

Enhancing the Quality of E-learning Systems via Multimedia Learning Tools

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Abstract

This paper discusses how the multimedia learning tools can enhance the quality of e-learning systems. The construction and use of multimedia learning tools is a relatively new pedagogy, where multimedia learning tools are a learning style. Keefe defined learning style as being characteristic of the cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Learning style also represents both inherited characteristics and environmental influences. There are many types of learning styles; Visual Learners, learn through seeing, Auditory Learners, learn through listening and Tactile/Kinaesthetic Learners, Learn through, moving, doing and touching. Multimedia learning tools contain three types of learning styles. These three types are effective in the classical ways of learning. The most important question in this paper is; how can multimedia learning tools improve the quality of e-learning? To get the answer of this question, we must find out what are the requirement of e-learning quality and are the multimedia learning tools meet these requirement and what is the effect they can make for quality. It is hard to assure the quality of e-learning, since it differs from the old fashion of learning.

Keywords: multimedia tools, hyper media, hyper text, authoring tools, e-learning

1. Introduction

A critical question is can we enhance the learner satisfaction on an E-Learning system or his first impression will be negative by using multimedia technology. The E-Learning systems base their functionality on a simple browsing mechanism accompanied with a section of web

links and a few on-line quizzes. Today multimedia might be defined as the seamless digital integration of text, graphics, animation, audio, still images and motion video in a way that provides individual users with high levels of control and interaction. The evolution of Multimedia is a story of the emergence and convergence of these technologies. One of the most significant developments in computing technology over the past few years is the emergence of multimedia. Glossy multimedia applications are shown all over the place and on a wide range of different platforms [1]. The first attempts to use computers in education had only a simple navigation implemented (see figure 1). Their teaching path was mainly fixed and linear. Hypermedia is the most recent way of using computers in education and its main criterion is the possibility to navigate free among the teaching material. Hypermedia systems have the power to build a framework for a modern constructivist E- learning environment.

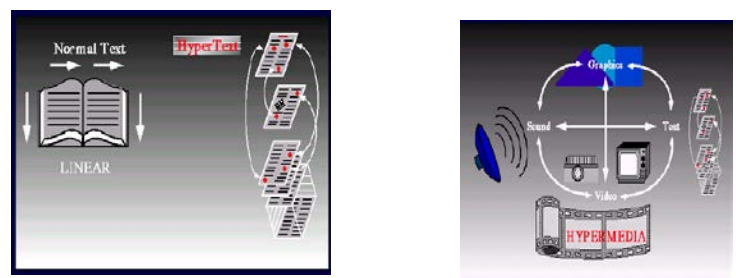


Figure 1: Hypertext and Hyper Media

The value of a hypermedia learning environment depends, besides navigation properties, on the value of its single components, which in turn depend on the content and its instructional presentation.

A major issue in the use of multimedia technology is to avoid replicating the problem which has persisted in much of the history of education, namely attention focused on presenting information rather than on understanding. One means of assisting student understanding is to design multimedia applications which reflect the characteristics of natural human learning [2].

2. E-learning Systems Quality

Quality is not just about zero defects; improving the performance and style of an end product are also important factors [3]. Garvin [4] states the role of quality personnel:

“Today’s quality professionals bear little resemblance to their turn of the century predecessors. They are managers, not inspectors; planners, not controllers; sensitive to markets as well as to manufacturing.”

The most important criteria for evaluating quality in E-Learning are in order of priority:

- Functions technically without problems across all users
 - Has clearly explicit pedagogical design principles appropriate to learner type, needs and context
 - Subject content is state of the art and maintained up to date
 - Has a high level of interactivity
- Quality in e-learning is one of the central challenges for theory and practice if e-learning is to become as important as traditional qualification measures in the future [5].

There are three different dimensions for quality may be mention here (see figure 2): different meanings of quality, different quality perspectives and different levels of the educational process to which quality can apply [6].

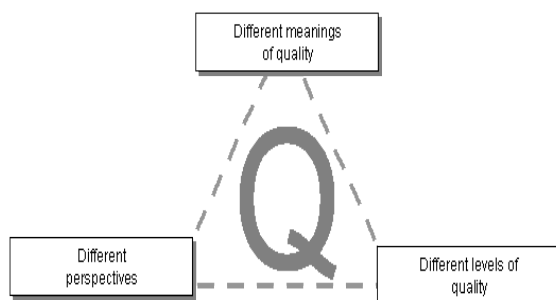


Figure 2: Multiple dimensions of the quality concept in e-learning

Quality is described as a concept rather than a technique, so its implementation is very much dependent on the type of organization or process at hand [7]. Identifying processes is an important step toward improving them and predicting the consequences of changes; process maps should consider all aspects of the service including suppliers, clients, design, production, and delivery [8]. According to Deming[9], some 94% of quality problems result from a faulty system.

