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Ashley Aitken
Curtin University, a.aitken@curtin.edu.au

Rohini Balapumi
Curtin University, roohinee@gmail.com

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Concepts and Factors Influencing Independent Learning in IS Higher Education

Rohini Balapumi
School of Information Systems
Curtin University
Perth, Australia
Email: rohini.balapumi@postgrad.curtin.edu.au

Dr. Ashley Aitken
School of Information Systems
Curtin University
Perth, Australia
Email: a.aitken@curtin.edu.au

Abstract

The concepts of independent learning (IL), self-directed learning (SDL) and self-regulated learning (SRL) have been widely used in relation to students' learning success. Often, these terms are interrelated and used interchangeably in the literature with regards to students' learning process. The purpose of this paper is (1) to promote conceptual clarity by having clear definitions of SRL, SDL and IL and (2) to provide a review of research related to the development of students' SRL at higher education particularly in the context of Information Systems studies. The findings from the literature reveal that mastering the process self-regulation progressively leads to self-directed and independent learning. The literature review on SRL reveals that students' academic self-regulation is influenced by their personal processes such as cognitive knowledge and motivational beliefs and also external processes such as lecturers and instructions in higher education.

INTRODUCTION

One of the educational aims, especially for the higher education institutions is to equip students to achieve independent learning. Although the term independent learning has broad definition, in the context of higher education, it generally refers to students taking responsibility, directing and regulating their own learning process. Often the terms Independent Learning (IL), Self-Directed Learning (SDL) and Self-Regulated Learning (SRL) are interrelated and used interchangeably in the literature with regards to students' learning process. For instance, Azevedo (2005p. 202) noted that self-regulated learners are "goal-driven, motivated, independent, and metacognitively active participants in their own learning" and Woolley (2011) asserted that positive self-concepts and training in self-regulation is essential in developing independent learning. A clear definition of these terms and concepts is essential because how we define the concepts directly influences what measures we use to assess them and how we interpret our research results (Kaplan 2008; Schunk 2008).

Thus, this conceptual and review paper addresses two research objectives. First, we investigate the differences and the relationships between the concepts of Independent Learning (IL), Self-Directed Learning (SDL) and Self-Regulated Learning (SRL). Next, we explore and identify the important aspects that influence students' academic self-regulation in higher education. Thus, the research questions for this paper are: (1) what are the differences and relationships between IL, SDL and SRL? (2) what are the factors that influence the development of students' SRL strategies and skills in higher education particularly in the context of Information Systems studies? We reviewed and analysed relevant past and recent studies in the education and psychology literature to answer the research questions. This rest of this paper is divided into two major sections that match the objectives above. The first section explores the literature for definitions on independent learning, self-regulated learning and self-directed learning. This section highlights differences and similarities between IL, SDL and SRL. We conclude this section by describing how a learner evolves from dependent learner to self-regulated learner and then self-directed and independent learner while progressing from their primary education through to their adult education. The second section of this paper explores the literature to identify the factors that influence students' academic self-regulation in higher education. We identified three main factors, namely the lecturers, instructions, and students in contributing to students' SRL. We conclude this section by presenting a conceptual framework based on the literature review, to describe the relationship between students, lecturers and instructions, in developing students SRL strategies and skills in higher education.

DISCUSSION OF CONCEPTS: INDEPENDENT LEARNING (IL), SELF-DIRECTED LEARNING (SDL) AND SELF-REGULATED LEARNING (SRL)

Independent Learning (IL)

Various terms have been used to describe “independent learning” in the educational context. These terms include “autonomous learning, independent study, self-directed learning, student initiated learning, project orientation, discovery and inquiry, teaching for thinking, learning to learn, self-instruction and life-long learning” (Kesten 1987p. 9). Moore (1973) described independent learner as an autonomous learner who accepts a high degree of responsibility for their own learning process. Likewise, Baird (1988) described independent learner as “both willing and able to take responsibility for, and control over, one’s own learning”, pointing out that independent learners are able to make “informed, purposeful decisions about planning, managing and evaluating” their own learning. More recently, Broad (2006) indicated that independent learning is a context-based concept. Broad (2006) explained that the aim of independent learning is to teach students to learn for themselves and in turn empower them in their learning process regardless of their learning context or environment. Broad further noted that independent learning is achieved when a student accepts responsibility for their learning and this will be evident in the student’s involvement in their studies.

