Relationship between Self-Regulated Learning Behaviors (SRLBs) and Academic Achievement of College Students: Teaching How to Learn

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Abstract: The purpose of this study was to assess the relationship between Self- Regulated Learning Behaviors (SRLBs) and academic achievement of college students. Accordingly, a correlational research design was employed to effectively assess the association among motivational, meta-cognitive and learning strategy self-regulation and college academic performance. To achieve this objective, 126 third year students (male= 66, female=60) from Robe and Assela Colleges of Teacher Education were randomly selected and involved in the study. Basically, a highly adapted instrument from the Motivated Strategies for Learning Questionnaire (MSLQ) was used to collect data from the students. Moreover, a five-semester academic achievement or GPA was collected from the respective registrar offices of the colleges. The collected data was analyzed using Pearson correlation test, regression methods and SEM path analysis. Moreover, t-test was used to identify the differences between male and female participants of the two sample colleges in their self-regulated learning behaviors and academic achievement. The analysis of the result showed that self-regulated learning constructs have significantly predicted academic achievement of the students. It also indicated that learning strategy regulation and meta-cognitive self-regulation directly and significantly predict academic achievement whereas motivational self-regulation is an indirect predictor of academic achievement. No statistically significant difference was identified between male and female participants of the two colleges in their SRLBs and academic achievement.

Key terms*: self-regulation, meta-cognition, motivation, academic achievement*

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Introduction

For many years, learning was viewed as a formal discipline and students' failure to learn was widely attributed to their personal limitations in intelligence or diligence. As a result, students were expected to overcome their individual limitation in order to profit from the curriculum of the school. Later on, the topic of individual differences in educational functioning attracted widespread interest and educators wrestled with the presence of substantial differences in individual student's background and modes of learning (Zimmerman, 2002; Zeigler , Stoeger and Robert, 2011; Chen, 2002).

In order to investigate the reasons why some students are more successful than others and to understand differences in the level of performance among students, researchers have considered a variety of non-cognitive skills among which self regulation in learning is a major one. Non-cognitive attributes are those academically relevant skills and traits that are not specifically intellectual or analytical in nature (Rosen et.al*.* 2010; Kyllonen, Walters and Kaufman, 2011; Heckman and Rubinstein, 2001). Such non-cognitive attributes include a range of personality and motivational habits such as perseverance, motivation, self-control, self-regulation, industrious study habits and other related constructs. These days, it is admitted that such non-cognitive traits and behaviors might be as important as or even more important than cognitive skills in determining academic and employment outcomes. Evidences indicate that self regulated learning is neither a function of intelligence nor is it developed automatically through maturation (Cobb, 2003; Zimermman, 2002). This is to mean, self regulation is not inherent, but a learned behavior that can be taught and cultivated by the learners themselves and their teachers.

In Education and Psychology, researchers assert that self-regulated learning is a learning paradigm where students have to self-direct, self-assess and self-pace their own learning (Yen *et.al*.,2005; Duckworth *et.al.,*2009; Wolter, 2010). Hence, self-regulating students evaluate

their task, review the strategies valuable to them for accomplishing the tasks and monitor the effectiveness of their strategies (Schunk, 2005; Montalvo and Torres, 2004; Zumbrunn, Todlack and Roberts, 2011). In self-regulated learning, students become masters of their own learning, direct their acquisition of academic knowledge and improve their overall academic performance (Zimmerman, 1990).

Even if the impressions of self regulated learning often differ on the basis of the researchers' theoretical orientations, a common conceptualization of such students has emerged as motivationally, behaviorally and meta-cognitively active participants in their own learning (Zimmerman and Martinez, 1986). Similarly, Boekaerts and Corno (2005) argued that students who self-regulate their own learning are engaged actively and constructively in a process of meaning generation and that they adapt their thought, feelings and actions as needed to affect their learning and motivation. Furthermore, Kitsantas, Winsler and Huie, (2008) and Magno (2011) argued that academically self-regulated students are independent in their studies, diligent in listening inside the classroom and are focused on doing their tasks inside the classrooms so as to get high score on tests.
Studies indicate that self-regulated learning strategies include such learning tasks as goal setting, monitoring performance, attending to and concentrating on instructions, using resources effectively, holding positive belief about one's capabilities and experiencing pride and satisfaction with one's efforts (Ho, 2004; Zimmerman, 2008; Duckworth *et.al.,*2009). In general, self-regulated learning (SRL) refers to proactive processes that students use to acquire academic skills such as selecting and deploying strategies and monitoring one's own effectiveness, rather than a reactive event that happens to students due to external forces.

Focusing on its components, Toranno and Carmen (2004) described self-regulated learning as a fusion of skill and will. Specifically, self-regulated learning requires effort, time and vigilance, so it follows that a student must be motivated in some ways before self-regulation takes

place. Based on such argument, some researchers assert that self-regulation has more of motivational components than cognitive ones (Pintrich, et al, 1993; Zimmerman, 1989; Schunk, 2005).

