

Tools for the Online Learner

Capsule: Effective online teaching depends on intrinsic characteristics of the student. Research has shown the two most critical factors associated with success in online learning are a student's self-management of learning and his/her comfort with online collaboration

Summary: The success of online education and knowledge dissemination not only depends on a student's technical acumen in utilizing online tools, but also factors associated with how the student learns, including study behavior, learning style, and preferences. Several studies have explored traits leading to success in online learning, where online learning is defined as not just receiving information via web-posting, but also includes utilizing interactive virtual classrooms promoting interaction with other students and instructors. Among the hypotheses and results formed by research studies (see references of Smith *et al* 2005) are that active participation, discussion, and cooperation are central to a successful online course, and that engagement in this cooperative environment benefits from a student's comfort with self-directed learning. This is indeed found to be the case in all forms of flexible delivery and resource based learning, not just online coursework. One particular tool developed to determine a student's propensity for online learning is the McVay Readiness for Online Learning questionnaire, which focuses broadly on relevant student behaviors and attitudes. A recent study by Smith and colleagues explores, in a large sample set, the validity of this tool in assessing student readiness for online learning. The tool was tested on 314 undergraduate students drawn from a variety of disciplines, after which a factor analysis of survey items was performed to identify those that were most significant. The results of this study show high factor significance in "self-directed" learning and "comfort with e-learning", analogous to prior results studying online learning identifying self-management of education and similar to the result of high aptitude for collaborative verbal/nonverbal discussion.

Implications in Engineering Education: As in other disciplines, online learning and instruction becomes more prevalent each year in engineering education. The two primary factors found in above studies which influence online learning should be considered both when developing online content, and when familiarizing students with what is expected of them in completing online curriculum. For example, as the ability to collaborate and communicate through online interaction is found to be important for student learners, instructors must ensure all students are familiar with online tools and functions at their disposal, as well as provide assignments with a required group component. Self-directed learning is an important skill for those studying engineering because they are often multi-tasking and parallel processing within and among their courses. Shifting to online instructional modules can help facilitate better access to instruction for students with overloaded academic, employment, and personal schedules, provided they have the self-motivation to actively engage in the online discussions and projects.

References: Smith, P.J. (2005) "Learning Preferences and Readiness for Online Learning" *Educational Psychology* 25: 3-12

McVay, M. (2001) "How to be a successful distance learning student: Learning on the internet" New York: Prentice Hall

Prepared by: John McMurdy, 2007 National Academies Christine Mirzayan Science & Technology Policy Fellow, *October 29, 2007*