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- *The Digital Generation - Engaging and Educating*
- *Construction of Metacognition Scale*
- *Problems Faced by First Generation Learners*
- *Professional Ethics of Teachers*
- *Usage of Mass Media and Performance of High School Students in Science*
- *Impact of Social Media on Self Esteem*

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RESEARCH AND REFLECTIONS ON EDUCATION

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GUIDELINES FOR AUTHORS

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Format

The author must provide (i) Name (ii) Job title (iii) Institution name.

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In addition, the paper should contain a title, an abstract, a main body and references. All references should be cited. Make sure that every table or figure is referred in the text. The length of the article or research paper should not exceed 3000 words. (4-6 pages in A4 size paper).

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All articles / research paper should be error free to the maximum extent possible and any technical matter must be clear.

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CONSTRUCTION OF METACOGNITION SCALE OF HIGH SCHOOL TEACHERS (AVSM)

Research
Paper

ABSTRACT

The paper aims to develop and standardize the metacognition scale of high school teachers. The steps followed for its construction and standardization are: (i) Ensuring Purpose and Usefulness of Items; (ii) Structuring the Tool; (iii) Pilot study and Item analysis; (iv) Validity; (v) Reliability and (vi) Final Draft of the tool. The researcher developed the preliminary version of AVSM Scale (63 items) with simple, clear and concise statements for better understanding both in English and in Tamil. The validity for each item was tested. Thus the final AVSM Scale consists of 40 items. This scale was aimed at covering the knowledge and concepts of high school teachers about the Metacognition. This tool will help to measure the metacognition of high school teachers.

Key Words: Metacognition, High School Teachers

INTRODUCTION

Many teachers are likely to have inert or inactive knowledge about teaching and learning due to lack of knowledge of the contexts and procedures for using these methods. Teachers who demonstrate a wide range of metacognitive skills perform better in their teaching and complete the work more efficiently through planning the way to approach a task, monitoring, comprehension and evaluating the progress towards completion of the above task. These are the metacognitive skills that may help the teachers to improve their competency in teaching. Metacognitive instruction is effective only if it involves theory and practice. A teacher must be given some knowledge of cognitive process as well as opportunities to practice metacognitive strategies. Simply providing knowledge without experience will not be sufficient for metacognitive development.

CONSTRUCTION OF ARVC'S SCALE ON METACOGNITION (AVSM) ENSURING PURPOSE AND USEFULNESS OF ITEMS

This section includes checking the previous research, considering one's own experience, consulting with recognized authorities and converting the accumulated materials into test items. The tool (AVSM) was developed

by the researcher to measure the metacognition of high school teachers to acquire knowledge for constructing the tool who are handling classes from sixth to tenth standard. The investigator referred books and standardized the tools on metacognition. Metacognition inventory prepared and standardized by Punita Govil (2003), contains 30 items with two dimensions namely Knowledge of cognition and Regulation of cognition. 'Schraw's Model of Metacognition' developed by Gregory Schraw (1998) and Brown's Model of Metacognition developed by Brown (1987) were the guiding force for the investigator to develop a tool with two dimensions namely Knowledge of Cognition and Regulation of Cognition. Discussion with two psychologists and two professors and members in the field of education and professors and teachers from various educational institutions helped the investigator to construct and refine the tool.

STRUCTURING THE TOOL

AVSM was constructed with two dimensions namely Knowledge of cognition and Regulation of cognition.

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KNOWLEDGE OF COGNITION

Knowledge of cognition includes what individuals know about their own cognition. It comprises of three different kinds of metacognitive awareness: Declarative, Procedural and Conditional knowledge. Declarative knowledge refers to knowing "about" things. Procedural knowledge refers to knowing "how" to do things. Conditional knowledge refers to knowing the "why" and "when" aspects of cognition.

REGULATION OF COGNITION

Regulation of cognition refers to a set of activities that help teachers control their teaching. Schraw & Dennison (1994) state that regulation is divided into planning, monitoring and evaluation. Planning involves sorting out a cognitive task by selecting appropriate strategies and cognitive resources. Monitoring involves awareness of one's progress through a cognitive task and one's ability to determine one's performance. Finally, evaluating involves taking a look at the outcome and determining if the outcome matches with goals if the regulation processes used were effective.

PILOT STUDY

The pilot study was made to find weakness and usability of the items. It was tried out on an investigative basis on 100 respondents. The goal at this point was aimed to get the irrelevant items out of the procedure. Items which were lengthy, ambiguous and not appealing were reconstructed to be clear, precise and easily answerable.

