Chapter VII
Technologies for Learning and Transfer:
Learning Frameworks and Technology Design for Career and Technical Education

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ABSTRACT

Applying learning technologies to improve the current practices of CTE requires a more holistic view focusing not only the aspect of learning but also the transfer needs of CTE within educational institutions and private sector organizations. In an effort to address the need for using technology appropriately for CTE, we provide a conceptual framework that synthesizes the literature of learning technologies and learning transfer within CTE. This chapter has the following sections: (1) developing learning content for CTE; (2) learning frameworks and instructional strategies for learning transfer within CTE; (3) key considerations for utilizing learning technologies for CTE; and (4) future trends of CTE in using advanced learning technologies.

INTRODUCTION

Current Trends and Practices

One of the most prominent practices of using technologies for teaching and learning in career and technical education (CTE) is the Internet. Effectiveness of learning and efficiency in programmatic administration are viewed as the major driver to the growth of using the Internet as a teaching and learning tool in CTE (Johnson, Benson, Duncan, Shinkareva, Taylor, & Treat,

2004). These researchers reported that 76.3% of all the CTE programs at various settings, such as community colleges, technical institutes, and junior colleges offered Internet-based CTE courses in recent years. Among them, e-mail was cited as the most commonly used technology (94.3%) followed by course management systems (84.2%), and asynchronous discussion lists (64.2%) (Johnson et al., 2004). Given that the overall enrollment growth of online learners over the past five years is about six fold (9.7%) than that of on-campus students (1.5%) in the U.S. (Allen & Seaman, 2004), this pattern of growing presence and use of the Internet in CTE education is likely to continue. However, few frameworks have been established and adopted yet in the field to guide the design of learning experiences leveraging media-convergent and resource-connecting Internet technologies.

Issues of CTE in the Utilization of Learning Technologies

While the adoption of learning technologies for CTE has widely penetrated through all levels of educational institutions and private organizations, some quality issues of utilizing learning technologies for CTE were pointed out. Examples include the lack of learners' technical skills (Kang, Lim, & Kim, 2004), the lack of social interaction during the learning process (Rovai, 2002), and the high learning curve for learning technologies by the CTE instructors (Muilenburg & Berge, 2001). For some, teaching CTE with advanced technologies was conceived as more complex and demanding than teaching a traditional classroom based course (Morrison, 2003). Lewis (2001) found that instructors' preparation was a main factor affecting the quality of instruction in both onsite and online CTE courses. For others, utilizing learning technologies for CTE typically required more effort in managing changes, keeping track of students' learning progress, and replying to students' questions and requests for learning support (Collis &

Nijhuis, 2000). Zirkle's study (2003) found that access barriers, poor technology skills, negative attitude toward technology, and low involvement of instructors negatively influenced the quality of distance CTE courses. Similarly, Wonacott (2001) emphasized that access, cost, learning effectiveness, and the program fit were critical factors affecting the quality of online CTE programs.

Another key concern for CTE instructors to use advanced learning technologies is the lack of good guides to select appropriate technologies and determine how and when to use those selected to improve students' learning. Designing and delivering a technology-rich or enabled CTE course involves various decision making processes such as identifying learning needs, deciding learning levels, developing learning frameworks, and embedding effective learning activities or measurements utilizing technologies. As clearly illustrated here, effective and efficient use of technologies are only feasible when planning and designing are grounded on the understanding of precise learning needs. In developing learning frameworks, several researchers claimed that current practices in CTE have been failing to satisfy the level of learning transfer for CTE clients. Efforts to increase the level of application and transfer to work settings will not come easy with isolated or inconsistent course-level efforts. It will be more achievable when the whole process of instructional development and technology implementation systems are managed at the curricular or a program level.

BACKGROUND

Satisfying the Transfer Needs of Learning for CTE

One critical issue in developing and delivering quality CTE programs is if those CTE programs provide opportunities to acquire, apply, synthesize, and integrate students' learning experiences throughout their learning processes. Previous

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