An Innovative Approach for Developing Multimedia Learning Modules

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Abstract

This paper presents an innovative approach for developing multimedia-learning modules. Using a constructivist approach, this innovative multimedia design model will demonstrate that purposeful content and supplemental instructional materials or Multimedia Learning Modules can be developed within the context of formative evaluation. In addition, I have included a case study that demonstrates that having students develop learning modules builds on previous knowledge and adds to the learning experience. The goal of multimedia in education is to immerse students in a multi-sensory environment. Multimedia has the ability to capture the attention of the learner using visual and auditory stimulus, through sound, text, video, colors, animation and graphics. The goal of developing Multimedia Learning Modules is to engage the designer (and student) in the learning process through entertaining and participative learning. This enables and promotes the transfer and infusion of knowledge while promoting considerable opportunities toward the efficiency and effectiveness of learning.

Keywords: Multimedia, learning modules, constructivist, new media, instructional design

1. DEVELOPING MULTIMEDIA

The driving force of multimedia has fueled the need to bridge computer technology with elements of the entertainment industry creating a field of 'new media.' In its many forms, multimedia offers exciting possibilities for education and entertainment. And of all the new technologies providing tools to reconstruct education, multimedia technologies are at the forefront in providing supplemental materials to multicultural education. In the past, computer-based multimedia relied on external laser disc players. The focus has shifted to multimedia education delivered on CD-ROM and, more recently, to digital videodisc (DVD) and the World Wide Web (National Council on Disability, 1998.) New hardware and software is being developed daily that contributes and enhances new media development in multimedia.

Evidence of an instructional program's worth is sought for use in making decisions about how to revise the program while it is being developed (Gagne, Briggs, Wager, 1974.) The evidence, or from the constructivists' point of view, adding knowledge to existing knowledge, is collected and interpreted during various phases of development and is used to form the instructional program itself. The instructional designer's role remains didactic and includes additional responsibilities of building in supervision or coaching elements that incorporate multiple instructional sources; all contained within a multimedia environment.

The primary reason for bringing students into the development arena of MLMs is because many students consider higher education as a rite of passage to be endured, rather than an exciting place to grow and learn. As a result, many become complacent in their quest for knowledge. Concerns about grades, achievement, and status, or attempting to juggle and balance personal life issues and employment overshadow the process of learning and information acquired. The instructional process fails to excite them. And the rest of us, as participants and observers of this scene have virtually forgotten that learning is supposed to be exciting. It is my belief that having students design small Multimedia Learning Modules can fuel their excitement of learning.

2. BENEFITS OF MULTIMEDIA LEARNING MODULES

A report on technology use in education states that it can provide the following benefits:

- enhance students' achievement
- help students master skills required for the workforce
- serve as a motivational tool, improving attitudes toward learning, confidence, and self-esteem
- enhance ability to remember and understand material
- enhance organizational and problem-solving skills
- help students become independent learners and self-starters
- increase family involvement in children's education; and
- improve skills and knowledge of teachers (U.S. Department of Education, 1996).

Multimedia Learning Modules (MLMs) can help students develop a better understanding of the topics they cover in the classroom, and help students develop a better understanding of their classroom work and the world around them. These modules can engage and motivate through a rich mixture of multimedia and visual resources. They would also focus student's learning on the objectives set forth by the instructor, raise the quality of their work, and move them along a constructive path toward independent learning. Various flavors of learning modules on a wide variety of topics are appearing throughout the Internet (Millichap, 2001.)

- Modules are learning resources
- Modules are intended for asynchronous use
- A module covers a particular topic
- A module forms part of a learning unit
- A module may be used for multiple purposes/in multiple settings: non-credit or credit learning, professional development

3. A COMPARISON OF MODELS

The multimedia design model I am proposing differs from other models in that it promotes constant evaluation and builds on a constructivist approach throughout the development life cycle.
Constructivists believe that learning is a process of sense-making, of adding and synthesizing new information within existing knowledge structures and adjusting prior understanding to new experiences (Jones, 1997.) Multimedia Learning Modules (MLMs) can be designed using the proposed Multimedia Design Model shown in Figure 1. I am presenting one version of literally scores of instructional systems design (ISD) models that have been designed for education and training. The basic instructional design model (the ADDIE model) uses Analysis, Design, Development, Implement, and Evaluation. The model is linear in fashion. Instructional design is evaluated at the end of the process. Another multimedia model developed by Reeves, 1994, presents a model similar to the ADDIE model. Reeves model is also linear in composition; Analysis, Design, Production, Evaluation. The pedagogical strength of the model I am proposing (and the basis of this paper) defines, proposes, and demonstrates a constructivist approach. Using formative evaluation and consistent review during the design process, the instructional designer builds extensive knowledge and experience to the learning process. The model includes five major functions: 1) analysis, 2) design, 3) production, 4) evaluation, and 5) revision. Each function is divided into a set of specific activities.

