

HIGH FIDELITY E-LEARNING MODELS

Dr. Satish Gill,

Shiv College of Education, Faridabad, Haryana

ABSTRACT

We define high-fidelity e-learning as “a set of tools and methods that delivers education and training to students anywhere, anytime without sacrificing efficacy”. High-fidelity e-learning preserves educational quality while minimizing or eliminating logistical requirements. High-fidelity e learning begins with the assumption that instructional delivery will be primarily asynchronous, so the content and its presentation must minimize the requirement for a live instructor.

High-fidelity e-learning extends the traditional concepts of e-learning through the use of rich media technologies, immersive simulations, and scenario-based instruction while maintaining its anywhere, anytime foundation. It is based on the presence of a ubiquitous internet connection, representing an always-connected world. It assumes students can and will access material on their terms and that they will acquire and maintain skills while they fulfill their day-to-day responsibilities.

High-fidelity e-learning supports and encourages hands-on learning, allowing students to practice instructional concepts whenever and wherever they choose

Keyword: *E-learning, Computer Network, High fidelity, media technologies, educational training, scenario-based instruction, Balancing Control, instructor-led training (ILT), web-based training (WBT), computer-based training (CBT)*

INTRODUCTION

High-fidelity e-learning environments incorporate rich media technologies, immersive simulations, scenario-based instruction, and hands-on exercises that can be accessed by students on their terms and as their time permits. The paper summarizes the principles of high-fidelity e-learning which include the following:

Personalization: using a casual, conversational style for spoken and written content
Multimodality: delivering training content using multiple sensory channels (read it, hear it, see it)
Lean-Forward Learning: using demonstrations, hands-on exercises, and self assessments to increase retention and recall (do it, master it)
Collaboration: providing technologies that allow students to engage with one another and with instructors
Accessibility: making training content broadly available to people with a range of abilities
Modularity: publishing content in manageable, self-contained chunks so that it can be easily reused by content owners and referenced by students
Progress Tracking: supporting course providers, instructors, and students with the ability to track student progress
Balancing Control: balancing control between the e-learning system and the student to achieve optimal learning.
Read It, Hear It, See It, Do It, Master It approach:

E-Learning, Classroom Learning, and Blended Learning

Learning models are frequently described as points on a spectrum. There is a set of instructor-led training (ILT, also referred to as

classroom training or direct instruction) and a family of technology-based models including computer- based training (CBT) and web-based training (WBT). Collectively, models at this end are grouped into the e-learning category. Blended learning occurs between the two extremes, which is a combination of direct instruction and e-learning. While classroom instruction as an educational method is fairly well understood, definitions for terms such as e-learning and blended learning are still the subject of debate. In this paper High-Fidelity E-Learning focus on pure e-learning.

PRINCIPLES OF HIGH FIDELITY E-LEARNING

High-fidelity e-learning extends the traditional concepts of e-learning through the use of rich media technologies, immersive simulations, and scenario-based instruction while maintaining its anywhere, anytime foundation. It is based on the presence of a ubiquitous internet connection representing an always-connected world. It assumes students can and will access material on their terms and that they will acquire and maintain skills while they fulfill their day-to-day responsibilities. High-fidelity e-learning supports and encourages hands-on learning, allowing students to practice instructional concepts whenever and wherever they choose. This section describes the eight foundational principles that characterize a high fidelity e-learning environment and describe the user experience.

Personalization

E-learning is enhanced when a conversational style is used for both spoken and written text. It also benefits from the use of on screen pedagogical agents.

E-learning designers and developers may be tempted to incorporate precise and formal text

on-screen and in narration read by a professional voice talent. The personalization principle counters this temptation and reminds us that a casual, personal style of communication is more effective for learning. The challenge for e-learning is to replicate the effective and personal communications that often happen in engaging classroom environments.

Current technologies make video segments of classroom instruction easy to integrate with e-learning courseware and therefore make the experience of the classroom and the instructor available not only to present material, but also to coach, work through examples, and guide the learning process in other ways. The use of video streaming in e-learning can make the classroom instructor available as the pedagogical agent.

Multimodality

Multimodality is defined as "the use of two or more of the five senses for the exchange of information. Multimodality is a broad, multidisciplinary area of research that includes the study of human-to-human spoken and gestural communications, audio-visual speech perception, and the incorporation of multiple modalities into human-to-system communication. As Granström et al point out, multimodality is not new from the early storytelling tradition, where body and facial gestures have always played a major role, through classic theater, opera, dance, film, video and multimedia, multimodal communication has been constantly present in human communication and human culture. The multimodality principle for high-fidelity e-learning is to deliver content across multiple sensory channels (visual and audible) to aid learning.

Research and cognitive learning theory indicate that people learn more deeply from

words and pictures than from words alone. The modality principle recommends presenting words as speech rather than onscreen text. According to cognitive learning theory, people have different information processing channels for visual information and for audio information; presenting information simultaneously across the two channels reduces the likelihood that either channel is overloaded and therefore aids learning.

