PROMOTING STUDENTS' SELF- REGULATION IN VOCABULARY ACQUISITION WITH THE SUPPORT OF WEB- BASED PEDAGOGICAL TOOLS

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One of the essential purposes of successful vocabulary instruction is to prepare learners to be independent and strategic in word learning. In comparison with the research in language learning strategy area, Self-Regulated Learning (SRL), a multidimensional construct, has been frequently investigated outside of the ESL/EFL context. This article discusses how SRL concepts can be incorporated into the language strategy instruction to promote ESL/EFL learners' self-regulation and achievement in vocabulary learning. In addition, in contrast to the traditional strategy instruction in the classroom, the potentials of web-based technological tools in supporting self- regulated learning have been investigated and advocated by some researchers since the last decade. This paper provides some recommendations on how to promote self-regulatory strategies in vocabulary learning using Web-Based Pedagogical Tools (WBPT). With a theoretical basis of social cognitive learning theory, this paper provides: (a) an overview of the nature and processes of SRL; (b) a description of research in the language learning strategies area and the implications of SRL in language learning strategy model; (c) discussion of the current approaches for vocabulary learning and independent vocabulary learning strategies; (d) a suggested model on promoting self- regulation strategies in vocabulary learning; (e) specific recommendations on how to operationalize self-regulation strategies for vocabulary learning using WBPT in an on-line learning context.

Keywords: Self-regulation, vocabulary acquisition, web-based pedagogical tools

In an age marked by the information explosion and globalization, it appears very important, especially for non- native English speakers to be equipped with competency in English so as to get ready access to a large amount of information and knowledge to upgrade themselves in meeting the increasing demands of employment and competition in society.

Vocabulary, as an internal link among all language skills has been considered as one of the deciding factors for success in language acquisition (Jordan, 1997). In the case of reading, the adequacy of vocabulary plays a vital role for L2 readers to comprehend a text (Cunningham & Stanovich, 1997; Nation, 1990, 2001; Nichols & Rupley, 2004; Tiffany, 2003).

Given a large amount of words in English, it is not possible to teach all the words within the limited instructional time, and most of the time learners have to learn vocabulary on their own. Thus, one of the major goals of vocabulary instruction is to instruct students in learning how to learn words (Diamond & Gutlohn, 2006; Graves, 1987). Upon reviewing the literature, many researchers have concluded that the acquisition of Vocabulary Learning Strategies (VLS) is crucial in improving second/foreign language vocabulary proficiency and to prepare strategic and independent word learners (Derin & Cenqiz, 2007; Gallo-Crail, & Zerwekh, 2002; Nation, 2001; Stoller & Grabe, 1993). Learners should be equipped with independent Vocabulary Learning Strategies (VLS), such as using context clues, word analysis and effective dictionary usage to enable them to profit from incidental vocabulary exposure via reading (Nation, 2001; Schmitt, 2000; Sokmen, 1997; Stoller & Grabe, 1993).

To date, extensive researches on learning strategies have been conducted in both Second Language Acquisition (SLA) and educational psychology areas (Kudo, 1999; O'Malley & Chamot, 1990). In SLA, both metacognitive and cognitive strategy use play a key role in promoting a strategic and independent language learner (Hunt & Beglar, 2005; O'Malley & Chamot, 1990). Metacognitive

strategies function as an executive control consisting of planning, monitoring and evaluating the learning process through which cognitive strategies, that is, task-specific methods are implemented.

Parallel to the conceptions on learning strategies in SLA, in the cognitive psychology area, Self-Regulated Learning (SRL) has been embraced by many educationists and researchers since the early 1980s. SRL, a multidimensional construct, involves all cognitive, metacognitive, motivational, environmental and social aspects of learning and explains the interactive relationship between these components (Boekaerts, 1999; Souvignier & Mokhlesgerami, 2006; Zimmerman, 1989a).

So far, a number of models of SRL have been proposed, and many researchers suggest that learning strategies should be applied within a SRL framework to empower the effectiveness of strategy use and students' academic performance (Butler, 1994; Souvignier & Mokhlesgerami, 2006; Tseng, Dornyei, & Schmitt, 2006; Zimmerman et al., 1996).

Based on the theoretical and practical investigations in both SRL and learning strategy in L2 vocabulary acquisition areas, this paper provides a view on embedding the notions of SRL into vocabulary learning strategy instruction to promote learners' self-regulatory strategies and achievement in vocabulary learning.

In implementing learning strategy instruction, with the ease of Internet access and advances in technology, the boundaries of the traditional classroom teaching and learning have been redefined (Dabbagh & Kitsantas, 2005). Compared with the traditional strategy instruction in the classroom, web-based technological tools have been considered as a useful means to support development of self-regulatory skills (Dabbagh & Kitsantas, 2004). Based on the SRL model from the social cognitive learning perspective, this paper provides some recommendations on how to promote self-regulation strategies for vocabulary learning using Web-Based Pedagogical Tools (WBPT).

