A Study on Self-Regulated Learning and Academic Achievement among the Science Graduate Students

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ABSTRACT:

Self-regulated learning (SRL) is recognized as an important predictor of student Academic motivation and achievement. It is a pivotal construct in contemporary accounts of effective academic learning. Self-regulation is essential to the learning process by which students direct their acquisition of academic knowledge. SRL creates opportunities for students to manage their own resources and to perform better in all learning processes. Self-regulated learners take responsibility for their own learning processes and adopt their learning strategies to meet their demands. Students use various cognitive, meta-cognitive, behavioural, motivational and environmental strategies to control and regulate their own learning. These strategies assist in SRL and simultaneously lead toward good academic achievement. Achievement is the main goal of students to make them success. The present study attempts to find out the relation of SRL and academic achievement of male and female science graduate students. 300 college students from Varanasi District were selected as the sample. Results reveal that SRL is moderately positive correlated with academic achievement. At different dimensions of the SRL, male and female science graduate students do not differ significantly but at environment they differ significantly. The Implications are presented in the article.

INRODUCTION:

In this age of science and technology we are advanced in scientific affairs and objects; no doubt onside these objects such as radio, mobile phone, computers, games etc. assisted in our daily routine and has become part of life while in other side these affairs and objects have exerted considerable pressure on students effort to use their time and study related activities

therefore they are distracting constantly. Students are struggling and facing of every day conflicts that arise due to the distractions and they are unable to self- regulate their learning. They are expected to know the strategies and to develop skills to utilize their time purposefully to maximize their performance and achievement. They need to regulate themselves to cope up with the rapidly changing scenario of the present world.

SELF-REGULATED LEARNING (SRL)

Self-regulated learning (SRL) has emerged as an important predictor of academic achievement and motivation of students. It is a pivotal construct in contemporary accounts of effective academic learning (Winne, 1995). Self-regulated learning refers to one's ability to understand and control accordingly his or her own learning environment. SRL is a also considered as a form of learning, through which the learner sets goals and makes plans before starting to learn; monitors and regulates his/her cognition, motivation and behaviour during the learning process and then reflects on his/her learning process and outcomes (Pintrich, 1995; Pintrich, 2000; Zimmerman, 2001). Zumbrunn, Tadlock& Roberts (2011), Pintrich (2000) and Schunk (1996) described SRL as an active, purposeful constructive process by which a learner sets goal, monitors his learning and controls his motivation, behaviour and cognition. Boekaerts (1999) refined the meaning of Self-regulation as 'being able to develop knowledge skills and attitudes which can be transformed from one learning context to another and form learning situation in which this information has been acquired to a leisure and work context'. Zimmerman (2008) viewed SRL as a proactive process rather than as a reactive event that happens to students due to impersonal forces like teaching. Students vary in their ability of self-regulated learning. Researches show that Self-regulation is essential to the learning process (Jarvela & Jarvenoja, 2011; Zimmerman, 2008) and those having better self-regulation skills typically learn more with less effort and show higher level of academic satisfaction (Pintrich, 2000; Zimmerman, 2000). Self- regulated learners are distinguished by (a) their awareness of strategic relations between regulatory processes or responses and learning outcomes and (b) their use of these strategies to achieve their academic goals (Zimmerman, 1990). SRL creates opportunities for students to manage their own resources and to perform better in all learning processes. Self-regulated learners take responsibility for their own learning processes and adopt their learning strategies to meet their demands.

By which students direct their acquisition of academic knowledge (Zimmerman, 1990). This process requires students to plan, monitor and assess their learning independently. It assists students in managing their thoughts, behaviours, and emotions in order to successfully navigate their learning experiences. This process occurs when a student's purposeful actions and processes are directed towards the acquisition of information or skills (Zumbrunn, Tadlock& Roberts, 2011).In process term the self-regulation is not a mental ability or an academic performance skill; rather it is the self-directive process by which learners transform their mental abilities into academic skills. Learning is viewed as an activity that students do for themselves in a proactive way rather than as a covert event that happens to them in reaction to teaching. Self-regulation refers to self-generated thoughts, feelings, and behaviour that are oriented to attaining goals (Zimmerman, 2002). There are two important concepts needed to defining self-regulated learning (i) Self-regulation process, such as perception of self-efficacy, and (ii) strategies, which is designed to optimize these processes, such as intermediate goal-setting.

A Self-regulated learning perspective on students' learning and achievement is not only distinctive, but it has profound implications for the way teachers should interact with students and the manner in which schools should be organised (Zimmerman 1990).

