form of the region. For example in England there has been a clear separation between dance as an art form (influenced mainly from formal dance training in ballet and/or contemporary dance) and folk dance. Similar difficulties are present when one tries to draw parallels between folk and traditional dances. For example Raftis (1993) defines folk dance as drawing upon traditional dances with the difference being that folk dances are taught in a class and/or performed on stage. However this definition does not address folk dances that have not been traditional (e.g., the Israeli folk dances choreographed in the 20th century in the style of European folk dances). The following description of folk dancing encapsulates many of the difficulties inherent in this term and outlines some useful characteristics:

> ”A participatory dance form, folk dance is usually traditional and performed by members of a community. Although not easy to define, the term seems best to fit those dances originated by agricultural peoples for secular and sometimes ritual purposes, in countries that also have an art form of dance. …Folk dances are usually group forms that are passed from one generation to another. Some folk dances, however, are not traditional. … Today, folk dances are frequently performed onstage, for which they are usually adapted for presentation to an audience”. (eDionysus 2003).

Folk dance can therefore be seen as requiring participation from members of a community, as often having a group form, having a purpose/function and as today often being performed on stage. Although folk and traditional dance can be used to mean the same thing, this is not always the case.

For the purposes of this project **‘folk’** dance is defined as follows:

> “Dances often drawn from traditional dances, often performed on stage and taught in a formal way”

B Background Status of Dance Education in Secondary Schools

B1 Traditional dance teaching in Europe

B1.1 Rationale for Arts in Secondary Schools

An examination of the history of education in Europe suggests that arts have long been included in the school curriculum. However, it is only in the last decade that arts instruction has received recognition and attention as an important aspect of education in European countries (Carey, Kleiner, Porch, & Farris, 2002). The place of arts in the educational curriculum in European countries reveals that

formal education has a fundamental role in shaping young students' attitudes to the artistic and creative movements (Robinson, 2003).

Research findings from a survey study in the member states of the Council of Europe (Robinson, 2003) have shown that all national policy statements on education emphasise the significant role of the cultural dimension and the necessity of promoting the artistic and creative abilities of students. In reality, the status and provision of the arts in education are less prominent. The main subject areas taught are art and music. In most European countries, the arts are compulsory in primary education and for the first two or three years of secondary education. Beyond this point, it becomes an elective subject. In addition, in all examined cases (22 member states), the arts have a lower status than mathematics and science. In all national education systems, there is positive emphasis on academic education. Despite the rhetoric, the arts are not seen yet as priorities in the long-term development of national education curricula (Robinson, 2003).

Arts education has also received increasing attention as a vital aspect of education in the United States during the last decade. Until 1998, however, there were no national data sources describing the status of arts education in American public schools. In order to fill this data gap, the Department of Education's National Center for Education Statistics conducted a study to provide a national profile of the status of arts education in public schools during the 1999-2000 school year (Carey, Kleiner, Porch, & Farris, 2002). Findings indicated that music (90%) and visual arts instruction (93%) were offered in most of the nation's public secondary schools. Dance and drama/theatre instruction were less commonly offered in secondary schools. More specifically, dance was offered in the secondary school curriculum at only 14 percent of the schools and drama/theatre was offered at 48 percent.

The majority of the public secondary schools that offered music, visual arts, dance and drama/theatre instruction employed full-time specialists to teach these content areas, with 91 percent reporting one or more full-time music specialists, 94 percent reporting one or more full-time visual arts specialists, 77 percent reporting one or more full-time dance specialists and 84 percent reporting one or more full-time drama/theatre specialists.

Ninety-one percent of public secondary schools that offered music instruction had dedicated music rooms with special equipment for teaching the subject, and 87 percent of those with visual arts instruction had dedicated rooms with special equipment. Of those schools that offered dance, only 41 percent used dance spaces with special equipment, and of those that offered drama/theatre, 53 percent had theatre spaces with special equipment (Carey, Kleiner, Porch, & Farris, 2002).

B1.2 Rationale for Dance in Secondary Schools

Dance has been characterised as an exciting and vibrant art, which can be used in the educational setting to assist the growth of the student and to unify the physical, mental, and emotional aspects of the human being (Dance Directions, 1988). It is an art form characterised by the use of the human body as a vehicle of expression (Young, 2003). Dance is abstract. It is not an expression of an act but an expression of the feeling of an act. It is in this specific way that dance differs from creative dramatics and mime (Siedentop, Herkowitz, & Rink, 1984). An educational dance programme is designed not only to give students experiences in expressive movement, but also to develop their ability to express themselves in movement. This is done through progressive experiences, which develop kinaesthetic and cognitive awareness of movement (Siedentop, Herkowitz, & Rink, 1984). Dance is more than exploring different ways to make a shape or learning series of steps to music. It is a way of moving that uses the body as the instrument for expression and communication (Purcell, 1994).

Dance education has experienced numerous changes in content and identity through its history (Bannon, & Sanderson, 2000). Until recently dance was part of the physical education programme in many countries. It is now recognised as an art form comparable to music, drama, and visual arts and equally worthy of study. However, it is true that of all the art forms, dance receives the least attention (Young, 2003).

Dance appears in the school curriculum 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).

A research profile in the United Kingdom revealed that teachers and students used different conceptualisations of dance in secondary education. Several differences were found in the title, the content, and the aims of dance education practice, ranging from creative to modern educational dances (Bannon, & Sanderson, 2000).

Young (2003) reported that in the United States at least 15 of the states had developed dance curriculum guides; however, but only North Carolina had provided for the implementation of guidelines through mandates. Several curriculum guides included specific content, goals, objectives, and limited measurable outcomes for such areas as: dance techniques for social, modern, and ethnic dances; aesthetic perception; kinaesthetic sense; creative expression; choreography; and dance criticism. Findings from a nationwide survey of secondary schools indicated that the majority of dance classes are taught in physical education programmes, while the styles of dance most frequently provided to students are aerobic (45%), folk (11%), ballet (9%), social (8%), and creative or ethnic (7%) (Papalardo, 1990, cited in Young, 2003).

B1.3 Dance in the National Curriculum: Examples from Greek, Cypriot, English, and Lithuanian Secondary School Curriculum

In the Greek curriculum dance is part of the physical education programme. The type of dance that is described in the curriculum is the folk/traditional dances. Time allocated for traditional dances in the Lower secondary school (Gymnasio) is 16 hours (8%) for the whole academic year. For the upper secondary school (Lykio) traditional dances are included in the national curriculum but the time allocation is not specified (National Curriculum of Greece, 1990).

Dance in the Cypriot National Curriculum it is also part of the physical education programme. Traditional dances constitute the main type of dance found in the curriculum. In the lower secondary school (Gymnasio), the time allocation for dance is a total of 26 hours for the academic year. Traditional dances are also part of the upper secondary school (Lykio) physical education curriculum. As in the Greek National Curriculum for upper secondary schools, the time allocation for dance is not specified (National Curriculum of Cyprus, 1997; 1999).

Dance in the National Curriculum of the United Kingdom is also one area of activity within the physical education programme (National Curriculum of England, 1999). At Key Stage 3, 'games' is the only compulsory area of activity. Pupils must also take some classes in one of the other areas as well as take some compulsory lessons in either gymnastics or dance (Robinson, 2003). At this level, pupils taking the full dance programme should be taught to:

- perform dances, showing control and sensitivity to the music and the style of the dance;
- perform dances, including set-dances from different traditions of the British Isles and elsewhere;
- describe, analyse and interpret dances and recognise differences;
- perform further dances, showing control and sensitivity to the music and the style of the dance;
- support their own dance compositions with descriptions of their intentions and outcomes;
- describe, analyse and interpret dances, recognising aspects of production and cultural/historical contexts.

At Key Stage 4, pupils are not required to study dance but may choose to do so. At this level pupils should be taught to:

- compose and perform, accurately and expressively, increasingly complex and technically demanding dances that successfully communicate the artistic intention;
- perform and create dances in a range of styles, showing understanding of form and content;
- design and evaluate aspects of production for their own compositions;
- evaluate aspects of dance, including choreography, performance, cultural and historical contexts and production.

In the National Curriculum of Lithuanian Secondary Education, dance is also an activity within the physical education programme. The type of dance included in the National Curriculum of Lithuanian Secondary Education is folk and sport. The time allocated to dance is not specified in the curriculum, nor are the goals or objectives of dance activities provided (National Curriculum of Lithuanian Secondary Education).

B1.4 Concluding Thoughts

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, Vasendova, Stratton, & Pangrazi, 2002).

According to Fromel, Vasendova, Stratton, and Pangrazi (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, Sweeting, Woods, & Jones, 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).

B2 Dance Technologies

B2.1 Dance Preservation

Dance, more than any other performing art, has been disseminated through time mainly by human chains of dancers, choreographers, and other people involved in its creation and performance (Dance Heritage Coalition). Sometimes these chains are broken and other resources are sought to reconstruct a dance or a specific performance (see table 1).

Types of Archival Materials	
Programs	Scrapbooks
Performance Logs	Education Program Files
Stage Manager's Books or Files	Biographical Files
Film, Video, and Audio Tapes	General Manager's Files
Notation Scores	Board of Trustees Files
Costume and Set Designs	Personnel Files
Press Clippings	Contracts
Photographs	Tour Arrangements
Posters	Financial Files
Publicity Materials	Artifacts

Table 1. Different types of archives may give enough information to reconstruct a dance or performance (Dance Heritage Coalition).

These archival materials need to be collected, taken care of and archived, so that knowledge of the dance won't be lost. The dance community explores how new technologies may support traditional media to preserve these valuable resources in a more systematic and safer way. Documenting choreographies and performances, disseminating relevant information amongst professionals of the field, and providing learning material for the performance and interpretation of a dance are some of the activities necessary for the preservation and evolution of dances that can be assisted by the application of new technologies.

Dance Documentation

The most eminent application of new technologies is to *visually record* and the performance of a dance in various digital media: on hard disk, cd-rom, vcd, dvd, web server. *Capturing or creating* the three dimensional motion of a dance and representing it with the aid of *computer graphics* is another way of applying technology in dance documentation. However, audiovisual representation of a dance does not exhaust the applications of new technologies in the dance documentation; it is also the documentation of the contextual information that can tell a lot about many aspects of a work and make its importance apparent to

people. *Electronic composition* and *online publication (with web applications)* of dance related documents can supplement the dance documentation. Scanners, digital photographic cameras, and other digitization systems can convert traditional archival material (paper, audio and video tape, film) in digital form. *Information systems* can support the systematic *storage* of large collections of documented information and the easy *retrieval* of specific archives, be it text, audio, still and motion pictures, drawings, or three dimensional graphics. For example, via the Middle Eastern Dance Resources Research Database one can search about books, magazines, journal articles, videos, films, and websites concerning Middle Eastern and North African Dance. The idancedb (internet dance database) provides information on dance in general, including resources about professions, dance schools, events, costumes, etc (see figure 1).

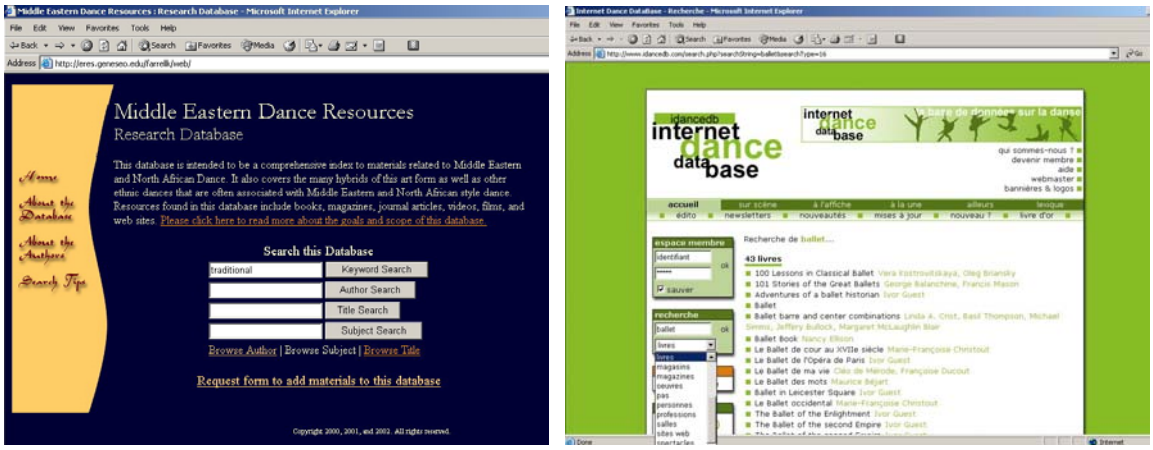

Figure 1. The interface of two dance related databases, one in English and the other in French.

Dance choreography can be described with the use of symbolic *notation* symbols, such as the Laban or Benesh notation, which is another valuable source of dance documentation. Notation is mostly being applied not so much during the creation of a new dance but rather in order to record or make notes on existing ones. The latter is profession of the choreologists and it concerns recent works of importance or historic ones which they try to recreate. Such a notation can be *created, stored, modified and printed* with the aid of computer (Herbison-Evans, 1991), like the LabanWriter and the CALABAN (figure 2).

Research is being conducted on translating automatically machine-readable notation into dance movements carried out by animated figures and converting images of moving figures to notation (Herbison-Evans,1991). Automatically translating a dancer's movements into notation is more complex, or not necessarily accurate, since one may not always distinguish what was meant to be performed from what was actually performed. Translation between different notations is another application of computers examined in research.