Definitions of Self-Regulated Learning

From the word "self-regulation" itself, as Garcia (1996) pointed out, there are two terms underlying the concept of self-regulated learning. One is "*self*-regulation". It stresses the role of individuals who rely on their own resources, proactively seek information or opportunities, and autonomously implement selected strategies or skills in a strategic and volitional way; the other is "self-*regulation*", namely, goal-setting and the actions or strategies regulated and controlled toward achieving the learning goals.

A wealth of research has focused on these two aspects of Self-Regulated Learning (SRL), self and regulation, and produced various definitions of SRL based on different theoretical frameworks and constructs. Zimmerman and Martinez-Pons (1986) captured a common theme that cut across most of the definitions of SRL and described self-regulated learners as metacognitively, motivationally and behaviorally active participants in the learning process. To specify the meaning of SRL, Zimmerman (1990) identified the three key features of self- regulated learning.

First is the systematic use of metacognitive, motivational and behavioral strategies. This is the most important feature of SRL that distinguishes self-regulated learners from others. In terms of metacognitive process, self-regulated learners are described as self-aware, knowledgeable, and decisive by using planning, goal-setting, organizing, self-monitoring and self-evaluation strategies to manage their learning processes. In terms of motivation, self-regulated learners always have high self-efficacy and intrinsic task interest, and display extraordinary effort and persistence in their learning. As for the behavioral process, they usually proactively seek information and assistance, select, structure and create an environment that will optimize their learning.

Second is the self-oriented feedback loop. It is a cyclic process subsumed in each personal, behavioral and environmental process of SRL through which learners self- judge the effectiveness of each learning strategy and react to the feedback in different ways, which might be covert changes, such as enhanced self-esteem or the overt behavioral changes, such as, using a different strategy for a specific task.

Third is the interdependent relationship between learning behavior and motivation. As discussed earlier, the word self-regulation itself indicates that self-regulated learners integrate both skill and will in their learning. In other words, the process of self-regulated learning should not only involve the use of cognitive and metacognitive skills and knowledge to self-direct their learning

process but more importantly, the use of motivational processes, such as extrinsic motivation (e.g., obtaining a good grade, graduate employment), intrinsic motivation (e.g., self-esteem or self-actualization), or others, such as self-efficacy and achievement success. These motivational processes and students' learning behaviour are interdependent; for example, students who have high self-efficacy tend to use more strategies to direct their learning, and the outcomes of their learning behavior will enhance their self-efficacy. Moreover, integrating both behavioral and motivational processes in learning makes self-regulated learners proactively seek opportunities to learn rather than being merely reactive to the learning outcome.

Self-Regulated Learning from the Social Cognitive Learning Perspective

The concepts of self-regulation have been applied in academic learning since the 1980s, and have been investigated through different theoretical perspectives ranging from pure behaviorism to the cognitive, phenomenological and volitional view (Zimmerman, 1989b). Zimmerman (1989b) briefly reviewed six influential theoretical perspectives, namely, operant, phenomenological, social cognitive, volitional, Vygotskian and cognitive constructivist view of SRL. Most theoretical views of SRL focus on three main issues, namely, metacognitive processes focusing on planning, monitoring and evaluation; motivational processes including self-efficacy and self-attribution; and behavioral processes such as choosing, adapting and creating the environment for learning (Anderton, 2006; Zimmernam, 1989a; Zimmernam & Martinez-Pons, 1986).

In comparison with other theoretical perspectives, SRL from the Social Cognitive Learning (SCL) perspective offers a more inclusive explanation of students' self-regulation in learning. Different from the behavioral view of SRL, which focuses on the external factors as reinforcing stimuli in self-regulation of behavior, SCL emphasizes more on personal processes, such as self-efficacy as well as environmental influences of learning. Unlike the pure cognitive approach, SCL links the personal processes (mental processes) with social and behavioral functioning. In other words, the mental processes, such as self-observation, self-evaluation and self-reflection are overtly manifested during behavioral and environmental functioning (Zimmerman, 1989b); moreover, they are reciprocally interrelated with the key personal factors, namely self-efficacy and intrinsic motivation (Zimmerman, 1989b).

Zimmerman (1989b) identified the three advantages in investigating SRL based on social cognitive learning theory. First, it identifies the effects of personal influences, such as, self-efficacy on overt behaviors; second, it shows the linkage between students' self-regulatory processes and specific social learning (i.e., vicarious learning or modeling) or behavioral enactive (i.e., self-experiential learning experience), and identifies the reciprocal relationship among these factors. Third, self-efficacy and strategy use are clarified as two key factors to achieve self-regulation in academic learning, and it further explains their relationship with students' motivation and academic achievement in school. Zimmerman (1989b, p. 337) claims that "a social-cognitive learning approach renders students' self-regulated learning processes observable and trainable through specific experience, it should prove helpful in guiding academic analyses and interventions."

Bandura (1986) identified three subfunctions of self-regulation, namely, self-observation, self-judgment, and self-reaction. Self-observation means that students systematically self-monitor their learning process (Zimmerman, 1989b). It has two important functions in the process of SRL, namely, providing learners with information for setting realistic learning objectives and evaluating ongoing behavior changes (Bandura, 1986). Self-observation is affected by both personal and behavioral processes, such as, self-efficacy, goal-setting and metacognitive planning. Self-judgment or self-evaluation refers to students' systematic comparison of their performance with a predetermined standard or goal. Self-reaction involves the personal processes, such as self-efficacy, goal-orientations and attributional beliefs (Bandura, 1986).