ITEM ANALYSIS

An item analysis shows the degree to which the various items "hang together" (Sommer & Sommer, 2005). The tool with 63 items, among them 30 from knowledge of cognition and 33 were regulation of cognition was administered to a sample of 100 teachers, teaching sixth to tenth standard belonging to Government, Aided and Matriculation schools in rural and urban areas. The teachers were instructed to select the test options for each item by a tick in the relevant column provided in the questionnaire.

The collected responses were scored with the help of a scoring key prepared by the investigator. The statements had a scoring in the order 5, 4, 3, 2 and 1 for the options strongly agree, agree, undecided, disagree and strongly disagree respectively (Appendix 1). The total score of AVSM ranges between 315 and 63. Item total and the sum of each individual score were calculated.

Item analysis was done by establishing Internal Consistency Reliability (ICR). ICR is the degree to which test items are consistent with each other (Furr & Bacharach, 2008). Items that enhance a test's internal consistency are preferable to items that deviate from the test's internal consistency. Item Total Correlation shows the correlation between the respective item and the total score (without the respective item) and Alpha gives the internal consistency of the scale if the respective item would be deleted. As per the rule-of-thumb (George & Mallery, 2003), Item Total Correlation should be at least 0.4 and Alpha value should be ≥ 0.7 for the item to be accepted. The Corrected Item Total Correlation's lowest value indicated items that are inconsistent. They were removed step by step and hence the Alpha value increased. Thus the removal of 23 items resulted in an increase of Cronbach's Alpha from 0.896 to 0.931. Very high value of Cronbach's alpha indicated excellent consistency of the items in the scale. The item total correlation values are given the following table 1.

ESTABLISHING THE VALIDITY

Validity refers to the degree to which evidence and theory support the interpretation of test scores entailed by proposed uses of test (Best & Khan, 1999). The validity of the tool has been found in different methods. For the present study, the investigator established the face and concurrent validities for the tool.

Table 1

ITEM CORRELATION FOR AVSM

Cronbach's Alpha		Reliability Statistics		N of Items
		Cronbach's Alpha Based on Standardized Items		
0.896		0.931		63

Item-Total Statistics				
Item No.	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
*1	254.31	527.307	.200	.897
2	253.87	527.569	.418	.895
*3	253.45	500.210	.128	.922
4	254.26	520.033	.440	.894
*5	253.87	530.842	.278	.896
*6	254.20	534.727	.117	.897
*7	253.83	530.567	.297	.896
8	254.60	523.051	.337	.895
*9	254.33	530.971	.190	.896
*10	254.55	533.947	.151	.897
11	254.03	527.423	.527	.894
12	254.10	522.556	.519	.894
13	254.16	520.580	.498	.893
14	254.00	516.101	.609	.892
15	253.86	526.526	.463	.894
16	253.97	531.201	.326	.895
17	254.03	522.696	.464	.894
18	254.20	529.636	.314	.895
*19	254.37	530.074	.175	.897
*20	254.15	531.846	.272	.896
21	254.20	525.859	.396	.894
22	254.17	519.819	.528	.893
23	254.05	529.260	.355	.895
24	254.07	520.551	.559	.893
25	254.00	523.293	.474	.894
26	253.94	526.340	.480	.894
27	253.95	528.270	.307	.895
*28	255.30	527.121	.199	.897
29	254.48	522.252	.380	.894
30	254.28	518.547	.544	.893
31	254.09	524.810	.478	.894
32	254.15	527.199	.467	.894
33	254.05	522.775	.641	.893
*34	254.08	526.297	.297	.896
35	253.97	524.413	.438	.894
36	254.11	524.058	.478	.894
37	253.99	525.727	.435	.894
*38	254.02	523.575	.529	.896
*39	254.05	527.705	.257	.896
*40	254.50	528.455	.221	.896
41	254.03	527.383	.441	.894
42	254.00	526.566	.473	.894
43	254.04	519.594	.542	.893
44	254.18	517.543	.575	.893
*45	254.36	522.233	.267	.897
*46	255.14	532.546	.124	.898
*47	254.20	524.727	.272	.897
*48	254.37	523.003	.256	.897
49	254.01	524.555	.425	.894
50	254.14	516.869	.486	.893
*51	254.59	522.992	.239	.897
52	254.08	521.367	.473	.894
53	254.20	521.152	.528	.893
54	254.07	521.035	.644	.893
55	254.29	514.370	.666	.892
56	254.17	512.930	.647	.892
*57	253.96	531.655	.218	.897
*58	253.90	529.525	.200	.897
*59	254.25	525.624	.266	.897
*60	255.68	543.998	-.081	.900
61	254.32	522.806	.470	.894
62	254.24	516.689	.522	.893
63	254.17	523.718	.432	.894

Note: * Items are deleted

FACE VALIDITY

The preliminary draft tool of the variable AVSM was given to the experts in the field of education, educational psychology, secretaries and principals and professors of the colleges of education for obtaining their opinion. Necessary rewording and rephrasing of the items in the scale have been carried out with the help of experts. Finally the tool contained 40 positive items with 20 in the dimension knowledge of cognition and 20 in the dimension regulation of cognition. Dimension wise distribution of the items in AVSM is given in the table below.