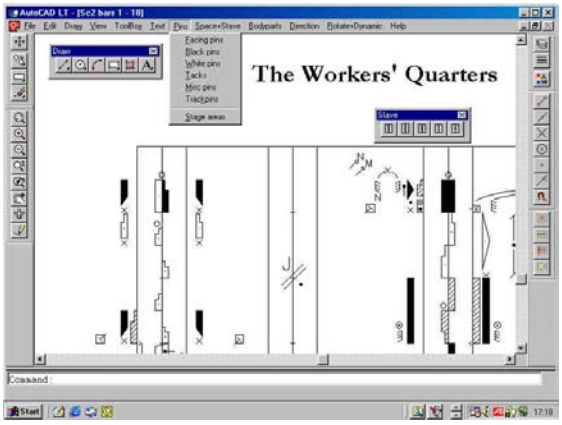

Figure 2. The interface of CALABAN, computer aided dance notation in Laban.

Three dimensional computer animated dancing figures can also be interactively created with programs like Life forms and poser. This form of representation enables the change of perspective and the focus on different parts of the virtual dancer; thus it may create different views of the dancer's movements from a single animation.

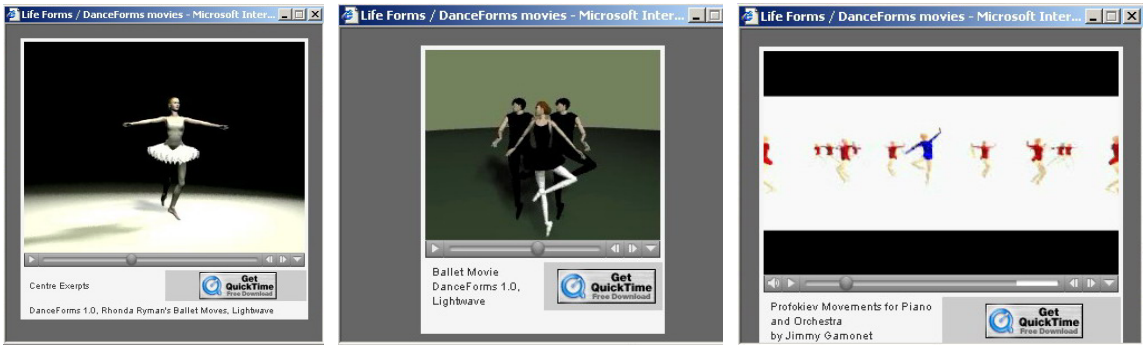

Figure 3. Danceforms, based on Life Forms is a very famous software for the creation of three dimensional representations of choreographies.

Dance Knowledge Dissemination

The benefit of documenting dance related material with digital technologies is that one can create different media outputs out of a single source. An electronic document can be printed, stored and transferred on various devices or be published on the web. A digitally stored motion picture can be converted in the right form to be shown on television, over the internet, or be recorded and accessed via a CD or DVD. Performance being presented live over the internet erases boundaries between public and private space. A performance may be done from one's house, classroom, or stage. Dance concerning ideas and views can be discussed by professionals or people simply interested in the art, via electronic mail, chat rooms or forums. Thus, knowledge is more accessible to a wider 'community'.

Dance Education

The new technologies can be applied in dance education as well. They not only support the traditional learning goals but also provide new learning tools for the students [CEDFA]. 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. New technology, 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, learning how to scan representations of their performances.

Figure 4. Interface of an electronic lesson of the WebDANCE applicatrion about a Greek traditional dance. A video of the animated dancing figure is shown on the right and information is provided on the left.

Our project, WebDANCE, uses the new technologies 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 are collected in a database through an electronic form. The content of the database consists of written material and pictures from relevant bibliographic resources, photos and videos acquired from performances at local festivals and celebrations. Then, material is chosen and adjusted to form interactive learning modules which bear more or less the same logical structure as the database schema. In addition to these resources, some dances where documented using motion capture technology to make a three dimensional model of the dancer, that is used as another interactive learning tool in the lessons. The e-learning modules will be available at the WebDANCE website. The material will also be disseminated via CD to high schools and other educational institutions.

B2.2 Dance Performance

Lastly, we should not omit to acknowledge the potentials of new technologies contributing in the art's evolution through their integration in the dance performances. Sharing multiple perspectives about dance easily and instantly assists in the offspring of new thoughts, concepts and types of interaction. Performing and exchanging ideas on choreography online, with people in different locations using video conference software, an activity referred as web dance or internet performance, lead to the creation of a new genre of dance, a "dance for the screen". Computers are also used on stage performances, in installations, workshops or cyberspace for the projection of digital images -two or three dimensional, prerecorded or interactively created:

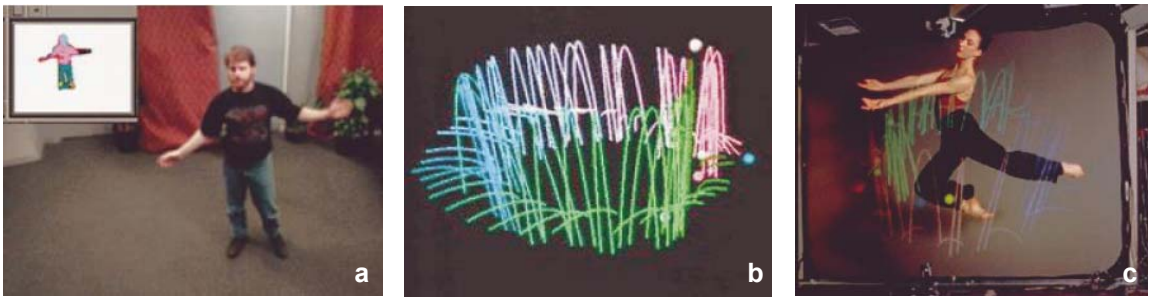

Figure 5. **(a)** Pfinder tracking the human body and labelling with different colours: head, torso, legs, hands, and feet. **(b)** Graphical output of DanceSpace. **(c)** Performer Jennifer DePalo in DanceSpace.

MIT Media Lab has created a real-time computer vision program, Pfinder (i.e. "person finder"), a system for body tracking and interpretation of movement of a single performer. The model-building process is driven by the distribution of colour on the person's body, with blobs being added to account for each differently coloured region (figure 5a). DanceSpace is an interactive stage which takes full advantage of Pfinder's ability to track the dancer's motion in real time. Different parts of the dancer's body (hands/head/feet/torso) can be mapped to different musical instruments that constitute a virtual body-driven keyboard. Moreover, the computer can recognize hand and body gestures, which can

trigger rhythmic or melodic changes in the music. A graphical output is also generated from the computer vision estimates (figures 5b,c).

Another application created by MIT Media Lab combines real foreground images shot in the studio with 3-D computer-generated background scenes (figure 6a). Using the real-time computer vision techniques previously described (Pfinder) they have built a low-cost virtual studio to perform special effects that use computer-vision-based real-time gesture recognition to enable synchronized interaction among the performers and the objects and creatures in the virtual setting.

Figure 6. **(a)** Study for a real time dance performance that virtually takes place in an enchanted forest (virtual studio dance stage), **(b)** surroundings of the cabin in the virtual enchanted forest, **(c)** the enchanted forest world view.

As a conclusion, one may say that new technologies may aid in the preservation of existing dances and inspire or enhance new ones.C Issues in traditional dance e-learning curriculum development

C Issues in traditional dance e-learning

C1 Dance conceptualization issues

Most of the studies that deal with traditional dances identify two major categories as relevant to such type of dance: (i) structure and (ii) function or in other words, (i) movement and (ii) context (Royce 1977, Zographou 1989, Sermpezis and Goulimaris 2001). These two components are closely linked together and provide an overall description of traditional dances. Within these broad categories there have been a number of attempts to identify smaller distinguishing features. However, no such attempt has been made at a European level. Most of the existing studies either refer to specific dance traditions originating from one part of Europe (e.g., Martin and Pesovar 1961, Singer 1974, Sachinidis 1995) or refer to specific systems and methodologies that have developed from studying non-European dance traditions (e.g., Hanna 1979, Kealiinohomoku 1970, Kaeppler 1972). There are also a couple of movement analysis systems in wide use today that make claims of describing movement endeavours with a universal applicability (e.g., Benesh and Laban notation systems). However none of these studies make references to European

traditional dances in particular. In order to conceptualise European traditional dances all these different sources have been searched for relevance to the project: theories and movement analysis systems used mainly in the dance world, studies originating from cultural/dance anthropology and/or ethnography, comparative choreology and dance education.

Movement Components

From the literature review it is apparent that there is no agreement amongst authors on a single set of features for traditional dances. For example, many of the older studies on traditional dances discuss dance as part of music. Others describe dance with terms that have been borrowed and adapted, to one degree or another, from music to the movement medium. One such study is Martin's and Pesovar's (1961) work on Hungarian traditional dances. Martin and Pesovar (1961) talk about the 'movement element' and the 'movement motif' but also highlight the tempo, melody and rhythm as predominant components of the movement of a dance. Similarly, in her study of the metrical structure of slavo-macedonian dances, Singer (1974) approaches traditional dances from an ethnomusicological perspective. In both cases dance is not perceived in its own right but rather as closely linked to music. Furthermore, as Singer (1974) herself acknowledges, such musical preoccupation does not sufficiently address the specific style of the dance but rather offers a kinetic analysis of movement.

In order to conceptualise dance for the purposes of this project, existing movement analysis systems have been perceived as much more relevant than the language of music, since they have been devised with dance and/or movement as their starting point. Concepts incorporated within these systems have been scanned for relevance to the project. For example, the Benesh system defines the following concepts as sufficiently describing human movement: floor patterns, direction, location and travel (for both solo and group dances), limp and body movements, rhythm and phrasing (Parker 1984). Similarly, Labanotation defines movement in terms of: body actions, direction, time and dynamics (Kipling-Brown 1984, Adshead 1988). The latter movement analysis system has greater relevance to the project mainly because Laban's theory (upon which Laban movement notation is based) has been developed in a number of different ways some of which are closely linked with traditional dance and dance education (Preston-Dunlop 1980, Smith-Autard1994, Karkou and Sanderson 2001).

Adshead (1988), amongst others, offers an interesting justification of the value of broad categories used within Labanotation such as body actions, direction and dynamics for describing the movement components of different types of movement. Adshead (1988) argues that references only to body actions (e.g., steps, turns, jumps etc.) are not sufficient for describing a dance since there is only a specific number of humanly possible movements which are bound to be repeated from one dance to another. The presence of body actions may suggest just the mere fact that a dance is taking place. The selection of some movement

from the possible range of human movements ('body actions') in relation to the direction of these movements in space ('direction') and the quality of these movements ('dynamics') is what contributes to a description of the genre of a dance. For example, certain dance traditions may tend to select some body actions over others (e.g., pre-occupation with the use of certain steps rather than arm movements) and certain directions in space (e.g., circular rather than in line). Similarly, steps may be used in a number of different dances from a ritual African dance to a 20th century's social dance to ballet dancing; the distinctive feature between these different dances is the fact that the one may involve 'shuffling' steps, the other 'metrically rhythmic' ones and the last one 'rapid running' steps (quality of movement/'dynamics').

Development of Laban's notation concepts is the work of the I.F.M.C. team (1974) who define traditional dances as consisting of:

(i) number of participants/dancers, (ii) formation (e.g., circle, straight line etc.), (iii) type of connection,

(iv) type of movement, (v) direction of movement (vi) steps, (v) dynamics

(vi) tempo, (vii) meter (viii) rhythm (rhythmical variation), (ix) musical structure

The above set of features acknowledges cultural issues (e.g., participation of more than one dancer, group formation and type of connection), places movement in the centre (e.g., type of movement, dynamics, direction and steps), incorporates the concept of time, and progression through time, (e.g., tempo, meter, rhythm) and the role of music (e.g., musical structure).

However, Laban's movement theory of effort-shape, as already stated, has also been developed in a different way than Labanotation. One of the most influential disciplines of Laban, Bartenieff (1980), used extensively the effort-shape principles of Laban and, in conjunction with Alan Lomax' 'cantometrics' projects, developed a 'choreometrics' system appropriate for traditional dances. Her concern was with the search for a means of:

> "describing dance patterns so that they could be consistently compared cross-culturally, grouped into their regional and functional families and thus studied in their cultural and historical contexts. (Bartenieff 1967, p.92).

Attempts to develop Laban's theory into a culturally sensitive tool are apparent. According to Bartenieff (1967), the descriptive components of all dances include:

(i) the body (parts and attitude/posture), (ii) transitions, (iii) shape, (iv) effort, (v) flow, (vi) group relationships and formations

Based on these two developments of Laban's theory, there have been a number of applications on the documentation of traditional dances and some European traditional dances in particular (e.g., Loutzaki 1983-1985). Interestingly in England, where Laban's theory is extensively used, traditional/folk dances are recorded mainly in ways that date as early as Playford and Cecil Sharp, that is systems that date from before the 20th century (e.g., Barrand 1984, 1991, Sharp and Maclwaine 1991); Laban-based systems are the least popular.

Irrespectively of which movement analysis system is used, these different ways of studying dance do not present the whole picture of traditional dances. Although Bartenieff (1980) insists that there are close links between the aesthetic preferences of a society towards their dance and the movement behavioural patterns of this society, in most movement-based definitions of dance the role of the society remains peripheral and/or is only implicitly addressed. Furthermore, many movement-based theories make all-embracing claims that their sets of concepts are relevant to all different types of dances. Adshead (1988) and a number of other dance scholars question these claims believing that not all descriptions of movement are necessarily valuable for describing dance styles. Adshead (1988) also adds that Laban's movement theory in general does not proceed beyond the level of describing observable features of dance creating serious problems when faced with invitations to attach meaning to dances and make interpretations of these movement features. Finally, we will add that such systems are complex in their use. Many folk dancers, folk teachers and students (i.e., the ultimate users of the WebDance products) are not familiar with them, making an exclusive use of such systems inappropriate for this project.

