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Effectiveness of 4F Model on enhancing Metacognition of P.U students

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Abstract : The present article throws light on to the Metacognition of the Pre-University Students and the results and analysis of the study undertaken by the investigator. Metacognition is a psychological construct which helps one monitor, regulate and have an understanding of his/her own cognition. This is one of the major traits any learner should possess to reach the goal. This experimental study tried to see the enhancement of Metacognition through a specially designed 4F model on Pre-university students (Higher secondary stage). A pre-test post-test design was adopted for the present study. The major findings of the study revealed that the 4F model is effective in enhancing the metacognition in the students.

IndexTerms **- 4F Model, Instructional Design, Metacognition**

I. INTRODUCTION

"Knowledge is as wings to man's life, and a ladder for his ascent. Its acquisition is incumbent upon every one of you."-(Baha'u'llah, Kitab-i-Aqdas).

"Metacognition is the ability to monitor and control your thoughts and actions" (John H. Flavell). Metacognitive awareness is crucial for students as it empowers them to take control of their learning processes, leading to more effective and independent learning. When students are aware of how they think, learn, and approach problems, they can optimize their strategies, monitor their progress, and make adjustments to enhance their academic performance. Students with metacognitive awareness can identify the most effective strategies for studying, problem-solving, and organizing information. For example, they might use summarization or concept mapping to reinforce understanding. This helps students avoid ineffective methods and focus their efforts on techniques that yield better results, this improves Learning Efficiency in the students. Students who are metacognitively aware can break down complex problems into manageable parts and identify the most appropriate strategies to solve them. This ability to plan, evaluate, and adjust their approach helps students tackle difficult tasks with greater confidence and success. This leads to a greater sense of responsibility and ownership over their learning. Saundra Yancy McGuire, educational psychologist opines that "Metacognition is the key to becoming a better learner."

When students actively engage in metacognitive practices, they develop deeper understanding and retain information longer. This is because these activities promote active learning rather than passive absorption of information this in turn allows students to reflect on the effectiveness of their thinking and reasoning. As David Perkins puts it "The more we understand how we think, the more we understand how to learn."

Therefore, the need of enhancing metacognition is a necessity in an era of total distortion. This study is an attempt to enhance the metacognition through a specially designed Instructional model-4F model: Facilitate, Feel, Face and Feedback among the Pre University (PU) Students of Dakshina Kannada district in Karnataka, India.

The Instructional Design provides an "orientation to instruction, where all of the independent components function together in order to meet the targeted learning goals" (Seda Khadimally). 4F Model is an instructional design specially developed on the theory of Albert Bandura's Observational learning- the mediational processes involved in-Attention, retention, Reproduction and motivation/Reinforcement. The investigator through the help of 4F model tried to enhance the metacognition of the students of Pre-University. 4F model specifically organizes the learning process so that the students will develop metacognitive awareness in their learning.

II. OBJECTIVES OF THE STUDY

1) To study the effectiveness of 4F model on Metacognition of PU students
2) To study the effectiveness of 4F model on Metacognition among male and female students of PU College.

III. HYPOTHESES OF THE STUDY

H1: There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group students taught through 4F Model

H2: There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group male students taught through 4F Model

H3: There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group female students taught through 4F Model

IV. RESEARCH METHODOLOGY

The present study used Pre-test post-test Experimental design. The investigator visited the pre-university college and after seeking permission, a pretest was administered for the sample, then the experiment was undertaken. The students were taught their lessons through 4F model. after the experiment, the students were given a post test. (O_1 X O_2).

4.1 Variables of the study

Independent variable: Specially designed 4F Model

The investigator had developed a 4F Model. the model has four distinct stages in its syntax Viz; Facilitate, Feel, Face and feedback. These distinct stages are further subdivided for easy facilitation of the model. These Phases and subphases help the students better understand and involve and participate in the teaching learning process. Self-developed lesson transcripts were used to teach the students.

Dependent Variable: Metacognition

"Metacognition is the ability to monitor and control your thoughts and actions" (John H. Flavell). A Standardized tool by Dr. Punita Govil (2003) had been used to check the metacognition of the students before and after the intervention.

4.1 Sample of the study

55 Pre-university students of Dakshina Kannada district were selected randomly for the study. The study included both male and female students.