Table 2
DIMENSION WISE DISTRIBUTION
OF ITEMS IN AVSM

Dimensions	Item Numbers	Number of Items	Percentage
Knowledge of Cognition	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	20	50.00
Regulation of Cognition	21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	20	50.00
Total		40	100.00

Table 3
Scoring Key for AVSM

Sl. No.	Response	Score Value
1.	Strongly Agree	5
2.	Agree	4
3.	Undecided	3
4.	Disagree	2
5.	Strongly Disagree	1

CONCURRENT VALIDITY

Concurrent validity measures the correlation of the test score with existing tests or measures (Sommer & Sommer, 2005). To establish concurrent validity, the researcher used the Metacognition Inventory (MCI) designed by Punita Kovil (2003). The investigator administered the tool (AVSM) to 100 teachers of three different schools and later Metacognition Scale was given

to the same set of teachers on the same day after an hour's break. After scoring, the product moment correlation coefficient was found to be 0.889, which is substantial. Thus the concurrent validity of the tool was established.

*Research
Paper*

ESTABLISHING RELIABILITY

Reliability refers the extent to which differences in respondents observed scores are consistent with difference in their true scores (Furr & Bacharach, 2008). Of the different methods, split-half method and test-retest method were used to determine the reliability coefficient of the tool.

SPLIT-HALF METHOD

In split-half method, AVSM was administered to 100 teachers from three different schools. The scores of all odd numbered items were combined into one group and all the even numbers into another group. Reliability estimate of the two halves was determined using Spearman-Brown Prophecy formula, $r' = 2r / (1+r)$ and it was found to be 0.876, which is high.

TEST-RETEST METHOD

To establish the reliability of AVSM by test-retest method, it was administered to 100 high school teachers and it was re-administered to the same set of teachers after an interval of 15 days. The two sets of scores were correlated using Pearson product moment correlation and the value was found to be 0.897, which is substantial.

FINAL DRAFT OF THE TOOL

After establishing the reliability and validity of the tool the investigator printed the tool for the data collection. The particulars of the AVSM are given in the table 3. The final draft of the tool is enclosed (Appendix 2).

Table 4
Distribution of Items in Metacognition
Scale (AVSM) – Final Draft

Sl. No.	Dimensions of Metacognition	Final Draft Items
1.	Knowledge of Cognition	1 – 20
2.	Regulation of Cognition	21 – 40

CONCLUSION

Evaluation is making decisions about various phenomena or presentation on the basis of some determined objectives. This scale items are prepared on the basis of pre-determined specific objectives and ensured that the expected answers were definite and objective, provided clear spelt-out scheme for scoring and conducting evaluation under identical and ideal condition, it was helpful in enhancing reliability. Validity is the most important quality needed for an evaluation tool. It fulfilled the objectives for which it was developed. This scale was aimed at covering the knowledge and concepts of high school teachers about the metacognition. This tool helps to measure the metacognition of high school teachers.

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ARVC'S SCALE ON METACOGNITION (AVSM) – Preliminary Draft

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Knowledge of Cognition						
*1.	I know whether to attend or not a call on my mobile during my teaching.					
2	I know that what I need during my teaching.					
*3.	I am fully satisfied with the knowledge on the concept which I teach.					
4	I know that where my attention is distracted during my teaching.					
*5.	I won't mind the obstade in teaching, since I know that teaching styles are unique.					
*6.	If I memorize anything once, I will remember that forever.					
*7.	I am satisfied with the method I teach. It doesn't require any change in it.					
8	I know to memorize a concept.					
*9.	I know why I forget something while I am able to memorize something.					
*10.	I teach best when I know something about the topic.					
11	I know many ways to teach more about a concept which I have to teach.					
12	I know how to teach even a complex concept.					
13	I understand my intellectual strengths and weaknesses.					
14	I create my own examples to make information more meaningful.					
15	I am good at organizing information.					
16	I learn lessons in each and every action.					
17	I do not go without rehearsing my lesson to myself once.					
18	I can visualize my teaching.					
*19.	I am aware of my strengths in teaching.					
*20.	I do breathing exercise (or) yoga daily to control distraction.					

