REVIEW OF RESEARCH

CONSTRUCTION AND STANDARDIZATION OF SELF-REGULATED LEARNING INVENTORY

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ABSTRACT:

The purpose of this study is to construct and validate a research inventory for measuring the self-regulated learningof the higher secondary students. For this study, simple random sampling technique was used for selecting the sample. For constructing this inventory, 50 items were framed for the pilot study. The pilot study was conducted for a sample of 100 higher secondary students. After the pilot study, item analysis was done to standardize the research inventory. Finally, 32 items were selected for the final study.

KEYWORDS: *Self-Regulated Learning.*

SELF-REGULATION

Etymologically the term self-regulation is formed as Self + Regulation. The term self-regulation refers the fact of something such as an organization regulating itself without intervention from external bodies. Self-regulation is the ability to adaptively regulate one's own emotions, cognition, and behaviour in order to respond effectively to internal as well as environmental demands (McClelland/Cameron 2012; Raffaelli et al. 2005). Zimmerman (2000) said that self-regulation, "…refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals". Boekaerts (1999) defines self-regulation as the ability to develop knowledge, skills, and attitudes transferable from one learning context to another and from learning situations in which this information has been acquired to a leisure and work context. Self-regulation is a self-directive process and set of behaviours whereby learners transform their mental abilities into skills and self-regulation is a set of thoughts, feelings and actions generated by the students to achieve specific educational objectives (Zimmerman, Bonnor, & Kovach, 2002).

SELF-REGULATED LEARNING

Self-regulated learning is a word formed of self-regulation + learning. Self-regulated learning (SRL) refers to the process through which learners systematically direct their thoughts, feelings, and actions towards the attainment of their goals (Schunk & Zimmerman, 1994). A students' level of learning has been found to vary based on the presence or absence of these key self-regulatory processes (Schunk & Zimmerman, 1994; 1998). Holec (1981) points out; self-regulated learning is an umbrella concept which may lead a person to autonomously learn at different levels. At this point it seems reasonable to argue that SRL is strongly associated with learner autonomy. It could be argued that developing learner's ability to self-regulate their learning is of great importance to the development of learner autonomy.

SELF-REGULATED LEARNERS

Self-regulated learners view acquisition as a systematic and controllable process, and they accept greater responsibility for their achievement outcomes (Zimmerman & Martinez-Pons, 1986, 1990). In terms of metacognitive processes, self-regulated learners plan, set goals, organize, self-monitor, and self-evaluate at various points during the process of acquisition (Corno, 1986, 1989; Ghatala, 1986; Pressley, Borkowski, Schneider, 1987). Self-regulated learners are not merely reactive to their learning outcomes; rather, they proactively seek out opportunities to learn (Zimmerman, 1989a). According to Cubukcu (2009), one of the major causes of students' failure intheir learning is the lack of self-regulation. Self-regulators are easily identified in the classroom as being self-starters, confident, strategic and resourceful, and self-reactive to task performance outcomes (Cubukcu, 2009). Santrock (2004) describes self-regulated learners as those who: set goals for widening their knowledge and maintaining their motivation, are aware of their emotions and learn how to manage their emotions, regularly monitor their progress towards a goal, modify their strategies on the basis of their progress, assess hindrances that may arise and make adjustments.

CONSTRUCTION OF SELF-REGULATED LEARNING INVENTORY

Steps involved in constructing the Self-regulated learning Inventory

1. Investigators personal experience and observation.
2. Investigator's discussion with teachers, professors and students of various schools and obtain their opinions.
3. Collecting information from enormous review of related literature.

ITEM POOLING

By reviewing various related literature, the investigator has collected 50 statements and classified in to three phases for the pilot study. The phases of self-regulated learning are:

1. Forethought Phase

'Forethought phase' is the initial phase in which the learners set their goals, objectives and set their planning strategies for completion of their activities or projects.

2. Performance Phase

In this 'action phase' efforts of learning process takes place. It includes decisions take by the learner's to reach their goal, by minimize the distractions which affect their concentration and performance.

3. Reflection Phase

In this last phase, attained learning processes are evaluated. The effect of learning strategies set by the learners, identification of perfect learning methods for attaining goals is measured.

Table 1: The Various Phases and its Statements in the Self-Regulated Learning Inventory

S.No.	Phases	Serial-Wise Statement Numbers	No. of Statements
1.	Planning phase	1 – 16	16
2.	Performance phase	17 - 32	16
3.	Reflection phase	33 - 50	18
Total number of statements			50

Pilot Study

In order to perfect the inventory, a pilot study was conducted among 100 higher secondary biology students in five schools located in Chennai, Kancheepuram and Tiruvallur districts. For the pilot

study, 100 inventories were distributed to 50 male and 50 female higher secondary biology students. The tools were distributed and collected through individual contact with the students in the premises of the respective school principals and higher authorities. The 100 inventories administrated to the pilot study were scored and arranged in descending order from the top most scorer to the bottom most scorer. Two criterion groups the upper group consisting of 27 tools and the lower group of 27 tools were arranged. Then they were subjected to item analysis.

