
Streaming Media to Enhance Teaching and Improve Learning

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Abstract

In a search for more natural way of learning, streaming media is one of the ways. One old Chinese statement says: "a picture is worth a thousand words if used correctly". Today we can ask ourselves how many words worth a video sequence? The use of online courses continues to grow worldwide, yet it is still not clear whether such online learning environments enhance the learning outcome of students or even meet the level of success of traditional classrooms. Many online courses represent no more than electronic versions of traditional classes without, of course, face-to-face interaction between instructor and students. These electronic courses often contain Web materials that lack any significant level of creativity or interactivity. Cognitive research suggests that the addition of multimedia can actually improve the learning process if certain methods are employed. By using auditory and visual methods of presenting information, students can process that information more quickly, often fostering an enhanced learning process.

Keywords : Streaming Media, Real-time Multimedia, Multimedia Integration Language, E-Learning

0. Introduction

Streaming media is a method of creating digital video, audio, graphics and text so that it is distributed in "real-time" (synchronously) over the Internet. This means that packets of data are sent or "streamed" from a computer serving the data in real-time. The end user doesn't have to wait for the files to download or store the files on the hard drive in order to view them. A media file is quite large, so the advantage of streaming packets of information is that the end user views the media as the data is received by the user's computer from the server. This technology tool is a powerful asset in delivering instruction from a distance.

Whereas the technology that allows media to be distributed in real-time is a very recent development, the manner in which we apply this technology tool to teaching is not so new. Educational research of the past ten years informs us as to which practices best help students learn using technology tools. The key to the success of using streaming media will depend on how it is integrated into the course's over all instructional design and applied to learning activities.

1. How can streaming media be used for instruction?

When considering the best practices of the use of streaming media, the pedagogy should reflect what we know to be effective teaching and learning practices regardless of delivery method of the instruction. The application of streaming media should be an intricate part of the instructional design and support those essential activities in which the student must engage to achieve the learning outcomes. We know that engagement in interactive activities in which the learner receives feedback regarding performance from either a computer, peer or teacher is a best practice.

Streaming media can be used to support activities such as cooperative learning projects, online discussion or individual practice in applying skills and knowledge. For example, several short case studies which

demonstrate concepts related to the learning objectives might be presented in streaming video and audio format. Students are then instructed to discuss the case online, perhaps answering direct questions or offering solutions to a specific problem. Alternatively, an audio visual segment may be used to present instructional information related to course learning objectives. After viewing the media clip, each student can use a computer-based quiz to assess his/her own learning by answering a series of questions that check comprehension of the learning objectives associated with the media clip.

The benefit of streaming media is that the student can control the pace of the learning process if learning materials and activities are designed to foster interactivity. A learner can also select the media which match the preferred personal learning style: text, audio or visual. Animated models, charts and graphs, which learners can manipulate, will appeal to kinesthetic learners. Streaming media can present information to fit many learning styles.

2. Building Skills and Knowledge

A best practice is that all presentations of information should be clearly associated with specific learning objectives and have some form of interactions to practise the new skills or knowledge before that knowledge is assessed via exams. The more interactions a student has in order to practise new skills and knowledge, the more the student has opportunity to engage in construction of knowledge. Imagine a construction scaffold that vertically spans several stories of a 10 - story building. The top of the building is where a student must be to succeed in your class. At the bottom of the scaffold is the foundation that is necessary to support each of the next levels.

A student may have some background knowledge that is the foundation for adding new knowledge. However, an instructor may discover that he or she will need to provide remediation for the prerequisite skills and knowledge before some students can acquire new ones. It is through guided practice and interactions with new information that a learner constructs meaning. Passively reading or viewing information is usually not enough interactivity for all students to master procedural or conceptual knowledge.

3. Levels of Media Interactivity

- ✍ Level 1- student controls stopping and starting of segment
- ✍ Level 2- student implements an action and gets a “canned” response
- ✍ Level 3- student implements an action and gets a unique response
- ✍ Level 4- student inputs unique data and gets a unique response

Level 1 : Lecture, as an instructional strategy, is not interactive. It is presentation of information in audio and visual mode. Research has shown we learn 50% of what we see and hear.

In a face- to- face lecture, a low level of interaction can be incorporated by posing questions to students or considering questions from students. Unless a student gets an actual response to an individual question, lecture is not interactive. If the equivalent of a “lecture” is used in distance learning, then it recommended to pose questions that students have asked ahead of time or ones that the instructor predicts would be asked. An example of level 1 interactivity is a student starting, stopping, rewinding, etc. the RealMedia player while viewing a presentation.

Level 2 : student implements an action and gets a “canned” response (all students get same response) This level can range from multiple choice questions with corrective feedback to intricately designed simulations or role playing activities. An application of this level of interactivity would be the use of

scenario or role play that was created with branching or different paths depending on the response of the student.