Based on these definitions, we can conclude that independent learning is learning in which the direction, control and regulation of their learning process is solely guided and managed by the learner. Independent learners, therefore can be described as proactive, self-motivated and resourceful (make use of available resources) individuals who are able to self-direct, monitor and self-regulate their learning progress towards achieving their learning goals.

Self-directed learning (SDL)

Self-directed learning is often used in conjunction with independent learning. The concept of self-directed learning, which has its root in adult education, originated by Malcom Knowles (1975). Knowles (1975 p.18) defined self-directed learning as “a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes.”

A survey of the literature for definitions of SDL describes learners as responsible and manages their own learning process. The concept of SDL incorporates self-regulating, self-monitoring and self-evaluating of cognition, context, and resources. Research studies on SDL also emphasise the important role of motivation and volition in initiating and maintaining learners' efforts (Bolhuis 1996; Garrison 1997). More recently Brookfield (2009) described “self-directed learning is learning in which the conceptualization, design, conduct and evaluation of a learning project are directed by the learner”. Brookfield also asserted that SDL does not necessarily occur in isolation rather the learner can engage with external sources such as peers and tutors whenever needed. However, SDL concept has evolved since its introduction in the literatures by Knowles in 1975.

The SDL concept has evolved since its introduction in the literatures by Knowles in 1975. Based on the definitions in the literature, we can define that SDL is a learning in which the learner sets the learning goals and decides on the route or direction to achieve the learning goal by utilising strategies and skills such as planning, goal-setting, finding resources for learning, self-monitoring and self-reflection.

Self-regulated learning (SRL)

The seminal work of Albert Bandura promoted self-regulation of learning as a fundamental component of any major academic endeavour. According to (Bandura 1991 p. 248; Bandura 2001) social cognitive theory, “human behaviour is extensively motivated and regulated by the ongoing exercise of self-influence.” Bandura (1991) stated that most human behaviour is regulated by forethought. The forethought process involves people setting goals for themselves and plan courses of action that are likely to produce desired outcomes. Through exercise of forethought, people motivate themselves and guide their actions in a proactive way to achieve their goals. This human functioning is regulated by reciprocal interaction of self-generated influence such as control of thoughts, feelings, motivation, and actions and external sources influence such as peers, family and environment (Bandura, 1991). The social cognitive theory of self-regulation proposes that the use of self-regulated learning are essential in any learning process and that good self-regulated learner can effectively control and regulate their cognition, motivation, behaviour and environment to achieve their learning goals (Zimmerman 1989).

Generally self-regulated learning (SRL) can be described as a process in which students engage in an iterative process of the forethought, performance and self-reflection of their cognition, metacognition, behaviour, motivation and environment during their learning process to achieve their academic goals (Pintrich 1995; Pintrich 2004; Winne 2010; Zimmerman 2002). The forethought phase involves processes and beliefs that occur before student engage in learning processes and include aspects of task-analysis, goal-setting, strategic planning, and self-motivation. The performance phase includes processes of self-control and self-observation that take place during the learning process. Finally, the self-reflection phase includes processes that occur after each learning effort, in which students respond to their learning efforts with self-judgements and self-reactions (Zimmerman 2002). Feedback from prior cycle is used to adjust their current learning efforts. Thus, a self-regulated learner continually adjusts their goals and choice of strategies. According to Zimmerman (2002) self-regulation improves with practice and successful self-regulated learners will draw on their previous learning experiences to build a growing repertoire of strategies and beliefs that enhances their learning. Such students are highly self-efficacious and they perceive themselves as competent and autonomous in managing their own learning, thus highly motivated to regulate their own learning process. Students who are self-motivated will continuously plan, organise, self-monitor, and self-evaluate at various stages during the learning process and their take responsibility for their own learning (Zimmerman 1990; Zimmerman 2002). In order to develop this responsibility and learner autonomy, the learning environment should encourage and provide opportunities for students to learn and practice self-regulatory strategies. Students who master self-regulatory skills will have a sense of control and this will encourage them to uptake responsibility for their learning (Zimmerman 2002, 1990). Thus, teaching students self-regulated learning strategies are consistent with the life-long goal of education, which is teaching students to have the “will” as well as the “skill” in becoming an independent learner (Weinstein et al. 2011).

Based on the discussions on IL, SDL and SRL, it is evident that concepts of metacognition and motivation play a central role in students adopting self-regulation process to achieve independent learning. In the following, we will discuss how metacognition and motivation play a role in students’ academic self-regulation and independent learning.