Multimodality can also be described as read it, hear it, see it learning. Classrooms offer rich opportunities for multimodality such as chalk and whiteboards, document cameras, handouts, and instructor speech, gestures, facial expressions, and body language. In e-learning, the role of video can help to make the richness of gestural and body language communication available from the classroom, but it needs to be balanced with graphics and other supporting media to enable the full multimodal experience.

An example of how the e-learning environment can promote multimodality could involve the following elements:

Read it: transcripts of the instructor's presentation are available.

Hear it: audio of the instructor maps to the video of the presentation.

See it: presentation materials, screenshots, and diagrams appear on-screen synchronized with the instructor's words.

Lean-Forward Learning

E-learning is a new educational paradigm. In part, e-learning represents a shift away from instructor-centered learning toward student-centered learning. The web provides access to vast amounts of information anytime and anywhere, which makes information gathering

and synthesis an easy part of the process of life-long learning. E-learning offers self-paced courses in a web environment, allowing for the pursuit of more formal learning throughout our lifetimes without the requirement to be in a particular place at a set time. As a principle of high-fidelity e-learning, lean-forward learning refers to the inclusion of hands-on, context-appropriate practices, demonstrations, exercises, and assessments to engage the student and to assist with encoding the material being learned in a way that facilitates recall in the future.

Lean-forward learning includes two distinct e-learning activities:

- practices, exercises, and labs
- formative assessments

Practices, Exercises, and Labs

Practices, exercises, and labs are key learning activities that provide the student with the opportunity to use the knowledge being acquired to complete context-relevant problems or tasks. The practice exercises and examples should mirror the job context as closely as possible to help encode knowledge in a manner that supports its ultimate retrieval when needed to support task performance or problem solving in the workplace. They also report on evidence that practices distributed throughout the training results in better long-term retention than the same practices placed at the end of the training activity.

Practices, exercises, and labs extend the read it, hear it, see it model introduced in the multimodality principle to create the read it, hear it, see it, do it model for high-fidelity e-learning. It provides students the opportunity to engage the learning topic in a multimedia and multi-modal environment and provides both active as well as passive opportunities for students to learn at their own pace.

Assessment

Assessment has long been a key part of the educational experience. There are two types of learning assessments: summative assessments are used for grading or ranking students and for confirming certain student achievements (e.g., certification exams); formative assessments, or assessments for learning, are used to provide feedback to the student to highlight areas of further study and improve performance. High-fidelity e-learning offer students opportunities to gauge their understanding of the material.

Collaboration

Many research studies have shown that in conventional courses, students who work or study together learn more than those who work or study alone. Major outcomes of online courses improved when professors structured them to support the growth of a learning community, by being available online to interact with students, and by using collaborative learning strategies. Evidence is building that collaboration among students and with an instructor improves learning from online courses. We address this principle of collaboration in two parts:

- peer-student collaboration
- Instructor support

Peer-Student Collaboration

Research has indicated that working in groups, instead of alone, increases motivation, perception of skill development and solution satisfaction. This finding was based on self-reported learning, with groups working online through an asynchronous learning network reporting slightly better perceptions of learning than the groups working face-to-face.

Instructor Support

Instructor, teacher, mentor, or guide, an experienced individual delivering or facilitating access to training material adds well-established value. Self-paced, location-independent e-learning should provide access to an instructor when the student requests it. The instructor's or subject matter expert's availability and contact information should be readily available to students. The instructor should make every attempt to minimize the time between the student's request and the instructor's offer of assistance. The goal would be to reduce the time delta to zero the student question is answered immediately. However, because the student can return to the material at any time, the instructor's response is still valuable to the student even if it is delayed.

Accessibility

The accessibility principle for high-fidelity e-learning is to deliver content in a manner that is broadly accessible to people with a wide range of abilities.

Some accessibility features provide benefits to all users. For example, a full transcript for audio content provides all users with a means to better understand the lecture content.

Modularity

Modularity means that the high-fidelity e-learning system which support and loosely enforce constraints on content managed and delivered by the system. Modularity includes two sub-principles design for re-use and reference

Design for Re-Use, reusability is one area where e-learning offers natural advantages over direct instruction.

Design for Reference, learning involves both skill building and skill maintenance.

CONCLUSION

High-fidelity e-learning environments incorporate rich media technologies, immersive simulations, scenario-based instruction, and hands-on exercises that can be accessed by students on their terms and as their time permits.

E-learning systems should provide course designers and students with options for organizing, indexing, navigating, and annotating the learning materials. Doing so will improve the likelihood that students use the learning system and will provide the flexibility for tailoring to various cognitive

styles. It offers the user a web-based, multimedia, interactive training experience that can be accessed anytime, anywhere. Learning environment uses state-of-the-art software and hardware to train users with technical and managerial roles on a wide range of information.

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