21	When I teach concept I think of similar concept that I have listened to.					
22	I give my fullest attention to whatever the subject matter I teach.					
23	I imagine beyond the printed words in the text book.					
24	I know how much effort I should put to explain each and every concept.					
25	I am consciously aware of my performance in the class.					
26	I know the factors contributing to effective teaching.					
27	I know about the sharpness of my memory.					
*28.	I talk with myself on the concept, when I prepare for the class.					
29	I can perceive the results of my teaching activities.					
30	I will not hesitate to change the inferences of my interpretations					
Regulation of Cognition						
31	I have plan when I begin a work.					
32	If I fail in my efforts, I will try to find the reason for the failure.					
33	I know what type of environment is needed for me to teach with full attention					
*34.	I think back the quality of work I have done.					
35	I organize appropriate environment for my teaching. If the teaching environment is not suitable, I won't worry for that.					
36	I won't get depressed when I fail in my effort.					
37	If I adopt a specific method, I can recall concepts which I forgot.					
*38.	I use apt words which reflect my thoughts clearly.					
*39.	I won't like any interruption during my teaching.					
*40.	I won't involve in any other work during my class hours					
41	I won't get off from my teaching even there are some barriers.					
42	I setup specific objectives, before I teach.					
43	I monitor the plan of action of mine.					
44	I have done well to deserve my own appreciation.					
*45.	I organize appropriate environment for my teaching.					
*46.	I will be discouraged if suitable environment for teaching is not available.					
*47.	As soon as I complete my teaching in the class, the bell rings.					
*48.	What I am going to teach is not unknown to me.					
49	Every day I plan to approach my class differently.					
50	I ask myself periodically "Am I able to meet my goal?"					
*51.	I am aware of time and resources needed to my teaching.					
52	I am aware that my today's mistakes affect me the next day.					
53	I ask myself how well I did once I finish my teaching.					
54	Whenever I feel that I am not able to follow a method during my teaching, I will change the method of teaching at once.					
55	I know about my target of my teaching. I will try to achieve it as much as possible.					
56	I introspect myself about my teaching.					
*57.	I always check the current progress of my work.					
*58.	I introspect myself about my teaching.					
*59.	I correct my mistakes.					
*60.	I encourage students to apply new knowledge in their life.					
61	I will evaluate myself whether my efforts are going on in a right way.					
62	I know the ways to regulate the distraction and attention during my teaching.					
63	I think of possible ways of solving a problem and choose the best one.					

Note: * Items are deleted

ARVC'S SCALE ON METACOGNITION (AVSM) – Final Draft

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Knowledge of Cognition						
1	I learn lessons in each and every action.					
2	I know that what I need during my teaching.					
3	I know that where my attention is distracted during my teaching.					
4	I know how much effort I should put to explain each and every concept.					
5	I know how to teach even a complex concept.					
6	I know to memorize a concept.					
7	I know about the sharpness of my memory.					
8	I know many ways to teach more about a concept which I have to teach.					
9	I know the factors contributing to effective teaching.					
10	I understand my intellectual strengths and weaknesses.					
11	I create my own examples to make information more meaningful.					
12	I am good at organizing information.					
13	I can perceive the results of my teaching activities.					
14	I do not go without rehearsing my lesson to myself once.					
15	I can visualize my teaching.					
16	I will not hesitate to change the inferences of my interpretations.					
17	I am consciously aware of my performance in the class.					
18	When I teach concept I think of similar concept that I have listened to.					
19	I give my fullest attention to whatever the subject matter I teach.					
20	I imagine beyond the printed words in the text book.					
Regulation of Cognition						
21	I have plan when I begin a work.					
22	If I fail in my efforts, I will try to find the reason for the failure.					
23	Whenever I feel that I am not able to follow a method during my teaching, I will change the method of teaching at once.					
24	I know what type of environment is needed for me to teach with full attention.					
25	I organize appropriate environment for my teaching. If the teaching environment is not suitable, I won't worry for that.					
26	I won't get depressed when I fail in my effort.					
27	I know about my target of my teaching. I will try to achieve it as much as possible.					
28	I will evaluate myself whether my efforts are going on in a right way.					
29	I know the ways to regulate the distraction and attention during my teaching.					
30	If I adopt a specific method, I can recall concepts which I forgot.					
31	I won't get off from my teaching even there are some barriers.					
32	I setup specific objectives, before I teach.					
33	I think of possible ways of solving a problem and choose the best one.					
34	I ask myself periodically "Am I able to meet my goal?"					
35	I monitor the plan of action of mine.					
36	I have done well to deserve my own appreciation.					
37	I introspect myself about my teaching.					
38	Every day I plan to approach my class differently.					
39	I am aware that my today's mistakes affect me the next day.					
40	I ask myself how well I did once I finish my teaching.					