EFFECTIVENESS OF K–12 ONLINE LEARNING

This research briefing has been produced for NACOL by its Research Committee to inform its membership.

Meta-Analyses of Research in K–12 Online Learning

In recent years, five meta-analyses have included data from studies of K–12 distance education. These studies attempt to answer the question about whether K-12 distance education is effective for fostering student learning in comparison to classroom learning.
1. Cavanaugh's (2001) meta-analysis looked at the range of distance technology used at the K–12 level. The results indicated that achievement between distance and classroom programs could be considered equivalent. The online programs showed higher effect sizes than the audio/videoconferencing programs.
2. The Shachar and Neumann (2003) synthesis found a significant positive effect for K-adult distance education programs, noting that, "in two thirds of the cases, students taking courses by distance education outperformed their student counterparts enrolled in traditionally instructed courses".
3. Ungerleider and Burns (2003) restricted their analysis to networked and online distance education programs at the secondary level and the postsecondary level. No significant difference was reported for student achievement, and a small positive effect size was found for satisfaction in classroom courses.
4. The meta-analysis of 232 studies of online and video-based learning in K–12 and postsecondary students by Bernard, et al. (2004) resulted in a small positive effect size for achievement in online learning, although online learners had lower retention rates.
5. The single meta-analysis that focused solely on the K–12 online learning delivery systems in use in today's virtual schools was by Cavanaugh, Gillan, Kromrey, Hess, and Blomeyer (2004). This synthesis found once more that achievement in online and classroom programs was approximately equivalent.

While distance and classroom learning appear to be equally effective, they are different and equally complex, serving different populations using different strategies and methods.

Research on Features of K-12 Online Education

Student characteristics. Rates of successful completion of distance education courses have improved over time as course design, instructional practice, support services, and student screening have been refined. Virtual schools provide a quality learning experience to a more "bimodal" range of students than do most traditional schools, attracting large proportions of students who are academically accelerated and students who have not been successful in face to face courses (Barker & Wendel, 2001). Successful online students are motivated, independent, self-directed (Weiner, 2003). Those students who learn when presented with sound logical theories to consider seem to perform better than students who rely upon 'hands on' experience to learn (Barbour & Cooze, 2004; Cooze & Barbour, 2007). They enjoy technology, have strong language skills, and are visual learners; they also have consistent parent support and are involved in non-academic activities (Roblyer & Marshall, 2003). They have positive attitudes and are willing to ask for help. Extroverted students are often more successful in socially interactive courses, while more introverted students tend to succeed in self-paced courses.

Instructional factors. Online students value frequent and timely responses to questions (Weiner, 2003). Communication with and feedback from instructors has been identified as the most valuable aspect of online courses (Smouse, 2005). Simultaneous use of a number of teaching and communication tools in online courses enables group collaboration, one-to-one coaching, oral practice, and other strategies that compensate for the lack of visual cues online (Murphy & Coffin, 2003; Nippard, 2005). Many online students value inter-student communication within courses (Zucker, 2005). There are many best practices

within the virtual school community, however, these are usually isolated to examples from individual virtual schools or individual teachers within a specific virtual school (Barbour, 2007a).

Course design factors. Effective online instructional strategies include collaborative project-based design (Barman, et al., 2002), clear expectations, concrete deadlines with some flexibility, outlines of course requirements, time sheets, study guides, a meaningful curriculum, and rich interactive collaboration among students and teachers (Weiner, 2003). A combination of flexibility, independence, and experience with online tools has been associated with improved critical thinking, research, and computer skills (Barker and Wendel, 2001). As virtual school opportunities continue to expand to a wider range of K-12 students, it will be important that courses are straightforward and consistent in their design, provide clear instructions and expectations, and make use of appropriate media (Barbour, 2005; 2007b).

Teacher preparation and professional development factors. Professional development for online teachers has been shown to have an effect on online and classroom-based teacher ability and on student perceptions (Zucker & Kozma, 2003; Lowes, 2005). Student perceptions of their learning environment may be related to the amount of professional development their teachers receive in technology (Hughes, McLeod, Brown, Maeda, & Choi, 2005). Teacher technology skill was identified as a significant factor affecting student success (Kapitzke & Pendergast, 2005). Professional development is required for at least three major roles in Virtual Schooling: VS teacher, VS facilitator, and VS designer. All preservice teachers would benefit from preparation as VS facilitators able to support students in their K-12 school who are learning from a VS teacher. (Harms, Niederhauser, Davis, Roblyer, & Gilbert, 2006) This also fits with a systems perspective of distance education

Technological approaches. Simulations, manipulatives, online tutoring and tutorials that offer student feedback can increase performance, decrease failure, and provide students with visual and cognitive support they need to master abstract concepts (Cavanaugh, Bosnick, Hess, Scott, & Gillan, 2005; Chen, Toh, & Ismail, 2005; Schiel, Dassin, de Magalhaes, & Guerrini, 2002).

Administrative practices. Student support services are considerable contributors to their increasing course completion rates (Good, 2005; Harlow & Baenen, 2003; Clark, Lewis, Oyer, & Schreiber, 2002). Mentors, on-site support staff, counseling, and technical support result in positive outcomes for students, while fine-grained views of data can inform teaching practice (Dickson, 2005).

For more information:

•Learning Point Associates, http://www.ncrel.org/tech/

•Michigan State University distance learning research database http://ott.educ.msu.edu/literature/

•What Works in K-12 Online Learning, ISTE, 2007

•Handbook of Distance Education, Erlbaum, 2007

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