Quality is made up of many elements. For e-Learning products, the following is suggested as quality criteria (based on Garvin [10]):

- **Performance** – the finished product should operate in an effective way, as determined by the end-user.
- **Features** – the ‘bells and whistles’ incorporated into the finished product should be appropriate, and not detract from the overall objectives of the project.
- **Reliability** – the finished product should not be subject to malfunction.
- **Conformance** – the finished product should comply with industry standards, using standard technologies (though those technologies can be pushed to their utmost) and reflect established education theory.
- **Durability** – the finished product should be relevant and either timeless (in the case of teaching established principles) or easily updated.
- **Serviceability** – it should be easy to repair or adjust the finished product as required.
- **Aesthetics** – the overall ‘feel’ of the finished product should be professional and user-friendly.
- **Perceived Quality** – the finished product should enhance the reputation of product as a quality e-Learning provider.

3. How Multimedia learning tools Can Improve Education

The following are some of the properties of multimedia learning tools which can improve educational outcomes:

- Enable students to represent information using several different media
- Hypermedia links allow students to organize information in many meaningful ways Include a wide variety of activities and skills which groups can work on effectively over an extended timeframe
- Involve a substantial amount of work
- Involve open-ended assignments
- Involve theme-based activities
- Draw knowledge and experiences from a wide variety of sources

- Involve interdisciplinary activities
- Are a way to achieve high self-esteem
- Learners become more self-directed
- Students learn to think effectively, practice problem-solving and decision-making
- Requires and rewards good planning and execution skills
- Students are motivated to create a quality product because a wider audience may view it
- Multimedia skills will be useful for students in their adult lives

4. Multimedia and E-learning Systems

A wide range of individual educational software employing multimedia is available on CD-ROM. One of the chief advantages of such multimedia applications is that the sequence of material presented is dependent upon the student's responses and requests. Multimedia is also used in the classroom to enhance the educational experience and augment the teacher's work [11]. Multimedia for education has begun to employ servers and networks to provide for larger quantities of information and the ability to change it frequently.

The goal of the educator is to facilitate learning - to help the student gain a body of knowledge, acquire specific skills and function successfully in society. But one of the greatest challenges to educators is the diversity of students; especially in the different ways they learn. Some students learn better through association, others by experimentation, some are more visually oriented, others are more auditory.

5. Multimedia Modules in E-learning

The value of a hypermedia learning environment depends, besides navigation properties, on the value of its single components, which in turn depend on the content and its instructional presentation. This straightforward statement points out the requirement of answers about the following two questions:

- What is valuable content?
- What is a valuable instructional design?

The question about the value of the content cannot be answered in general. Content developers have to adopt the content for each E-Learning tool separately as it has to match the necessities of the user in focus. Too simple content as well as too complicated information does not facilitate learning [12].

In order to evaluate the value of the instructional design experimental settings are necessary which Investigate and compare the effectiveness of special aspects under controlled and constant circumstances. Two drawbacks have to be taken into account for evaluation studies [13]:

- Artificial experimental settings might lead to artificial results which cannot be transferred into the Real world
- The number of investigated variables in these studies has to be very restricted because otherwise Statistical analyses become impossible since the number of test persons is a limited factor.

Schulmeister [13] came to the conclusion that, due to the large amount of relevant variables, a serious experimental design cannot be done. However, even if it is problematic, experimental studies for the evaluation of the impact of important factors in E-Learning software tools are necessary and seem to be possible if one concentrates on relevant variables which have to be selected on a theoretical basis [14]. A theory of multimedia learning provides researchers with suitable predictions.

Support for computer-based multimedia applications develops from cognitive theories. Especially the cognitive processing of pictorial information in acquiring knowledge is one of the major topics in the present discussion about learning with multimedia [15]. Mayer and his colleagues have established a cognitive theory of multimedia learning that seems to be able to serve as a guideline for the research of an enhancement in effectiveness in multimedia modules.

In practice, costs for production of multimedia components are important. Therefore, efficiency is of greater relevance than effectiveness because (unlike effectiveness) it takes into account the bear of costs. The additional expenditure for the creation of computer-animations in E-Learning environments instead of still pictures has to be justified by a better learning outcome [16]. Especially the development of high-quality three-dimensional computer-animations for their use in multimedia E-Learning environments is doubted by Kerres[16].

