

## Chapter 4.9

# Online Synchronous vs. Asynchronous Software Training Through the Behavioral Modeling Approach: A Longitudinal Field Experiment

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### ABSTRACT

The continued and increasing use of online training raises the question of whether the most effective training methods applied in live instruction will carry over to different online environments in the long run. Behavior Modeling (BM) approach – teaching through demonstration — has been proven as the most effective approach in a face-to-face (F2F) environment. A quasi-experiment was conducted with 96 undergraduate students who were taking a Microsoft SQL Server 2000 course in a university in Taiwan. The BM approach was employed in three learning environments — F2F, online synchronous and online asynchronous classes. The results were compared to see which produced the best performance, as measured by knowledge near-transfer and knowledge far-transfer effectiveness. Overall satisfaction with

training was also measured. The results of the experiment indicate that during a long duration of training no significant difference in learning outcomes could be detected across the three learning environments.

### CONCEPTUAL FOUNDATIONS

The Internet's proliferation creates a wealth of opportunities to deploy alternative online learning environments to facilitate many users in their learning processes. The information technology (IT) skills training market represented 76% of the entire online learning market in year 2000, according to a Jupiter Research report (CyberAtlas, 2003). The worldwide corporate online learning market may grow to \$24 billion (\$18 billion in the U.S.) by 2006 with a compound annual growth

rate of 35.6% (IDC, 2002). The burgeoning online learning/training market, and the increasing training budgets of businesses and schools has provided these key users of online training and marketing tools with practical reasons, as well as compelling research motives, to investigate the effectiveness of training and education in different online formats.

Online learning differs primarily from the traditional face-to-face (F2F) learning in that it is a user-centered, rather than instructor-centered, learning mode. Other benefits of substituting online learning for F2F learning include (1) self-paced instruction; (2) the ability to incorporate text, graphics, audio and video into the training; (3) opportunity for high levels of interactivity; (4) a written record of discussions and instructions; (5) low-cost operation; and (6) access to a worldwide audiences (Aniebonam, 2000). In addition, online learning can remove a certain degree of space and time limitations, speed up the learning process for motivated learners, lower economic costs of attending F2F classes and have higher information accessibility and availability.

Although IT has changed the training and educational approaches and environments, the ultimate goal of learning has not changed, that is, to transfer knowledge to students and allow them to apply the acquired knowledge in real situations. In the field of IT, the success of software training can be assessed with a trainee's IT skills of, and knowledge of the use of, particular software to solve problems. Surprisingly, after attending a training session, very few students know how to properly apply the acquired knowledge and skills to real situations. This raises an important issue, that is, how to improve knowledge transfer capability of learners in different online learning environments.

The importance of knowledge transfer is self-evident. However, the knowledge transfer process does not occur naturally. There is a need to assist learners in transferring their acquired knowledge into future applications. One effective approach

to assisting the learning transfer process is "behavior modeling" (BM). This approach teaches learners through demonstration and hands-on experience. Simon, Grover, Teng, and Whitcomb (1996) and Compeau and Higgins (1995) found that in the field of information technology, BM is the most effective approach compared to the other two knowledge transfer approaches: exploration — teaching through practice on relevant example, and instruction — teaching software characteristics.

Distance education is defined as "teaching through the use of telecommunications technologies to transmit and receive various materials through voice, video and data" (Bielefeld & Cheeseman, 1997, p. 141). In the same token, Leidner and Jarvenpaa (1995) define distance learning as "the transmission of a course from one location to another" (p. 274). These definitions provide an analogy to distance learning in the field of information technology or online software training. Online software training can be the transmission of instructional IT programming or contents to geographically dispersed individuals or groups.

There are two general modes of online learning: synchronous and asynchronous modes. Each mode can be marshaled with IT tools to deliver software training. Case in point, audio and video conferences are two types of online synchronous training mediums. Online asynchronous training mediums range from Web pages, file download, e-mail, e-mail list, newsgroup, forum, chat, response pad, whiteboard and to screen sharing. Built on his personal distance training and education experiences since 1971, Horton (2000) suggests that online synchronous and asynchronous learning and training be designed for different purposes. Incorporating synchronous learning demands the control of schedule, time, people, class size, video and audio equipment and place. These factors constrain the possibility of reaching large numbers of students at any given time and in any given place.

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