Congruent with this concept, Schraw, Crippen and Hartley (2006) stated that self regulated learners perceive themselves as competent, self-efficacious and autonomous. On top of this, some researchers argue that if students have no motivation to use various cognitive and meta-cognitive strategies, possessing knowledge on the strategies will not be sufficient for them to learn and perform effectively (Pintrich and De Groot, 1990; Sungur and Gungoren, 2009).

According to Lai (2011) motivation involves constellation of beliefs, perceptions, values, interests and actions that are closely related. Bandura (1977) also contended that peoples' level of motivation, emotional status and behavior are based more on their beliefs than on objective truth. Similar studies unveiled that the students' ability, belief (self efficacy), perceived task importance (value) and the students' affect directly impact their employment of self-regulated learning strategies and academic results (Magno, 2011; Goulao, 2014).

More comprehensively, motivation and learning are treated as two integrated components of self-regulated learning. According to Cobb (2003), self-regulated learning strategies are classified into two categories - meta-cognitive strategies and cognitive strategies. The researcher further explained that cognitive strategies focus on information processing such as rehearsal, elaboration, and organization while meta-cognitive strategies address the behaviors that the learner displays while engaged in the learning situation.

Besides motivational self-regulation, learners are supposed to manage and regulate their time and study environment, regulate their effort, learn from their peers and seek help and support from others (Nevgi, 2002; Somtsewu, 2008). In academic settings, students who manage their time, employ proper study skills, select an appropriate study

environment commonly have higher academic performance (Yalew and Tilahun, 2013). Similarly, Kosnin (2007) showed that learning strategy constructs such as time and study environment management, effort regulation, peer learning and help seeking are the strongest predictors of academic success among undergraduates in Malaysia.

Conceptually, meta-cognition refers to higher order thinking which involves active control over the cognitive process engaged in learning. Studies indicate that meta-cognition is a regulatory system that includes knowledge, experiences, goals and strategies (Flavell, 1979; Shannon, 2008; Cubukcu, 2009). In a simplified expression, however, meta-cognition is "thinking about thinking" (Khatib, 2010; Livingston, 1997; Zimmerman; 1990). Thus, scholars in this discipline come to terms with the assertion that meta-cognition is a main feature or an engine that drives self- regulated learning.

Basically, there are two well known aspects of meta-cognition; i.e. meta- cognitive awareness and meta-cognitive skills. On one hand, meta-cognitive knowledge is stored knowledge about oneself and others as cognitive agents, tasks, actions or strategies and how all these interact to affect the outcome of any intellectual undertaking (Magno, 2011). On the other hand, meta-cognitive experiences are conscious cognitive or affective experiences that concern any aspect of an intellectual undertaking. From this point of view, meta-cognitively self-regulated learners plan, organize, self-instruct, self-monitor and self-evaluate themselves at different stages as they learn (Cobb, 2003). Recognizing the value of meta-cognitive constructs in learning, Zimmerman (2002) emphatically argued that self regulated learning is meta-cognitively guided.

Regarding the relationships between self-regulated learning behaviors and academic achievement, numerous studies affirm that self-regulation is closely linked to academic achievement and performance (Kosnin, 2007; Sungur and Gungoren, 2009; Mih and Mih, 2010; Martha, 2016). Hence, it is believed that the major cause for academic

failure is lack of self regulation. According to Borkowski and Thorpe (1994), underachievers are more impulsive, have lower academic goals, are more self-critical and less efficacious about their performance and tend to give up more easily than high achievers. Some previous studies disclosed that self-regulated learning predicted the students' engagement and persistence in academic task (Mezei, 2008; Matuga, 2009; Wolters, 2010). A similar study by Pintrich and De Groot (1990) identified that motivational, cognitive and meta-cognitive aspects of self-regulation predicted students' performance on home work, seat work, quizzes and overall grades in a group of seventh graders.

Statement of the problem

The major goal of higher education is to create life-long learners who can create, acquire, retain and retrieve knowledge of their own. Focusing on learning behaviors of such students, Zimmerman (1990) stressed that self-regulated learners are distinguished by their systematic use of meta-cognitive, motivational and behavioral strategies. Xu (2008) also asserted that self-regulated learners are reflective, autonomous and efficient learners who develop positive attitudes about their learning process. Furthermore, such students are described as more mastery oriented, self-motivated, assume responsibility for their own learning and tend to attribute failure to lack of effort or strategies. According to Kistantas, Winsler and Huie (2008), students who utilize strong meta-cognitive self-regulation strategies would set goals for the task at hand, ask questions to support their understanding of the material and continually adjust the strategies that they use according to their effectiveness.