Based on the social cognitive learning theory, Zimmerman (1989b, 2000) proposed a triadic view of SRL. It is assumed that the three key processes -- personal, behavioral and environmental influences -- reciprocally interact with each other during the self-regulated learning process, and learners who are able to exert strategic control over each influence can be considered as self-

regulated in their learning. The interactive relationship between the three influences is visualized in Figure 1.

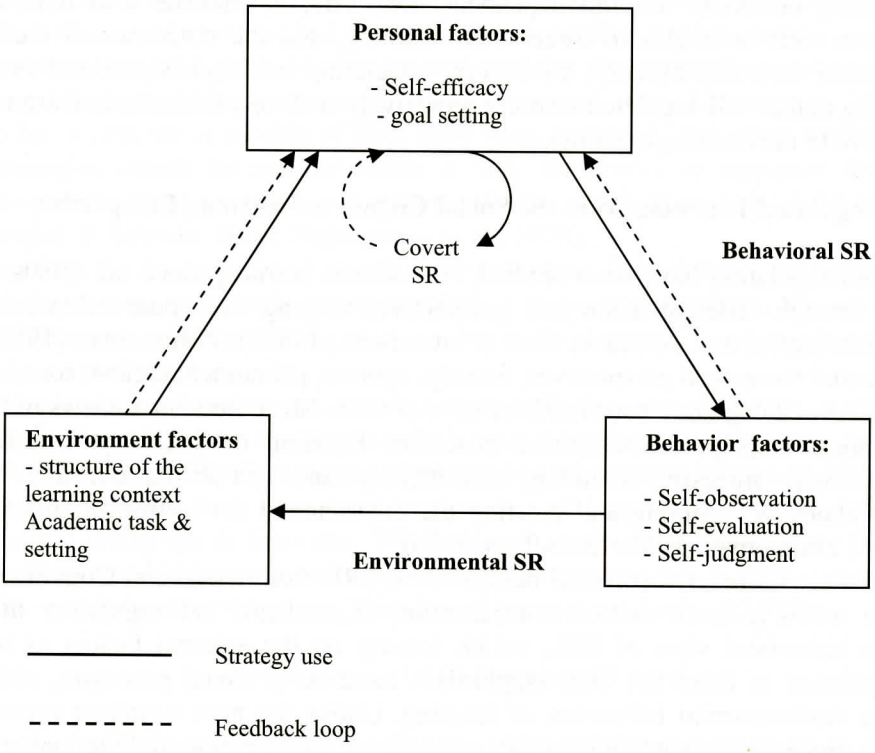

Figure 1. A triadic analysis of self-regulated functioning

Source: Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81*, p. 330.

Personal factors refer to beliefs and attitudes learners have in a certain learning situation, such as self-efficacy, that is, the degree of confidence one possesses in reaching target learning goals in a given learning situation (Bandura, 1986); behavioral factors involve responses or reactions made in a given learning situation; environmental factors are external as opposed to internal control of personal factors, such as curriculum modules and materials, and the role of teachers, parents, and peers during the learning process (Zimmerman, 1989a, 2000).

The most important personal factor, self-efficacy plays a central role in behavioral and environmental self-regulation (Zimmermam 1989a, 2000). For example, students with high self-efficacy tend to display better quality learning strategies to monitor their learning behavior and construct the learning environment.

Zimmerman (1989a) categorized the three sub-processes, namely, self-observation (i.e., self-monitoring), self-judgment and self-reaction, which were assumed to interact in a reciprocal way during the SRL process. Self-monitoring refers to students' systematic control of their learning progress by verbal or written reporting of their performance, for example, recording the words they got wrong in reading; self-judgment is the process whereby students systematically compare their performance with external standards or self-set learning goals; self-reaction to performance includes making changes according to self-judgment feedback, and it involves personal processes, such as goal- setting, self-efficacy, and metacognitive planning.

As self-efficacy beliefs control and monitor the behavioral and environmental self-regulation, behavioral and environmental influences in turn affect students' personal processes. For example, self-recording correct answers obtained from a test paper will certainly enhance students' self-efficacy.

Environmental influences in turn affect the self-learning system in three ways. First, it fosters development of the three subfunctions of SRL; second, it provides partial support to the internal standards; and third, it facilitates adaptive use of self-regulated learning processes (Bandura, 1986).

Based on this initial view of SRL from the SCL perspective, Zimmerman (1989a) identified those students who can exert strategic control over each of the three SRL influences, namely, personal influences (i.e., students' self-efficacy in academic learning), behavioral processes (i.e., self-observation, self-judgment, and self-reaction), and environmental influences (i.e., physical context and social experience) as self-regulated learners.

But how are these self-regulation processes structurally interrelated with one another? Zimmerman (2000) proposes three cyclic phrases to categorize self-regulatory processes and personal beliefs (see Figure 2). The first phase called the forethought phase maintains task analysis and self-motivation. During this process, self-regulated learners form a full picture of the task in terms of situational factors and personal factors. Situational factors involve clarifying a task, setting goals, and planning specific strategies; personal factors involve setting up motivational beliefs about the task, such as self-efficacy beliefs or the perceived capability to finish the task and self-expected outcomes.

