

Towards Multimedia Based Training Systems

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Abstract

Training has always played an important part in human learning. During the last few years new trends of training have been introduced due to technological developments. Computer based training (CBT), like other forms of individualised learning, is a manifestation of training technology. Today's technological advances have moved CBT into new dimensions. The introduction of multimedia in CBT makes it even more beneficial and interesting. The benefits of multimedia based training (MBT) over conventional training are apparent. The paper looks at the changes which have taken place in training environments through the use of CBT and, in particular, it concentrates on the introduction of multimedia into CBT. This is achieved through the discussion pertaining to the development of WORLDRIDE, a training system which helps its user to explore countries and learn about their culture and civilisation.

Keywords

Computer based training, multimedia based training.

1 INTRODUCTION

The development of one-to-one learning environments facilitated by CBT challenges our traditional methods of training. The expression 'computer based training' has been introduced for suggesting to us a new perception of learning using the computer both as a teaching and administrative tool. A CBT course is organised as a structure of interlinked information chunks which can be preplanned for, and accessed by, learners according to their learning style and needs. Well designed CBT courses can provide a trainer with a sophisticated interactive environment that responds with appropriate feedback, remediation or instruction according to a student's ability, interest, learning pace and need for detail or challenge. CBT was first employed by organisations to provide standardised, high volume, lower cost training as a replacement for expensive traditional methods used the time (Angelides and Stanley, 1995). The first steps of

CBT into the commercial world did not have the expected success due to the cost of the technology involved, the lack of widespread authoring skills and often the uncertain economic benefits. Private and public organisations had trouble in beginning to appreciate the value of adequate, consistent and long-term investment in training. Nowadays organisations realise that in order to survive and prosper in global competitive environments they have to adapt to political, economical, social and technological changes. The success they achieve in managing such adaptations will be decided partly by how well they use and develop the people who work for them. Recent technological advances moved CBT into new dimensions where it can be seriously considered as an alternative training method.

The contention of this paper is not to present CBT as an invariably superior to the more traditional training methods but nevertheless inferior when one considers the benefits that multimedia would add to it. Computer based training is not a panacea. It is quite inappropriate in some instances and out of question with regards to the cost in other. CBT has a number of advantages over other traditional training methods. Trainees need not have the same background or previous level of knowledge and can work at their own pace without any travel or other direct expenses being incurred while being trained. All trainees receive the same standard of training which is not influenced by exogenous factors, like insufficient teacher knowledge of the subject area and large number of students in one classroom. Trainees have their privacy and, thus, there will be no 'stigma' in case of errors or slower understanding of the subject and, where necessary, quick and accurate feedback is provided by the system. A high number of people can be trained without the need for a high number of trainers.

A successful CBT course like with any training course has to keep the student's interest by providing information in an interesting way, by providing real-time interaction and by taking the right action. Nevertheless, one cannot easily quantify any of these benefits as most of them are 'soft'. The introduction of multimedia in CBT makes it even more riveting. Multimedia offer new perceptions to learning which promises to increase our ability to process information for training.

The purpose of this paper is to introduce multimedia in CBT and demonstrate the applicability of multimedia based training (MBT) through the presentation of *WORLDRIDE*, an MBT system designed to assist students who want to learn more about other countries' culture and civilisation by providing guidance as well as exercises to them. *WORLDRIDE* is developed using the Multimedia Toolbook's CBT edition. *WORLDRIDE* is developed as a collection of books that integrate the stored information. The user chooses its path of learning through these books. The long term goal of *WORLDRIDE* is to contribute towards a multimedia based learning environment which offers the user an interesting, flexible, and fascinating experience.

2 MULTIMEDIA BASED TRAINING (MBT)

Two instructional media with very different roles are educational television broadcasts (ETB) and CBT. ETB are holistic in their approach to training with a beginning, an

end and a continuous linear flow. As self sufficient units they provide a coherent overview by presenting knowledge from various viewpoints, by extending current experiences and encouraging different user perspectives. However, they lack any degree of student control or feedback and are wide open to interpretation and generalisation depending on the viewer's point of view. On the other hand, CBT offers a level of interaction unavailable with ETB. CBT can provide a 'thinking tool' and when used for a specific educational aim CBT provides an environment for the development and exploitation of understanding and thereby the practice of skills.

Although CBT present facts and figures and allow a vast storage of information and a flexible retrieval system, the knowledge it presents is detached from reality and often raises considerable demands on the learner in order to be able to assess and apply the knowledge in relation to past experience. The two media together however, could be seen to be complementary with each one making its own unique contribution to a learning environment. ETB and CBT can now be designed and developed together in a single environment that meets common goals: MBT. Multimedia are a crossbreed of computing, information systems, and telecommunications. With the evolution of Multimedia, PCs changed roles from being computation-intensive to communication-intensive that use in addition to text, graphics and animation media like audio and video (Angelides and Dustdar, 1996).