Item Analysis

The pilot study inventory has 50 statements. All statements are positive in nature. Each statement has 5 responses and their scoring procedure is listed in the table.

Table 2: Scoring Procedure for Self-Regulated Learning Inventory

Responses	Strongly Agree	Agree	Undecided	Disagree	Strongly Agree
Scores	5	4	3	2	1

In this way, one can get a maximum score of 250 and the minimum score of 50. Then the responses are subjected to critical ratio analysis of 't' and correlation analysis of 'r'.

Table 3: Constructed Self-Regulated Learning Inventory FOR THE Pilot Study

S.No.	Statements	't' value	'r' value	Remarks
	Dimension 1: Planning phase			
1.	I was interested in studying Biology subject from my childhood.	3.27	0.358	Selected
2.	I like to draw floral and structural diagrams.	5.10	0.426	Selected
3.	I want to get good marks in the subject by doing hardwork.	4.71	0.454	Selected
4.	I prefer complex content matter so that I can learn new things.	7.52	0.558	Selected
5.	I plan my daily activities and work according to it.	2.05	0.244	Selected
6.	**I prefer guides rather than text book material.**	**1.55**	**0.106**	**Not Selected**
7.	I prepare time table for studying my subjects.	2.07	0.340	Selected
8.	I am confident that I could understand the complex subject matter better.	2.75	0.296	Selected
9.	**I know my strength and weakness in learning subjects.**	**1.26**	**0.109**	**Not Selected**
10.	**I like to attend the special classes taken by the subject experts.**	**1.77**	**0.296**	**Not Selected**
11.	I use coding mechanism for writing biology notes.	3.74	0.42	Selected
12.	I work hard till I understand the subject matter.	5.16	0.492	Selected
13.	I use my study time in perfect manner.	7.71	0.584	Selected
14.	I feel very bad for selecting the biology group.	8.22	-0.398	Selected
15.	I review the notes prepared by me before the examination.	2.01	0.332	Selected
16.	I want to get good marks in the class rather than my friends.	7.31	0.591	Selected
	Dimension 2: Performance Phase			
17.	I complete my home work in a specified time.	8.01	0.638	Selected
18.	**During class hours, I concentrate on my studies even though I have problems.**	**0.38**	**0.103**	**Not Selected**

19.	I complete my homework by watching TV.	3.40	0.426	Selected
20.	I study according to the guidelines of my teacher.	2.28	0.305	Selected
21.	I create a checklist about my tasks.	2.71	0.258	Selected
22.	**I prefer quite places for studying.**	**0.38**	**0.015**	**Not Selected**
23.	**I prefer group study for better achievement.**	**2.64**	**0.344**	**Not Selected**
24.	I can read even in noisy places.	4.8	0.509	Selected
25.	**I collect information from different sources for study.**	**1.87**	**0.240**	**Not Selected**
26.	**Whenever my friends talk about subject matter, I will get ideas from them.**	**1.56**	**0.178**	**Not Selected**
27.	I hate people, who are disturbing me, during my studies.	4.39	0.443	Selected
28.	I refer dictionary for clarifying my doubts.	2.47	0.363	Selected
S.No.	**Statements**	**'t' value**	**'r' value**	**Remarks**
29.	**I always like to study only in my study room.**	**0.85**	**0.163**	**Not Selected**
30.	I do not hesitate to ask my doubt to teacher.	2.64	0.295	Selected
31.	**I will not take food till I complete my work.**	**1.71**	**0.171**	**Not Selected**
32.	I stop my work, when I feel tension or bore.	5.62	0.543	Selected
	Dimension 3: Reflection Phase			
33.	After reading each lesson, I complete the text book exercises without anyone's help.	2.33	0.443	Selected
34.	I review my old answer sheets to avoid previous mistakes.	2.50	0.360	Selected
35.	**After reading each question I recall it.**	**0.01**	**0.137**	**Not Selected**
36.	**If anybody critises my work, I take it positively for improvement.**	**1.21**	**0.119**	**Not Selected**
37.	After examination, I analyse the question paper to find out the mistakes committed by me.	4.19	0.405	Selected
38.	**I do not want to stick on to the subject matter which I don't understand.**	**0.60**	**0.112**	**Not Selected**
39.	If I can't understand the subject matter, I will just memorize it.	3.43	0.300	Selected
40.	**If I fail in my task, I am responsible for that.**	**1.07**	**0.169**	**Not Selected**
41.	**If I achieve my short goal, I will praise myself.**	**0.60**	**0.195**	**Not Selected**
42.	I have to get good marks to prove my ability to others.	2.23	0.215	Selected
43.	At the end of each task, I think how to improve myself in next time.	3.20	0.338	Selected
44.	**My instructor is responsible for my lower marks.**	**0.66**	**-0.080**	**Not Selected**
45.	**I get suggestions from my seniors about exam.**	**1.39**	**0.102**	**Not Selected**
46.	I change the reading method based on subject matter.	3.92	0.403	Selected
47.	**I will get upset if anyone finds my mistake.**	**0.27**	**0.019**	**Not Selected**
48.	I take key points while reading the textbook.	3.83	0.497	Selected
49.	I try to explain the subject matter to my friends, which they don't understand.	3.52	0.459	Selected
50.	If I can't understand the subject matter I openly ask my friends.	2.83	0.344	Selected