For example, when moving from the Analysis to the Design phase, Evaluation should occur, then, from the Design phase, Evaluation and Revision should re-occur. Finally, prior to the Production phase, authoring and pre-production examples should be re-evaluated. Revisions should take place at this time. During actual the Production (which includes Pro-and Post Production) phase, a final Analysis and Usability study should occur prior to creating the master product.

4. A CASE STUDY

I recently taught a Multimedia Design course to undergraduate students. Students were divided into teams and given a list of topics in the area of computer technology from which to select. One team selected the topic of **Binary to Decimal Conversion**. Their task was to develop a learning module using a multimedia authoring program. The intended audience was first or second year college students majoring in computer technology. By following the Multimedia Design Model (see Figure 1) students developed a lesson outline, collected and re-designed graphics and text, recorded and edited audio samples, which included narratives, and developed animations. Within each area of development, students had to draw from previous experience and knowledge using various applications such as audio/graphic/video recording and editing programs. Students had to re-visit a topic that they had been familiar with in the past and bring the material to the forefront to begin the design of the MLM. Finally, students developed an interactive assessment activity to test the participants understanding and success with the module.

4. IMPLEMENTING MLMs

Multimedia Learning Modules can be included into existing classroom instruction for use as enhancements during lectures or as supplemental materials available

Figure 1. Multimedia Design Model
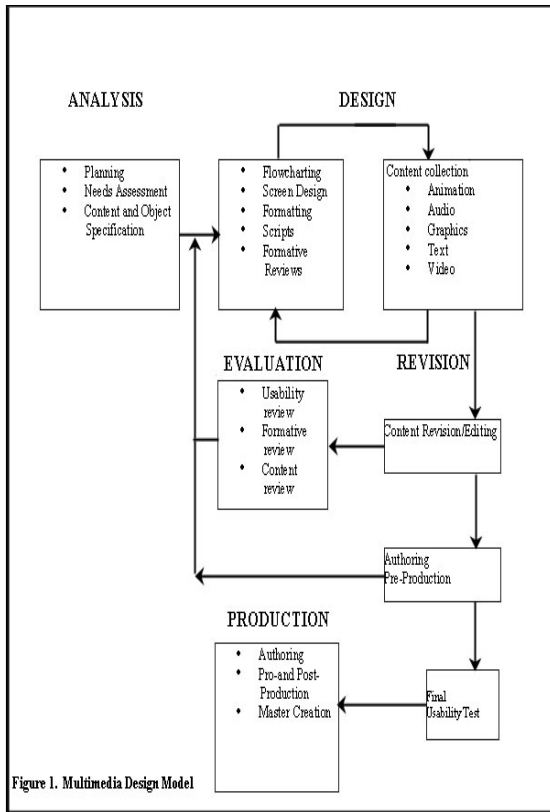
to students as media on demand. These supplementary modules would be similar in nature to a videocassette tape played during a class period used to enhance a topic or subject. An instructor normally would not have students sit through a lengthy videotape presentation of a specific topic. The same constriction applies to multimedia delivery as well. Small multimedia learning modules should be no longer than 3-5 minutes in duration. MLMs could be burned to a CDROM, stored on a Web Site, or streamed to the classroom via an Internet connection. The concise delivery of these modules would keep the student engaged and could be used to stimulate multi-sensory learning environment. The potential for topics in this (or any other) area is boundless.

5. SUMMARY

Creating a multi-sensory learning environment is challenging to say the least. Issues of planning and production within multimedia production teams and specialists, is of paramount importance. Classroom issues dealing with a plethora of learning theories must be addressed. While the focus of this paper is not

on learning theory, I must admit that the cognitive perspective on processing information becomes a ground base on which to establish a multi-sensory learning environment.

The importance of designing instruction (e.g., multimedia learning modules) for information processing is that logical meaning of the knowledge is transformed into psychological meaning. Logical meaning is the relationship of symbols, concepts, and rules of the subject areas (Gredler, 2001). Psychological meaning then becomes the relationship of logical meaning to the student's cognitive structure. Within the MLM, graphics, text, instructional delivery and order, audio and visual stimulus become part of the logical meaning which thereby enables and promotes the transfer and infusion of knowledge while promoting considerable opportunities for promoting the efficiency and effectiveness of learning. The classroom is changing; delivery of education is changing. Educationally- and cost-effective education (whether in the classroom or delivered via distance) requires at least four characteristics: 1) *high-quality multimedia learning materials produced by multi-skilled academic teams*; 2) personal academic support (tutoring); 3) well-developed, highly reliable logistics; 4) a strong research base. Successful development and implementation of this 're-invention' requires enlightenment and acceptance – not the common academic *laissez faire* approach (Smith & Prados, 2000).

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