In order to overcome the limitations of movement-based systems, it seems imperative to draw upon a number of other bodies of knowledge. Studies completed by dance anthropologists for example, offer ways of completing the picture half-drawn from the discussion solely of the movement of the dance. The context is highlighted and issues of function and purpose are revealed (e.g., Hanna 1979, Kaeppler 1972, Cowan 1990). In such studies, movement and context seem intrinsically linked. Kealiinohomoku's (1970) study strengthens this point further by revealing that there are identifiable traits in normal movement patterns of particular groups of people that are reflected in the movement of their dances. For example, the way many Europeans walk by pressing into the floor and pushing off is reflected in dances that involve exaggerated stamping of feet on the ground (e.g., in many Balkan dances). Many people from India on the other hand may walk in a way that involves adapting to the floor without digging into it; this different way of relating to the floor on everyday walking can be reflected on the many traditional dances from India (there is often an emphasis away from the feet to hand gestures). Without the knowledge of everyday preferences, movement or otherwise, of the people from whom a dance originates, the movement of the dance can be misrepresented, cultural peculiarities can be omitted and cultural subtleties can be ignored.

Furthermore, the structure of the society from which certain dances originate may also offer additional information about the style of these dances. The eDionysus (2003) website for example refers to two distinctive tendencies within European dance. According to the one trend, the individual is submerged into the larger society and having to fit into the dance group harmoniously. Other peoples on the other hand, appreciate improvisatory clownery or virtuoso display by talented dancers. It becomes apparent that if an untrained eye views a specific traditional dance for which the context is not known, he/she may miss culturally-specific characteristics, (e.g., issues of restrain and uniformity or issues of improvisation or virtuoso display). Similarly, if not aware of the context, the person who attempts to dance this dance may end up performing a set of movements that are colourless and insignificant. In both cases, movement descriptions of style may not be sufficient for identifying and/or performing the style of the dance.

Another example of an anthropological perspective in dance is Kaeppler's (1972) study on Tongan dance. Although this study builds a methodology for dance analysis from the isolation of movement patterns, such patterns are immediately placed in context. Kaeppler (1972) also re-enforces the point that movement and context are closely linked. As this study points out, descriptions have to be analysed in a meaningful way since: "…only a small segment of all possible movements are significant in any dance tradition" (Kaeppler, 1972, p.173). Kaeppler (1972) maintains that it is therefore necessary to make an inventory of those movements that are important in a particular culture. In order to do so, each traditional dance needs to be based on learning to acquire the perceptions of the people whose dance it is, to learn how to think, feel and react as the people who perform or watch the dance would. Giving voice to the people themselves from whom the dance originates may, therefore, add to the description of the most important movement characteristics of this dance.

Anthropological studies highlight the specificity of the dance experience and the value of context in understanding the style of the dance. However, some of the limitations of these studies are the fact that, on the whole, they do not offer a comparative model of dance that can be used for studying European dances across different cultures and regions. Given that European dance consists of a number of different dance traditions, some more or less divergent, the search for a language that is sufficiently broad for embracing all these different movement expressions and specific enough for identifying distinctive styles takes us to comparative choreography.

Comparative choreography is a term utilised within folk dance scholarship to refer to the development of models that can be used for studying two distinctive folk dances. One very interesting example of a study in comparative choreography is the work of Forrest (1984). Forrest (1984) has developed a comprehensive model for assessing and comparing what he terms as 'ceremonial dance types'. The movement categories of this model refer to (i) individual and (ii) group movements. The first movement category consists of:

(i) Individual Body Movements

1. Body parts emphasised (a) individual part, (b) mode of emphasis

2. Co-ordination of body movements

3. Extra somatic modes of emphasis (for example bells)

4. Body attitude

5. Degree of variation

The second category consists of:

(ii) Group Movements

1. Number of dancers

2. Figures (a) starting position, (b) evolutions

3. Order of figures

4. Extra characters (a) extent of integration into dance, (b) movement outside central dance

5. Duration

Some of the useful aspects of this model are: movement is seen as both individual and group movement; many European traditional dances have either individual or group formations. There are terms introduced that are closely linked with the teaching of traditional dances (e.g., co-ordination of body movements, group figures and the use of the props as an integral part of the dance). Finally, it is a model that has already been used for comparing dances that do not necessarily derive from the same tradition (e.g., English morris and American matachin).

Contextual Components

There are a number of ways of referring to the context of a selected dance. Some studies originating from the dance world for example, highlight the need to develop models that are closely linked with the peculiarities of dance but also parallel the other arts (Kagan 1978, Adshead 1988). Adshead (1988) for example proposes that next to the movement components of the dance (defined in Laban terms) the following categories need to be included:

(i) dancers (age, sex, size, number and role)

(ii) visual setting (e.g., performance area, costumes or cloths, properties of any kind and lighting) and

(iii) aural elements (random noise, spoken word, singing or instrumental music)

Each of these categories may be closely linked with other arts forms, for example the theatre (i.e., dancers, similar to actors), the visual arts (i.e., visual setting) and music (i.e., aural elements). Although the terminology used in the proposed model refers predominantly to dance as a performing art (e.g., performance area, lighting etc.), the links between dance and other art forms are particularly useful for the current project. Dissimilar to the western divisions of the arts, especially within a modernistic era, into dance, music, visual art and theatre, many traditional dances are not separated from other artistic expressions.

Furthermore, within the broad categories proposed by Adshead (1988) some concepts are more relevant to traditional dances than others. For example, the concept 'sex' within the dancers category is an important concept for traditional dances. In some dances there may be strict regulations according to sex. Men and women may hold dances separately, or men have to occupy one-half of the dance line and women follow in the second half. In other places in social rounds men and women may alternate. For example, the eDionysus (2003) website refers to men usually performing the traditional Morris and sword dances, but the sexes mingle in country dances, reels, and quadrilles. The solos in Scottish sword dances are traditionally male performances, but, as a 'non-authentic' deviation, girls may now execute the tricky steps of the dances.

The movement of the dance is also affected by the sex of the participants. For example, in the Balkans some males may engage in acrobatics-crouches, leaps, or pivots-while the rest of the group adheres to the traditional steps. In the Basque provinces of Spain, in the Ukraine, and in Poland male experts have the opportunity to display high kicks or spectacular leaps. According to eDionysus (2003), the improvisations of these privileged experts have often led to the introduction of permanent new elements into the dances.

The traditions of age grades are also important. From Greece to Great Britain, almost universally, the older, experienced men and women are the leaders, while the children bring up the rear of dance lines as apprentices. With the dissemination of folk dances into the schools, children are learning adult routines. However, in remote villages of Europe youngsters have their special dances, and adolescents may enter the adult circles modestly. Other distinctive roles may also be present, e.g., the role of the leader of the dance line (male or female in Balkan dances) or the role of the 'fool' in English Morris dancing (eDionysus 2003).

The 'performance area' within Adshead's (1988) 'visual setting' category is also an important concept for many traditional dances. Traditional/folk dances may take place in open spaces, in specifically designated areas and/or on stage (especially in the case of many folk dances). Similarly, 'costumes' and props are often associated with traditional/folk dances, adding certain characteristics to the dance for example regarding the quality of the movement (e.g., freedom of

movement or restriction). Links between costumes used and the wider context from which each costume originates are apparent in most cases (e.g., quality of materials used or type of decoration).

Finally, within the 'aural elements' introduced by Adshead (1988), references to different types of musical accompany are also useful. In traditional dances, the 'aural elements' may indeed vary from instrumental music, songs and/or spoken words. Similarly to the previous category, aural elements may exist independently from the dance as art forms in their own terms or may be created specifically for the purposes of a dance. For example, in English Morris dancing both costume and music follow the dance; costumes are specifically devised for the dance group and often by the members of dance group and instrumental music follows the movements of the dancer. On the other hand, in many Greek dances, the costumes are, or used to be, the everyday cloths of the dancers and the movement of the dance often follows live or recorded instrumental music.

Given that Adshead's (1988) categories have a bias toward dance as an art form, Forrest's (1984) model of ceremonial dance types is again utilised as offering closer links with traditional/folk dancing. Forrest's (1984) model includes, besides the movement components of individual and group movement described in the previous section, the following categories:

(i) ***Setting*** (equivalent to the 'performance area' of the 'visual setting' category described by Adshead 1988)

1. place
2. time of year
3. occasion (e.g., religious/secular event, monthly event)
4. audience (a) composition, (b) behaviour (c) position
5. time of day

(ii) ***Dance group structure and composition*** (equivalent to Adshead's 1988 category: 'dancers')

1. Status of dancers in the community (a) because of dance group (b) regardless of dance group
2. Procedures for choosing new dancers
3. Methods for training new dancers
4. Internal structure or hierarchy
5. Number of each type of dancer (for example leaders, line dancers, extra characters) (a) available to dance (b) necessary for a performance
6. sex of performers

(iii) ***Musicians*** (there is no equivalent category for this in Adshead's 1988 model)

1. number
2. position
3. instruments
4. status (a) in the hierarchy (b) dancing ability

(iv) ***Music*** (equivalent to Adshead's 1988 category: 'aural elements')

1. predominant type (for example jigs, reels)
2. melody (a) number of discrete sections (b) arrangement of sections
3. relationship of melodic patterns to dance pattern (a) body movements (b) figures
4. Supposed origin (for example popular song, medieval dance tunes)

(v) ***Costume*** (referred to by Adshead 1988 within the category of visual setting)

1. relationship to everyday cloths
2. supposed origin of components
3. components (a) variable (b) non-variable (c) degree of uniformity among dancers
4. relationship to dance
5. relationship to function of dancer
6. additional paraphernalia (a) carried by all (b) carried by special individuals

(vi) ***Social function*** (no equivalent category in Adshead's model 1988)

1. Explicit
2. Implicit

Forrest's (1984) model includes a number of categories that overlap with Adshead's (1988) model. However, he also adds two new categories (e.g., 'musicians' and 'social function') and more detailed concepts within some of the existing categories. For example in the 'dance group structure and composition, issues of hierarchy, training of new dancers and status of dancers in the community are included. In many European dances, the participants in dance gatherings do indeed, observe closely knit organization and definite rules for the individual's place in the community and in the communal dances (eDionysus 2003). In the 'setting' category proposed by Forrest (1984), the audience is

included as an important component of traditional/folk dances, while the time of day and year, and the occasion are also regarded as useful descriptors of traditional/folk dances.

The eDionysus website (2003) highlights the importance of occasions within which traditional/folk dances are performed. It claims that, in general, many folk dances celebrate original festivals. In Europe however, many such celebrations have been adjusted to the Christian feasts. The same source also makes apparent that there are close links between the occasions within which traditional dances take place and social, historical and geographical contexts. Within the dance anthropology literature, there is a similar, if not stronger, emphasis upon socio-political, economic relationships and references to historical underpinnings. In such studies, the context becomes of particular importance and discussions are situated within specific geographical areas and within the everyday experiences of the primary actors of the dance (e.g., Kaeppler 1972, Cowan 1990, Kealiinohomoku 1970).

Anthropological studies, as already stated, also address issues of function and purpose of traditional/folk dances. Similarly, issues of function are highlighted in a number of other folk dance-related sources, often to a greater extent than Forrest's model (1984) covers. For example, the eDionysus website (2003) discusses some of the functions that are relevant to European traditional/folk dances and offers examples of such functions:

> "… on the village green the British Morris dances and the Abbots Bromley Horn dance speak of renewed May Day vegetation and of Paleolithic elk worship. Other dances may serve more than one function. For example, the Spanish Aragonese jota is best known as a rural entertainment for men and women, but it may also enliven funerals." (eDionysus 2003)

These functions are closely linked with the historical, socio-economic and geographic climate of the regions within which they have developed. Traditional/folk dances may reflect transition from pagan to Christian religions and, in more recent times, the change from the attitudes of village and agriculture to those of town and industry and the consequent changes in social relations. According to eDionysus (2003), European traditional/folk dances can be seen as falling under at least three categories according to their function:

(i) One type, which takes the form of combat, remains highly ritualistic, albeit with a mixture of pagan and Christian elements. For example, male combat dances of the Balkans echo ancient pre-Christian rites for initiation into brotherhoods, the heralding of spring and of animal fecundity, and healing. Fierce battles ensue at the seasonal rituals of the Macedonians, of the Slovenes, and of the Romanians. Animal maskers and buffoons enact resurrection dramas. Along the coasts of Croatia and Dalmatia the battling factions have, under Christian influence, been renamed into Moors and Christians or Moors and Turks. These battle dances

have related forms and styles in other European countries, from Spain to Great Britain.

(ii) A second, is relating to occupation such agriculture, sowing, haymaking, cloths washing, involves more of the community than the combative type and fluctuates between celebrations of sowing and harvest and of social festivities. Rural celebrations of planting and of harvests feature communal round dances, such as the kolo of the eastern Balkan region, the horo of Bulgaria, the hora of Romania, and a variety of Greek chain dances. The celebrations include vestiges of ancient vegetation festivals, impersonations of fertility deities, and 'rain magic'. The same rounds, however, appeared also at weddings and other secular or semisecular gatherings. In other parts of Europe, there are also dances miming agricultural and other occupations, such as the Polish sowing of rye and oats, the Hungarian haymaking, the Swedish flax reaping, the clothes washing of Denmark, and the spinning mime of Spain. Some of these occupational dances derive from enactments by medieval guilds or from the mime in medieval branles. They survive as entertainment in adult couple dances and in children's games, often in settings remote from their origin.