In this study, the statements having satisfied level of both 't' value and 'r' value were selected for the main study. The statements used in the pilot study were 50, out of these only 32 statements were selected for the final study.

Table 4: Self-regulated Learning Phases and the No. of Statements in Each Phases (Final Study)

S.No.	Phases	No. of Statements
1.	Planning Phase	12
2.	Performance Phase	10
3.	Reflection Phase	10
Total No. of Statements		**32**

The selected items are presented in the Table. 5. These 32 statements constitute the final form of knowledge on Self-regulated learning inventory. The following items have been rejected, since the 't' value and the 'r'value were not at the level of significance.

Table 5: Statement Selected for Final Form of the Knowledge on Self-Regulated Learning Questionnaire

Serial No. of Statements Selected	't' value	'r' value	Remarks
1.	3.27	0.358	Selected
2.	5.10	0.426	Selected
3.	4.71	0.454	Selected
4.	7.52	0.558	Selected
5.	2.05	0.244	Selected
7.	2.07	0.340	Selected
8.	2.75	0.296	Selected
11.	3.74	0.42	Selected
12.	5.16	0.492	Selected
13.	7.71	0.584	Selected
14.	8.22	-0.398	Selected
15.	2.01	0.332	Selected
16.	7.31	0.591	Selected
17.	8.01	0.638	Selected
19.	3.40	0.426	Selected
20.	2.28	0.305	Selected
21.	2.71	0.258	Selected
24.	4.8	0.509	Selected
27.	4.39	0.443	Selected
28.	2.47	0.363	Selected
30.	2.64	0.295	Selected
32.	5.62	0.543	Selected
33.	2.33	0.443	Selected
34.	2.50	0.360	Selected
37.	4.19	0.405	Selected
39.	3.43	0.300	Selected
42.	2.23	0.215	Selected
43.	3.20	0.338	Selected
46.	3.92	0.403	Selected
48.	3.83	0.497	Selected
49.	3.52	0.459	Selected
50.	2.83	0.344	Selected

Reliability

Reliability refers to consistency through a series of measurements. 'A scale or test is reliable to the extent that repeat measurements made by it under constant conditions will give the same result' (Moser &Kalton 1989: 353). To establish the reliability of the inventory study, split-half method was employed. The reliability co-efficient by Split-half method was found to be 0.80. The co-efficient indicates that the constructed inventory possess the reliability at significant level.

Validity

The concept of appropriateness and accuracy as applied to a research process is called validity (Ranjit Kumar, 2011). The research scale constructed by the investigator was validated by applying Face validity method. For establishing validity the investigator distributed a set of objectives and the tool constructed for the study to 25 experts including post graduate teachers, principals, and professors and some of the gifted higher secondary students to check whether the statements given in the various phases of the tool were related to the present study and satisfy the objectives of the study. On the basis of their suggestions, minor corrections were made for clarity in the tool.

Norms for Self-Regulated Learning Inventory

The minimum score for the self-regulated learning was 32 and the maximum score for the self-regulated learning inventory was 160.

Table 5: Different Levels of Self-Regulated Learning Phases

Interpretation of Self-Regulated Learning Inventory				
S.No.	**Phases**	**Low**	**Average**	**High**
1.	Planning phase	12 - 28	29 – 45	46 - 60
2.	Performance phase	10-23	24-46	47-50
3.	Reflection phase	10-23	24-46	47-50
4.	Self-regulated learning	32-74	75-118	119-160

CONCLUSION

The final form of Self-Regulated Learning Inventory consists of 32 statements with 3 phases. The investigator believes that the three phases and the 32 statements framed in the inventory are meaningful and reflect the Self-regulated learning of higher secondary students and it will helpful to measure the level of their Self-regulated learning.

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