Cognizant of the role of creating life-long learners, much effort has been exerted in the past two decades to transform our education system from teacher-centered to student-centered practices. By its nature, student-centered method of teaching is active and learners make their own plan, choose learning goals and activities, test their

progress, take care of their own learning and personal understanding and they reflect on errors and success in their academic performance (Ahmed, 2010; Neill and McMahon, 2005). Reda (2001) also remarked that teachers should be able to encourage students to construct their own understandings, assess their own assumptions and learning strategies. Pedagogically, active learning has to do with preparation, execution, regulation, control, feedback and maintenance of learning activities by the learners themselves. Focusing on such premises, scholars strictly underline that the purpose–of schooling should be to teach students to become masters of their own learning (Xu, 2008; Montalvo and Torres, 2004).

Relying on the findings of an extensive study, Ministry of Education had introduced a program known as Higher Diploma Program (HDP) to all higher learning institutions, as part of a one year in-service continuous professional development (MoE, 2003). The purpose of the program was to enhance professional development of teachers and enable them promote active learning methods (Adula, 2008; FDRE, 2004). Truly speaking, educators who passed through HDP are more likely to enhance students' involvement and participation in learning. Even if the overall practice of teaching and learning at colleges of teacher education is more of reflective and learner-centered, it is not well oriented towards preparing students to self-regulate their learning behaviors and learn with their own strategies. To put it differently, the students are wanted and told to be active participants in the teaching-learning process, but they are not taught how to do so. As a result, many students lack important personal qualities to plan, monitor, organize, evaluate and regulate their own learning behaviors. Similarly, Yalew (2004) emphasized that unless students are encouraged to create their own way of learning and drive meaning from the interaction with the environment, their involvement in learning could decrease and the quality of education. Thus, it could not be a hasty conclusion to say that teaching self-regulated learning behaviors have received no or very little attention in our education system. As described earlier, a lot has been studied about self-regulated learning behaviors and

academic achievement of college students at global context. This study has been designed to assess the local situation and fill the existing gap in this respect.

At policy level, our education system encourages ensuring quality and better academic attainment through active participation of the learners themselves (TGE, 1994; MoE, 2002; MoE, 2003; FDRE, 2004). However, motivational, cognitive, meta-cognitive and behavioral self-regulation strategies in learning are addressed at no level of our school curriculum as main school content or at least as co-curricular activities. For this and many other reasons, every curious person should ask "how can one expect learners to be active in their own learning motivationally, behaviorally, cognitively and meta-cognitively without teaching them how to do so?" Thus, if learners are meant to be masters of their own learning and thrive in their academic performance, they deserve to be taught how to learn. To put it differently, as far as students are attending schools just to learn, teaching how to learn should be part of the schools' activities.

This study is basically designed to assess the relationship of self-regulated learning behaviors (SRLBs) and academic achievement of college students. To this end, the current study addresses the following leading issues:

- The extent the students' Self-Regulated Learning Behaviors (SRLBs) are related to their academic achievement.
- The variations in the students' Self-Regulated Learning Behaviors (SRLBs) and academic achievement as a function of the students' gender and college type, if any.

Objectives of the study

The major objective of this study is to assess the relationship of self-regulated learning behaviors and academic achievement of students with particular focus on college students in Robe and Assela Colleges of Teacher Education.

Significance of the study

The result of this study has prominent implication for curriculum designers, prospective teachers, teacher educators and researchers. More specifically it

- helps curriculum designers to integrate self-regulated learning strategies as part of the college curriculum, or as pre-requisite for the implementation of active learning methods;
- inspires the prospective teachers to evaluate their own learning strategies against their academic achievement and adjust themselves towards becoming masters of their own learning;
- notifies the teacher educators to consider teaching the prospective teachers focusing on the how of active learning methods (self-regulated learning behaviors) as a basis for the implementation of active learning; and
- provides background information for researchers in the field of education and psychology to undertake further investigation in this discipline.

Limitations of the study

Self-regulated Learning (SRL) constructs are composed of highly intricate variables. Even if scholars adhere to different models, most of them focus on motivational and learning strategy elements (Sometsewu, 2008; Magno, 2011; Nevgi, 2002). Under the learning

strategy component, however, there are cognitive, meta-cognitive and resource management sub-constructs.

Among all others, cognitive self-regulated learning behaviors are about intellectual abilities and this makes it challenging to measure using self-report tools. Because of this, the learning strategy constructs used in this study are exclusive of cognitive related variables. It is worth noting that failure of assessing the students' cognitive self-regulated learning behaviors might have some impact on the result, conclusion and implications drawn from this study. However, it is assumed that non-cognitive aspects of self-regulation are easily teachable but more relevant to the implementation of active learning and enhancing academic performance in colleges of teacher education, where the contents of the lessons are less difficult.

