DEVELOPING METACOGNITIVE KNOWLEDGE SKILL AMONG STUDENT TEACHERS THROUGH THE ACTIVITIES

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Abstract

Learning depends on the effective use of cognitive process such as memory and attention, the activation of relevant background knowledge and the deployment of cognitive strategies to achieve particular goals. To ensure that the basic processes are used effectively that the activated knowledge is indeed relevant and the appropriate strategies are being organized. The task category of metacognitive knowledge included all the information about a proposed task that is available to a person (Flavell, 1979). This knowledge guides the individual in the management of a task, and provides information about the degree of success that he is likely to produce. Lesson planning and teaching is the task for student teachers. 'How to start thinking on given topic for teaching purpose and how to process on the knowledge?' is the major question which is frequently asked by student teachers. So, purpose of the paper is to suggest and implement the activities for developing metacognitive knowledge skill among student teachers.

Keywords: Metacognition, Metacognitive knowledge, Declarative knowledge, Procedural knowledge, conditional knowledge, Student teachers

Introduction:

"To make an individual metacognitively aware is to ensure that the individual has learned how to learn"

- Garner 1988 (http://sites.google.com/site/metacognitiveschool/thinking-quotes)

The fundamental principle of the best education is to teach 'How to learn'. Learning depends on the effective use of cognitive process such as memory and attention, the activation of relevant background knowledge and the deployment of cognitive strategies to achieve particular goals. To ensure that the basic processes are used effectively that the activated knowledge is indeed relevant and the appropriate strategies are being organized. Learners also need to have awareness and control of their cognition and this is called Metacognition. The label Metacognition was given by American psychologist John Flavell (1976).

There are three major categories of metacognitive skills- Metacognitive Knowledge, Metacognitive Regulation, Metacognitive experiences.

Metacognitive Knowledge:

The task category of metacognitive knowledge included all the information about a proposed task that is available to a person (Flavell, 1979). This knowledge guides the individual in the management of a task, and provides information about the degree of success that he is likely to produce. Task information can be plentiful or scarce, familiar or unfamiliar, reliable or unreliable, interesting or not, organized in a useable or unusable fashion. Task knowledge informs the person of the range of possible acceptable outcomes of the cognitive enterprise and the goals related to its completion. Knowledge about task difficulty and mental or tangible resources necessary for its completion also belong to this category.

The strategy category of metacognitive knowledge involved identifying goals and sub-goals and selection of cognitive processes to use in their achievement (Flavell, 1979). Flavell also emphasized that these types of variables overlap and the individual actually works with combinations and interactions of the metacognitive knowledge that is available at that particular time. He also stated that metacognitive knowledge is not fundamentally different than other knowledge, but its object is different. He also mentioned that metacognitive knowledge may be activated consciously or unconsciously by the individual. This question of consciousness later became a subject of controversy among researchers in metacognition.

In the present research knowledge about the content, Teaching strategies, use of different methods of teaching, updating knowledge about pedagogy and school subject content, knowledge about different evaluation tools etc. are the part of metacognitive knowledge so, metacognitive knowledge plays imperative role while developing lesson plan on each step means from introduction of topic to evaluating students included formative and summative evaluation. 'How to start thinking on given topic for teaching purpose and how to process on the knowledge?' is the major question which is frequently asked by student teachers. So, purpose of the paper is to suggest and implement the activities for developing metacognitive knowledge skill among student teachers.

Statement of problem:

To study the effectiveness of activities conducted for developing metacognitive knowledge skill among B.Ed. student teachers.

Conceptual Definition:

Metacognitive Knowledge: Known as metacognitive awareness, that means individuals known about own and others cognitive process

B.Ed. student teachers: The students who are studying in Bachelor of Education course. It is the undergraduate professional degree for teaching in high schools.

Operational Definition:

Metacognitive Knowledge: Knowledge about the content, Teaching strategies, use of different methods of teaching, updating knowledge about pedagogy and school subject content, knowledge about different evaluation tools etc. are the part of metacognitive knowledge. This part of metacognitive knowledge named as Declarative knowledge, Procedural knowledge and conditional knowledge.

B.Ed. student teachers: The students who are pursuing Bachelor of Education degree in Jayawant Shikshan Prasark Mandal's Jaywantrao Sawant College of Education (B.Ed.) and studying in first year.

Research Objectives:

1. To examine presence of metacognitive knowledge skills among student teachers.

2. To develop activities for Metacognitive knowledge skill.

3. To implement activities for developing metacognitive knowledge skill.

4. To evaluate effectiveness of metacognitive knowledge skills.

Research Methodology:

Experimental Method

Research Design:

From Pre- experimental design, Single group time series design will be selected. It will be useful to avoid limitations of single group pre and post test design.

90 students ⟶ Pre test ⟶ receives intervention ⟶ post test1 ⟶ post test 2

Variables:

Dependant variables: Metacognitive skills inventory Scores for metacognitive knowledge skill.

Independent variables: Activities for developing metacognitive knowledge skills.

Tools:

Metacognitive awareness Inventory for teachers which is developed by Cem Balcikanli

Statistical Tool:

Mean, Standard deviation, t-test.