The way we learn is generally reflected in the way we teach. A teacher with self-regulated learning skills are more likely to generate scope for the students for self-regulation in learning while teaching them. As Zimmerman & Martinez-Pons (1986, 1990) LATEST SOURCE pointed out, self – regulated learners are aware when they know a fact or possess a skill and when they do not. Unlike their passive classmates, self-regulated students proactively seek out information when needed and take the necessary steps to master it. When they encounter obstacles such as poor study conditions, confusing teachers, or abstruse text books, they find a way to succeed. Self- regulated learners' views acquisition as a systematic and controllable process, and they accept greater responsibility for their achievement outcomes.

Self-regulated learning consists of three main components: **cognition, metacognition** and **motivation**. Cognition includes skills necessary to encode, memorise, and recall information.

Metacognition includes skills that enable learners to understand and monitor their cognitive processes. Motivation includes beliefs and attitudes that affect the use and development of cognitive and metacognitive skills. Each of these three components is necessary, but not sufficient, for self-regulation (Schraw, Crippen, & Hartley, 2006).Although definitions of self-regulated learning involves specific processes often differ on the basis of researchers' theoretical orientations, a common conceptualizations of these students has emerged as **metacognitively**, **motivationally**, and **behaviourally** active participants in their own learning (Zimmerman,1986). In term of metacognitive processes, self-regulated learners plan, set goals, organize, self-monitor, and self-evaluate at various points during the process of acquisition. These enable them to be self-aware, knowledgeable and decisive in their approach to learning. In term of motivational processed, these learners report high self-efficacy, self-attributions, and intrinsic task interest. Motivational constructs (learning goal orientation, task value and self-efficacy) were strong predictors of students' self-regulation in science learning (Velayutham, Aldridge& Fraser, 2013).In term of behavioural processes, they select, structure, and create environments that optimize learning (Zimmerman, 1990).During the past two decades, researchers have applied Bandura's (1997) social-cognitive theory to many settings, including school learning. These attempts led to the development of self-regulated learning theory which contends that learning is governed by a variety of interacting **cognitive**, **metacognitive, motivational**, **Behavioural** and **Environmental** components (Butler &Winne, 1995; Zimmerman, 2000).In their research, Zimmerman & Martinez-Pons (1986) have identified 14 strategies of self-regulated learning, namely, self-evaluation, organisation and transforming, goal setting and planning, information seeking, record keeping, self-monitoring, environmental structuring, giving self-consequences, rehearsing and memorizing, seeking social assistance(from peers, teacher, or other adults), and reviewing (notes, books, or tests).

Thus studies shows that these are the five important components i.e. cognition, metacognition, motivation, behaviour and environment which play vital role in self-regulated learning processes. These components led toward good performance of learner through using strategies as subcomponent to be proactive. Self-regulated learning is an indication of how and why students choose to use a particular strategy or response for better learning. Because

self-regulated learning involves temporally delimited strategies or responses, students' efforts to initiate and regulate them proactively require preparation time, vigilance, and effort. Unless the outcomes of these efforts are sufficiently attractive, students will not be motivated to self-regulate (Zimmerman, 1990). The students' use of self-regulated learning processes and strategies are the indicator of academic self-regulation.

ACADEMIC ACHIEVEMENT:

It is not easy to define, quantify and measure student achievement. The most common indicator of achievement generally refers to a student's performance in academic areas such as reading, language arts, math, science and history as measured by achievement tests. Many of the researches indicating the important role that students 'use of self-regulated learning strategies plays in their academic achievement (Zimmerman, 1990). Academic achievement may be defined as excellence in all academic disciplines, in class as well as co-curricular activities (Ganai, et.al. 2013). It includes excellence in sporting behaviour, confidence, communication skills, punctuality, arts, culture and the like which can be achieved only when an individual is self-regulated. Trow (1956) defined academic achievement as "knowledge attaining ability or degree of competence in school tasks usually measured by standardized tests and expressed in a grade or units based on pupils' performance". Good (1959) refers to academic achievement as, "The knowledge obtained or skills developed in the school subjects usually designed by test scores or marks assigned by the teacher" Mehta K.K. (1969) states "academic performance includes both curricular and co-curricular performance of the students. It indicates the learning outcome of the students. In class rooms students performs their potentials efficiently, as a result of it, learning takes place". The learning outcome changes the behaviour pattern of the student through different subjects. In the investigation of Zimmerman & Martinez-Pons (1986) revealed that students' use of SRL strategies was strongly associated with superior academic functioning. One more interesting finding in their study is that students in the lower achievement tracks tended to give several common non-self-regulated responses with greater frequency than students from the advanced track.

In operational definition Self -regulated leaning refers to the under graduate science stream students that how they meta-cognitively, motivationally and behaviourally promote their SRL with various self- regulated learning strategies. The academic achievement of the students is considered to be measured by the total scores obtained by the B. Sc. Students in examinations conducted during academic year 2012-13 in August month.