Research Design and Methodology

The overall purpose of this study was to investigate the relationship between self-regulated learning behaviors and academic achievement of college students. Therefore, a correlational research design was employed to effectively assess the relationship among motivational, meta-cognitive and learning strategy self-regulation and college academic performance of college students.

Population, samples and sampling

The target populations of this study were third year college students of Robe and Assela Colleges of Teacher Education in Oromia regional state. College students are preferred for this study because they are considered more in charge of their learning than secondary school students or lower grade level students. This is because the nature of teacher training is quite different from academic subject teaching. In teacher education system, on one hand, prospective teachers are allowed to be more autonomous and reflective. On the other hand, self-regulated learning entails experience, maturity and self-understanding.

Because of this, senior students are favored as they have already worked through many courses that might have required their active participation and involvement. In other words, third year students are preferred for the study because they are supposed to have better familiarity with active learning practices, which require self-regulated learning behaviors, throughout their college experience as learners.

As there are different number of students in different departments of the colleges, stratified random sampling technique was applied to select the specific participants from each department of the respective colleges. There are 267 male and 276 female (N=543) students in Robe College of Teacher Education and 249 male and 252 female (N= 501) students in Assela College of Teacher Education. From this population, 39 male and 48 female, (N= 87) students from Robe and 35 male and 27 female (N=62) students from Assela College of Teacher Education were selected for the study. However, responses of 66 males (34 from Robe and 32 from Assela) and 60 females (44 from Robe and 16 from Assela) were used for the final analysis. Out of the 149 students who initially participated in completing the questionnaire, 23 responses were discarded because they were either incomplete, lack clarity or the students' identity numbers were not written. This sample size determination was based on sample size and precision of population estimate at 95% confidence level.

Instruments

There is a significant variation among scholars in measuring SRLB constructs. Many researchers admit that intensive measurement of all SRL constructs is demanding because SRL is a complex concept which is explained by various theories and models. Many studies imply that SRL includes measures of learning strategies, motivation, cognition, meta-cognition, learning related skills and beliefs. For this reason, the components measured in SRL are various but basically focus on what learners do, think and feel when they are actively and constructively engaged in learning. Accordingly, the major source of

instrument used in this study is the Motivated Strategies for Learning Questionnaire (MSLQ), which is a self-report instrument developed to measure college students' motivational orientation behaviors, meta-cognitive self-regulation and use of different learning strategies (Pintrich,*et. al*., 1993). The original MSLQ had 81 items divided into two major categories: motivation section and learning strategy section.

For the purpose of the present study, however, most of the items were highly modified, adapted and used to assess motivational, meta-cognitive and learning strategy self-regulation. The original items were all a 7 point likert scale type , but adjusted to a 5 point likert scale like,1= not at all true of me, 2= not true of me, 3= indifferent, 4= true of me and 5= very true of me. Totally, 42 close-ended and 3 open ended items were used for this study. The number and type of each item used in this study is as follows:

Motivational Self-Regulation Measures

Intrinsic and extrinsic goal orientation (4 items for each): Intrinsic goal orientation measures the degree to which students perceive themselves to be participating in a task for reasons such as challenge, curiosity and mastery. Contrary to this, extrinsic goal orientation measures the degree to which students perceive themselves to be participating in a task for reasons such as grades, rewards, performance, evaluation by others and competition.

Control of Learning Beliefs (4 items): These items measure the students' beliefs that they are in control of their own learning and that their learning outcomes are thus contingent upon their own efforts rather than external factors.

Self-Efficacy for learning (6 items): These items measure the students' confidence in their ability to control their thoughts, feelings, actions and therefore their ability to influence outcomes. The total motivational self-regulation items yielded reliability value of .769 at alpha level.

Meta-cognitive self-regulation measures: Meta-cognitive constructs are interrelated sets of competencies required for active learning, critical thinking, problem solving and decision making (Dawson, 2008; Khatib, 2010). Under this construct, there are four sub-constructs: knowledge, experience, goals and strategies. In this study, the focus is only on self-regulation and control aspects of meta-cognition not on knowledge component. Each construct is specifically described as planning, monitoring and regulating. Accordingly, 10 items that measure meta-cognitive self- regulation (planning, monitoring, regulating and checking) were used. The internal reliability of these items was computed .57 at Cronbach alpha level.

Learning strategy measures: Besides meta-cognitive and motivational constructs, learning strategy constructs which measure effort regulation (2 items); time and study environment management (6 items), peer learning (2 items) and help seeking (4 items) were used in this study. Totally, 14 items with a reliability value of (α =.539) were used in this study.