Metacognition

The term metacognition was introduced by John Flavell (1976 p. 232), who describes metacognition as “one’s knowledge concerning one’s own cognitive processes and products or anything related to them”. More recently, Zeidner (2005 p. 205) defined metacognition as the learners’ “awareness of their personal resources in relation to the demands of particular tasks, along with the knowledge they possess on how to regulate their engagement in tasks to optimise goal related processes and outcome”. Metacognition includes knowledge of cognition and regulation of cognition. Knowledge of cognition involves learners acquiring knowledge that includes learner’s declarative knowledge (what the strategy is), procedural knowledge (how to use the strategy) and conditional knowledge (when and why the strategy should be used). Regulation of cognition involves how the learners plan their learning, monitor their progress, and adapt their learning strategies accordingly to be successful in their learning process (Schraw et al. 2006; Sperling 2004).

Teachers can help the students by explaining about each self-regulatory learning strategy, when it might be applied, and why it is important, in order to help their students to develop declarative (awareness of and knowing “what” are the SRL strategies and skills), procedural (knowing “how” to use those strategies and skills), and conditional knowledge (knowing “why” and “when” to use those strategies and skills) (Sperling et al. 2004; Schraw, Crippen, and Hartley 2006). More importantly, Sturomski (1999) pointed out that, learning is fostered when the learner has opportunities to practice a new skill, to receive feedback from an expert, such as lecturer, and apply the new knowledge or skill in familiar and unfamiliar situations, with decreasing assistance from others. When encouraging young adults, such as university students, to practice self-regulated learning, it may be necessary to carefully plan and provide many reflection and discussion opportunities in order to help them adopt and practice the new self-regulatory strategies (Sturomski 1999). In other words, lecturers should help students to take ownership in practicing the new self-regulatory strategies and skills, and value these strategies and skills in their learning process, instead of simply equipping the students with self-regulatory strategies and skills.

Having knowledge of strategies and skills alone will not help students to self-regulate their learning. The metacognitive knowledge should be coupled with positive motivational beliefs. Motivation influences the type of personal goals students set for themselves and the use of self-regulatory strategies in their learning. Both motivation and strategy use relates to other self-regulation processes such as self-monitoring and self-evaluation at various stages during the learning process.

Motivation

Students’ motivation is regarded as an important component in self-regulated learning, self-directed learning and independent learning concepts. Motivation influences how students adjust their engagement in their learning

process during the various phases of self-regulated learning. Zimmerman (2000p. 17) asserted that “self-regulatory skills are of little value if a person cannot motivate themselves to use them”. Positive motivational beliefs such as positive self-efficacy (one’s judgement of their capability to perform an action) for task, intrinsic value for the tasks and task goals, and goal orientation is crucial for students’ actual and successful engagement in self-regulated learning (Boekaerts 2010; Pintrich 1995). Goal can be regarded as a specific purpose a student is striving to achieve in his/her learning task. On the other hand, goal orientation is concerned with why the student wants achieve that particular goal, how they approach the task, and the standards they use to evaluate their performance (Pintrich 2000).

Two general goal orientations that students can adopt during their learning are mastery goal orientation and performance goal orientation (Pintrich 2000). Mastery goal orientation focuses on mastery and learning of the material, thus concerns with learning, understanding, and mastering the task. On the other hand, a student with performance goal orientation focuses on demonstrating his/ her ability and performance in relation to other students (Pintrich 2000) . Research studies also indicated that students who perceive the teacher as emphasising mastery goals are more likely to use adaptive cognitive, emotional, and behavioural regulatory strategies, such as positive coping, help seeking, and expenditure of effort, than are students who perceive the teacher as emphasising performance goals (Goddard et al. 2000; Goddard et al. 2004). Besides that, it is easier to facilitate of SRL to students who focus more on learning and understanding the material (mastery orientation) than to students who focuses on performance orientation.

RESEARCH QUESTION 1: What is the relationship between key terminologies in the area of self-regulated and independent learning?

FINDINGS: Based on the literature, it is evident that all three concepts involve learner’s ability to control their cognition, motivation and behaviour. However these three concepts can be differentiated in terms of setting learning goals, decision about learning activities, finding and managing learning resources. Reviewing the literature, we deduce the following definitions for IL, SDL and SRL.