(iii) The third type, situated in more central and western Europe, is completely secular and social. Rural and urban gatherings include the social square dances and couple dances for men and women. Within the last century the Bohemian polka, the Austrian waltz, the Polish mazurka, and the Hungarian czardas are just some few examples of secular dances. According to eDionysus (2003), when religion weakens, some of the mystery and the magic depart from the dances that express it. The dancer becomes less a medicine maker than a performing artist as ritual changes imperceptibly into art. In short, man's social adjustment to the environment, for purposes of survival, created both the original dance rituals and their subsequent functional or formal changes.

A Model for Traditional/Folk Dance

As already stated, in this project, traditional/folk dance is seen as a set of movements within a specific context. For each of these two broad categories (i.e., movement and context) a number of subcategories and concepts have been selected from the reviewed literature. However, during the early work of conceptualising traditional dance it became apparent that the division between movement and context was not as clear-cut as initially perceived. For example the sex and age of the dancers as well as their role may determine the type of movement used within the dance. Different types of music inspire slightly or very different types of movement. Similarly costumes and props may be an important component of the movement of the dance either as aspects that restrict or further articulate movement. Compensation for this arbitrary division was therefore made with the inclusion of an intermediate step that brought both movement and context together. Figure 7 shows the new broad categories and how they can be used within a dance teaching framework. Block arrows suggest teaching/learning possibilities, i.e. users can move from wider contextual

information to movement characteristics, while other users can choose to start from the movement components of the dance and move to contextualising them.

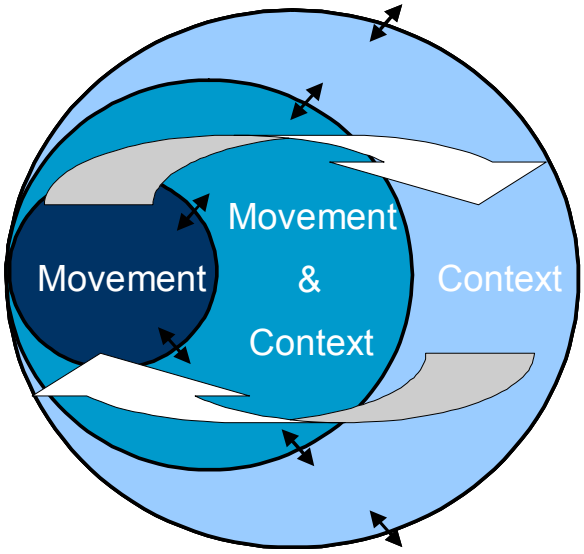

Figure 7. Relationship of Movements Components and their Context

Three new labels were finally introduced, that is 'dance activity', 'dance event' and 'dance tradition'. These new terms have been defined as follows:

Dance Activity

A dance activity is about the movement components of a dance

e.g., movement of karsilamas

Dance Event

Dance events are about the dance within its immediate context (emphasis on both movement and context)

e.g., karsilamas within a festival in Mytilene

Dance Tradition

Dance traditions are about placing the dance in its wider context (emphasis mainly on context)

e.g., karsilamas within the wider dance tradition/s of Mytilene

By replacing the concepts movement and context with the new terms defined (i.e., dance activity, event and tradition), Figure 7 becomes Figure 8. In the latter Figure the level 'movement' is substituted with 'dance activity', 'movement and context' is substituted with 'dance event' and 'context' becomes equivalent to 'dance tradition'.

Each of these broad categories incorporates some of the important concepts revealed in the literature and discussed before. In particular each category consists of the following subcategories and concepts:

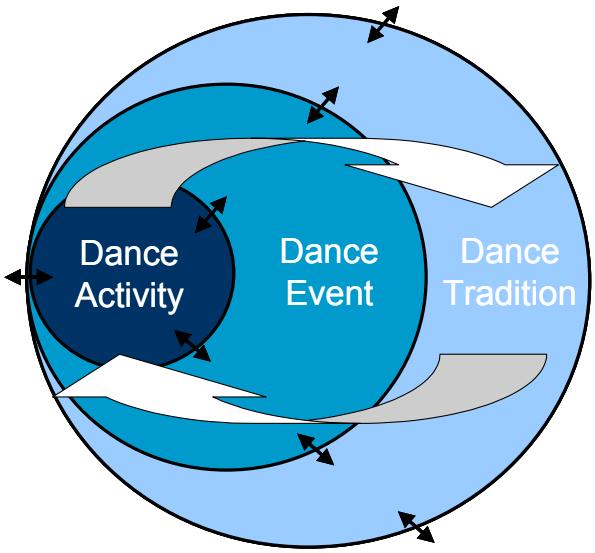

Figure 8. Relationship of Dance Activity, Dance Event and Dance Tradition.

Dance Activity

Broad Movement Characteristics

Body part/s, characteristic body posture/s, degree of energy and/or dynamics, rhythm, characteristic movement, characteristic gestures, characteristic vocalisations, props integrated within the dance

Individual Movement

Pathways and floor patterns, basic movement, variations, repetitions and/or phrasing

Couple/Pair/Group Movement

Number of participants, type of connection, pathways and floor patterns, basic movement, variations, distinctive movements amongst dancers, repetitions and/or phrasing

Dance Event

Music

Meter and melody, song/spoken words, instruments, variations, relationship of music/song/spoken words to movement

Costume

Common costume components, distinctive costume components, relationship of costume to movement, relationship of costume to everyday cloths

Role of Dancers

Internal structure and hierarchy, procedures for training new dancers, status of dancers in the community

Role of Musicians

Number of musicians, position of musicians in space in relation to dancers, status of musicians among dancers

Role of Audience

Composition of audience, position of audience in space in relation to dancers, behaviour of audience

Other Roles

Gender roles, familial/age roles, other roles

Immediate Context

Occasion, time, place, other activities, myths/stories

Dance Tradition

Wider Context

Cultural context, historical context, societal context

Another broad category has also been identified which refers to indexing documented dances. This category consists of concepts extracted from the broad categories of dance activity, event and tradition as follows:

Indexing Field

Name of the dance
Geographical location (dance tradition)
Type of dance (e.g., solo, couple/pair, group) (dance activity)
Gender of dancers (dance event)
Age of dancers (dance event)
Function (dance event)

C2 Pedagogical and didactical concerns

C2.1 General issues

Creating and developing the teaching strategies, the content for the lessons and associated learning activities for traditional dance via e-learning is a challenge, especially since a number of persons of different backgrounds and discipline (e.g., secondary education teachers, content experts, multimedia and 3D

animation developers, etc) are involved. It is important to assure a common understanding of the projects goals and purposes.

It is not uncommon for members of the development group to interpret key concepts regarding lesson planning in different ways. This may become evident only after completing the first draft of teaching scenarios and discussing them thoroughly during group meetings. A common understanding of dance teaching concepts and the functionality of e-learning tools is vital for the establishment of the project's development and evaluation efforts regarding the teaching scenarios.

C2.2 Teaching scenarios development

Any e-learning teaching scenario should address the following issues:

- Learning traditional dances is a very practical subject area; how can this be achieved through an e-learning environment and also how the e-learning can be applied in a classroom situation with its spatial and technical limitations?
- How to develop a cohesive scenarios framework focused on developing efficient and meaningful instructions?
- How to attract students' interest and create the incentives for them to get involved in this new learning adventure?

In addition, the content of e-lessons and associated teaching activities should meet the following learning objectives:

- 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

The definition of appropriate teaching activities should take into consideration the nature of dance as well as the students interests and provide a balance between intellectual tasks (reading, viewing) with interactive tasks as well as group activities and practical experience outside of 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 may include:

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

Examples of group activities include:

- 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

Given the complexity of the subject and the capabilities of multimedia technologies, the activities selection process can become more difficult and lengthy than initially envisioned.

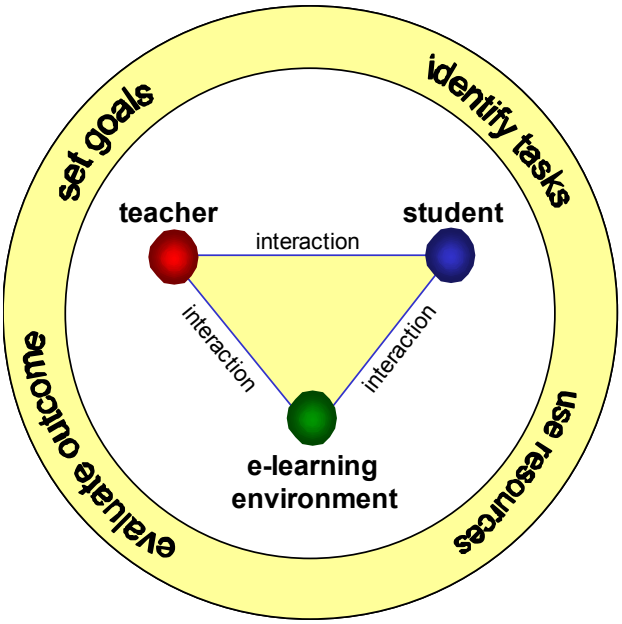

Figure 9. Interaction between teacher – students and technology

In the above context, the role of the teacher should be to act as 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 the student, something, which is appropriate for interactive subjects such as dance.

C2.3 Conclusive thoughts

The learning environment has traditionally been viewed as teacher orchestrated domain. Contemporary thinking emphasises an integrated role of students in a way that challenges the educational system and particularly the teachers to view them as collaborators in the learning process. More recently, a more radical and progressive shift in technologies created the need to look and explore these new possibilities such as e-learning. The challenge is to create an e-learning

environment where the students take initiatives and play an important role in the learning process.

In addition, it is important through the specific area of e-learning to enhance learning in other as well (e.g., music, history, culture, etc.). More specifically, it is essential to help students make connections across subject and content areas in an attempt to facilitate their creative thinking.

C3 Content creation

C3.1 Dance digitization technologies

Computerized/Virtual technologies allow us to manipulate, extend, and distort images of the body. These technologies extend and colour work in ways not possible in the **physical realm or by traditional means**. They offer a way to **augment** and **expand** work, thus introducing new possibilities **creatively, experientially, spatially and interactively** (Sharir). The VR technology tends to **blur disciplinary boundaries** by changing the nature of **what and how** artwork is created, realized, and performed. Because one must create a computerized "world," open to user interactions, the work necessitates a non-linear, open-ended, almost fragmented composition usually found in artistic expressions. Like all other art forms, **dance is absorbing technology**, as a creative and learning tool, affording dancers and technologists the opportunity to **explore interactive environments** and **integrated methods** that have shifted artistic process.

The crossovers that already happened last century between performance and art, sculpture, architecture and film, are now re-examined within and through multimedia-mixed realities technologies that so far have been more closely connected to simulation than to dance and other artistic expressions. **The basic forms of live dance performance will survive**. But, what about **"new"** and **unimagined** possibilities. For these, we need to **look to the artists**. The most talented contemporary artists always find ways to incorporate and respond to what is happening in other fields around them, whether directly or indirectly. The dance artists are already working for some time with media as it serves their creative needs, both old and new (DeLahunta).

The dance event constitutes part of the **"intangible heritage"** [UNESCO, 1989], because it, unlike other art forms, leaves few physical records behind. There are several **limitations** in the recording systems used by dance companies, organisations, folk clubs and bodies that perceive preservation of dances as part of their mission. For example, archival information in the form of documents and books offer rich information about dance as an agent of cultural meaning **but fail to present the movement and stylistic aspects of dance genres**. On the other hand, video addresses movement/audio aspects, but at the same time it **lacks information about the wider context, meaning and cultural significance of the dance event** recorded. Despite these limitations, **video is currently the most efficient way** of preserving dance of any kind. An example

of systematic work in this direction is the LADD project in the USA (LADD Dance Heritage Coalition). However video as a learning medium is passive, in the context that **cannot deliver user participation or interaction**.

A main objective in dance e-learning is the development of a 3D platform visualising dance events in 3D virtual environments, **making the learning/performing process intuitive and more motivating**. This enabled the integration of virtual humans that interact dynamically according to the dancer movement.

Motion-capture techniques

Capturing motion is a long and difficult process, which requires a lot of heavy equipment and sophisticated software. There exist plethora of technologies that enable one to record a motion, but among these, two classes of systems are more widespread than the others. The first one is optic: an array of cameras (at least two and up to more than 20) can “see” markers that are placed on the various locations that one wants to record (see figure 10). The cameras are calibrated so that their position in space and their internal configuration (focal length) are know, thus by using a bit of simple and not-so-simple geometry computation the system calculates the location of the markers with a fairly good accuracy (below one millimetre, depending on the quality of the calibration) and a high frame rate (up to 1Khz).

Several companies manufacture and sell such systems (Vicon Motion Systems Ltd, Meta Motion, Motion Analysis Corporation) but they are all relying on the same basic principles.

Figure 10: A calibration pose for a MoCap Session.

Figure 11: A magnetic markers layout for a real-time full body capture

The second class of system is magnetic (Ascension Technology Corporation): a box emits an intense magnetic field which is analyzed by sensors attached to the body to track thus providing the position and orientation of each sensor (figure 11). Such system is more used for real-time applications due to its quick setup capabilities (no calibration is required for instance) and its transportability. The drawbacks, however, are a poor accuracy (around a centimetre), a small range of action (you mustn't get too far nor too close from the emitter), a huge sensitiveness to the surrounding environment (no metal allowed around the capture zone) and a lower frame rate (less than 200 Hz).