All the three sections of the questionnaire have been commented on by college instructors with measurement and evaluation background. Moreover, the items were translated into “Afaan Oromo”, the mother tongue of the respondents, with the support of 2 instructors who are teaching “Afan Oromo” at college level. Finally, the tool was pilot-tested on 42 college students, who were intentionally omitted from the main study. Accordingly, a separate reliability value was computed for the three major parts of the items - motivational (α.769), meta-cognitive (α.57) and learning strategy self-regulation (α.539). The internal consistency value of meta-cognitive and learning strategy self-regulation items tended to be low probably because of the sub-divisions of constructs under the major variable. Most probably, these sub-constructs might be weakly correlated. Nevertheless, some sources (Mehrens and Lehmann 1991; Yalew, 2006) argue that the value is not unacceptable unless otherwise it is less than 0.5 at alpha level. Similarly, it is asserted that items for research purpose might

have lower reliabilities than scales being used for other purposes, such as clinicians making decisions about the future of the individual (Howitt, 2011).

Academic achievement measure

Many researchers asserted that self-regulated learning is highly associated with academic achievement (Ahmed, 2010; Chen, 2002; Mih and Mih, 2010; Zimmerman, 1990). Most of the studies in this area stress the extent to which learners are capable of regulating their own learning greatly enhances their learning outcomes. In order to check for the relationship between the students' self-regulation and their academic achievement, their 5-semester cumulative grade average point (CGAP) was collected from the registrar offices of their respective colleges based on the identity numbers they put on the questionnaire.

Data gathering procedures

The instrument was administered with the help of staff in lecture rooms after regular class schedule. As the list of participants was prepared in advance using stratified sampling techniques, a brief orientation was given to the participants just to secure their consent. Finally, their identity numbers were announced and volunteers are taken to the lecture rooms where the questionnaires were completed. At the beginning, oral clarification was given to the respondents, in addition to what is written on the questionnaire and respondents were repeatedly notified to write their identity numbers. However, 17 students (from both colleges) failed to do so and their responses were discarded.

Methods of data analysis

The data analysis method employed in this study was entirely inferential. Accordingly, Pearson product moment correlation coefficient was used to make an overview of all the possible overlaps among predictor variables and academic achievement of the students. As the

major objective of the study was to test the relationship of SRLBs and academic achievement of the college students, regression analysis was used to find out the contribution of the independent variables for the variations attained on the dependent variable. Furthermore, path analysis, based on structural equation modeling (SEM), was employed to identify the direct and indirect impact of the independent variables (self- regulated learning behaviors) on the dependent variable (academic achievement).

Besides regression analysis, t- test was employed to test for any difference between the students in terms of their gender and colleges they belong to. Based on the type of data, tables and charts were used to portray major findings of the study.

Results

As indicated in the research methodology section, inferential statistical analyses were performed to respond to the basic questions raised in this research. Accordingly, results are presented in sequential order. First of all, relationships of the variables (inter-correlations and regression analysis) are presented. Second, similarities and differences observed between the given groups in terms of some variables are indicated.

Table 1: Inter-correlation matrix among variables in the study

Variables	LSTR (X_1)	MSR (X_2)	MCSR (X_3)	AACT (X_4)
LSTR (X_1)	__			
MSR (X_2)	.527**	__		
MCSR (X_3)	.557**	.518**	__	
ACAT (X_4)	.625**	.414**	.577**	__

**p< 0.01

As indicated in Table 1, academic achievement is strongly correlated with sub-constructs of the self-regulated learning behaviors (motivational, meta-cognitive and learning strategy). On the other hand, motivational, meta-cognitive and learning strategy self-regulations are significantly correlated with each other.

The first basic question of this study is about assessing the relationship of self-regulated learning behaviors and academic achievement of the students in general. To respond to this question, regression analysis was computed and the following result is obtained.

Table 2: Summary of regression analysis result for predicting academic achievement from SRLBs

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.917	0.442		-2.073	0.04
	LSTR	0.045	0.009	0.435	5.152	.000
	MCSR	0.032	0.008	0.327	3.897	.000
	MSR	0.001	0.007	0.015	0.183	0.855

R^2 = .467

The above result (Table 2) reveals that self-regulated learning behaviors significantly predict academic success of the students (R^2= .467). This shows that self-regulated learning behaviors have contributed about to 46.7% for the variation of the students' academic success. On the other hand, it is the interest of the research to investigate the independent contribution of each sub-variable, i.e. learning strategy regulation, motivational self-regulation and meta-cognitive self-regulation to the students' academic achievement.

As presented in the above table, learning strategy self-regulation (t=5.152**, sig .00) and meta-cognitive self-regulation (t= 3.897**, sig. .000) are significant independent contributors to academic achievement of the students. However, Motivational Self-Regulation (MSR) is not a significant independent predictor of college academic success when learning strategy regulation of the respondents is statistically controlled. Nevertheless, it is shown in Table 1 that motivational self-regulation is positively and significantly correlated with academic achievement. Presumably, this variable might have an indirect contribution to the prediction of academic achievement through learning strategy regulation and meta-cognitive self-regulation. To identify whether this variable has indirect impact or not, another regression analysis was conducted considering Learning Strategy Self-Regulation (LSTR) and Meta-Cognitive Self-Regulation (MCSR) as dependent variables (in turn) and Motivational Self-Regulation (MSR) as independent variable.