Independent learning (IL) is learning in which the learning goals, method or direction to achieve the learning goals, and regulation of learning process is decided, guided and managed by the learner. In IL there is no external intervention on what, when and how to learn. Though the lecturer may offer some advice or direction on how to go about the learning, the final decision about the learning process is decided by the learner. On the other hand, Self-Directed Learning (SDL) is a learning in which the learning goals are explicitly or implicitly decided or establish by external entities such as lecturers. The self-directed learner has decides the types of learning activities and the methods or direction to undertake to achieve the learning goals. Finally, Self-Regulated Learning (SRL) is a learning in which regulation of learning process is managed by the learner. Typical of any classroom-based learning environment the learning goals and the learning outcomes are well established and, directions for achieving the learning goals and resources are pre-determined. Learner need to regulate their learning activities to achieve the goals by completing the designated learning tasks. Self-regulated learners also may seek information beyond the prescribed text and learning materials while undertaking a particular task.

We can also discuss SRL, SDL and IL in relation to primary, high school and higher education. In Figure 1 we introduce a continuum of independent learning, with stages ranging from primary to adult education and beyond.

One end of the continuum is dependent learning, where learners need to be externally motivated and regulated by people such as parents and teachers in their learning endeavour. This is typical of a pre-schooler or primary student, who needs well-defined structure (including syllabus, tools) in the learning. At this stage, often the parents and teachers monitor and regulate the students learning. The parents and teachers at this stage also play an important role in introducing and encouraging students to practice self-regulatory strategies and skills. As the students move to high school, they would be equipped with basic academic learning skills such elaboration, organisation and rehearsal skills. At this high school level, the students may gradually acquire SRL strategies and skills such planning, goal setting, self-monitoring and self-reflection At this stage also, constants parental control and monitoring may decrease and the students will learn to control and

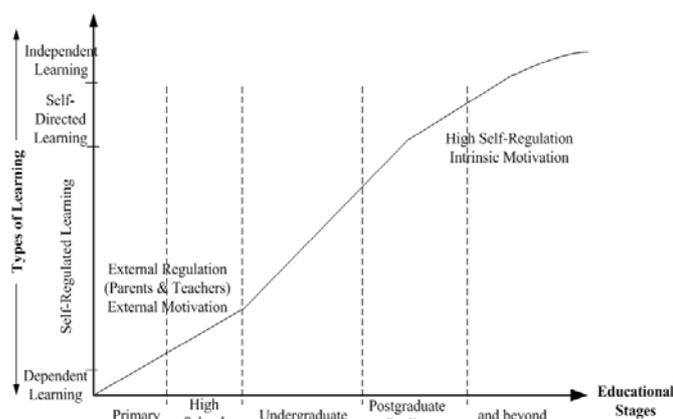


Figure 1. The Continuum of Independent Learning in Education

monitor their own learning. By the time the students' progress to tertiary education, they should and would have a basic repertoire of learning strategies and self-regulation strategies such as systematic approach to learning and accomplishing academic tasks like goal setting, planning and reflecting. We have to stress here that parents and teachers of primary and high school students' play a central role influencing students' self-regulation and motivation at this level.

As the tertiary education demands, students need to maintain high motivation for academic learning, set goals and exercise learning strategies effectively (Bembenutty 2011; Pintrich 1995). In order for students to acquire these skills, they need to move from low-medium level self-regulation to highly self-regulated learners and possibly moving towards self-directed learners. Lecturers and instructions now play an important role in guiding and continuously encouraging students to master their academic self-regulation.

This is a general framework in describing students' independent learning and self-regulation at various stages of the academic life. Self-regulated learning and independent learning is not a fixed attribute of a learner, instead SRL and IL should be viewed as an evolving attribute of a learner. With practice and experience, the learner can only become more effective self-regulated learner.

FACTORS INFLUENCING SRL AT HIGHER EDUCATION

Students and Self-Regulated Learning

Numerous studies has been undertaken to understand the factors that affects students' self-regulated learning and how self-regulating can be fostered among students at primary, secondary and post-secondary levels. In order for students to become more self-regulated learners, the students need to be aware of their behaviour, motivation, and cognition and able to reflect on these aspects of their learning. Researchers (Bembenutty 2011) have called for educators, policy makers and researchers to investigate the effect SRL on students' academic success at higher education. In particular, it will be interesting to investigate the understanding and use of SRL among IS and IT students because these courses are known to be practical and realistic which require aptitude and logical deduction and at the same time requires application of their current knowledge in the competitive business world.

