Study Skills:

A Research Review of the Cognitive Processes, Interventions, and Positive Outcomes

The purpose of this paper is to offer a comprehensive overview of current research on the development of student study skills, including the cognitive processes, interventions, and positive outcomes for the development of study skills across a diverse scope of academic content areas, and for multiple types of learners.

Overview of Study Skills

Study skills are comprised of a range of integrated neurological systems that enhance the efficiency and capability of a students' ability to gain, retain, and process information.

Study skills can be looked at from two distinct, and equally important, factors of academic and nonacademic processes (Crede' and Kuncel, 2008). Academic aspects of study skills include organizational and time-management techniques, information processing, memory procedures, and metacognitive comprehension (Awang & Sinnadurai, 2011). Nonacademic aspects are the mindset of successful studying, such as perseverance, motivation, self-efficacy, and the desire for growth and improvement (Putwain, Sander & Larkin, 2013).

According to Bandura's research on self-efficacy, this mindset is a stronger predictor of success than ability within a subject, and can be transferred to, and cultivated in, students (Bandura, 1986). Thus, the makeup of study skills must be evaluated and measured with two perspectives: (1) factors such as study tactics and habits, and (2) factors such as mindset and self-efficacy.

Cognitive Requirements for Proficient Study Skills

Proficient study skills are made up of specified techniques and strategies, application of these intohabit, and the motivation to press forward with attendance to the task. First and foremost, study skills must be taught, modeled, and practiced so that students can then apply the techniques independently (Kartika, 2007). These tactics may include note-taking, repetition, visual and auditory attention, organizational tools, active review, and time management. Effective studying requires specific training and consistent practice with tactics that help a learner to access, retain, organize, and apply information.

Secondly, proficient study skills require individual purposefulness, apart from the comprehension and application of techniques. This purposefulness differs from the incidental learning that may occur in a classroom setting because it requires deliberate and focused effort by the learner (Gardner, 2009). Studying is an individual and personal practice, as opposed to being in a classroom and listening to instructors and classmates. Therefore, motivation (e.g., initiative, persistence, work ethic) is a vital factor for efficient and fruitful studying, not only during the early gaining of study skills, but additionally for learning beyond traditional academic settings (Darwin, 2011).

Interventions: Study Skills Training

Effective study skills must be comprised of specific tactics and/or strategies, which can consistently be drawn upon by the learner as a means of organization, retention, and processing of information (Kartika, 2008). For example, a study tactic could be a specific procedure, such as

underlining, note-taking, and summarizing. Such techniques are often taught through instruction wherein the skill is presented, but not practiced; therefore, the flawed assumption that knowing study tactics equates to effective studying. In fact, routine teaching of study habits and extensive study hours had no measurable effect on the success of students evaluated (Darwin, 2011). Merely teaching a sequence of behaviors does not necessarily encourage students to plan, think about, use, or monitor their studying.

Study Skills Via Traditional Education

Instead of simply transmitting the content of information (study tactics) to a learner, the goal of effective study skills instruction is to empower a student with metacognitive processing that can ultimately be applied to ongoing and diverse topics (Feurerstein & Falik, 2010). Such tactics are best instructed in a manner that is both effective (the strategy is learned) and efficient (it is learned to an optimal level with minimal effort). However, the prevailing instructional approaches in US schools do not address the underlying processes for successful studying and efficient learning (Feuerstein & Falik, 2010). Unfortunately, students are expected to understand and employ study skills with completion of homework or prepping for tests, yet teachers ordinarily spend little time offering instruction and practice in such techniques (Zimmerman, 1998).

Empirical Research on Study Skills Training

Because the application of study skills is so closely correlated with academic achievement, there exists a flood of studies on the subject. The ideal environment for teaching study skills is within a classroom setting, and as part of the curriculum for elementary grades through high school. However, research documents the lack of training in study skills and habits among public school educators, and particularly teachers within primary grades (Cornick, Guy, and Beckford, 2014). Curriculum for presenting learners with specific study techniques does not exist as a requisite and is seldom available within US schools, despite the fact that research confirms overall improvements in academic achievement when students apply good study skills (Demir, Kilinc, Dogan, 2011).

Teachers within primary schools should be teaching study tactics, which can then become study habits and ultimately improve student motivation, self-efficacy, and achievement in later grades. Interviews with middle school teachers in one study revealed a lack of study skills instruction within the classroom and a significant lack of study skills knowledge among educators (Thorpe, 2010).