3.2 Data and Sources of Data

For the present study, the data was collected before and after the experiment. The investigator administered a standardized research tool 'Metacognitive Inventory' by Dr. Punita Govil (2003) to the PU students as a pre-test and Post-test.

3.3 Theoretical framework

The present study contains dependent and independent variable as mentioned earlier. The investigator was influenced by Albert Bandura's Social Learning Theory which helped the investigator to develop the specially designed 4F model. The investigator designed the Instructional design based on the theory to see the enhancement in the metacognition of the students.

3.4Statistical tools

To test the hypotheses, Descriptive and inferential statistics t-test were used in the study.

IV. RESULTS AND DISCUSSION

4.1 Analysis and Results of the study

Objective One

1] To study the effectiveness of 4F model on Metacognition of PU students.

The investigator formulated a hypothesis to study the objective, ie,

H1: 'There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group students taught through specially designed 4F Model.

HA: 'There is a significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group students taught through specially designed 4F Model.

To test this hypothesis, the data was analyzed using descriptive statistics and inferential statistics 't' test at 0.05 level of significance. Table 1 shows the result of significance.

Table 1 shows the t-test results pertaining to pre-test and post-tests in Metacognition of experimental group taught through specially designed 4F Model

Test	N	M	SD	df	't' value	't' table value	Result
Pre-test	55	76.1	20.26				

				54	**4.05**	1.98	**significant**
Post-test	55	89.9	15.15				

Significant at 0.05 level

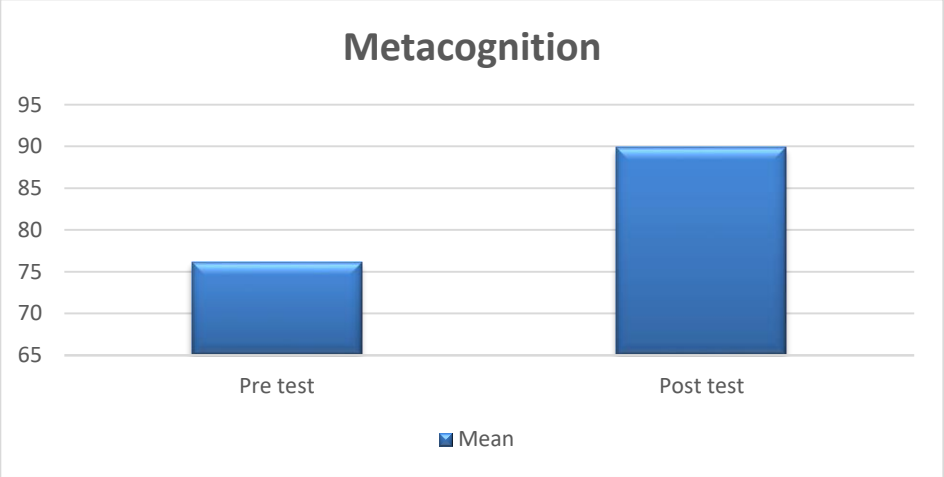

Figure showing the mean score difference in pre-test and post-test of experimental group students' Metacognition.

From the table 1, it is clear that the mean scores of pre-test and post-test of the Experimental group is different and post-test scores are higher than their pre-test scores. In order to check and ensure whether it is a chance error or a real difference, the researcher ran an inferential test- students' paired sample t test. The result is significant at 0.05 level of significance. The obtained 't'-value of post-test scores of Metacognition of Experimental group is 4.05. Hence, the null hypothesis was rejected and accepted the alternate hypothesis.

Interpretation and conclusion of the result

Experimental groups' students post test scores in their metacognition differ significantly. It can be concluded that the mean score difference of 13.8 unit is in favour of the post-test scores. It is revealed that after the experimentation through specially designed 4F model, the experimental group achieved well in their metacognition. This infer that the experimentation was effective.

Objective Two

[2] To study the effectiveness of Specially designed 4F model on Metacognition among male and female students of PU College.

In order to study this objective, two hypotheses were formulated based on the gender.