Epistemological Belief

Besides metacognitive skills and motivational beliefs as discussed in the previous section of this paper, epistemological beliefs also play a role in influencing students' motivational beliefs and the use of SRL strategies in their learning process. Epistemological beliefs are learners' beliefs about the nature of knowledge and learning (Hofer 2000; Hofer 2001). Students' epistemological beliefs affect the type of academic achievement goals they set for themselves, the perception of the knowledge they acquire and how they acquire the knowledge (Hofer 2001; Muis et al. 2009; Winne 2010). Students who belief that knowledge was certain and simple are likely to adopt performance goals rather than mastery or learning goals. Students who believed that knowledge is tentative and always evolving tended to focus on "improving" and are more likely adopt mastery goals. Muis et al. (2009) theorised that achievement goals provided the linkage between epistemological beliefs and strategies students use and that learning strategies provided the linkage between goals and academic performance.

It is evident from the independent learning continuum (Figure 1) that tertiary students' academic self-regulation is not entirely possible without the help of faculty members and instructions. Lecturers and instructions play an important role in guiding and continuously encouraging students to master their academic self-regulation.

Lecturers and Self-Regulated Learning

Faculty, particularly the lecturers, play an important role in modelling various learning and thinking skills and providing opportunities for students to practice self-regulated learning strategies in their learning. As pointed out by (Zimmerman 1995), students must have some choice and control over their learning if self-regulated learning is to occur. Students need opportunities to practice self-regulatory skills. This may start off with explicit course on SRL strategies but students need to continue to practice and use these skills and strategies over time after the formal course is completed. Lecturers can construct tasks that will provide opportunities for self-regulation. In order for the academics to provide such opportunities for students to practice SRL, they must be equipped with not only content knowledge but also pedagogical knowledge about cognitive and metacognitive strategies for learning (Kiewra 2002; Schraw et al. 2006). However, several factors influence whether or not lecturers include self-regulation strategies in their teaching. This includes lecturers' beliefs about teaching which guides the purpose and lecturers' approach to teaching (strategies a lecturer adopt for in her/his teaching) (Postareff et al. 2008b).

Lecturer's Approach to Teaching

The nature of the lecturers' beliefs about learning and instructions, which includes teaching instructions and instructions in teaching materials, will affect how possible it is for the lecturer to teach SRL strategies and skills which are required by the students to actively engage in the learning process. Lecturers with traditional transmission-of-knowledge approach (content-focused approach) views the curriculum and subject matter as the centre of instruction. In this approach, clarity is an essential element of instructions and uncertainty or ambiguity is not acceptable most of the times. As such, the cognitive demands of learning tasks will be lowered in order to reduce the ambiguity in learning and students' independent thinking skills takes back seating in the teaching and learning environment. Since instruction is seen as the focus of the subject matter to be taught, students' cognitive reasoning difficulties become obstacles in the main teaching activity, which is the transmission of knowledge. Thus, students' reasoning difficulties are either completely ignored or treated in a superficial and obligatory manner (Zohar 2004). Meanwhile, lecturers who view teaching as facilitation of students' learning process (learner focused), perceives the student at the focal point of instruction. Students' reasoning difficulties become opportunities for productive interactions between teachers and students. Problems that require students' independent thinking are important because they form opportunities for active thinking that may bring about meaningful learning. Thus, the cognitive demands of tasks, which require higher order thinking skills such as critical thinking and problem solving, will always be kept high (Zohar 2004).

Experience and Pedagogical Knowledge

Not all university lecturers are sufficiently knowledgeable and trained in teaching academic self-regulation strategies. Woolley (2011 p. 147) noted that "very few teachers are adequately trained to assist students in becoming independent learners". Often insufficient training or information about learning strategies aspects deters lecturers providing instruction in this area (Wehmeyer et al. 2000; Woolley 2011). Lecturers who have never received formal instructions on cognitive and metacognitive strategy use may feel uncertain about their ability to teach these skills. As Zohar (2006p. 335) notes "...teachers cannot teach effectively what they do not know".

Teaching experience is also a factor that affects lecturers' facilitating self-regulatory strategies and skill to students in the classroom. Novice university lecturers who are still developing classroom problem solving skills are likely to adopt information transmission strategies, thus may avoid classroom problems and inquiry approach to learning (Postareff et al. 2008a). As such they are more likely to adapt teaching approaches that mainly focuses on how they organise the content of learning rather than facilitating self-regulated learning skill among students. This could be one of the factors that may limit the lecturer from facilitating SRL strategies in his/her teachings.

