Learning Outcomes Across Instructional Delivery Modes

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INTRODUCTION

A discussion of distance learning usually entails a wide range of instructional and learning activities, instructional delivery modalities, and learner interactions characterized by some distance between the teacher and the learner, and mediated by a variety of technological tools (Schlosser & Simonson, 2002; Tiene & Ingram, 2001). The tools available for the delivery and access to learning materials contribute in large measure to the kind of experiences that learners have with distance learning. Distance-learning delivery and access tools have radically evolved in recent years with the advent of new and mostly Web-based technologies. Podcasting, virtual communities, and social networking tools, such as Facebook and MySpace, all have implications for how current and future learners access and even cocreate contents of instruction locally and at a distance (Appel, 2007).

Distance learning environments employ any different combination of telecommunication systems. These include cable, satellite, two-way interactive fiber networks, desktop videoconferencing, and the Internet. Components of online learning environments, such as a computer interface, provide access to data in a variety of formats (text, graphics, videos, audios, or multimedia). Online communication tools facilitate student-to-student, student-to-teacher, and student-to-content interactions. Course management software contains evaluation tools to assess and monitor students' progress, as well as tools to provide support to learners (Tiene & Ingram, 2001).

Each combination of these technologies provides pedagogical opportunities or obstacles that can affect outcomes of learning. The technologies present the opportunity to deliver instruction, in different modalities, synchronously or asynchronously. Synchronous instruction and learning can take place through live face-to-face instruction, interactive broadcast media, and communication forums of the Internet. Asynchronously, instruction and learning can take place through the World Wide Web and through prerecorded audio and video. The present authors contend that we lose and gain certain outcomes by using particular delivery modalities. Effective selection of different modalities has implications for optimal educational outcomes.

BACKGROUND

Instruction offered to the distance learner today falls into a range that can be categorized along a quasi-continuum of modalities. On one end of the continuum is the traditional face-to-face instruction delivered by a live instructor to students in other locations through distance media such as the interactive television and live Web cast. On the other end of the continuum is the completely **automated instruction** in which the machines take the place of a live instructor to provide learners with dynamic interaction with course content, as in the case of online simulations. In between these two modalities are **hybrids** or **blended models** in which face-to-face instruction is combined with the use of various online tools. These include the **information assistance model** in which the Web is used as a placeholder for course syllabi and other class information, Web-assisted or **Web-enhanced instruction** (Dabbagh, 2000) in which some of the course activities are carried out with the aid of the online tools such as e-mail, discussion board, listserv, and **fully online instruction** in which students' interaction with each other, course materials, and the instructor is totally through online means.

As we move from left to right of this continuum, there are trade-offs in educational outcomes of deliver-

ing instruction as described in this continuum. For an insight into outcomes that might be lost or gained, the authors propose that educators revisit some various taxonomies of educational outcomes that have been in use in education and training for decades. Although some researchers have taken issue with the idea of a hierarchy in the taxonomies of educational outcomes, the present authors propose that thinking in terms of a hierarchical structure to learning, where there can be "higher order" and "lower order" outcomes, might be a useful way to begin thinking about what might be gained or lost as we change the structure of course delivery.

LEARNING OUTCOMES

Learning outcomes have been organized as a set of behaviors termed educational objectives. The most well-known of these have been taxonomies of educational objectives (Bloom, Englehart, M. Furst, Hill, & Krathwohl, 1956). Part I of the taxonomies, also known as the "Bloom's Taxonomy" (after Benjamin Bloom, one of the authors of the taxonomy), refers to a set of cognitive learning objectives arranged in a continuous, cumulative hierarchy, with the major steps being knowledge, comprehension, application, analysis, synthesis, and evaluation. Even though the idea of an ordered, cumulative hierarchy has resulted in much controversy and criticism with regard to validity, it has had enough appeal, at least on face validity, to form the basis for discussions of outcomes of learning in many educational settings (e.g., Clabaugh, Forges, & Clabaugh 1995; Furst, 1981; Green, 1997; Stearns & Crespy, 1995).

Part II of the taxonomies of educational objectives (Krathwohl, Bloom, & Masia, 1964), written several years later and largely ignored in the literature, focuses on the "affective domain" of learning consisting of receiving (attending), responding, valuing, organization, and characterization by a value. As with the Bloom's Taxonomy (of the **cognitive outcomes of learning**), the affective taxonomy proposes a cumulative, linear ordering that could be subjected to the same philosophical arguments regarding validity. Indeed, the Part II authors themselves raised this issue in noting that it is difficult to place some of the subelements above or below others. Nonetheless, the taxonomy of the **affective outcomes of learning,** like the cognitive taxonomy, has value in evoking discussion of such issues in learning, and how it could function in a hierarchical manner, regardless of its validity as a model in the whole.

Psychomotor learning outcomes are even less discussed in the education literature. Even though the Committee of College and University Examiners mentioned the need for a psychomotor domain of educational objectives, none was developed by Bloom and his colleagues on the committee. For the purpose of this discussion, we propose looking at Simpson's (1972) classification of psychomotor domain of learning objectives. Simpson's model has seven categories of psychomotor learning outcomes ranging from the simplest to the most complex behavior, including 1) Perception – the ability to use sensory cues to guide physical activity; 2) Set – a learner's readiness to act, including mental, physical, and emotional sets; 3) Guided Response - the early stage of learning a complex skill, which includes imitation; 4) Mechanism – the ability to perform a complex motor skill; 5) Complex overt response – which involves the intermediate stage of learning a complex skill; 6) Adaptation – a learner's ability to modify motor skills to fit a new situation; and 7) Origination – which involves learner's ability to create new movement patterns.

Metacognitive Skills

Earlier taxonomies of educational objectives were not specific about the role of metacognition in the learning process. Later taxonomies, for example, Anderson and Krathwohl (2001), specifically listed metacognition as one of the cognitive processes. The capacity for self-regulated learning becomes even more critical in distance-learning instruction. Learners need active, self-regulated learning skills involving knowing how to monitor one's learning, knowing how to learn, and how to solve ill-defined problems.

The need for **metacognitive learning skills** increases as a learner moves from the left end of the continuum to the right. The completely automated environment, for example, is likely to frustrate learning styles that work well with structure, and need well-defined, focused directions in the learning process (affective domain).