Once the data was acquired, it presents itself under the form of a collection of trajectories of either points or rigid bodies. Needless to say that such data is quite useless if not linked to an object to animate (a body, a face) and cleaned from all the artefacts that always occur during a capture session (occlusion of optical markers, perturbation of the magnetic field). The process of cleaning up the data is called post-processing, while mapping it to the target object is called retargeting. Eventually, tuning the captured motion is called editing.

There exists some powerful pieces of software for post-processing the data that use a lot of data estimation and smoothing techniques from the simplest one (e.g. linear interpolation) to the more complex (e.g. Vicon IQ uses a skeleton calibrated on the subject and error minimization for estimating it's pose at every frame and therefore the location of the markers (figure 12), plus many others: Kalman filtering, a-priori knowledge about rigid bodies, spline interpolation and of course hand work.

The reason for doing motion retargeting or editing (Kaydara MotionBuilder software) is that the data will perfectly fit only on a model that has exactly the same dimensions as the recorded object and will generate huge artefacts if mapped onto something else. For example, if one captures a giant and then tries to map he's motion onto a dwarf character, the global motion of the body will not match anymore the relative motion of it's legs (to cover the same distance, a tall person will walk less than a small one), thus leading – at best – to feet skating on the floor, or characters flying in the air.

Quite a lot of research has been conducted about this particular issue but so far it didn't achieve to be integrated into production software (Maya 6.0 integrated state-of-the-art motion retargeting tools (Alias|Wavefont Maya 6.0 technical sheet)). Constraints based approaches aim at obtaining a visually plausible motion when the target model doesn't quite match the captured data. It formulates the problem of retargeting more or less as follows: the captured motion is the starting point for satisfying a set of constraints to be enforced (e.g. always at least one foot on the floor, no foot skating,) and the data is then optimized for satisfying the constraints while minimizing the change in the motion (Gleicher, 1997, 1998). However, this approach correct only what it is asked for: if, say, the captured character was walking on a flat area and the animated one is walking uphill, then the final animation will dangerously bend downward, but the character will not fall. Further adaptation has to be done when such a case

occurs, and Physics based approaches tend to address this issue. Physics based methods also aim at satisfying constraints without changing too much the original animation, but this time the constraints that are enforced are physical ones (ensure the right balance of the character,) either by non-linear optimization (Popovic, 1999) or more fancy methods like close-form (Shin, 2003).

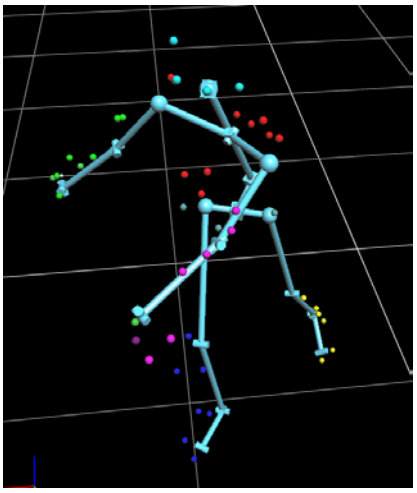

Figure 12. A skeleton estimation (light blue coloured) from the markers reconstruction (the small rainbow coloured balls).

Figure 13. A skinned character with no motion retargeting: the legs are self penetrating at every step

Other problems may arise during the retargeting process. For instance parts of the body sometimes self-penetrate with others parts when the motion is mapped on another character (Jeong, 2000)(this range of cases arise when e.g. the person that was captured was quite skinny, and the animated character is fat (figure 13)) or the recorded motion doesn't fit into the surrounding virtual environment. These issues are often edited by hand due to the large number of solutions that are available for one single case (e.g. when the hand of an animated virtual character penetrate the wall of a virtual house, how should he avoid that e.g. by bending his elbow or wrist, by moving himself etc.), and the research often focused on finding ways to make the editing by hand more easy [Boulic et al, 2003], (Lee, 1999) rather than doing it automatically.

Dance Digitisation & Visualisation using Motion capture techniques

The typical pipeline production for optical motion capture begins with camera volume calibration, where the relation between all the cameras is computed using recording of dedicated calibration props (assuming the volume set-up [where the cameras are properly aimed at the captured volume], has already been achieved). Then the subject, wearing optical markers (e.g. spheres of 25mm diameter for body capture), is recorded in a static posture so that the operator can manually label all the markers. The operator gives/selects names for each

marker in this static pose, usually using anatomically relevant labels (e.g. LKNE for the left knee marker). The information gathered at this stage will be used by the system to label the trajectories automatically during post-processing of dynamic movements.

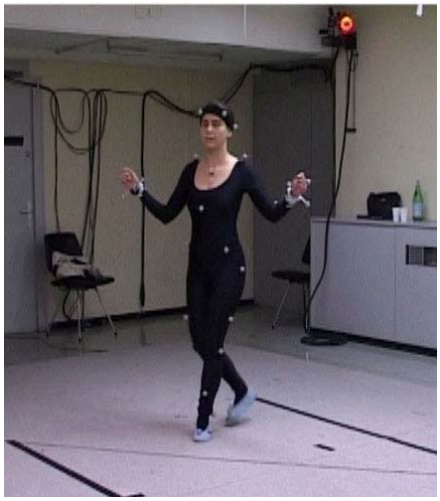

Figure 14. Greek dancer

Figure 15. UK dancer

The post-processing of motion sequences primarily involves the following two stages: trajectory reconstruction and labelling of markers/trajectories. Once those two steps have been completed, it is possible to visualize the technical skeleton obtained by drawing segments between the marker positions. From this information the subject skeleton and its animation are derived.

It is relatively easy to construct the subject skeleton (or its approximation) from the markers. However, the problem becomes much more complex when considering the body meshes and its deformation parameters (figure 16). Skin deformation (or skinning) is based on three inter dependant ingredients. First the skeleton topology and geometry, second the mesh or surface of the body, and third the deformation's own parameters (very often consisting of vertex-level ratios describing the scope of deformation with relation to joints). Good skinning results are achieved by a careful design of these three components, where positions of joints inside the body surface envelope and attachments ratios are very important issues.

One of the main issues in this approach is to **identify key frames where the timing element is visible in the appearance of the dancer**. (e.g. position of feet). Synchronization of the frames generated from the dancer's motion with respect to the music in such a way that it enables comparison of key timing frames. Synchronized recording of the music and dance sequence of the student is challenging and is crucial for the evaluation technique to work. A manual technique of the dancer indicating the starting of the audio and dance sequence can be used, which may later be evolved into an automatic system.

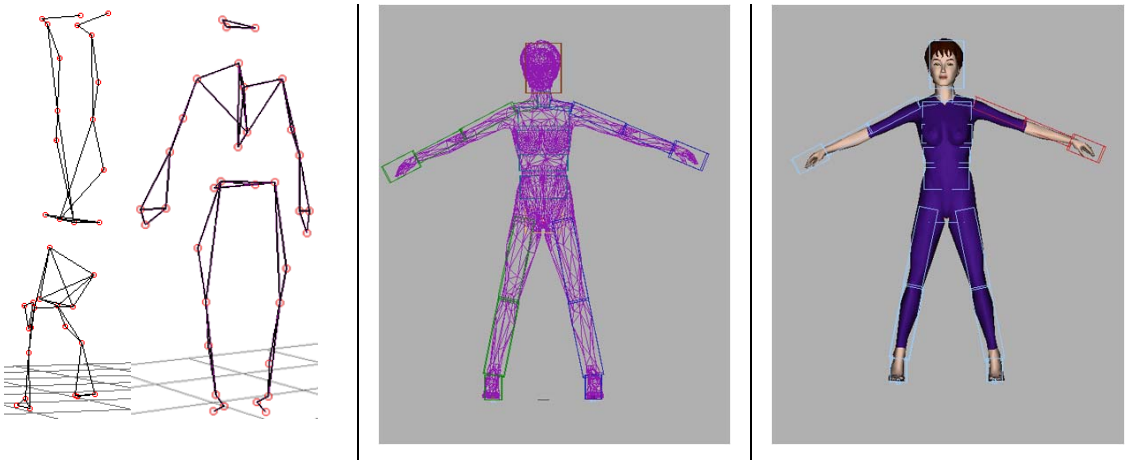

Figure 16. From technical skeleton to skinning

The final step is the development of the 3D animation viewer that allows the manipulation of the 3D dancer, offering a number of functionalities (e.g., start, stop, Zoom in / Zoom out, Focus, Change camera position, etc.). The 3D viewer software can be developed with Macromedia Director 8.5 Shockwave Studio, which embeds Intel Internet 3D Graphics technology and new released 3D-Lingo commands for 3D runtime rendering control. A 3D-Viewer provides a 3D-World navigation engine made with Lingo (Director's programming language), so that the user to be able to watch a dancing model, choosing the point of view in the 3D-World and the zoom level, controlling the speed of the 3D animation as well.

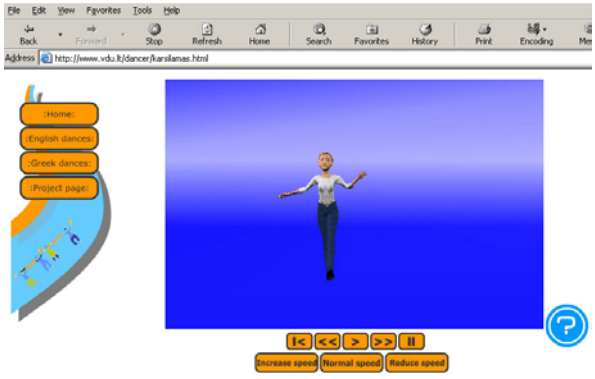

Figure 17. The Webdance 3D animation viewer

D Development of e-learning modules

D1 Metadata (standards)

D1.1 Metadata Definition:

Metadata describe the content, quality, condition, and other characteristics of data, helping to locate and understand data. Metadata include information needed to

- determine the sets of data that exist for a geographic location,
- determine if a set of data meets a specific need,
- acquire an identified set of data, and
- to process and use a set of data.

The exact order in which data elements are evaluated, and the relative importance of data elements, will not be the same for all users.

D1.2 Objectives of the Standard

The objectives of the metadata standard are to provide a common set of terminology and definitions for the documentation of digital geospatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements.

The information included in the standard was selected based on four roles that metadata play:

- **Availability**: data needed to determine the sets of data that exist for a geographic location.
- **Fitness for use**: data needed to determine if a set of data meets a specific need.
- **Access**: data needed to acquire an identified set of data.
- **Transfer**: data needed to process and use a set of data.

These roles form a continuum in which a user cascades through a pyramid of choices to determine what data are available, to evaluate the fitness of the data for use, to access the data, and to transfer and process the data. The exact order in which data elements are evaluated, and the relative importance of data elements, will not be the same for all users.

D1.3 Existing standards

AICC: The Aviation Industry CBT (Computer-Based Training) Committee

The Aviation Industry CBT Committee (AICC) is an international association of technology-based training professionals. The AICC develops guidelines for the

aviation industry in the development, delivery, and evaluation of CBT and related training technologies. The objectives of the AICC are to:

- Assist airplane operators in development of guidelines that promote the economic and effective implementation of computer-based training (CBT).
- Develop guidelines to enable interoperability.
- Provide an open forum for the discussion of CBT and other training technologies.

Although AICC primarily attends to the aviation industry, over 12 years focus on the specifications required to meet this industry's needs has led to a very well developed specifications for learning and particularly for computer managed instruction. As a result, a wide range of learning consortiums and accredited standards groups are in the process of adopting and adapting the AICC guidelines to their own industries. AICC is the oldest standards body in e-learning and was originally established by the aviation industry to provide standards for Computer Based Training (CBT). The AICC wants the aviation training community to get the best possible value for its technology-based training dollar. The only way this is possible is to promote interoperability standards that software vendors can use across *multiple* industries. With such standards, a vendor can sell their products to a broader market for a lower unit cost. If you are concerned about reuse and interoperability of online learning, the AICC is a good group to participate in or follow. The AICC also actively coordinates its efforts with broader learning technology standards organizations like IEEE LTSC, ADL, and IMS .

IMS (Instructional Management System) Global Learning Consortium

The IMS Global Learning Consortium, headquartered in Burlington Massachusetts, is developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS has two key goals:

1. Defining the technical standards for interoperability of applications and services in distributed learning.
2. Supporting the incorporation of IMS specifications into products and services worldwide. IMS promotes widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to work together.

IMS is a global consortium with members from educational, commercial, and government organizations. Funding comes from membership fees, with organizations choosing to join as either Investment or Developers Network members. The IMS specification documents are available online.

The IMS focus on the development of XML-based specifications. These specifications describe the key characteristics of courses, lessons, assessments, learners and groups. In addition, the XML specifications and Best Practices Guidelines provide a structure for representing eLearning meta-data (defined as data about the data). This group offers a disciplined approach for describing the

various resources and provides a common set of elements that can be exchanged between multiple systems and products. Describing eLearning resources helps you search through them for existing resources, exchange resources and data with others, and better manage the maintenance of these resources through their life cycles. The most widely acknowledged IMS specifications are as follows: IMS Meta-data, IMS Content Packaging and IMS QTI (Question and Test Interchange).

IEEE Standard for Learning Object Metadata LOM

Institute for Electrical and Electronic Engineers Learning Technology

The IEEE is an international organization that develops technical standards and recommendations for electrical, electronic, computer and communication systems. IEEE specifications are already widely adopted and becoming international standards.