Motivational Beliefs

Lecturers' motivational beliefs have direct impact on the academic self-regulatory strategies and skills they use and facilitate in their teaching process. Several studies have affirmed the fact that lecturers' self-efficacy plays an important role teaching and learning environment (Goddard et al. 2000; Goddard et al. 2004; Skaalvik et al. 2007). Teachers with higher levels of teaching self-efficacy, which refers to how confident a teacher is in his/her teaching abilities/processes, may set higher teaching goals and standards for themselves, such as providing positive classroom climate for learning and to ensure the students demonstrate and practice selected SRL strategies and skills by the mid-semester. Teachers with high teaching self-efficacy also sets higher learning goals for the students, give more autonomy to students, and help students reach higher levels of academic achievement, than do teachers with lower levels of self-efficacy (Goddard et al. 2000).

Instructions and Self-Regulated Learning

Research studies shows that a cognitive and metacognitive instructional program either as an independent course or embedded in teaching and learning instructions, would be very likely to improve student learning outcomes. Weinstein et al. (2010) noted that students can be taught general knowledge learning skills in independent course and this can further carried forward by embedding teaching learning strategies in the course content. Embedding instructions in course content can be as simple as paraphrasing a lesson and then teaching the class to do the same thing on their own to check their understanding, or as complex as teaching students how to develop, implement, monitor, and modify a test-preparation plan for an upcoming exam (Weinstein et al. 2011). As noted by Pintrich (1995) this will give the students the opportunities to apply the skills they learned from the stand-alone courses to their content-specific courses. Most often, students learning problems relate to their inability to choose and use appropriate self-regulatory strategies during the learning process. Hofer et al. (2003), investigated the impact of a semester-long course called "Learning to Learn," an undergraduate psychology course designed to teach college students to be self-regulated learners. The results of the study revealed that the students' mastery orientation to learning, cognitive strategy use and their self-efficacy for learning increased. In

addition students' appreciation of the course increased and declined in test anxiety over the term. In sum, Hofer and Yu's (2003) findings suggest that there is value to a stand-alone course in learning to learn at the university level. Stand-alone learning to learn course that targets a range of cognitive and motivational aspect of learning can be very useful for students, especially for the first-year students, in easing their transition from high school into university learning environment. In agreement to Hofer and Yu's (2003) claims, Bail et al. (2008), found that students who took a SRL course had significantly higher cumulative GPAs four semesters afterwards.

Besides stand-alone courses, self-regulated learning strategies can also be embedded in domain-specific content. In addition to teaching the subject matter, lecturers can empower students in their learning by teaching and guiding students with the necessary self-regulatory strategies, to be successful in their tertiary learning. Lecturers can encourage students to self-generate reasonable positive goals along with the thoughts and behaviours needed to attain their learning goals. As Kiewra (2002) pointed out, teaching and learning strategies should be embedded in the content instruction so the strategic learning responsibilities can be gradually be transferred from the lecturer' shoulders to the student' shoulders, thereby helping them learn now and for lifetime. To start with this transition process, lecturers can introduce the strategies and demonstrate how and when the strategies are used, and allow time for students to discuss, reflect upon, and practice the strategies with realistic tasks. Then as students begin to assume responsibility for strategic learning, lecturers can gradually decrease their guidance in self-regulatory strategies.

RESEARCH QUESTION 2: What are the factors influencing SRL in higher education?

FINDINGS: Based of literature review we present a conceptual model, as depicted in Figure 1 that describes the

factors and the relationship between the factors that influence students' SRL in higher education. Students' metacognition knowledge and skills helps them to boost their motivation for learning. This involves the aspects of motivation such as self-efficacy and mastery goal orientations and performance orientations. As indicated in earlier sections of this paper, students' epistemological beliefs also contribute to how they perceive their learning and the goal orientation they adopt for their learning.