Second is the performance phase that includes self-control and self-observation. Self-control refers to carrying out the strategies and tactics specified in the first phase by using self-control methods, such as, attention-focusing, using imagery, self-instruction, and task strategies. Self-observation means self-recording events to control learning behavior or self-experimentation to find out the cause of these events. For example, students self-record the time spent on homework.

The last phase is self-reflection which includes self-judgment and self-reaction during which students self-evaluate their performance against their prior performance or external standards set by others, and then reconstruct new information and make adaptive strategy changes toward their learning goals.

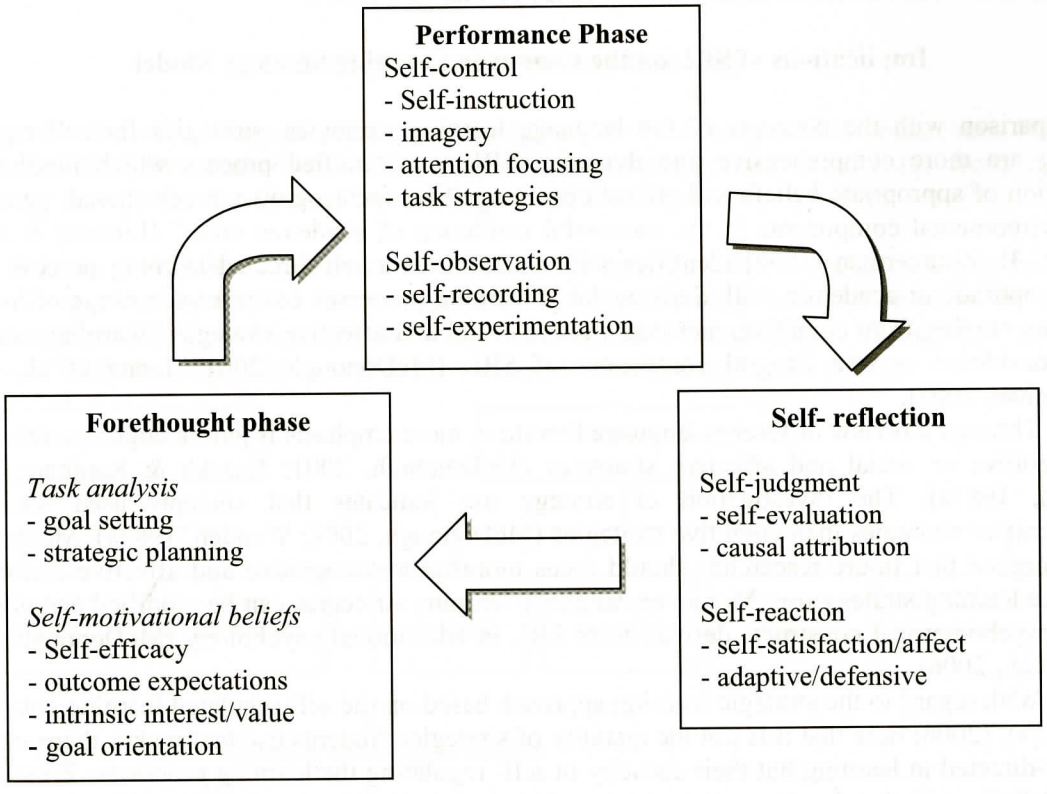

Figure 2. Phases and subprocesses of self-regulated learning (SRL)

Source: Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, and M. Zeidner (Eds.), "*Handbook of Self-regulation.*" Academic Press.

Learning Strategies in Second Language Acquisition

In the early 1970s, research focus in second language learning and teaching shifted from methods of teaching to the study of how learner behaviors affect language acquisition (Brown, 2000; Rubin, 1987; Schmitt, 1997; Wenden, 1987a). The extensiveness of the research is especially appreciated in studies on areas such as "self-direction", "self-instruction", and "autonomous learning", all of which reflect the ideas of self-regulated learning to some extent (McDonough, 2001). For example, self-directed learning and learner autonomy have emphasized learners' self-control and self-responsibility in their learning process and the role of motivation and volition in learning (Abdullah, 2001).

One of the basic justifications cutting across the concepts, such as learner autonomy, and self-instruction in language education, is to help students learn how to do (Benson, 1997; Dickinson, 1987). It has contributed to the research thrust on investigating student learning strategies, which has been greatly researched and advocated that language learners can achieve self-direction in learning by using learning strategies (Griffiths, 2004; O'Malley & Chamot, 1990; Oxford, 1990; Rubin, 1987; Wenden, 1991).

So far, researchers have formulated various interrelated language learning strategies, which are generally classified into three main areas, namely, metacognitive, cognitive, social-affective strategies (Chamot, 1987). Brown and Palincsar (1982, cited in Chamot, 1987) clarified the distinction between metacognitive and cognitive strategies, that is, metacognitive strategies refer to selective attention, planning, monitoring and self-evaluating the learning process, and these strategies can be applied to all types of tasks, while cognitive strategies, which are more directly related to a specific learning task, involve the process of manipulating and transforming the learning materials, such as using rehearsing, organizing, summarizing, transferring and elaboration strategies. Besides, other strategies, such as cooperative learning, seeking social assistance and emotional control are categorized as social-affective strategies (O'Malley & Chamot, 1990).