Table 3: Summary of regression analysis result for predicting LSTR from MSR and MCSR

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14	4.338		3.227	0.002
	MSR	0.262	0.066	0.325	3.945	0.000
	MCSRBS	0.364	0.077	0.388	4.707	0.000

As summarized and presented in Table 3, motivational self-regulation and meta-cognitive self-regulation have significantly predicted learning strategy regulations (LSTR). Even at independent level, motivational self-regulation (t= 3.945**, sig. 0.000) significantly predicted learning

strategy self-regulation. However, it is shown in Table 2 that motivational self-regulation could not independently contribute to the prediction of academic success. Another regression analysis was conducted to test for the effect of motivational self-regulation and learning strategy self-regulation on meta-cognitive self-regulation considering motivational self-regulation and learning strategy self-regulation as independent variables and meta-cognitive self-regulation as dependent variable. The result is summarized as follows.

Table 4: Summary table of regression analysis for predicting MSCR from MSR and LSTR

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			Std. Error	Beta		
1	(Constant)	4.579181303	4.831539		0.947769	0.345106
	MSR	0.266968086	0.071653	0.311	3.725859	0.000295
	LSTR	0.419273784	0.089077	0.393	4.706845	6.66E-06

From the above table, one can infer that motivational self-regulation has contributed to college academic achievement through learning strategy self-regulation and meta-cognitive self-regulations. Furthermore, it is shown that meta-cognitive self-regulation has explained academic achievement directly and also indirectly through learning strategy regulation. On the other hand, this study aims to determine the overall increase in R^2 when some variables are statistically controlled. Thus, a stepwise multiple regression was conducted and the summary of the analysis is presented as follows.

Table 5: A step-wise multiple regression analysis of academic achievement on SRLB variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
		B	Std. Error	Beta			R2
1.	LSTR	0.065	0.007	0.625	8.922	0.000	.391
2.	LSTR	0.059	0.009	0.564	6.866	0.000	.401
	MSR	0.01	0.007	0.117	1.423	0.157	
3.	LSTR	0.045	0.009	0.435	5.152	0.000	
	MSR	0.001	0.007	0.015	0.183	0.855	.467
	MCSRBS	0.032	0.008	0.327	3.897	0.000	

It is shown in Table 3 that motivational self-regulation could not significantly and directly contribute to academic achievement. Nevertheless, it is given in Table 1 that learning strategy self-regulation, motivational self-regulation and meta-cognitive self-regulation are positively and significantly correlated with academic achievement. Moreover, regression analysis result given in Table 2 shows that all self-regulated learning behaviors, jointly, significantly predicted academic achievement of the respondents (R^2= .467). Thus, it is logical to suspect that motivational self-regulation might have indirectly contributed to the prediction of academic achievement of the students. As depicted in Table 5, analysis of a step-wise regression reveals that the contribution of learning strategy self-regulation is only 39.1 % out of the total 46.7%. When motivational self-regulation is entered into the equation, the contribution raises by 1% and becomes 40.1%. Above all, when meta-cognitive self-regulation is entered into the equation, the contribution raises by 6.6 % and becomes 46.7 %. This proves that a variable that failed to contribute directly, i.e. motivational self-regulation, contributed indirectly for the academic achievement of the students through learning strategy and meta-cognitive self-regulation.

Based on structural equation modeling (SEM), the relationship of the variables in the study is summarized in path model diagram as follows. The standardized beta weight and coefficients are taken from tables 2, 3 and 4.

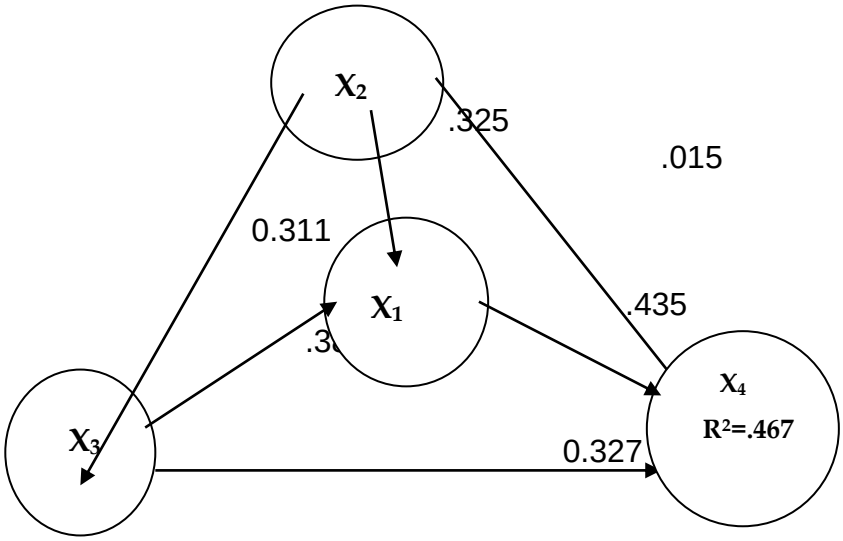

Fig. 1. *The Relationship of academic achievement (X_4) to Meta-Cognitive Self-Regulation (X_3) Motivational Self-Regulation ($X_{2)}$ and Learning Strategy Regulation (X1).*