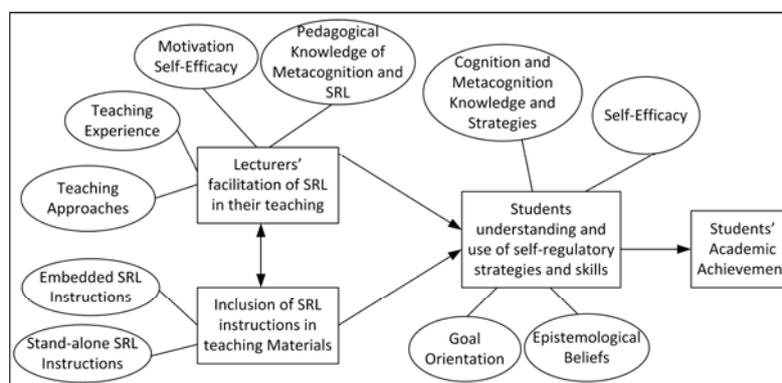


Figure 2: Conceptual Framework: Relationships and interactions that occur between students, lecturers, and teaching materials, in influencing student' SRL in higher education

Students who perceive knowledge as a definite entity acquires performance goal orientation and students' who perceive knowledge as an ongoing process acquires mastery goal orientation. However, with information and guidance, particularly from lecturers and tutors on metacognitive knowledge and motivational aspects of learning, it will be possible to encourage students to adopt mastery goal orientation, which is the main aim of self-regulated learning. In order to impart the importance of self-regulation for academic achievement in students, lecturers and tutors can create courses and facilitate SRL instructions in their teaching as well as in their teaching materials in which the students can engage and practice strategic planning, develop positive self-efficacy, maintain intrinsic motivation, and monitor their own academic progress.

On the other hand, lecturers' facilitation of metacognitive knowledge and skills and motivational aspects to their students are affected by several aspects as well, as depicted in Figure 2. Lecturers' and tutors' motivational aspects such as teaching self-efficacy, their teaching beliefs and approaches such as content-focused or learner-focused and their knowledge on training students on academic self-regulation aspects influence the lecturers imparting knowledge on self-regulation strategies and incorporating activities for students to practice these skills in their classrooms. Lecturers need to adopt specific methods, materials, and instructional strategies in facilitating self-regulation in teaching and learning. For instance, cognitive instructions by means of guided inquiry, scaffolded support, reciprocal teaching, and collaborative learning can foster reflective discourse among students and lecturers, about the tasks and how to use appropriate strategies to solve problems and to learn effectively (Wehmeyer et al. 2000). Here, the faculty and policy makers play an important role in organising workshops, seminars and training in educating the lecturers on teaching self-regulatory strategies and skills to students.

CONCLUSION AND FUTURE WORK

This conceptual and review paper addressed two objectives. First, it investigated the definitions and relation between independent learning (IL), self-directed learning (SDL) and self-regulated learning (SRL) concepts. Our findings based on the literature survey reveals that engaging in the process of self-regulation, whereby learners

set goals for their learning and monitor and regulate their cognition, motivation, and behaviour within their environment can lead to achieving independent learning. Consequently, we pointed out that metacognitive skills and positive motivational beliefs assists self-regulation of one's learning, which in turn, contributes to the learner achieving life-long independent learning. We also presented a continuum of independent learning, describing the two extreme ends of learning; externally motivated, other-directed and other-regulated dependent learning and self-motivated, self-directed and self-regulated independent learning.

The second objective of this paper is to explore factors influencing SRL particularly with regards students' learning in higher education. Based on conceptual framework in Figure 2, it is evident that students' academic self-regulation is influenced by their internal elements such as metacognition knowledge and the motivational beliefs and external elements such as lecturers and instructions. Faculty and lecturers can utilise the different instructions to teach students self-regulatory strategies. Particularly for first year students, "Learn to Learn" courses can help first year students to strategically manage their learning at higher education. In turn, the faculty should also provide opportunities for lecturers' and tutors for professional development programmes such as training in academic self-regulatory strategies, in order for the lecturers and tutors to have the knowledge and the ability to facilitate self-regulatory strategies and skills to students in their teaching process.

There still a need for exploration and explanation of the aspects that encourage and equip IS and IT students to use SRL strategies and skills in their learning process. Future studies should explore the current teaching strategies utilised by IS and IT lecturers. Studies should also investigate the factors that will encourage and equip IS and IT lecturers with SRL knowledge and then the aspects that influence these lecturers to facilitate SRL to students in their teaching and learning environments and investigate the factors that influence the embedding of SRL strategies instructions in their teaching materials. Studies also need to investigate, the factors that influence the understanding and use of SRL strategies and skills among IS and IT students. Put together, as described in Figure 2, empirical studies needed to identify and understand the relationship and reciprocal interaction between lecturers teaching process, teaching materials, and students in determining students understanding and use of SRL.

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