6. Multimedia as a Courseware

Multimedia is a powerful tool for making presentations, also multimedia offers unique advantages in the field of education. For instance, text alone simply does not allow students to get a feel. Multimedia enables us to provide a way by which learners can experience their subject in a vicarious manner. The key to providing this experience is having simultaneous graphic, video and audio, rather than in a sequential manner. The appeal of multimedia learning is best illustrated by the popularity of the video games currently available in the market.

These are multimedia programmers combining text, audio, video, and animated graphics in an easy-to-use fashion. Moreover, under conditions of chronic under-funding, multimedia can provide an enhanced or augmented learning experience at a low cost per unit. It is here that the

power of multimedia can be unleashed to provide long-term benefit to all. Multimedia enables learning through exploration, discovery, and experience.

In the traditional information communication process, the teacher is the source of the knowledge and presents the knowledge to the students, who are in turn, passive receivers of the information. With multimedia, the communication of the information can be done in a more effective manner and it can be an effective instructional medium for delivering educational information. This is because it enables the teacher to represent the information in various media, i.e., via sound, text, animation, video and images. With multimedia, the teacher is now the director of the knowledge and can use the various combinations of media elements to create interactive educational content. The result is a stimulating environment for learning and retaining the information delivered [17].

7. Disadvantages of Multimedia

Multimedia requires high-end computer systems. Sound, images, animation, and especially video, constitute large amounts of data, which slow down, or may not even fit in a low-end computer. Unlike simple text files created in word processing, multimedia packages require good quality computers. A major disadvantage of writing multimedia courseware is that it may not be accessible to a large section of its intended users if they do not have access to multimedia-capable machines. For this reason, courseware developers should think very carefully about the type of multimedia elements that need to be incorporated into applications and include only those that have significant value. Multimedia has other weaknesses too. While proponents of this new technology are very enthusiastic about its potential, they often leave the financial and technical issues unattended. Developments in multimedia are very high and the process of developing effective multimedia takes time. Time spent on developing the multimedia package requires money so that the true cost of an interactive programme mounts with each delay. Further, if the prerequisites for using multimedia include to computers with related software, the user must possess a minimum level of computer literacy in order to exploit the capabilities of this medium for learning. And finally, of the educator who is unfamiliar with the production and design of multimedia courseware or packages can be equally complicating.

8. Conclusion

One unexpected result of the multimedia revolution is the opportunity to improve the quality of E-Learning. Many E-Learning programs lacking in instructional design are presupposed as multimedia distance learning programs

because of the lure of cost savings in travel, space allocation, salaries, and time away from the job. As a result, there's an opportunity to make E-Learning programs into something well designed that delivers the learning objectives.

Up to now, the lack of infrastructure for delivery of high-quality multimedia applications, the weakness of supporting technologies for easy content creation, the absence of experience with the benefits of futuristic multimedia, and a variety of economic factors have impeded the widespread deployment of multimedia applications. Experience with multimedia on the Web and availability of the Internet for disseminating low- and medium-bandwidth products are breaking down these barriers. People now accept the enormous value of widespread use of multimedia technologies to support societal desirable, financially profitable, and personally rewarding services such as distance-independent learning, low-cost video telephone service, improved customer-relationship and help services, new forms of entertainment and interactive games, and new types of electronic commerce (such as tourism, real-estate, and merchandise sales). Successful integration of multimedia applications in E-Learning systems must follow a well-designed curriculum based on existing and proven standards.

10. Future work

Development of multimedia data types and integrates these types and their operations into an extensible database system and its query language. When a multimedia application lacks a database, the data structure is buried in the script, where all of its value is lost. This omission also makes the script more complicated and less flexible. Using a multimedia database makes the data structure logic available to other multimedia applications and simplifies the script so that many scripts can share the same multimedia metadata. In addition, when a multimedia or abstract data database is organized and annotated for one application, other applications can use those annotations without going through the same time-consuming process. This capability adds great value to the data through reuse and controlled redundancy, then integration of multimedia database with E-Learning systems.

This project focuses on devises and implements data types for these non-standard kinds of multimedia data. Multimedia technologies are rapidly attracting more and more interest every day. In order for such a vast amount of data to be easily available, existing database design models and indexing methodologies have to be improved and refined. In addition, new techniques especially

tailored to the various types of multimedia must be devised and evaluated.

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