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Using asynchronous AV communication tools to increase academic self-efficacy

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ABSTRACT

Technology-enhanced learning environments (TELEs) deliver instructional content and provide an array of scaffolding features designed to support independent student learning. TELEs also support teacher efforts to guide student inquiry within these sometimes complex environments. Self-efficacy, defined by Bandura [Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). New York: Academic Press] as a person's beliefs about his capabilities is also known to influence student academic performance in a learning environment. This paper discusses the potential importance of designing scaffolds in TELEs that intentionally promote academic self-efficacy. We advocate for designing asynchronous Audio/Visual tools into TELEs to promote student self-efficacy and ultimately performance.

1. Introduction

As technology becomes more powerful and accessible in the classroom, educators are challenged to use these tools to create and support student-centered learning environments. Technology-enhanced learning environments (TELEs), as they are sometimes known, have been increasingly studied as a way to provide a rich supportive instructional system to students (Wang & Hannafin, 2005). TELEs deliver instructional content and provide an array of scaffolding features designed to support both student independent learning as well as teacher efforts to guide student inquiry within these sometimes complex environments.

Researchers have begun to examine the role that these complex TELEs have in facilitating student learning (Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; Land, 2000; Shapiro & Roskos, 1995; Wang & Hannafin, 2005). It is believed that higher order learning outcomes like critical thinking and synthesis skills can be developed by students who interact with authentic problems in these scaffolded environments (e.g., Kozma, 1994). Learning measure has been the dependent variable studied in many TELE investigations. However, we argue that more attention needs to be paid to other benefits that may accrue to students who work in TELEs, for example, academic self-efficacy. Though a much-researched cognitive construct, academic self-efficacy is not often considered an *outcome* of an instructional treatment. This paper will discuss the potential importance of designing scaffolds in TELEs that intentionally promote self-efficacy. To lay the foundation for this argument, we first discuss self-efficacy and scaffolding broadly, then describe how scaffolds have been conceived in TELEs, before making the case that a specific type of scaffold (asynchronous Audio/Visual [AV]) could be particularly useful in promoting self-efficacy.

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2. Self-efficacy

Bandura (1994) defines self-efficacy as, "...people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave" (p. 71). While there are many factors that influence human behavior, Bandura identifies self-efficacy as a key mechanism that influences both task performance and cognitive cultivation. Individuals with a strong sense of self-efficacy will view difficult tasks as challenges that can be dealt with rather than avoided. This type of outlook, according to Bandura (1994), "...fosters intrinsic interest and deep engrossment in activities. Such an efficacious outlook produces personal accomplishments, reduces stress and lowers vulnerability to depression" (p. 71). Conversely, individuals who shy away from difficult tasks have "...low aspirations, slacken their efforts, and give up quickly" (p. 71). A person's cognitive processes are affected by self-efficacy. A high self-efficacy fosters aspirations for challenging goals and good analytic thinking. Those who have self-doubts become increasingly erratic in their analytic thinking and the quality of their performance deteriorates.

Bandura (1994) posits there are four main sources that influence efficacy. Of the four sources, *mastery experiences* is the most effective way of creating a strong sense of efficacy. A mastery experience is when a person is convinced they have what it takes to succeed because they have successfully completed the task in the past. This is important because when a person knows they can succeed at a certain task, they will persevere in the face of adversity and quickly rebound from setbacks. When a learner experiences success at a task, she is much more likely to overcome new obstacles when faced with the same or similar task.

The second of Bandura's sources of self-efficacy is *vicarious experiences*. People "...seek proficient models who possess the competencies to which they aspire" (p. 72). *Social persuasion*, the third source of self-efficacy, deals with being *told* you can or cannot accomplish a certain task; "People who are persuaded verbally that they possess the capabilities to master given activities are more likely to mobilize greater effort and sustain it than if they harbor self-doubts and dwell on personal deficiencies when problems arise" (p. 72). On the other hand, by telling someone they lack the skills or capabilities to perform a task can easily lower one's self-efficacy. The last source of self-efficacy deals with one's *somatic and emotional states*. Simply put, if a person has reduced stress, or is in a good mood, she will have increased self-efficacy related to the task at hand. Levels of stress, strength, and stamina all have an effect on a person's perceived abilities to perform a task. A caveat here though, according to Bandura (1994), is that it is very difficult to increase one's self-efficacy through verbal persuasion or reduced stress alone. Experiencing a mastery or vicarious experience has a far greater impact on raising their self-efficacy than either of the last two sources.

Academic self-efficacy pertains to student perceptions about learning. Most academic self-efficacy research is domain-specific, often focusing on math or verbal skills. According to Bong (1997), measuring academic self-efficacy has often been restricted to a specific task within a domain (such as subtraction). She found that academic self-efficacy judgments can stretch beyond specific tasks, as long as there is a perceived similarity among tasks. Academic self-efficacy, as it relates to this paper, will be used to describe a student's self-efficacy in the specific content domain covered in a given TELE, as opposed to confidence in the environment itself.

Schunk (1991) and other researchers have examined how self-efficacy can be described in academic terms. Multon, Brown, and Lent (1991) found in a meta-analysis of academic self-efficacy studies that, "...self-efficacy beliefs account for approximately 14% of the variance in students' academic performance and approximately 12% of the variance in their academic persistence" (p. 34). Lent, Brown, and Gore (1997) found that self-efficacy "...contributed most strongly to the prediction of grades in [undergraduate] math-related courses" (p. 313). Lane and Lane (2001) and Lane, Lane, and Kyprianou (2004) found similar results with postgraduate students enrolled in a business course.

Britner and Pajares (2006) studied the role of self-efficacy and science performance in middle school students (grades 5–8) and found that self-efficacy was a consistent predictor of science grades. Britner and Pajares (2001) and Pajares and Valiante's (1997) reported similar findings with academic self-efficacy and writing. Britner and Pajares (2006) found that mastery experiences, the strongest source of self-efficacy, positively predicted science self-efficacy beliefs. They suggested that learning should be authentic, inquiry-oriented science activities and recommended that teachers should scaffold these activities by tailoring them to students' developing abilities. They also recommended that teachers should scaffold student science learning activities to develop strong self-efficacy beliefs. This paper aims to present TELEs as a tool that can scaffold student learning and increase academic self-efficacy.

3. Scaffolding and TELEs

Scaffolding is a well-established method for supporting learning (Graves & Braaten, 1996; Palinscar, 1986; Rosenshine & Meister, 1992). Wood, Bruner, and Ross (1976) defined scaffolding as a method for providing assistance to students on an as-needed basis, fading the assistance as learner competence increases. While scaffolding researchers agree that scaffolding can support learning, there are many interpretations for how to best do it. Hobsbaum, Peters, and Sylva (1996) proposed two methods of scaffolding, incidental and strategic, where supporting child learners is concerned. Incidental scaffolding builds on the child's own overt intention within a shared, functional learning environment, and strategic scaffolding pertains to adult-taught strategies that enable the child to solve problems posed by a task.