Within the IEEE, the Learning Technology Standards Committee (LTSC) provides specification that address best practices, which can be tested for conformance.

The most widely acknowledged IEEE LTSC specification is the Learning Object Metadata (LOM) specification. This standard will specify the syntax and semantics of Learning Object Metadata, defined as the attributes required to fully/adequately describe a Learning Object. Learning Objects are defined here as any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning. Examples of technology-supported learning include computer-based training systems, interactive learning environments, intelligent computer-aided instruction systems, distance learning systems, and collaborative learning environments. Examples of Learning Objects include multimedia content, instructional content, learning objectives, instructional software and software tools, and persons, organizations, or events referenced during technology-supported learning. The Learning Object Metadata standards will focus on the minimal set of attributes needed to allow these Learning Objects to be managed, located, and evaluated. The standards will accommodate the ability for locally extending the basic fields and entity types, and the fields can have a status of obligatory (must be present) or optional (maybe absent). Relevant attributes of Learning Objects to be described include type of object, author, owner, terms of distribution, and format. Where applicable, Learning Object Metadata may also include pedagogical attributes such as; teaching or interaction style, grade level, mastery level, and prerequisites. It is possible for any given Learning Object to have more than one set of Learning Object Metadata. The standard will support security, privacy, commerce, and evaluation, but only to the extent that metadata fields will be provided for specifying descriptive tokens related to these areas; the standard will NOT concern itself with how these features are implemented. We expect these standards will conform to, integrate with, or reference existing open standards and existing work in related areas. For example core Attributes of Learning Objects will be

coordinated with or may simply defer to, the efforts to standardize content objects in general.

Advanced Distributed Learning (ADL) Initiative

ADL Co-labs (**A**dvanced **D**istributed **L**earning **Co**llaborative **labs**).

This is an initiative of the US Department of Defence. It has been widely embraced by the industry and is fast becoming the *de-facto* umbrella standards body. The labs develop a specification called **SCORM** (**S**hareable **C**ourseware **O**bject **R**eference **M**odel), which unifies standards, developed by IMS and AICC into a comprehensive model.

Advanced Distributed Learning (ADL)

The ADL is a U.S. government-sponsored organization that researches and develops specifications to encourage the adoption and advancement of eLearning. The purpose of the ADL is to ensure access to high-quality education and training materials that can be tailored to fit individual needs and made easily available. The ADL's combination of research and recommendation helps turn the specifications into standards.

The most widely accepted ADL publication is the ADL Shareable Content Object

Reference Model (SCORM). The SCORM specification combines elements of IEEE, AICC and IMS specifications into a consolidated document that can be easily implemented. The ADL adds value to existing standards by providing examples, best practices and clarifications that help suppliers and content developers implement e-Learning specifications in a consistent and reusable way.

Shareable Courseware Object Reference Model (SCORM): The work done by the US Federal Government ADL initiative and their recently released Shareable Courseware Object Reference Model (SCORM) provides one of the best and most recent examples of the application and integration of these learning standards. These guidelines provide a foundation for how the Department of Defense will use learning technologies to build, and operate in, the learning environment of the future. The US military (be it Navy, Air Force, Army, or Marines) can all use, exchange, manage, track, and reuse all of their learning content and data no matter its source or application. Moreover, the Federal Government can choose multiple vendors, if they comply with the IEEE LTSC standards and the SCORM specifications, for various projects and know that all of the products and services will interoperate.
The SCORM model consists of three parts:

- **SCORM RTE** (Run Time Environment) which specifies a language and method for courseware and LMS to communicate with each other. This is used for the effective launching and tracking of content through an LMS. The SCORM RTE is, in fact, an updated version of the AICC CMI Interoperability specification mentioned above.

- **SCORM metadata,** which defines a list of minimum information (or *metadata*) that each piece of content should have attached to it. This is used to express common attributes of content (such as author, price, level of instruction etc) as well as provide keywords that could be used to catalogue and search for e-learning content. SCORM metadata is, in fact, identical to and subordinated to the IMS metadata specification.
- **SCORM Packaging profile** which defines a structured way to take the individual pieces of a course (or other collections of content) and package them together with their metadata, media files and navigation structure. This is used to pack up e-learning content so that it can be exchanged between different systems, LMSs and organizations. The SCORM Packaging profile is, in fact, a simplified version of the IMS Content Packaging specification.

As you can see, all three of these bodies work very closely with each other to ensure consistency of their specifications. In fact, the ADL has adopted and unified standards from IMS and AICC to create its SCORM specification.

ALIC (Advanced Learning Infrastructure Consortium) (Japan):

ALIC's objective is to establish an active society by reasonably and effectively providing a learning environment, which enables anyone to learn anytime, anywhere, according to the goals, pace, interests and understanding of individuals and groups. Also, we attempt to foster experts who will be the origin of global competitiveness.

ARIADNE (Alliance of Remote Instructional Authoring and Distribution Networks for Europe):

ARIADNE is a research and technology development project pertaining to the "Telematics for Education and Training" R&D program sponsored by the European Union. The project focuses on the development of tools and methodologies for producing, managing, and re-using computer-based pedagogical elements and telematics -supported training curricula. Validation of the project's concepts is currently taking place in various academic and corporate sites across Europe.

CEN/ISSS (European Committee for Standardization/Information Society Standardization System):

The mission of CEN/ISSS is to provide market players with a comprehensive and integrated range of standardization-oriented services and products, in order to contribute to the success of the Information Society in Europe.

EdNA (Education Network Australia):

EdNA Online is a service that aims to support and promote the benefits of the Internet for learning, education, and training in Australia. It is organised around Australian curriculum, its tools for education provision in Australia - all Australian governments.

DCMI (Dublin Core Meta-data Initiative):

The Dublin Core Meta-data Initiative is an open forum engaged in the development of interoperable meta-data standards that support a broad range of purposes and business models. DCMI is dedicated to promoting the widespread adoption of these standards and developing specialized meta-data vocabularies for describing resources that enable more intelligent information discovery systems. DCMI's activities include consensus-driven working groups, global workshops, conferences, standards liaison, and educational efforts to promote widespread acceptance of meta-data standards and practices.

GEM (Gateway to Educational Materials):

The Gateway to Educational MaterialsSM is a Consortium effort to provide educators with quick and easy access to thousands of educational resources found on various federal, state, university, non-profit, and commercial Internet sites. GEM is sponsored by the U.S. Department of Education and is a special project of the ERIC Clearinghouse on Information & Technology. Teachers, parents, administrators can search or browse The Gateway and find thousands of high quality educational materials, including lesson plans, activities, and projects from over 414 GEM Consortium member site.

Communication Interface or API

The communication interface is how learning resources exchange information dynamically, such as while student is taking a lesson. Currently, both the AICC and the ADL specify communication interfaces, while IEEE and IMS specification do not yet explicitly identify a communication interface.

For content developers, the most widely accepted communication protocol is Hypertext AICC Communication Protocol (AICC HACP). The AICC CMI guidelines describe a common set of data records about student performance and lesson history that are useful for tracking student performance across sessions. The AICC also manages an independent test lab that certifies compliance with the AICC LAN or HACP protocols for either content or management systems.

The trend among LMS vendors is toward an alternate AICC communication protocol that is also shared with the ADL, called “API Communication,” and often referred to informally as the LMS API since the functions used are all named

“API.LMS function name”. This API is the run-time communication specified in the ADL SCORM document, and acceptance and implementation are accelerating rapidly. In the first three years after the original AICC protocol was published, only a handful of commercial products supported it. However, after just two years, dozens of commercial products include support for the ADL communication protocol. The AICC test lab does not currently provide certification testing for the API communication interface, but the ADL publishes a test suite and works toward certification testing. The main difference between the AICC and the ADL view of the API communication interface is that the AICC

specifies a larger set of data elements that can be communicated. The ADL uses a subset of this data, and also views this “vocabulary” as only one potential set of data elements. The ADL envisions other potential data bindings that may map different groups of data elements to the protocol. For now at least, the two overlap to a large degree.

Macromedia Authorware® 6 supports the AICC LAN protocol, and the Authorware AICC HACP protocol implementation was certified in August 2001 by the AICC. Macromedia Dreamweaver and Dreamweaver UltraDev provide support for sending student performance data via the AICC HACP protocol through the free CourseBuilder extension for Dreamweaver and Learning Site extensions.

Likewise, Macromedia Flash™ developers can use the Flash Learning Extensions that are included with Macromedia Flash 5 to create interactions that send scores and complete student performance data. By downloading an update, a ready-made template is also available for quizzes.

Dreamweaver, Dreamweaver UltraDev and Macromedia Flash 5 also support the

ADL SCORM Run Time Interface (RTI) API through extensions. The sample extensions provide the ability to quickly “wrap” existing HTML or Macromedia Flash movies so they not only comply with ADL minimum requirements.

The IEEE Learning Object Meta-data (LOM) is the most broadly accepted meta-data standard, and it is included in key IMS and ADL specifications. If your content and process support IMS and ADL, then the IEEE LOM may be implicitly supported file.

D1.4 Standards used in WebDANCE

SCORM

For the WEBdance e-learning courses, we have used the SCORM standard.

SCORM has been developed in November 1997 after the initiative of the Department of Defences that established the Advanced Distributed Learning (ADL). Among other things, SCORM defines what an e-learning lesson should contain and how it should be structured in order to create, in our case, a dance curriculum.

According to the AICC norm, “an e-learning lesson is a meaningful division of learning accomplished by a student in a continuous effort”. This is expressed in our web platform by SCO’s (when talking about SCO’s, we mean lessons). Lessons (SCO’s) added create chapters and chapters create the curriculum of the dance.

Teaching scenarios define firstly objectives and skills and then we create lessons (SCO’s) through which our objectives could be accomplished. For a teaching hour and the objectives we have in mind, an instructor could define or select more than one lesson. S/he can also set the path of the lessons to be followed by

the students to achieve their objectives. Some lessons can be perquisite in order to attend the following ones.

Before incorporating the e-learning content about dances in the e-learning environment we define some teaching scenarios. According to these scenarios we propose some lessons (SCO's) to be attended which are created with the multimedia content disposed in the database.

Every SCO contains assets, which mean single electronic files representing media, text, image, audio etc. Every SCO can contain one or more assets so that we create a meaningful lesson.

In the database of the e-learning platform we store SCO's and the instructor has to combine them according to his teaching objectives.

D2 Development Tools

Although Authorware and Toolbook were once major players in the development of CBT titles, they have now been delegated to a minor role. Microsoft PowerPoint and Macromedia Dreamweaver and Flash are the primary basic eLearning development tools.

D2.1 Existing tools

PowerPoint

At the simplest level, you can use Microsoft PowerPoint or a similar presentation application to author eLearning. Although a PowerPoint slideshow is usually linear, you can include hyperlinks to jump to other sections. This allows the user to get more detail on a subject of interest. You can also include audio and video clips in a PowerPoint presentation. Testing and scoring is not easy in PowerPoint. A PowerPoint presentation can be distributed as a CBT or WBT. Delivery on the Web can be viewed either graphically or as text-only.

Macromedia Dreamweaver and Flash

Dreamweaver offers the Coursebuilder extension that allows the addition of testing to Web pages in an eLearning application. Animations can be done in Flash, making for a very flexible and usable product that can be delivered via the Internet or on a CD-ROM. Sometimes Director is used instead of Flash, because of its program language capabilities.

Macromedia Flash MX allows designers and developers to integrate video, text, audio, and graphics into immersive, rich experiences that deliver superior results for interactive marketing and presentations, e-learning, and application user interfaces. Flash is the world's most pervasive software platform, used by over one million professionals and reaching more than 97% of Internet-enabled desktops worldwide, as well as a wide range of devices

It's extraordinarily versatile as an authoring tool, which means you're not stuck with the tool designer's limited ideas of what you should be designing and developing. Macromedia Flash MX allows you to create highly interactive instructional materials that work well at low and high bandwidth, as well as with low- and high-resolution monitors. Macromedia Flash also integrates easily with both learning and Internet standards-compliant authoring processes.

The new Macromedia Flash MX features make instructional development easier than before. The interface is more intuitive, and makes seeing the big picture while authoring easier (big plus). The application comes with excellent integrated "getting-started" tutorials and learning objects, like multiple-choice and drag-and-drop interactions.

Macromedia Flash MX uses vector-based animation, which enables to create extremely small file sizes. These small files stream easily, even at low bandwidth.

The following software tools are useful for the production of formal e-learning solutions, i.e. online (or web-based) courses:

TRA's automatic e-Learning Software™ by TRA | RightArrow, LLC.

TRA's automatic e-Learning Software™ converts content authored in Microsoft Word or PowerPoint automatically to quality e-Learning. Easily add and synchronize most standard media. Quickly develop assessments and a glossary that hyperlinks to your course.

LearnPoint™ XE e-Learning Software by LeanForward, Inc.

LearnPoint™ XE is a one-stop solution for creating online and CD training and testing. Use your own content, design lessons, and deploy training and testing. It supports tracking of student activity to a built-in LMS. Requires zero programming. Lessons are quickly published then accessed by students using standard web browsers.

Lersus

Lersus provides rapid development of an interactive e-Learning content. It allows use in modules formatted text, links (internal and external), equations, pictures, flash animations, video clips, audio tracks, java-applets and more. e-Learning content in LERSUS is based on predefined didactic model that allows plan e-Learning courses, guarantee structural identity, standard format and same style for all modules of course. LERSUS divides content and its styles, that allow easy update styles, increase content development speed, decrease content costs and makes content reusable.