As depicted in the above figure, motivational self-regulation has indirectly contributed to academic achievement through learning strategy regulation and meta-cognitive self-regulation. In other words, learning strategy regulation and meta-cognitive self-regulation have acted as intervening or mediating variables in the study. The figure shows that the direct prediction of academic achievement from motivational self regulation is not statistically significant. However, one can compute from this figure that the total indirect effect of Motivational

Self Regulation (MSR) is about 0.194, which is by far greater than the direct effect (0.015).

In order to respond to the second basic question, independent sample t test was computed. However, sex of the respondents has brought significant difference on neither of the variables treated in the study. Similarly, the college the students belong to has shown no statistically significant difference on the students' self-regulated learning behaviors as well as their academic achievement.

Discussion

The major purpose of this study was to examine the relationship of self-regulated learning behaviors to academic achievement of college students. To do this, Pearson product moment correlation coefficient, regression analysis and SEM path analysis were used. To begin with, the inter-correlations matrix (Table 1), revealed that academic achievement is positively and significantly correlated with learning strategy regulation (.625 **, P<001), motivational self-regulation (.414 **, P<001) and meta-cognitive self regulation (.577 **,P<0.01). This result goes with numerous previous studies (Ziegler, Stoeger and Robert, 2011; Mango, 2011; Pintrich and De Groot, 1990).

Many scholars argue that students' self regulated learning behaviors are highly associated with their academic performance. For example, Mih and Mih (2010) mentioned that well developed meta-cognitive abilities correlate with good performance at school, while individuals with ineffective meta-cognitive abilities are commonly seen as incompetent. In the present study too, self-regulated learning behaviors are able to positively and significantly predict academic success of the collegians. It was found that self-regulated learning behaviors have contributed for about 46.7 % for the variations in college academic success. This result is congruent with a local study conducted on distance education learners which revealed that personal, behavioral and environmental self-regulated learning strategies accounted for

about 52 % of critical reading performance among university students (Bekele, 2013). Furthermore, the present result complements Kitsantas ,Winsler and Huie (1998) finding which affirmed that about 47 % of the students academic achievement was accounted by self-regulation related variables.

Further regression analysis was carried out on the data to see which aspect of self-regulated learning behaviors was significant in predicting academic achievement. The result revealed that learning strategy and meta-cognitive self-regulations were the strongest direct predictors of academic achievement (β= .435 and .327, P<.01) respectively. In one way or another, this result supports a study conducted on Malaysian undergraduate students, which revealed that resource management strategy (β=0.40) and meta-cognitive learning strategy (β =.28) were the major significant academic achievement predictors (Kosnin, 2007). Moreover, this result is partially congruent with a study conducted on Hong Kong students, which identified that control strategy and self-efficacy were the most important learning strategies associated with performance in reading, mathematics and science (Ho, 2004). Regrettably, the only variable that failed to directly predict academic achievement in the present study was motivational self-regulation.

At a concept level, learning strategy regulation deals with resource utilization, study environment regulation, time and study environment management. The present result is concordant with Cobb's (2003) study which disclosed the presence of a significant relationship between time and study environment management and academic performance in web-based courses.

Next to learning strategy regulation, meta-cognitive self-regulation constructs accounted for the second largest contribution to the prediction of academic achievement in the present study. On one hand, this result is consistent with some previous studies (Takallou, 2011; Mahadi and Subram, 2013). Mahadi and Subram (2013), for example, asserted that meta-cognitive strategies have significant role in

improving low achievers' performance. Similarly, Takallou (2011) identified that meta-cognitive instruction had contributed to the students' reading comprehension performance.

On the other hand, this result is discordant with a study which revealed that meta-cognitive self-regulation is not significant to academic performance in web-based courses (Cobb, 2003). The most likely reason for such difference could be the participants' biography, as the participants of the present study are not online learners.

It could be unusual to learn from the present study that motivational self-regulation could not independently and directly contribute to college academic achievement. This particular part of the result is quite inconsistent with many previous studies (Pintrich, *et. al*.1993: Amare, 2001; Kitsantas, Winsler and Huie, 2008). With this regard, Pintrich and De Groot (1990) asserted that higher levels of intrinsic value and self-efficacy are associated with higher levels of student achievement across all types of tasks (seat work, quizzes/exams, essays/reports and grades). On the opposite side, the present result tends to support a study by Kosnin (2007) which reported that self-efficacy, one component of motivational self-regulation, was the only variable that failed to predict academic achievement.