Research Hypothesis:

Activities implemented for developing Metacognitive knowledge skill will be effective for first year B.Ed. Student teachers**.**

Data analysis and interpretation:

Factor 1 (Declarative Knowledge)

	Pre-test and Post test 1	Pre-test and post test 2	Post test 1 and post test 2
Mean	3.686	4.057	3.7143
Std. deviation	3.628	3.556	1.416
t-test	6.010	6.750	1.552
Df	34	34	34
Sig.	.000	.000	0.130

Table No. 1 Data analysis for Declarative Knowledge

Pre test and Post test 1

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. Student teachers for metacognitive knowledge skill.

Observation: Table 1 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 6.010 so, t-table < t-cal

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, **"**There is significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for metacognitive knowledge skill" that means Metacognitive skills development programme is effective for developing declarative knowledge skill.

Pre test and Post test 2

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation:

Table1shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 6.750. t- table < t-cal.

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"There is no** significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, "There is significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means Metacognitive skills development programme is effective for developing declarative knowledge skill after one month time period.

Post test 1 and Post test 2

Null hypothesis: There is no significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation: Table No.1 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 1.552. t-table < t-cal.

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"There is no** significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is accepted and following main statistical hypothesis is rejected, "There is significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness

inventory along with factor 1 Declarative Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means there is no difference in the awareness of metacognitive skills in post test 1 and 2

Factor 2 Procedural Knowledge

	Pre-test and Post test 1	Pre-test and post test 2	Post test 1 and post test 2
Mean	3.5714	4.3428	0.771
Std. deviation	3.440	2.7433	1.190
t-test	6.140	9.365	3.834
df	34	34	34
Sig.	.000	.000	.001

Table 2 Data analysis for Procedural Knowledge

Pre test and Post test 1

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation: Table No. 2 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 6.140. t-table < t-cal

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, "There is significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means there is no difference in the awareness of metacognitive skills in post test 1 and 2

Pre Test and Post test 2

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation: Table No. 2 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 9.365. t-table < t-cal

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, "There is significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means the programme is effective for development of procedural knowledge.

Post Test 1 and Post Test 2

Null hypothesis: There is no significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation: Table No. 2 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 3.83. t- table value is less than t-cal but from the significance column it is not significant because the value is .001.

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is accepted and following main statistical hypothesis is rejected, "There is significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 2 Procedural Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means there is no significant difference after one month of post test 1.

Factor 3 Conditional Knowledge

	Pre-test and Post test 1	Pre-test and post test 2	Post test 1 and post test 2
Mean	2.711	3.4285	.6571
Std. deviation	3.049	2.604	1.3271
t-test	5.377	7.789	2.929
df	34	34	34
Sig.	.000	.000	.006

Table 3 Data analysis for Conditional Knowledge

Pre test and Post test 1

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation:

Table No. 3 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 5.377. t-table < t-cal.

Interpretation: On the basis of decision of hypothesis testing null hypothesis "There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, "There is significant difference between mean scores of pre metacognitive skills awareness inventory and post (1) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means the programme is effective for development of conditional knowledge skill.

Pre test and Post test 2

Null hypothesis: There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor (Conditional Knowledge skills) obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation:

Table No. 3 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 7.789. t- table < t-cal.

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is rejected and following main statistical hypothesis is accepted, "There is significant difference between mean scores of pre metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means the programme is effective for development of conditional knowledge skill after one month.

Post test 1 and Post test 2

Null hypothesis: There is no significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor (Conditional Knowledge skills) obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan.

Observation: Table No.3 shows that for df = 34, at 0.01 level, table value is 2.72 and calculated t value is 2.92 and last column of the table show that the difference is not significant.

Interpretation: On the basis of decision of hypothesis testing null hypothesis **"**There is no significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" is accepted and following main statistical hypothesis is rejected, "There is significant difference between mean scores of post (1) metacognitive skills awareness inventory and post (2) metacognitive skills awareness inventory along with factor 3 Conditional Knowledge skills obtained by first year B.Ed. student teachers for use of metacognitive skill while developing lesson plan" that means there is no difference in the effect of programme after one month of post test 1.

Results:

1. Student teachers have excellent awareness about declarative knowledge skill in pre test after implementation of Metacognitive skills development programme it became 80% and 91.43% in post test 1 and post test 2 respectively.

2. Student teachers have excellent awareness about procedural knowledge skill in pre test after implementation of Metacognitive skills development programme it became 82.87% and 97.14% in post test 1 and post test 2 respectively.

3. Student teachers have excellent awareness about conditional knowledge skill in pre test after implementation of Metacognitive skills development programme it became 80% and 100% in post test 1 and post test 2 respectively.

Conclusion:

1. Activities conducted for Metacognitive Knowledge are useful to increase number of student teachers acquired excellent category in the declarative knowledge. This shows that more number of student teachers is able to the collect and store factual knowledge or knowledge which is static in nature.

2. Activities conducted for Metacognitive Knowledge are useful to increase number of student teachers acquired excellent category in the development of procedural knowledge skill which shows that more numbers of student teachers are able to process on declarative knowledge.

3. Metacognitive skills development programme is useful to increase number of student teachers acquired excellent category in the development of conditional knowledge skill which shows that more numbers of student teachers are able to process on declarative and procedural knowledge.

4. Metacognitive skills development programme is effective for developing awareness about declarative, procedural and conditional knowledge skill.

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