H2: There is no significant difference in the mean scores of pre-test and post-test in Metacognition learning of experimental group male students taught through specially designed 4F Model

HA: There is a significant difference in the mean scores of pre-test and post-test in Metacognition learning of experimental group male students taught through specially designed 4F Model

The result of the analysis is as follows,

Table 2 shows the t-test results pertaining to pre-test and post-tests in Metacognition of male students of the experimental group taught through specially designed 4F Model

Test	**N**	**M**	**SD**	**df**	**'t' value**	**'t' table value**	**Result**
Pre-test	34	76.12	22.1	33	**5.02**	2.03	significant
Post-test	34	88.71	17.7				

Significant at 0.05 level

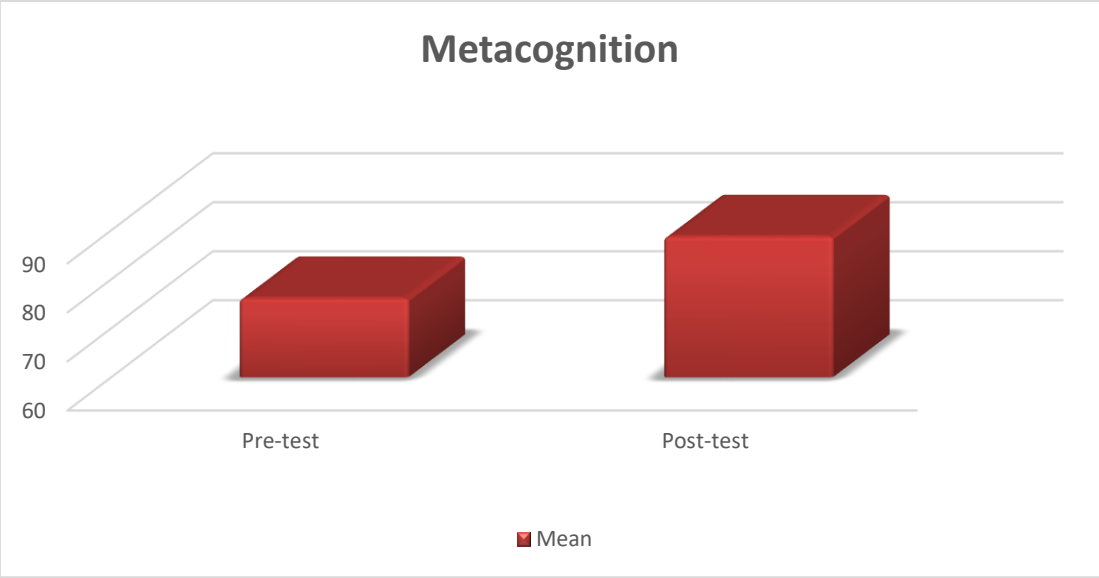

Figure showing the mean score difference in pre-test and post-test of experimental group male students' Metacognition

Interpretation and conclusion of the result

The above table 2 shows the inferential statistics result of 't'-value of pre-test post test scores of male students of Experimental groups of their Metacognition. It is proven that the group significantly differ in their Metacognition after the intervention. The obtained t value of 5.02 is greater than the theoretical t value of 2.03, P<0.01, thus, the null hypothesis was rejected in turn accepted the alternate hypothesis. Male students of Experimental group differ in their Metacognition at their post-test significantly. Hence, this can be deducted and concluded that the mean score difference of 12.59 unit is in favour of the post-test which indicates that the intervention through 4F model was effective to develop the metacognition among male students of the experimental group.

H3: There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group female students taught through specially designed 4F Model
HA: There is no significant difference in the mean scores of pre-test and post-test in Metacognition of experimental group female students taught through specially designed 4F Model

The result of the analysis is as follows,

Table 3 shows the t-test results pertaining to pre-test and post-tests in Metacognition of female students of the experimental group taught through specially designed 4F Model

Test	**N**	**M**	**SD**	**df**	**'t' value**	**'t' table value**	**Result**
Pre-test	21	75.95	17.46	20	**6.27**	2.09	significant
Post-test	21	91.76	9.95				