NEED AND IMPORTANCE OF THE STUDY:

The gender gap issues in science education have been well documented over many years and are still persistent and pervasive today (Baker, 2002; Meece, Glienke& Burg, 2006). Contemporary science education reviews suggest that gender differences continue to exist for student achievement, selection of science courses and careers in science. Due to these distinct variations, coupled with the differences in the way that students learn science, it is vital that science educators both know of and responds to them (Osborne & Dillon, 2008).

Researches supported the idea that self-regulatory skills can be taught and once it is used, will be predictive of academic successes (Zimmerman, 1989). Skills which lead to SRL are not an important personality trait and they can be learned through experience and self-reflection. Boekaerts (1997) also asserted that though SRL can be complex, it can taught, although SRL cannot occur overnight, there are numerous strategic instructions available to promote effective self-regulation, since self-regulation is regarded as a desirable educational goal, as it is linked to achievement, effective problem-solving and greater, self-realisation. SRL becomes essential now because it emphasizes the emerging autonomy and responsibility of students to take charge of their own learning (Paris &Winograd, 2001), particularly constructive perspectives of educational interventions.

Self-regulated learning is an important aspect of learning and achievement in academic contexts. Students who are self-regulating are much more likely to be successful in school or college, to learn more, and to achieve at higher levels. Accordingly, it is important for schools and classrooms to attempt to foster the development of expertise in self-regulated learning. In the twenty-first century and as the explosion of information and multiple ways of learning increase, it will become even more important that individuals know how to self-

regulate their learning and that fostering self-regulated learning becomes an important goal for all educational systems. From the above studies, it was felt that self-regulation is an important factor which has many aspects like, self- motivation, self-control on cognition and behaviour etc.; which influence the achievement of the student or person. One who have the SRL they would be successful in his life mainly in academic field, but many of the students not feel that it is important so; they want to ignore this. Therefore I felt that study on this topic is needed; Due to this I came to know the strategies which must be used in life for academic achievement.

OBJECTIVE OF THE STUDY: The following objectives have been formulated for the present study:

1. To study the relationship between self-regulated learning and academic achievement among under graduate students science

2. To study the self-regulated learning among UG students of science with respect to Gender

3. To study the academic achievement of UG students of science with respect to Gender

4. To study the domains of SRL with respect to Gender

HYPOTHESES OF THE STUDY:

The following hypotheses have been formulated for the present investigation:

1. There will be significant relationship between SRL and academic achievement

2. Male and female science students will not differ significantly on their SRL

3. Male and female science students will not differ significantly on their academic achievement

4. Male and female science students will not differ significantly on domains of SRL

METHODS AND DESIGN: in this study survey has been adopted.

- **Sample:** this present study was carried out on 300 undergraduate students pursuing B.Sc. final year. These consist of 165 male and 135 female UGscience students from four different colleges in Varanasi district of U.P., selected through stratified random sampling.

- **Tools used:** "self-regulated learning scale" developed by researcher has been used in this present study. This five point scale consisted of 46 items. It measures four major domains (self-motivation, cognition and metacognition, behaviour, and environment) and14 different self-regulated learning strategies namely self-evaluation, organisation and transforming, goal setting and planning, information seeking, record keeping, self-monitoring, environmental structuring, giving self-consequences, rehearsing and memorizing, seeking social assistance and reviewing records.The reliability was estimated by the split-half method (odd-even) method and found to be 0.724 and researcher established the content validity. For the academic achievement of B.Sc. Final year students; thescores of B.Sc. 2nd year examinations had taken which is conducted during academic year 2012-13 in August month.

STATISTICAL TREATMENT:

The data was analysed by applying Karl Pearson's product moment correlation and t-test.

Results and discussion

Table 1.1: Relationship between self-regulated learning and Academic achievement among science students

Variable to be correlated	No. of sample	Pearson's co-efficient Value (r)
self-regulation and academic achievement	300	0.513

For d.f. (300-2=294), the table value of "r" at 0.05 level of significance is 0.113 hence, there exists significantly positive correlation between SRL and academic achievement.

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Table 1.2: Significance of difference at means of SRL between male and female science under graduate students on their SRL

Variable	Gender	(N)	Mean (M)	SD	t-value	Inference
Self-regulated learning	Male	165	76.66	10.83	7.09	
	Female	135	84.03	5.84		Significant *

* Significant at 0.05 level for d.f. (165+135 -2=298)

Frome above table it is clear that the self-regulation of male student has mean 76.66 with standard deviation 10.83. Female have mean 84.02with standard deviation 5.84, and calculated t-value for difference between means score of male and female students is 7.09. Calculated t- value is more than table value at 0.05level.

It reveals that male and female students differ significantly on their self- regulated learning. So the Null hypothesis is rejected.