Implications of SRL on the Language Learning Strategy Model

In comparison with the concepts of the language learning strategies, strategies for self-regulated learning are more comprehensive and dynamic. SRL is a "unified process which involves the integration of appropriate beliefs and utilisation of cognitive, metacognitve, motivational, perceptual and environmental components in the successful resolution of academic tasks" (Lindner & Harris, 1993, p. 3). Zimmerman (1998) identifies self-regulation as a self-directed learning process rather than an aptitude or academic skill. Self-regulated learning processes cover a wide range of learning behaviors ranging from cognitive, metacognitive to social and affective strategies; learning strategies were considered as one integral component of SRL (McDonough, 2001; Tseng et al., 2006; Zimmerman, 2001).

Through a review of foreign language literature, more emphasis is put on cognitive other than metacognitive or social and affective strategies (McDonough, 2001; Rasekh & Ranjbary, 2003; Wenden, 1987a). The investigation of strategy use indicates that students used far fewer metacognitive strategies than cognitive strategies (McDonough, 2001; Wenden, 1987a). McDonough (2001) argued that future researches should focus more on metacognitive and affective factors that influence learning strategy use. Moreover, language learning strategies can be modified and enriched by the psychometrical constructs derived from SRL in educational psychology (McDonough, 2001; Tseng et al., 2006).

With regard to the strategic learning approach based on the self-regulated learning constructs, Tseng et al. (2006) note that it is not the quantity of strategies students use that makes them strategic and self-directed in learning but their capacity in self- regulating the learning processes. Zimmerman et al. (1996) posit that learning strategies can be taught to students of different levels, but their effectiveness depends on whether they are integrated within a larger framework of self-regulated learning processes. In other words, students should be able to manage the learning process through which their learning strategies will be selected, self-monitored and evaluated. Butler's study (1994) also concludes that enhancing strategic learning requires supporting students to engage in the cycle of self- regulated learning activities as they confront learning tasks. Above all, to develop strategic

learning among ESL learners, it has been claimed that the research area of language learning strategies should shift from the focus on "product" or the specific individual techniques applied during learning, to the "self-regulatory processes" (Weinstein, Husman, & Dierking, 2000; Tseng et al., 2006).

Comparing the concepts of self-regulated learning that emerged in the areas of educational psychology and the researches in language education, some researchers suggest that the knowledge from these two areas can greatly benefit each other (Gao, 2007; McDonough, 2001). Future researches in foreign language study can be enriched and enhanced by considering the notions of self-regulated learning to fully conceptualize learner behaviors in second/ foreign language learning (McDonough, 2001; Tseng et al., 2006).

Approaches of Vocabulary Learning

There are two main approaches of vocabulary acquisition, namely, explicit and incidental learning (Schmitt, 2000). Explicit vocabulary learning refers to the direct learning of vocabulary information and skills. In contrast, in incidental learning, information or skills of learning a new word are obtained during the learning for communication purposes (Schmitt, 2000). Huckin and Coady (1999) agree that apart from the first few thousand most common words that need to be explicitly taught, most vocabulary is acquired by learners through incidental vocabulary learning. Schmitt (2007) posits that there are two vital factors of incidental vocabulary learning, namely, reading and instruction on key vocabulary learning strategies. Extensive reading maximizes learners' exposure to vocabulary learning, such as graded readers, authentic texts, narrow reading, and extensive reading. In addition to such language input, learners should be equipped with strategies to help them cope with the vocabulary they meet in context.

Strategies for Vocabulary Learning

To date, a number of typology of vocabulary strategies have been developed by researchers. Williams (1985) identifies five trainable word recognition strategies, namely, inferring from context, identifying lexical familiarization, unchaining nominal compounds, synonym search and word analysis.

Schmitt (1997) developed a more comprehensive taxonomy of vocabulary learning strategies, which are organized around the four categories of language learning strategies proposed by Oxford (1990), namely social, memory, cognitive and metacognitive categories of LS and the two main domains of VLS, discovery and consolidation strategies identified by Nation (1990).

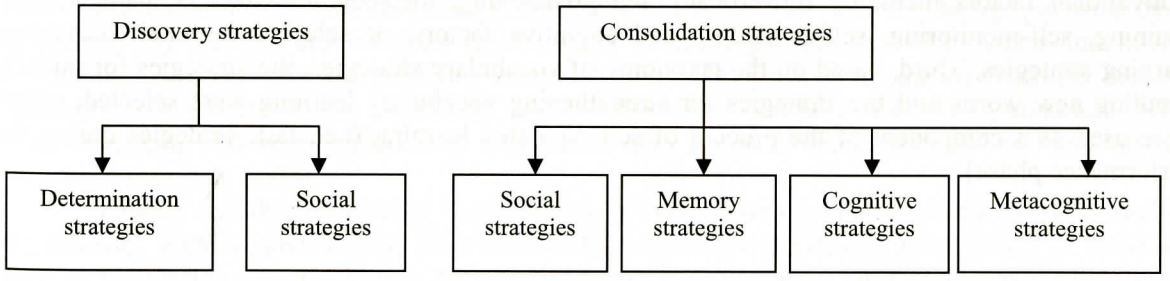

Figure3: Taxonomy of vocabulary learning strategies

Source: Schimitt, N. (1997). Vocabulary learning strategies. In N. Schmitt and M. McCarthy (Eds), "*Vocabulary: Description, Acquisition and Pedagogy*". New York: Cambridge UP