Content Point

Content Point is Atlantic Link's unique software solution to allow the rapid, professional authoring (and maintenance) of dynamic, web based e-Learning content, quickly and easily. Complex, web based, course creation is as easy as

putting together a PowerPoint presentation, and publishing to your learners is instantaneous. In a world first, Content Point uses web services to talk directly to an e-learning database, allowing the instant creation and publishing of on-line e-learning. All courses are automatically published in Flash format, giving users the most interactive and media rich training courses. And all this is available to more than 500 million Flash capable web browsers.

Construct Author

Course Authoring tool. Features conversion of MS Office documents into online course; assessment creation - including LMS tracking; SCORM-compliance (if needed); export of courses.

Lectora

Featuring an extremely low learning curve and vast features and functionality, Lectora is the fastest, easiest-to-use, most comprehensive, and cost- effective authoring and publishing software available. From the novice user to the advanced programmer, Lectora blends simplicity with extensibility providing a unique solution for a wide range of authoring and publishing needs.

SyberWorks Web Author

SyberWorks Web Author one of the fastest, easiest, and most effective Web-based training course authoring tool on the market today. With SyberWorks Web Author, you can create Web-based AICC/SCORM compliant training courses with audio, video, software demonstrations, and much more. You can quickly, easily, and inexpensively update your courses when new information is available, making it possible to tackle rapidly evolving information for even small audiences. Student comments are gathered at the end of each lesson along with ratings on key factors such as organization and presentation. This crucial feedback is reported in a variety of ways to enable the quality, relevance, and value of your e-Learning to increase dramatically over time.

Thesis Professional

Thesis is an e-learning application that creates and deploys SCORM 1.2 conformant, media rich learning content across any SCORM conformant learning management system. Thesis users can create SCORM conformant and ADL certified content with Word, PowerPoint, Excel, Visio, Producer 2003, and other web content tools like Flash, Dreamweaver, etc. Thesis allows the user to author in familiar tools and eliminate any lengthy development of the SCORM standards by reducing the conversion to a simple click to “Save as SCORM”. Other tools like LCMS, Authorware, Toolbook, etc. are sophisticated tools that are focused on a select group of developers. These tools also require training to be proficient on the application where any user of Thesis can be trained in 5 to 15 minutes.

courseGenie

CourseGenie is an application that allows you to author interactive eLearning from within Microsoft Word. It has platform independence, exporting to multiple VLE & LMS systems; standards compliance, with SCORM 1.2 and IMS support; and accessibility, providing an easy way to generate accessible content. Using courseGenie you can take course material in a Word document and efficiently transform it into a dynamic online course. From one Word document you can instantly generate a set of web pages, including navigation, interactive features and 15 different types of self test question.

OPEUS

OPEUS is a simple sustainable online webpage making tool that is as easy to operate as a word processor. OPEUS gives a school or other learning facility the opportunity to develop eportfolios - all authenicated by staff and online learning resources. OPEUS is web based and all technical support is included - enabling the technology to support sustainable learning development without the technical drawbacks of more complicated solutions.

E-Learning Course Development Kit

e-Learning Consulting announced the immediate availability of the e-Learning Course Development Kit, a authoring tool that enables HTML developers to create e-Learning Courses. The development kit has built-in navigation, bookmarking, scoring and other capabilities that every e-learning course needs. The e-Learning Course Development Kit supports SCORM, the standard way to communicate between a course and a Learning Management System.

Expert Author

Use Expert Author to quickly create Web-delivered, self-paced courseware where computer software is the subject matter. Courseware created with Expert Author utilizes a realistic simulation of the software being taught. The student learns in a safe, simulated environment without the fear of making a mistake.

EasyGenerator

EasyGenerator® Suite is a comprehensive e-learning suite that offers fast productivity while creating and providing e-learning solutions. The power of EasyGenerator® is that every subject matter expert (SMe) can start creating interactive training content immediately. No programming is needed. The extreme short learning curve, the speed at which e-learning content is created and the simplicity to keep it up-to-date are the main reasons why companies choose EasyGenerator®.

Kallidus Authoring ystem

Kallidus™Authoring System allows users to produce interactive learning content for web based and CD Rom distribution. It is simple to use and enables

organisation's own staff to create e-Learning lessons quickly and efficiently, without the need for programming skills. The system has been developed to industry standards, including AICC.

EasyProf

EasyProf® is a multimedia authoring tool designed to help experts in their field, with no programming skills, create engaging multimedia e-learning materials. With EasyProf®, authors, professors and trainers can create powerful Internet and CD training and easily track student's progress within the course.

Toolbook Instructor

ToolBook Instructor is a comprehensive desktop authoring solution designed for use by a broad spectrum of course developers and instructional designers to create standards-based content. With Instructor, you can easily create highly interactive content with a catalog of smart objects, including assessment and simulation support. Customized behavior can also easily be created using ToolBook's Actions Editor, Simulation Editor and extension capabilities.

LEARNERland

The Course Development Tool allows in-house creation of courses online via a browser. A course web-site and structure is automatically created on the learnerland server. Text, graphics and assessment content is input and uploaded into the course by the client administrator via the easy to use browser-based admin system. The Course Development Tool has integrated Media Library and Add Quiz systems.

Outstart Evolution

OutStart provides a complete solution to create, manage, and deliver e-learning content. This includes a rich authoring environment built on an object model that fully describes e-learning content, an enterprise-class repository that runs on commercially available RDBMSs and generators to dynamically deliver content to the Web, CD, print, presentation, wireless devices and a variety of file formats.

CourseBuilder for Dreamweaver

CourseBuilder is Macromedia's "powerful extension application to Dreamweaver for creating Web-based learning content and interactive Web pages.

Knowledge Mechanics Studio

Knowledge Mechanics Studio 3.1 represents the first comprehensive e-Learning tool set for client-specific content. It incorporates a knowledge repository for storage and deployment of knowledge objects. These knowledge objects can be assembled into multiple configurations to meet constantly changing user and organizational needs.

D3 E-learning management systems

D3.1 Existing tools

Blackboard Learning System -Academic Suite

Blackboard is a leading provider of enterprise software and services to the education industry. The Company's product line consists of five software applications bundled in two suites, the Blackboard Academic Suite TM and the Blackboard Commerce Suite TM. Blackboard's clients include colleges, universities, schools and other education providers, as well as textbook publishers and student-focused merchants that serve education providers and their students. Blackboard is headquarted in Washington, D.S., with offices and staff in North America, Europe and Asia. Enabling organisations to use the Internet as a powerful tool for teaching and learning, Blackboard offers a complete suite of enterprise software products and services that power e-Education programmes in institutions of higher learning, primary and secondary schools, as well as corporate and government organisations. Blackboard solutions deliver the promise of the Internet for online teaching and learning, campus communities, and integration of Web-enabled student services and back office systems Used daily by organisations dedicated to teaching and learning, the Blackboard Learning System provides an enterprise-critical online environment to complement and supplement the traditional classroom, pure distance learning, and blended learning programmes.

Breeze- Macromedia

Quickly and easily share online meetings, presentations and training courses over the Internet using the familiar PowerPoint application and the Macromedia Flash format .Also build a complete online training system with PowerPoint presentations that includes surveys, tracking, analysis, course administration, and content management.
Core Breeze Training Features

- **Course management.** Schedule courses, invite and register participants, track attendee statistics, and more.
- **Administration and reporting.** Generate detailed reports on courses, students, and test results and set -up automated certification criteria.

EasyProf -ITACA S.L.

ITACA provides complete e-learning solutions that enable organizations to access and distribute critical knowledge to anyone, anytime, anywhere. ITACA has developed EasyProf, a state-of-the-art course authoring software that combines a solid instructional design, logical action creation, powerful multimedia capabilities with a feature-rich student learning interface. EasyProf allows authors without programming skills to effortlessly produce all kinds of web-based training

materials - from the simplest of content to the richest, most sophisticated multimedia courses, tutorials and presentations.

WebCT Campus Edition -WebCT

WebCT Campus Edition is a global market-leading Course Management System that enables the efficient delivery of high quality online education. With a complete set of easy-to-use teaching and learning tools for course development, course delivery, and course management, WebCT Campus Edition provides the best system for student learning and the most efficient solution for faculty. WebCT Inc. is the world's leading provider of e-learning systems for higher education institutions. Headquartered in Lynnfield, Massachusett, and with offices worldwide, WebCT provides a highly flexible e-learning enviroment that empowers institutions across the educational spectrum with the ability to achieve their unique objectives. Thousands of institutions in more than 70 countries are using WebCT's e-learning solutions to expand the boundaries of teaching and learning. The only e-learning platform specifically built to support mission-critical e-learning deployments. WebCT Vista can be extensively customized and flexibly deployed to meet diverse needs. In addition to an unparalleled suite of teaching and learning tools, WebCT Vista provides content management options that make it easy to efficiently distribute, share, and reuse content.

WBTServer4 -4system

4system took the significant attention to develop educational standards, especially for ingenious training-methods. The goal is the development of efficient teaching methods. Four system premeditated actions lead the clients to the intended goal, what is the passing a knowledge on. It creates individual solutions, where the knowledge is adapted to requirements given by the client and even for optimal trainings to motivate employees. 4system know - how is available for companies in more than 100 courses. So we have acquainted ourselves with -almost every technology of the e- Learning creation and optimized our training platforms WBTServer to be more flexible to client's needs.

Lotus Learning Space

LearningSpace is a framework for managing and delivering online courses. It provides a Web interface and a back-end database for organizing, delivering and tracking online courses that are developed separately. Within the framework provided by LearningSpace, is a third-party relational database management system used for storing information about courses users and student progress. This information is shared with LearningSpace on demand. The framework also contains a series of content files, which contain information to be presented within one or more courses. Course content is developed outside of LearningSpace using third-party products (such as Macromedia Dreamweaver) and is then accessed from within LearningSpace as course activities.

LearningSpace Core stores the structure of each course, and contains the URLs referencing activities within the course. Assessments, and the questions on

which they are based, are stored and managed in Core, where course developers can establish the scoring for each assessment and track students' progress. Core additionally provides an interface for maintaining user information, such as passwords and permissions, and for modifying the structure of the relational database.

Every LearningSpace installation uses at least one Core module, which may be on its own server or may share a machine with other applications. You may also use multiple Core servers, which lets you balance user load, and if necessary, distribute the servers geographically.

E Usability and dance e-learning

From the point of view of 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, De Marsico et al., 2005).

Norman asserts that a formative product should (Norman, 1993):

− be interactive and provide feedback

− have specific goals

− motivate, communicating a continuous sensation of challenge

− provide suitable tools

− avoid distractions and factors of nuisance interrupting the learning stream.

Moreover, it should be pedagogically suitable, though attractive and engaging. This means that the tools as well as the kind of interaction provided must be aimed at supporting the learner in the specific learning tasks and must be fitted on them, rather than being a mere exercise of (advanced) technology. They must be designed based on processes and activities suggested by well-established pedagogical methodologies and outcomes. For example, the use of multimedia must be carefully planned in order to avoid a counterproductive overload of sensory channels. Using new technologies does not mean to reject traditional and successful teaching strategies, e.g. role-playing, goal-based learning, practice dancing, improvisation. Thus, a traditional dance e-learning system should allow integrating such strategies. Looking for a set of features specific for e-learning system interfaces, we can assert that they have to give a

comprehensive idea of content organization and of system functionalities, simple and efficient navigation, advanced Personalization of contents, clear exit.

E1 Evaluating traditional dance e-learning

Usability evaluation is an important phase of the development process. It takes place not only when the production is completed but also before and during the development of the e-learning system. Depending of the development phase that the evaluation takes place, it is referred as **front-end**, **formative** or **summative**. Front-end evaluation mainly tests whether the user requirements for the application truly reflect the users' needs; it can help to avoid misunderstandings in the specifications early on and make the appropriate changes with low cost. Formative is the evaluation that is conducted throughout the development phase: analysis, design, and programming. It may include the assistance of a sample user group but usually, the formative evaluation group consists of experts within the development team. Finally, summative evaluation concerns the evaluation of the final product, normally by its actual users. Results of the summative evaluation usually lead to the development of a revised version of the application.

Various techniques have been developed for the evaluation process. One way of categorizing them is in analytic, experimental and inquiry methods. The techniques in the first category are conducted by the developers at the computer laboratories and among them are: keystrokes analysis, cognitive walkthrough and heuristic evaluation. Experimental methods are also done in the lab but require the participation of a group of users, and include performance measurement, thinking aloud protocol. The last ones take are also conducted with the aid of users but away from the lab. They can be user interviews, questionnaires, group evaluation or field observation.

E1.1. Evaluation criteria

Evaluation of an online course on traditional dance may take into consideration a number of criteria that cover general both technical and pedagogical aspect.

In particular, technical evaluation examines

- the ease of navigation,
- the availability of record keeping,
- the presentation of information and functionalities in a stimulus and clear manner, and
- the quality of the lesson (in visuals, sound, and music)

The technical information about the application can be another subject of evaluation. Hardware requirements, instructions, support and technical guide, are some of the necessary issues that should be evaluated.

Furthermore, it is important to know whether the teacher finds the application a useful tool that complements or enhances traditional teaching. A well designed content and appropriate language for the target group is a much greater issue here than in other technological products.

Concerning the content, some evaluation criteria are:

- appropriateness (of vocabulary, concepts, and interaction),
- accuracy (objective and up-to-date information), and
- scope (interesting way of cover the subjects, logical progression and variety of activities).