Restating the obvious, motivation by itself does not guarantee academic performance; rather it enhances the use of one or more strategies to keep oneself on-track towards learning activities. Pertaining to this concept, Zimmerman (2000) argued that when students are motivated to learn, they are more likely to invest the necessary time and energy needed to learn and apply appropriate self regulated learning skills. This could be one plausible reason for motivational self regulation to be the strongest indirect contributor through mediating variables, i.e. learning strategy and meta-cognitive self-regulations. As depicted in fig.1, motivational self regulation has brought an indirect impact on academic achievement via learning strategy regulation (.1413), meta-cognitive self-regulation (.102) and learning strategy regulation and meta-cognitive self-regulation (.0523).

Thus, the total indirect impact of motivational self-regulation is (.295), which is quite larger than the direct impact of the variable.

By and large, scholars insist that self-regulated learning behaviors are the primary determinants of students' learning outcomes, and whether or not they will persist through challenging tasks (Zimmerman, 2000; Zumbrunn *et.al.,* 2011; Kosnin, 2007). Therefore, by helping the students to utilize new learning strategies and teaching them to be more self-regulative, teachers may experience greater success in promoting academic achievement and life-long learning. On top of this, Schraw, Crippen and Hartley (2006) remarked that effective instruction must not only increase academic achievement, but also help students develop meta-cognitive life-long learning skills needed to succeed at higher levels.

The second basic question in this study was about similarities and differences as a function of gender and college of the respondents. However, no significant difference was obtained between male and female respondents in terms of any of the variables in this study. Apparently, this result is found to be inconsistent with the result of a study conducted by Kitsantas, Winsler and Huie (2008) which revealed a significant gender difference in cumulative college (CGPA) in the sophomore year where females attained higher cumulative college (CGPA)s, $t(118) = 2.65^{**}$, $p < 0.01$ (females $M = 3.03$; males $M = 2.79$). Furthermore, the present result is incongruent with Yalew's (1997) study which found out that boys and girls showed a significant difference in self-efficacy, perceived importance, attitudes (all addressed as motivational self-regulation in the present study) and academic achievement in secondary school Physics. Like that of gender, no statistically significant difference was found as a function of the college the respondents belong to.

Perhaps, this result is more likely attributed to similarities in teaching and assessment approaches employed in the two colleges. In colleges of teacher education, course material preparation is highly centralized by the Regional Education Bureau and every module is prepared by central supervision and approval of the Bureau. On top of this, the way

the student teachers are recruited, teaching methods and assessment techniques are more or less similar and this might have helped to overcome differences and irregularities.

Behaviorally, self-regulated learners are distinguished by their systematic use of cognitive, meta-cognitive and motivational strategies and by their responsiveness to feedback regarding the effectiveness of their learning (Zimmerman, 1990). Normally, student achievement within college learning environments is influenced by the degree to which the student has effective use of self-regulation, or the ability of the students to plan, monitor, and evaluate their own behavior, cognition and learning strategies.

In most cases, the major concern for college personnel is to ensure that students progress throughout their program, do well and eventually graduate. Fortunately, the students' academic self-regulatory skills are amenable to change through intervention (Cobb, 2003; Zimermman, 2002). In other words, it is accepted that self-regulating strategies can be learnt to a varying extent, but students need to be instructed, and they need to be provided with plenty of practice and appropriate feedback in classes. This means, as part of promoting student-centered learning, teachers should teach students on how to regulate their learning and provide opportunities for the students to manage their own learning activities. As a rule, class rooms become learner-centered when the learners are provided with appropriate support from the teachers side (Derebsa, 2005).

Therefore, if our ultimately goal is to create successful life-long learners and ensure quality of education through learners' active involvement, then we must first ensure that we teach them the strategies necessary for learning.

Implications

Enhancing self-regulation processes will not only allow the students to maximize their college achievement, but also enables the colleges to promote better involvement of students in their own learning. It is presumed that promoting self-regulated learning strategies is

particularly important in college, where the students are given more freedom to engage in various activities and prepare themselves to be reflective teachers in the future. The findings of the present study imply that college instructors should focus on instilling self-regulatory interventions, perhaps to teach students how to cultivate their meta-cognitive, motivational and learning strategy self-regulations. Scholars confirmed that the ability to self-regulate one's own learning is a learned behavior. Thus, self-regulated learning skills such as time management, planning, goal setting, self-evaluation, effort regulation and help seeking should be integrated into college courses to positively impact the students' involvement and academic achievement.

Further research is needed to be conducted on the development of self-regulatory interventions incorporating a variety of strategies that college educators could use to increase self-regulated learning behaviors.

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