For instance, in one such activity designed with the purpose of demonstrating the influences of institutional discrimination, the student views several media clips of a young black woman who is making choices about school and her future. The student, who plays the role of this young woman selects an option that is presented regarding jobs, housing employment, etc. Depending on the choice that is made after viewing each scene, new options become available to the student. Choices are somewhat limited because of certain societal restrictions. For example, the role-playing student experiences “driving while black”. The outcome of the role play is dependent on the path that the student takes as a result of choices.

Level 3 : Student implements an action and gets a unique response - Examples of this level of interaction are similar to those of search engines and at sites like about.com or Ask Jeeves. The computer-based response will be unique to the individual’s search request. High level interactive programming, such as .cgi (common gateway interface) is used for database search. An instructional use of this level might be to have a database of media which the student can search with keywords specific to a certain problem that needs to be solved.

Level 4 : Student inputs unique data and gets a unique response - This level is an example of artificial intelligence or intelligent tutoring systems which are capable of generating a unique response to a specific inquiry. These systems are usually in place at large research institutions or in training programs at NASA. Complex computer programs enable the learner to tailor individual instruction to fit specific needs.

Good uses of streaming media should support students in achieving learning outcomes aimed at:

1. Procedural Knowledge ie. a skill with narrative (text/audio) of procedures : For example a nursing distance learning program uses streaming media to demonstrate how to prepare a microscopic slide with a blood smear. The student can repeat the viewing as many times as necessary. The student then goes to a hands-on lab and practices the skill.
2. Conceptual Knowledge ie a concept such as a case study or problem-based scenario with interactive opportunities to explore different outcomes, or a Flash graph that changes when you input different data

4. Cognitive Apprenticeship Model (Collins, Brown and Newman 1989)

A good model that emphasizes the role of practice is the Cognitive Apprenticeship Model. The analogy of “apprenticeship” suggests that acquisition of thinking and reasoning processes can also be learned by observing an expert and practicing with the guidance of a “master” or expert.

1. Modeling : Teacher gives examples and non-examples of concept or demonstrates skill. One technique is to “think aloud” as the expert proceeds through the steps of cognition.
2. Coaching : Provide students with opportunities to practise newly acquired knowledge, skills and provide feedback, offer suggestions.

First the practice is carefully guided by the expert and as the learner gains competence, the learner begins to practice independently. Use elaborative feedback rather than just “Yes, that is right.” or “No, that is wrong”.

3. Articulation : Students discuss problem-solving process, knowledge or reasoning.

4. Reflection : Student assesses own cognitive processes by comparing with another student or expert.
5. Exploration : Students pose own problems and continue the quest, asking questions themselves. (Collins, Brown, Newman, 1989, 481-482).

For example, in the context of language learning, a short video and audio segment may demonstrate two persons engaged in a conversation in the new language. The learning objectives are clearly defined for the students. One of the speakers falters over understanding a word that was used. This speaker would think out loud, modeling various ways to try to determine the meaning until the speaker finally comprehends. The targeted vocabulary words appear in text on the screen as a caption as the word is applied in the context of the conversation. After viewing the media segment, the student engages in activities requiring the student to answer questions about the scene and receives feedback. The student can replay the video and audio or select key words from a text list to hear the words pronounced, see definitions, etc.

After practice exercises, small groups of students discuss online their processes of comprehension and mastery of the learning objectives. Finally, students formulate new avenues to explore related to the topic.

5. Conclusion

Streaming media is a powerful tool for learning environments when used effectively. Rather than seek to merely replace face-to-face lectures with audio and video lectures which have few interactions, if instructional developers keep the focus on the learner and what the learner will do with the information, the use of streaming media can reach students with a variety of learning style preferences.

Streaming media encompasses the use of text, audio, video, graphics, animations, simulations so that learners can not only control when they interact with instructional materials and how long, but they can choose the preferred mode of learning: audio, visual, kinesthetic. Streaming media is powerful as it can demonstrate both procedural and conceptual knowledge.

There is a range of interactivity available to the end-user of streaming media. The more a learner can practice new skills, the better the chance for achievement. Since not all learners learn all subjects best by reading texts, by offering alternative learning activities, more learners can be reached.

The instructional design is important to the learner's achievement. Creating apprenticeship experiences which allow the learner to practice skills and knowledge along with an expert is a good model.

In the 21st century, educators are challenged to prepare a diverse workforce to be skilled and knowledgeable employees. We have the technology tools to reach more learners than before. By keeping the focus on the learner and not on the technology alone, educators will be more likely to use sound practices that can help learners with diverse learning styles and ensure success.

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