Gu and Johnson (1996) developed a taxonomy of VLS based on the responses of a group of Chinese learners to a self-report questionnaire. It covered both cognitive and metacognitve strategies for vocabulary learning. Metacognitive strategies involve selective attention and self-initiation in vocabulary learning; cognitive strategies refer to guessing, dictionary use, note-taking, rehearsal, encoding and activation strategies. Jurkovic (2006) categorizes VLS into contextualized strategies such as guessing using contextual clues, and decontextualized strategies, such as grouping, placing new words in a context, translating, using imagery, and key words strategies.

Promoting Strategic and Independent Word Learners

So far, a number of studies indicate that vocabulary strategy instruction plays a critical role in promoting independence in vocabulary acquisition (Gu & Johnson, 1996; Lawson & Hogben, 1996). Teaching word learning strategies has been considered as an essential component of effective vocabulary instruction (Graves & Fink, 2007). However, most studies on vocabulary strategy instruction emphasize individual cognitive-based strategies rather than the joints effects of the combined use of strategies. Moreover, little concern was given to metacognitive and motivational regulation of strategy use.

In order to encourage learner autonomy in vocabulary learning, Nation (2001) identified three essential factors, namely attitude, awareness and capability. Attitudes refer to needs or wants for learners to take responsibility for vocabulary learning; awareness indicates if learners are aware of their effort in using different approaches and self-reflect and check the effectiveness of using these techniques and their vocabulary learning progress. In this aspect, metacognition plays a key role in raising learning awareness; capability refers to skills and knowledge required for vocabulary learning.

Drawing upon the work of SRL, this paper argues that the concepts of vocabulary strategies can be enriched by incorporating the notions of self-regulation into the vocabulary strategy instruction. The cyclic self-regulation process was used as a structural framework for designing and developing strategy instruction for vocabulary learning. The underlying theoretical notion is that the use of a learning strategy will be empowered when it is integrated within the self-regulated learning process. In other words, the use of strategies should be goal-oriented, self-monitored and self-evaluated. Figure 4 presents a proposed model of self-regulated processes and strategies for vocabulary learning.

First, in the center, it indicates the main purpose of the instruction, namely, promoting independent and strategic word learners, which provides a basis for designing and developing the instruction. Second, based on the cyclic processes of self-regulation proposed by Zimmerman (1998), that is, forethought, performance or volitional control and self-reflection phase from the social cognitive learning perspective, the strategies for self-regulated learning were identified. It consists of motivational factors including self-efficacy and goal-setting, metacognitive factors, namely, self-planning, self-monitoring, self-evaluation and cognitive factors, or selected essential vocabulary learning strategies. Third, based on the taxonomy of vocabulary strategies, the strategies for initially handling new words and the strategies for strengthening vocabulary learning were selected, which were used as a component of the process of self-regulated learning (i.e., task strategies during the performance phase).

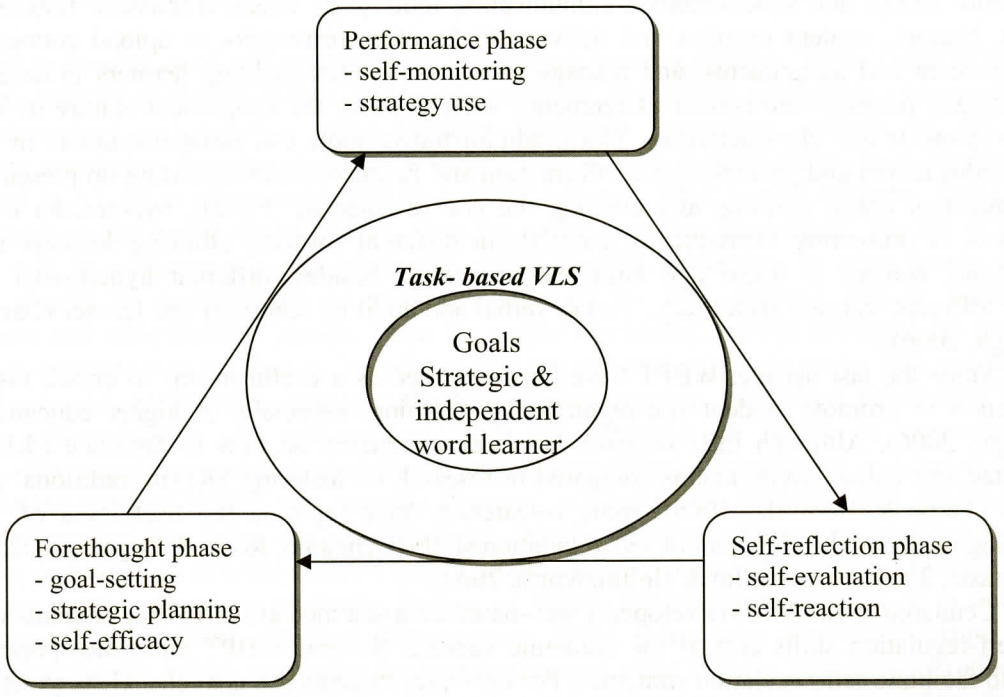

Figure 4. Proposed model of self-regulated learning processes for vocabulary learning