MBT combines the benefits of traditional CBT with those of interactive audio and video. CBT's interactivity combined with multimedia's information richness creates an information rich training content that can be adjusted to each individual trainee. Studies quantifying the results of MBT show that learners enjoy the material, achieve shorter learning times and much improved retention rates. The reasons for these are largely psychological: people learn better by 'seeing', 'hearing' and 'doing'! MBT is becoming popular in classroom learning because of its ability to demonstrate the techniques and skills to be learned and because it enables the learner to practice through ingenious real-image simulations. Even 'soft' communications or social skills can be effectively learned this way, as the learner visualises human interactions through video. MBT does not attempt to create legions of redundant trainers. It is a productivity tool for training able to deliver the foundations of knowledge and skills thus liberating the trainer to educate in more interesting, advanced or abstract areas.

3 TOWARDS A MULTIMEDIA BASED TRAINING ARCHITECTURE

The proposed MBT architecture has been used to develop **WORLDRIDE**. **WORLDRIDE** is proved to be an efficient means of obtaining knowledge for various countries, an acceptable compensation for 'gaps' arising with traditional classroom education, an introduction to new technology and to the latest advanced methods of training and an interesting experience.

The **Domain Knowledge** includes all geographical knowledge and solutions to problems given out to students. These are stored as multimedia objects, i.e. still and

full-motion video, audio, animation text and graphics. All objects are linked to those that either they are related to or 'I like these'. Users may browse through a series of related or 'I like these' multimedia objects especially still and full-motion video images. Just as images bring text to life in a training environment audio adds depth. The student may choose to listen to music or 'hear' text rather than read it, or hear people talking in a video clip of their own choice. The use of audio in CBT is far more comprehensive and uses speech for conveying information as alternative to text.

Operations Management is responsible for keeping a record on the user's progress and thus for making decisions regarding whether a student ought to continue interaction with the current course or start a new one. It is also responsible for answering where possible student queries. Actions to be taken as a result of making a decision are communicated to the Control System which carries those out.

A **Multimedia User Interface** is used to support the presentation of the various objects included in the Domain Knowledge and also to provide the user-learner with a high quality interface and thereby the opportunity of a fascinating interaction.

The **Teaching Strategy** adopted is that of providing tasks for the students and evaluating their responses in order to diagnose any mistakes in their answer, thereby providing appropriate feedback, monitor their progress and help the students navigate through WORLDRIDE. To the end-user WORLDRIDE is a collection of interactive electronic books which not only bring images and conversations to life but also allow various pathways through their information 'landscapes'. It uses audio, video, text, animation, and graphics to teach about a number of different countries. It has two components: a **textbook** and a **tutorial**.

The **Textbook** is an encyclopaedia with many pages of written or spoken text, graphs, flags world and country maps and video of the history, agriculture, traditional music industry, main economical resources, fauna, cities, and other areas of interest of many countries. The **Tutorial** consists of many pages and questions based on the material in the textbook. A variation in the style of questions makes tutorials more interesting and therefore students do not get easily bored over the same type of interaction: alternative-response questions require students to choose the correct response from a list and constructed-response questions require students to produce rather than select a response. The questions serve many purposes: to keep students interested in the lesson, compel students to practice, and assess how well they remember and understand information. The system records a score for each question answered by a student which the teacher can use to decide on the best course of action to be taken for a student. The teacher as a system administrator creates, updates and manages the courses, assigns courses to students, manages the system users, views student transcripts and looks at their score records.

4 CONCLUDING DISCUSSION

Training helps employees understand business objectives, promotes employee motivation and maintains morale. The need for different training environments is vital within education and as traditional training approaches become more inept due to the speed and size of training requirements CBT increasingly becomes a viable option. A successful training method is one that meets the user's needs and requirements. The flexibility provided by MBT justifies it as an effective training method which has certain advantages over traditional ones. However, MBT is not a panacea to all training problems. Its suitability depends on factors like the nature of subject matter, the age of trainees, and the educational goals to be achieved.

WORLDRIDE in an experimental MBT prototype and as such succumbs to many shortcomings which provide necessary ground for future research and development to enhance both the system and the new ground that is breaking. Currently, the system only supports discovery learning. One improvement to the system would be to provide a variety of learning strategies and give the user the opportunity to choose from among these. In addition, the student neither can pose arbitrary questions to WORLDRIDE about the subject matter, nor can it ask for explanation about a problem solution. If WORLDRIDE is equipped with such capabilities then the learning opportunities offered by the system will be greatly improved.

The principles of training design will remain unchanged. The methods of delivering training will alter with the introduction of multimedia. Multimedia is ideal for CBT as it saves trainee's time and improves the training environment quality. CBT will be so cheap that the poorest person in the poorest country will be able to afford it, thereby making CBT an essential societal training method.

5 REFERENCES

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