Research on the efficacy of focused study skills programs within higher education points toward a need and a solution which offers positive outcomes for students, yet would be most efficient if applied sooner and more consistently (Smith, Groves, Bowd, & Barber, 2012; Shetty & Srinivasan, 2014). In fact, university students who had been placed on academic probation were found deficient in the study skills needed to complete postsecondary education (Renzulli, 2015).

Positive Outcomes: Evidence-Based Correlates of Improved Study Skills

Academic success is foundationally correlated with the acquisition and application of study skills, across a myriad of academic content areas, and for a variety of learners (Gettinger, Seibert, 2002; Awang & Sinnadurai, 2011). As expected, research confirms that improved study skills correlate to a higher GPA for learners of both genders, across a diverse spectrum of socioeconomic levels and within a variety of academic fields (Al-Hilawani, 2016). According to Feurerstein and Falik (2010), it is more

effective to incorporate a diverse and thorough cognitive approach to education than the traditional adherence to curriculum-based rote memorization and repetition. Teaching students the skills and habits of efficient studying contributes large dividends to their ongoing ability to learn and master information (Entress & Wagner, 2014).

Academic success is also fundamentally accompanied by the presence of a student's motivation and self-efficacy. The learner's work ethic, motivation, and perseverance have been determined as important as academic components (Yu, 2011). This aspect of intellectual prowess has been increasingly researched as a contributing factor of scholarly success, with correlates that outweigh traditional academic measures, such as grade point average (Niessen, Meijer, & Tendeiro, 2017). According to current research, self-efficacy is a byproduct of a student's acquisition and application of proficient study skills, and the two factors are mutually beneficial (Wernersback, Crowley, Bates, & Roshenthal, 2014). In other words, the development of study skills and self-efficacy create an environment of progressive motivation and study efficiency; study skills training increases self-efficacy, which leads to improved academic performance (Boysen & McGuire, 2005).

StudyRx: Cognitive Training to Impart Proficient Study Skills

With such robust evidence of the impact study skills have on a learner's academic achievement, one would expect to see an abundance of effective programs to develop such skills. However, the content-based approach employed by US public schools is intended to focus on the transmission of information, without cognitive training that increases operational thinking and self-efficacy (Feuerstein & Falik, 2010). It is precisely this integration of both cognitive and non-cognitive aspects that facilitates proficient study skills and subsequent academic prowess.

Study skills must be taught, practiced, and ingrained into habitual use, which in turn improves confidence, work-ethic, and inner motivation (self-efficacy). According to Dweck (2015), this growth mindset is a learned characteristic, which can and should be systematically taught, encouraged, and cultivated. Her research confirms that students with a mindset of cognitive growth as a realistic and scientific process exhibit academic improvement and increased self-efficacy. The StudyRx cognitive training program comprehensively addresses both the intellective and non-intellective aspects required for proficient study skills. The student meets one-on-one with a certified trainer in a clinical setting for instruction in basic study skills, which are then practiced, encouraged, and refined throughout the course and training. The trainer provides information for practical study tactics and techniques, while also addressing a growth mindset through goal setting, motivation for improvement, perseverance in the face of obstacles, and self-efficacy. The 12 training concepts within StudyRx are as follows:

1) A mindset for success
2) Goal-setting strategies
3) Improved perseverance
4) Organizational skills
5) Better study habits
6) Improved essay writing
7) Visualization and memory skills
8) Stronger note-taking skills
9) Enhanced test-taking abilities
10) Homework success strategies

11) Planning and prioritizing skills
12) Improved time management skills

These procedures and concepts build on one another. In accordance with Bandura's seminal work on self-efficacy, the StudyRx trainer begins by modeling skills and techniques, then creates experiences of mastery during training, verbally encourages the student with dynamic feedback, and trains the student in stress management (Bandura, 1982). This diverse approach addresses both the cognitive and non-cognitive aspects needed for acquiring proficient study skills.

StudyRx is offered at LearningRx centers across the US and abroad, as a standalone training or supplemental to other cognitive training programs, such as ReadRx, MathRx, or ThinkRx. Each of these programs also employs the same model of addressing both cognitive and non-cognitive aspects of learning and helps facilitate a student's progress in the subject area, as well as improved motivation and self-efficacy. StudyRx is designed to include eight 90-minute sessions of one-on-one training for a student, which can be completed in two to four weeks. To increase relevancy, the procedures incorporate a student's current school projects and coursework where possible. Evidence confirms that learners from middle school through high school and beyond who pursue and acquire proficient study skills will benefit academically across a variety of subjects, and with resulting improvements in motivation and self-efficacy.

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