Web-Based Pedagogical Tools and Self-regulation in Learning

Tuckman (2003) notes that academic tasks in higher education require more self-regulation and higher-level thinking skills for academic success compared to the secondary school level. In the traditional college classroom, the large number of students might result in limited student-teacher interaction and suppressed development of learners' self-regulation skills (Dabbagh, 2006). Currently, with easy Internet access and advanced technology, many courses have been delivered online, enabling learners to access subject resources anytime and anywhere; In contrast to traditional classroom teaching and learning, online learning offers several advantages in developing students' self-regulation in learning: (1) online learning highly requires individual learners' abilities in directing and managing the learning process; (2) learners are required to actively explore and construct knowledge and information in the online learning context rather than passively being spoon-fed by the instructor; (3) learners are involved in making a choice regarding the what, when and how of conducting learning tasks and activities delivered online; (4) the hypermedia environment demands learners make judgment and effectively manage the online learning resources (Anderton, 2006). Online learning has been regarded as a potential area for developing students' self-regulation in learning (Anderton, 2006).

Among all the web-based technologies, Course Management Systems (CMS), such as Blackboard, WebCT, and Moodle have been widely applied in the design and delivery of courses as well as facilitating communication between instructors and students, and processes for developing shared projects in a web-based learning environment (Dabbagh, 2006). These online instructional activities and tasks are facilitated by integrating Web Based Pedagogical Tools (WBPT) into the CMS (Dabbagh, 2006). Online technological tools are said to have potential to develop learners' thinking skills (Anderton, 2006).

Dabbagh and Kitsantas (2004) categorize four main types of WBPT, namely content creation and delivery tools; collaborative and communication tools; administrative tools; and hypermedia tools. First, collaborative and communication tools are applied to facilitate student to student or student to instructor interactions through the use of asynchronous communication tools (e.g., virtual

chat, white board) and synchronous communication tools (e.g., email, discussion forums, bulletin boards). Second, content creation and delivery tools allow instructors to upload course syllabus, course content and assignments, and manage resources besides enabling learners to access course resources and readings and submit assignments, such as using the assignment feature in WebCT to post assignments and class activities. Third, administrative tools can assist instructors in managing student information and general course information and functions, such as setting up presentation and communication areas, grading, and creating the course calendar. Fourth, hypermedia tools assist instructors in presenting instructional materials in different formats, allowing learners to browse instructional content in linear and nonlinear structures; besides, different hypermedia tools can support different learning styles (e.g., visual, verbal and auditory learning) and learner characteristics (Dabbagh, 2006).

Since the last decade, WBPT have been regarded as a useful means to enrich instructional intervention to promote student self-regulation in learning, especially at higher educational level (Dabbagh, 2006). Although little research has been conducted on how to facilitate SRL skills in distributed and online environments compared to research on fostering SRL in traditional classroom settings (Terry & Doolittle, 2006), some researchers have reported the usefulness of WBPT in supporting students' development of self-regulation skills (Cennamo, Ross, & Rogers, 2002; Dabbagh & Anastasia, 2004; McLoughlin & Hollingworth, 2001).

Cennamo et al. (2002) developed a web-based course aimed at scaffolding students while they learn self-regulation skills critical for academic success. Several WBPT were incorporated in the course to facilitate self-regulation strategies. For example, students use goal checklists to set the dated learning goals, which will be emailed to students upon reaching the deadline; students use study guides to structure their learning activities; moreover, online graded quizzes were provided for students to monitor their learning process and evaluate learning performance. The research findings are positive in showing that the structure of the web-based course did facilitate acquisition of self-regulation strategies.

Research by Dabbagh and Kitsantas (2005) also confirmed the potentials of different categories of WBPT in supporting the development of SRL processes. Dabbagh (2006) provides specific recommendations on effective use of WBPT by instructors in the college classroom, and she further suggests that future empirical researches should be conducted on how WBPT can be effectively applied with students who lack self-regulatory skills and motivation in learning.

Several researchers state that the models of SRL from the social cognitive perspective can be a useful framework for understanding learning success in the online learning context since it explains the interrelationships between motivational, cognitive, metacognitive and social factors of learning (Artino, 2007; Whipp & Chiarelli, 2005). Based on the social cognitive view of SRL, Dabbagh and Kitsantas (2004, 2005) identified several key SRL processes, namely, goal setting, self-monitoring, self-evaluating, task strategies, help seeking, and time planning and management, which can be support by using different categories of WBPT.