E2. Evaluation questionnaires

Evaluation questionnaires are among the most popular evaluation methods due to the fact that the answers obtained can be easily transformed into quantitative results and provide statistical information regarding the effectiveness of a system.

In order to obtain objective results questionnaires should be distributed to a large number of users. In addition, the clarity in the wording of the questions is a very important aspect that should be considered when designing a questionnaire, since users normally fill in questionnaires in their own time without being able to ask for further clarifications. Therefore, even if the same questions are addressed to teachers and students, they may be differently expressed in order to be understood by both user groups.

The following sections E2.1 and E2.2 present two sample questionnaires targeted to the evaluation of traditional dance e-learning systems. The first is addressed to teachers and the other is addressed to students.

E2.1 Questionnaire for teachers

Questionnaire for teachers

School .....

Specialty .....

Class in which you have used the application .....

Level in which you teach _____

Please answer the following questions, adding comments, where appropriate, in the space provided.

Questions:

A. General

1. Which WebDANCE thematic units have you completed? (Fill in all that apply at the space provided)

   .....

2. Does the application contribute to an improvement of teaching about traditional dances?
   ☐ YES ☐ NO

   .....

3. Is the application appropriate for use in the classroom with the participation of all students in your presence?
   ☐ YES ☐ NO

   .....

4. Does the application encourage students to participate more in class?
   ☐ YES ☐ NO

   .....

5. Does the application fit in the Curriculum?
   ☐ YES ☐ NO

   .....

6. Does the application facilitate learning in other parts of the Curriculum (e.g., history, music lessons, cross cultural education, etc.)
   ☐ YES ☐ NO

   If so, in which parts?

   .....

B. Content and presentation

7. Which of the application's thematic units did you find more useful for teaching traditional dances? (Fill in all that apply at the space provided)

   .....

8. Does the application have scientific inaccuracies?
   ☐ YES ☐ NO

   If so, state the inaccuracies you have detected

   .....

   .....

   .....

9. Do you believe that the thematic units of the application fully describe traditional dance?
☐ YES ☐ NO

……

10. Does the content of the application relate to the students' experiences?
☐ YES ☐ NO

……

11. The way the content is approached, does it encourage students' creativity and imagination?
☐ YES ☐ NO

……

12. Is the application appropriate to the students' age, with respect to:

• The tasks involved	☐ YES	☐ NO
• The level of difficulty/complexity	☐ YES	☐ NO
• The amount of the information presented	☐ YES	☐ NO
• The speed of moving from one topic to another	☐ YES	☐ NO

……

13. Is the content of the application well presented?
☐ YES ☐ NO

……

14. Is the content of the application well organized?
☐ YES ☐ NO

……

15. Is there enough variety in the way of presenting the content of the application?
☐ YES ☐ NO

……

16. Choose one of the following statements:
☐ Each thematic unit may be taught independently.
☐ There is a strong dependency between thematic units so that they cannot be taught separately.

……

C. Pedagogical aspects

17. Does the application assist the achievement of learning goals?
☐ YES ☐ NO

……

18. In which order did you or would you teach the thematic units of the application? (Please order the existing units)

……

19. In average, how long did it take you to cover:
a. each thematic unit?
…..……..……..……
b. all the thematic units?
……..…..……..……

20. Do you agree with the way you can progress inside one thematic unit (sequential progression from the first to the last screen at least once before the user is allowed to move to whichever screen he/she chooses)?
☐ YES ☐ NO

……

21. Is there a balance between intellectual tasks (see, listen, read) and other interactive activities (quizzes, puzzle, other games)?
☐ YES ☐ NO

……

22. Did you do any of the extended activities suggested in the thematic units? (Fill in all that apply at the space provided)

……

Which, in your opinion, was the most successful?

……

23. Does the application encourage learning which is
☐ active

☐ collaborative

☐ exploratory

☐ creative

☐ other Please, explain:

……

D. User interface

24. Is it easy for you and/or your students to learn how to use the application?
☐ YES ☐ NO

……

25. Which of the application's interactive activities do you find useful? (Fill in all that apply at the space provided)

……

26. Is the text well written and comprehensible?
☐ YES ☐ NO

……

27. Is the text readable (with respect to font type, size and colour, etc.)?
☐ YES ☐ NO

……

28. Are the instructions and icons (verbal or signs/ icons) easy to comprehend? (e.g. Is it obvious when the user has to click on a symbol in order to proceed, when to reveal hidden information, etc.)
☐ YES ☐ NO

Please mention any difficulties you have spotted

……..……..

……

29. Does the amount of information in each screen put a strain on students?
☐ YES ☐ NO

……

30. Is it is easy for you and/or your students to find your way around in the application? (e.g. move forwards and backwards, change lessons, etc)
☐ YES ☐ NO

……

E. Use of multimedia (photos/diagrams, sound/music, videos)

32. Does the use of multimedia assist the achievement of learning goals?
☐ YES ☐ NO

……

33. Does the use of multimedia contribute towards the comprehension of the content?
☐ YES ☐ NO

……

34. Does the use of multimedia complement the presentation of the content?
☐ YES ☐ NO

……

35. Which of the following do you think are most useful for teaching dance? (Tick all that apply)
☐ photos/diagrams

☐ sounds/music

☐ videos

……

36. Is the quality of the photos/diagrams (resolution, brightness, colour, size) acceptable?
☐ YES ☐ NO

……

37. Is the quality of sound/music acceptable?
☐ YES ☐ NO

……

38. Is the quality of the videos acceptable, with respect to:

• sound	☐ YES	☐ NO
• image	☐ YES	☐ NO
• window size	☐ YES	☐ NO
• causing delay or freezing of the application	☐ YES	☐ NO

……

39. Is the handling (start, restart, stop, pause, etc.) of multimedia simple?
☐ YES ☐ NO

……

40. Is response time acceptable, with respect to:

• Presenting text and images	☐ YES	☐ NO
• Running sound/music	☐ YES	☐ NO
• Running videos	☐ YES	☐ NO

……

F. The 3D animation (In case 3D animation is included)

41. Does the use of the 3D animation assist the achievement of learning goals?
☐ YES ☐ NO

……

42. Does the use of the 3D animation contribute towards the comprehension of the content?
☐ YES ☐ NO

……

43. Does the use of the 3D animation complement the presentation of the content?
☐ YES ☐ NO

……

44. Which of the following do you find most useful for teaching dance? (Tick all that apply)
- ☐ Normal speed
- ☐ Slow motion
- ☐ Fast forward
- ☐ Stop and start
- ☐ Other

……

46. Are there any additional functions you would like to see in the 3D animation (e.g., focus, orbit camera etc)?

☐ YES ☐ NO

……

47. Is it easy to use the 3D animation, with respect to:?

• Normal speed	☐ YES	☐ NO
• Slow motion	☐ YES	☐ NO
• Fast forward	☐ YES	☐ NO
• Stop and start	☐ YES	☐ NO
• Other	☐ YES	☐ NO

……

48. Is the quality of the 3D animation acceptable, with respect to:

• sound	☐ YES	☐ NO
• image	☐ YES	☐ NO
• window size	☐ YES	☐ NO
• causing delay or freezing of the application	☐ YES	☐ NO

……

49. Are there any suggestions you would like to make regarding the overall quality of the 3D animation?

☐ YES ☐ NO

……

Please add below any other comments you may have regarding the application in general

……

……

……

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……

……

Thank you for your time

E2.2 Questionnaire for students

Questionnaire for students

School .....
Level .....
Class .....

Please answer the following questions, adding comments, where appropriate, in the space provided.

Questions:

A. General

1. Which lessons have you completed? (Fill in all that apply at the space provided)

   .....

2. Do you feel that after completing the lessons you would like to learn more about traditional dance?
   ☐ YES ☐ NO

   .....

3. Do you think that lessons encourage you to participate more in class?
   ☐ YES ☐ NO

   .....

4. Do you think that some of the things in the lessons will be useful to you in other classes?
   ☐ YES ☐ NO

   If so, in which classes?

   .....

5. Have you used the application on your own (e.g., in school without the presence of the teacher, at home etc)?
   ☐ YES ☐ NO

   .....

6. Would you prefer using the application on your own?
   ☐ YES ☐ NO

   .....

B. Content

7. Do you think that the lessons are interesting?
   ☐ YES ☐ NO

   .....

8. Which lessons have you found most interesting? (Tick all that apply)
   ☐ General Info
   ☐ Activity
   ☐ Costumes
   ☐ Roles of participants
   ☐ Event
   ☐ Tradition

   .....

9. Have you done any of the tasks suggested in the lessons? (Fill in all that apply at the space provided)

……

10. Do you find the information presented too difficult?
☐ YES ☐ NO

……

11. Do the things that you learn about in the application remind you of other experiences you have had (e.g. participating in festivals, weddings, celebrations, etc.)?
☐ YES ☐ NO

……

C. Presentation

12. Do the lessons look good?
☐ YES ☐ NO

……

13. Are the lessons well organized?
☐ YES ☐ NO

……

14. Is there enough variety in the way that the information of lessons is presented?
☐ YES ☐ NO

……

15. Do you think that the information presented is too much?
☐ YES ☐ NO

……

16. Do you think that the information is presented too quickly?
☐ YES ☐ NO

……

D. User interface

17. Is it easy to learn how to use the applicaition?
☐ YES ☐ NO

……

18. Which of the interactive tasks have you enjoyed most? (Fill in all that apply at the space provided)

……

19. Is it easy to read the text (with respect to font type, size and colour etc)?
☐ YES ☐ NO

……

20. Are the instructions and icons easy to understand? (e.g. Is it obvious when you have to click on an icon in order to proceed, when to reveal hidden information, etc.)
☐ YES ☐ NO

Please mention any difficulties you have spotted

……

21. Is it easy to find your way around in the application? (e.g. move forwards and backwards, change lessons, etc)
☐ YES ☐ NO

Please mention any difficulties you have spotted

……

E. Use of multimedia (photos/diagrams, sound/music, videos)

23. Do you find the use of multimedia interesting?
☐ YES ☐ NO

……

24. Which of the following have found most interesting? (Tick all that apply)
☐ photos/diagrams

☐ sounds/music

☐ videos

……

25. Is the quality of the photos/diagrams (resolution, brightness, colour, size) good?
☐ YES ☐ NO

……

26. Is the quality of sound/music used in the application good?
☐ YES ☐ NO

……

27. Is the quality of the videos good, with respect to:

• sound	☐ YES	☐ NO
• image	☐ YES	☐ NO
• window size	☐ YES	☐ NO
• causing delay or freezing of the system	☐ YES	☐ NO

……

28. Does it take a long time for the programme to:

• Presenting text and images	☐ YES	☐ NO
• Running sound/music	☐ YES	☐ NO
• Running videos	☐ YES	☐ NO

……

F. Use of 3D animated figure (In case 3D animation was included)

29. Do you find the 3D animated figure enjoyable?
☐ YES ☐ NO

……

30. Which of the following have you found most enjoyable? (Tick all that apply)
☐ Normal speed
☐ Slow motion
☐ Fast forward
☐ Stop and start
☐ Other

……

31. Are there any other functions you would like included in the 3D animation (e.g., focus, orbit camera, etc)?
☐ YES ☐ NO

……

32. Is it easy to use the 3D animated figure, with respect to

• Normal speed	☐ YES	☐ NO
• Slow motion	☐ YES	☐ NO
• Fast forward	☐ YES	☐ NO
• Stop and start	☐ YES	☐ NO
• Other	☐ YES	☐ NO

……

33. Is the quality of the 3D animated figure good, with respect to:

• the figure itself	☐ YES	☐ NO
• sound	☐ YES	☐ NO
• image	☐ YES	☐ NO
• window size	☐ YES	☐ NO
• causing delay or freezing of the system	☐ YES	☐ NO

……

34. Are there any other comments you would like to make about the quality of the 3D animation?
☐ YES ☐ NO

……

Please add below any other comments you want to make about the application in general

……

……

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……

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……

Thank you for your time

F Conclusions

Dance education, and teaching of traditional dances in particular, forms part of most the school curricula in many European countries often under the remit of physical education. Traditional dance has relied heavily on face-to-face kinaesthetic learning as the main means of passing the associated knowledge from one generation to another. However, this type of learning does not allow transferability of knowledge between communities and is particularly sensitive to rapid cultural changes. Existing teaching aids are limited to books and video recordings, which despite their wide use, provide only a fragmented picture of the dance experience (e.g., either focusing on the cultural or the movement aspects of the dance). Even more limited are the existing e-learning applications for traditional dance.

This is partly due to the fact that dance compared to other less interactive subjects (physics, maths, or history) faces more difficulties in creating teaching scenarios. When teaching traditional dances, emphasis is being given on movement rather than in the development of cognitive skills posing different learning requirements.

To this end 3D animation technologies can assist the visualization and analysis of dance movement. Among the available technologies, motion capture and 3D animation techniques offer a solution for a more realistic and interactive presentation of the three dimensional dancer's movement.

However, traditional dance is not just as a set of steps/movements but also carries social meaning. For example the sex and age of the dancers as well as their role may determine the type of movement used within the dance. Different types of music inspire slightly or very different types of movement. Similarly costumes and props may be an important component of the movement of the dance either as aspects that restrict or further articulate movement. Therefore, a traditional dance curriculum should cover a number of interrelated views which can be summarised under the broad terms dance activity, dance event and dance tradition.

Finally, traditional dance is a subject that requires dynamic social involvement. Our experience has shown that practical exercise and teamwork is very important in dance education. To this end, any teaching application should provide a balanced set of cognitive and interactive tasks to ensure the above.

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