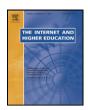Contents lists available at ScienceDirect

Internet and Higher Education

Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review

J. Broadbent *, W.L. Poon

Deakin University, School of Psychology, 221 Burwood Highway, Burwood 3125, Victoria, Australia

A R T I C L E   I N F O

A B S T R A C T

As enrolments in online courses continue to increase, there is a need to understand how students can best apply self-regulated learning strategies to achieve academic success within the online environment. A search of relevant databases was conducted in December 2014 for studies published from 2004 to Dec 2014 examining SRL strategies as correlates of academic achievement in online higher education settings. From 12 studies, the strategies of time management, metacognition, effort regulation, and critical thinking were positively correlated with academic outcomes, whereas rehearsal, elaboration, and organisation had the least empirical support. Peer learning had a moderate positive effect, however its confidence intervals crossed zero. Although the contributors to achievement in traditional face-to-face settings appear to generalise to on-line context, these effects appear weaker and suggest that (1) they may be less effective, and (2) that other, currently unexplored factors may be more important in on-line contexts.

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* Corresponding author at: School of Psychology, Deakin University, 221 Burwood Hwy, Burwood 3125, Victoria, Australia.
   E-mail address: jaclyn.broadbent@deakin.edu.au (J. Broadbent).

1. Background

Increased internet access in the past decade has led to a rapid increase in the number of students electing to undertake their higher education learning experience online, rather than in traditional face-to-face settings (Greenland & Moore, 2014). In contrast to traditional learning where student/teacher interaction and communication occur face-to-face in a classroom (Artino & Jones, 2012), online learning relies on the use of asynchronistic and synchronistic interaction and communication within a virtual environment (Ku & Chang, 2011).

Online courses have several advantages over traditional settings. Web-based learning provides flexibility and accessibility for students whose schedule or location makes it difficult to attend a physical class (Waschull, 2001). Further, students who study online, compared to those in traditional classrooms, have more opportunities to learn information, additional access to learning resources, and greater opportunities for collaboration (U.S. Department of Education, 2009). Unlike face-to-face classes, the online environment exceeds standard synchronous education where students learn at the same time and place, and provides for asynchronous learning in which space and time are not barriers (Ku & Chang, 2011).

In spite of these benefits, success in an online learning environment heavily relies on a student's ability to autonomously and actively engage in the learning process (Wang, Shannon, & Ross, 2013). Online students are required to be more independent, as the very nature of online settings promotes self-directed learning (Serdyukov & Hill, 2013). It is therefore particularly important that online learners compared to their traditional classroom peers, have the self-generated ability to control, manage, and plan their learning actions (Ally, 2004). Such a regulatory process has been referred to as self-regulated learning (SRL; Zimmerman, 2008).

The relationship between self-regulated learning and academic achievement has been theorised under the social cognitive view that self-regulated learning is acquired through a triadic interaction between three important characteristics: a) self-observation (monitoring one's actions) seen as the most important of these processes; b) self-judgement (evaluation of one's performance), and c) self-reactions (one's response to performance outcomes; Zimmerman, 1989). More importantly, this view postulates that learning is not merely a fixed trait, but can be influenced and improved with the aim of achieving successful academic outcomes (Zimmerman, 1989). Students may use a variety of cognitive, metacognitive, and resource management SRL strategies as part of their SRL behaviour (Puzziferro, 2008). Cognitive strategies such as rehearsal aim to help learners acquire knowledge at a surface level by retaining information. Metacognitive strategies refer to the awareness to monitor, plan, and regulate learning (Yukselturk & Bulut, 2007), and resource management strategies require students to use resources around them such as their peers (Puzziferro, 2008). Self-regulated learning strategies affect learning outcomes by assisting learners to acquire and retain knowledge in a structured and methodological way. Strategies are part of the SRL process and are specific skills that can be taught to students to put into real world practice (Zimmerman, 1989). The application of SRL strategies typically predicts high academic achievement in the traditional learning environment (Wang et al., 2013).

Academic achievement (in both traditional and online learning settings) can be generally defined as achieving a particular result in an online assignment, exam, subject, or degree, and is ordinarily expressed in terms of a numerical grade or grade point average (GPA; Richardson, Abraham, & Bond, 2012). Research has shown positive relationships between the use of SRL strategies and academic outcomes in traditional learning settings (Beishuizen & Steffens, 2011; Dignath & Buttner, 2008; Pintrich, 2004; Richardson et al., 2012; Zimmerman, 2008). Within the traditional learning environment, the SRL strategies with the strongest findings are metacognition, time management, and effort regulation (Richardson et al., 2012). However, little comparative research has been conducted on the use of SRL in the online learning environment to determine whether these strategies are of equivalent use. Exploration of predictors of online learning success is becoming increasingly important as more students are taking advantage of the flexibility and accessibility online courses.

The aim of this review was to understand how students could best apply self-regulated learning strategies to achieve academic success within the online environment. This was achieved by evaluating empirical studies from the last decade that have examined SRL strategies associated with academic outcomes in online settings. Specifically, this review investigates which learner self-regulation strategies are correlates of academic achievement in online higher education environments. This review adhered to guidelines set by the PRISMA statement for systematic reviews (Moher, Liberati, Tetzlaff, & Altman, 2009).

2. Methods

2.1. Eligibility criteria

Papers were restricted to peer reviewed journal papers published within the last decade in English language journals between the years 2004 to Dec 2014.

2.2. Search strategy

The search strategy encompassed systematically reviewing peer-reviewed published papers with an initial database search of PsycINFO, CINAHL Complete, ERIC, MEDLINE, and psychARTICLES. This search was undertaken for papers that explored SRL strategies and academic achievement in online higher education settings with the aim of maximising relevant findings for papers published within the last decade. The key terms used are shown in Box 1. This search was performed in Dec 2014.

2.3. Types of studies

All studies were required to examine the application of SRL strategies by students who enrolled in an online or web-based course where the outcome variable was based on academic achievement. Studies involving solely traditional classroom learning, blended/hybrid learning environments, or used combined SRL strategies instead of single strategies were excluded. Self-regulated learning strategies that have been clearly identified within the SRL literature were included.