Dabbagh and Kitsantas (2004) discuss the role of different types of pedagogical tools in supporting the development of self-regulatory strategies. They suggest that matching the use of different WBPT with the SRL processes can facilitate instructors in developing learners' self-regulation in the online learning context. First, using collaborative and communication tools can engage learners in active and reflective learning process through interacting with peers and relevant content; second, content creation and delivery tools can facilitate learners' implementation of task strategies, such as, rehearsing, elaborating, organizing and transforming learning content as well as assisting learners in self-monitoring and self-evaluation processes, such as monitoring their goal progress by evaluating what they have done and receiving feedback on their products; third, administrative tools (e.g., tools to manage general course information and functions) can assist learners in monitoring their learning process and assessing learning outcomes; and finally, hypermedia tools allow learners to seek help when dealing with difficult tasks and assist learners in obtaining information for completing assignments.

Promoting Self-Regulatory Strategies for Vocabulary Learning with the Support of WBPT

It is critical to develop good self-regulation for vocabulary learning (Nation, 2001; Tseng et al, 2006). Vocabulary learning strategies play a vital role in students' vocabulary acquisition and prepare them to be independent and strategic word learners. Explicitly instructing students on the use of independent vocabulary learning strategies to improve vocabulary acquisition has been advocated and investigated by a number of researchers (Nation, 1990; Schmidt, 2001; Stoller & Grabe, 1993).

Based on the cyclic model of SRL from the social cognitive perspective, the use of learning strategies will be empowered when integrated within the SRL processes. In other words, learning strategies should be implemented as one component of the SRL process, that is, forethought, performance and self-reflection phases. From the earlier discussion, several strategies for promoting student self- regulation in vocabulary learning, which are grouped into three cyclic SRL processes are described, namely, goal-setting, strategic planning, self-monitoring, task-based vocabulary learning strategies, self-evaluation and self-reaction. With the potentials of WBPT in supporting SRL strategies, this paper suggests that operationalizing self-regulatory strategies for vocabulary learning using different types of WBPT can promote learners' self-regulation strategies and achievement in vocabulary learning. The following provides some specific recommendations on applying WBPT to support the development of some selected self-regulation strategies for vocabulary acquisition.

First, goal-setting is a particular feature of highly self-regulated learners. It is defined as determining specific learning outcomes (Zimmerman, 2000). It has been shown that setting specific and hierarchical goals, which emphasize the learning process other than the general and product goals, such as exam grades result in high skill achievement and motivation (Zimmerman, 2000). In a web-based vocabulary learning context, the use of content creation and delivery tools can assist learners in setting specific and appropriate process goals. For example, lists of goals with regard to the types of vocabulary and strategies that should be acquired by the learners can be posted by the instructor so that students could obtain the general information of the learning content and set the dated learning goals; besides, using the communication tools, students can post the specific learning goals on the white board or communicate their learning goals with the instructor to get feedback.

Second, strategic planning consists of selecting appropriate strategies for completing tasks and effectively managing time and planning vocabulary learning resources. In web-based learning, for example, the instructor can present different task strategies in a motivating and alternative way with the use of hypermedia tools; an online calendar and timeline of the learning tasks and activities throughout the course to assist learners in managing time and planning their vocabulary learning; moreover, learners can communicate with their instructor on their vocabulary planning through asynchronous or synchronous communication tools.

Third, task strategies refer to learning strategies which can assist learners in accomplishing learning goals (Zimmerman, 2000). The task strategies are domain specific including (1) deep processing strategies for analyzing, elaborating and organizing learning tasks and materials such as selecting main ideas and outlining the text; (2) rehearsal strategies for memory task, such as mnemonic strategies (Zimmerman, 2000). In vocabulary learning, the strategies for initially handling and reinforcing vocabulary learning can be facilitated through using content delivery and hypermedia tools, such as, graphics, audio, flash cards, Java scripts and so forth to engage learners in using different types of strategies to process vocabulary knowledge.

Fourth, self-monitoring means learners personally track the progress of specific aspects of learning performance (Zimmerman, 2000). In the web-based vocabulary learning context, administrative tools can assist learners in recording detailed information of performance, time spent on doing online vocabulary exercises, and type of vocabulary strategies used in completing tasks; online graded vocabulary quizzes can also help learners monitor their learning progress.

Fifth, self-evaluation refers to student evaluation of performance outcomes with reference to the set learning goals or standards. As for vocabulary learning, the rubrics and evaluation criteria can be posted online by the instructor to guide learners in assessing their vocabulary learning progress and strategy use; in addition, students can evaluate their vocabulary learning through a final vocabulary assessment test and review results of previous quizzes.

Conclusion

With the theoretical basis of self-regulated learning from the social cognitive learning perspective, several strategies for promoting students' self-regulation strategies in vocabulary learning were identified. Considering the potential of web-based technological tools to support self-regulated learning, this article further discusses how WBPT can be applied as a useful means to support the implementation of self-regulatory strategies for vocabulary acquisition. It has suggested that the research findings of SRL can greatly enrich the language learning strategy area, and SRL has been a potential area for developing instructional modules and materials, especially in a web-based learning environment. Future empirical researches should investigate how WBPT can be effectively applied to enhance ESL learners' self-regulation strategies in vocabulary learning.

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