Significant at 0.05 level

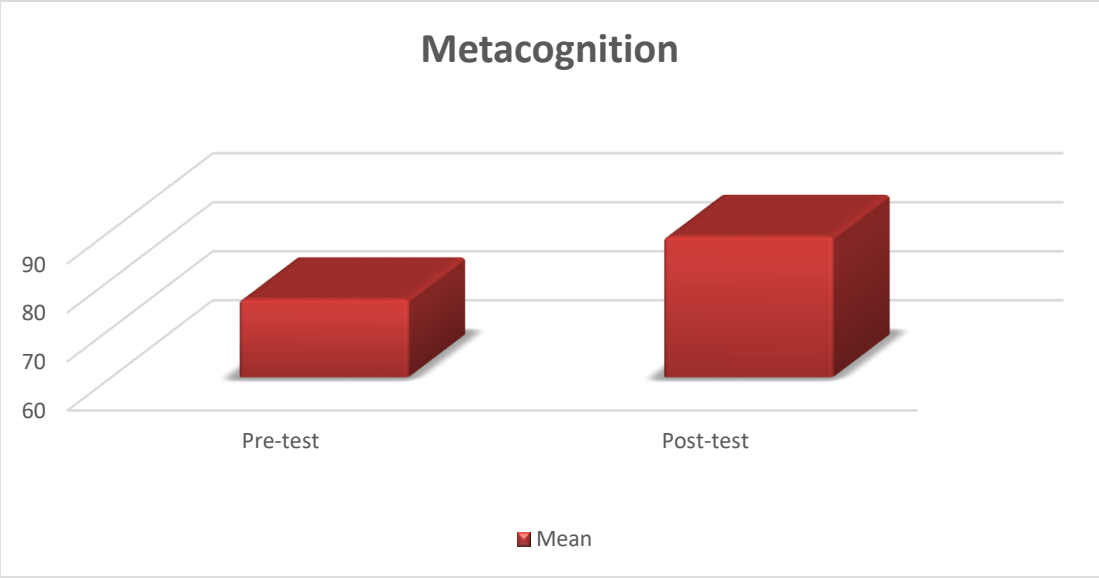

Figure showing the mean score difference in pre-test and post-test of experimental group female students' Metacognition

Interpretation and conclusion of the result

The table 3 reveals the 't'-value of pre-test post test scores of female students of Experimental groups of their Metacognition. It is proven after the test of significance that the group significantly differ in their post-test on Metacognition. The obtained t value of 6.27 is greater than the theoretical t value of 2.09, $P<0.01$, thus, accepted the alternate hypothesis by rejecting the null hypothesis. Experimental groups' female students differ in their Metacognition at their post-test significantly. So, the mean score difference of 15.81 unit is in favour of the post-test which reveals that the treatment through 4F model was effective to develop the metacognition among female students of the experimental group.

4.3 Discussion and summary

The objectives of the present study were to study the effectiveness of 4F model in enhancing the Metacognition of the students. It is revealed that after the intervention through specially designed 4F model, the experimental group achieved high in metacognitive inventory test. Hence the analysis and results infer that the experimentation through 4F model was effective to enhance metacognition of the students. Hence, the stakeholders can better equip with this model to make the learners more metcognitive as 4F Model provides scope for their own ability to monitor and control their thoughts and action.

V. ACKNOWLEDGMENT

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BIBLIOGRAPHY

[1] Anderson, Neil J., (April, 2002). The Role of Metacognition in Second Language Teaching and Learning. ERIC Digest. https://eric.ed.gov/?id=ED463659

[2] Arjunan, N. K. (2009). Psychological Bases of Education. Atlanta Books**.**

[3[Bruce Joyce, Marsha Weil,& Emily Calhoun. [2009]. Models of Teaching. Noida.Pearson Publication

[**4**] Creswell, John w., [2012] Educational Research Boston Edwards Brothers ,Inc

[5] Flavell, J. H. (1976). Metacognitive aspects of problem solving. The nature of intelligence, 12, 231-235.

[6]McLeord, Saul (2016). Albert Bandura's Social Learning Theory. SimplyPsychology. https://www.simplypsychology.org/bandura.html

[**7**]M.C, Lami (2022). *The Development and Validation of an Instructional Design, 4F Model*, International Journal of Multidisciplinary Educational Research, Vol:11, Issue 6(2). DOI: http://ijmer.in.doi./2022/11.06.31

[8] M.C, Lami (2019). *A Strategy shift in language Learning*. International Journal of Research and Analytical Reviews. http://ijrar.com/uploads/conference/ijrar_58.pdf

[9] Rahimi,M, Katal, M., (December, 2012). Metacognitive listening strategies awareness in learning English as a foreign language: a comparison between university and high-school students. ScienceDirect. https://www.sciencedirect.com/science/article/pii/S1877042811029491?via%3Dihub

[10] Singh, Karan (2014), Metacognition among senior secondary students in relation to their problem solving ability and self esteem. Shodhganga, https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/37316