Table 1.3: Significance of difference between mean scores of academic achievement among male and female of science UG students on their

Variable	Gender	(N)	Mean (M)	SD	t-value	Inference
Academic achievement	Male	165	59.15	8.78		
	Female	135	62.68	8.88	3.44	Significant *

*significant at 0.05 level for d.f. (165+132 -2= 298)

Frome above table it is clear that the academic achievement of male has mean 59.15 with standard deviation8.78, Female have mean 62.68 with standard deviation 8.88, and calculated t-value for difference between means score of male and female students is 7.09. This calculated t-value is more than the table value at 0.05 level.

It reveals that male and female students differ significantly on their academic achievement. So this hypothesis is rejected.

Table 1.4: Significance of difference of mean scores on different domains of SRL of themale and female science UG students

Domains of Self-regulation	Gender	N	Mean	SD	't' value	Level of significance
Self-motivation	Male	165	80.38	16.05	0.66	
	Female	135	79.18	15.10		Insignificant
Cognition	Male	165	81.00	16.06	0.20	Insignificant
	Female	135	81.37	14.63		
Behaviour	Male	165	70.71	22.33	0.69	Insignificant
	Female	135	72.56	23.31		
Environment	Male	165	66.92	20.86	2.20	Significant*
	Female	135	61.42	22.24		

* Significant at 0.05 level for d.f. (165+135-2=298)

Frome above table it is clear that the self-motivation dimension of the SRL; male students have a mean score of 80.38 with standard deviation 16.05. Female students have mean 79.18 with standard deviation 15.10. Calculated t-value for difference between mean scores of male and female science students is 0.66. This calculated t-value is less than table value for critical ratio to not significant even at 0.05 level. Thus the mean difference in self-motivation of the SRL of male and female science students is insignificant.

This reveals that male and female science UG students do not differ significantly on their self-motivation.

In table 1.4, the cognition dimension of the SRL; male students have a mean score of 81.00 with standard deviation 16.06. Female students have mean 81.37 with standard deviation 14.63. Calculated t-value for difference between mean scores of male and female science students is 0.20. This calculated t- value is less than table value for critical ratio to not significant even at 0.05 level. Thus the mean difference in cognition of the SRL of male and female science students is insignificant.

This reveals that male and female science UG students do not differ significantly on their ability to adopt cognitive and metacognitive strategies.

From above table 1.4, the behaviour dimension of the SRL; male students have a mean score of 70.71with standard deviation 22.33. Female students have mean 72.56 with standard deviation 23.31. Calculated t-value for difference between mean score of male and female science students is 0.69. This calculated t-value is less than table value for critical ratio to not significant even at 0.05 level. Thus the mean difference behaviour of the SRL of male and female science students is insignificant.

This reveals that male and female science UG students do not differ significantly on their cognitive domain of SRL.

The table 1.4, clearly indicate that the environment dimension of the SRL; male students have a mean score of 66.92 with standard deviation 20.86. Female students have mean 61.42 with standard deviation 22.24. Calculated t-value for difference between mean score of male and female science students is 2.20. This calculated t-value is more than table value for critical ratio to significant at 0.05 level. Thus the mean difference in environment of the SRL of male and female science students is significant.

This reveals that male and female science UG students differ significantly on their behaviour towards environmental structuring.

CONCLUSION: Above calculations shows that both self-regulation and academic achievement are positively correlated and it shows that there is significant positive relationship between self-regulation and academic achievement of science UG students in Varanasi district.

Male and female science students differ significantly on their Self-regulation and academic achievement but on different dimensions of SRL male and female science students do not differ significantly whereas on the environmental dimension of SRL they differ significantly. It means that male and female students in Varanasi district of U.P. are same in their self-motivation, cognition and behavioural dimension of self-regulated learning but they differ in their environmental dimension of self-regulated learning.

SUGGESSIONS:

Students should identify their all dimensions of SRL for enhancing their academic achievement. Above Results shows that environment is the main factor which causes the difference between male and female of science students so they can set their environment accordingly that enhance their academic achievement. And results also show that male and female are not differ on their self-motivation, cognition, metacognition, and behaviour so they can discuss about environmental factors which make them not difference between male and female.

IMPLICATIONS

The self-regulated learning is makes changes in academic achievement among the students. We can say that a person who possesses the self-regulated learning will also achieve more in his/her academic activities. Moreover the self-regulated learning is an increasing factor of academic achievement. Now a day's education is mainly based on the academic marks of the students at all level. The good academic achievement is also depends on the aspect of self-regulated learning so students would focus on their self- motivation, cognition and meta cognition development and reforming in their behaviour as well as their environment. One can improve his academic performance by possessing the good level of self-regulated learning throughout his entire life. There for it can enlighten the future of an individual.

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