Asian J. Adv. Basic Sci.: **2017,** **5***(2),* 140-142
ISSN (Print): 2454 – 7492
ISSN (Online): 2347 – 4114
www.ajabs.org

Effect of Learning Teaching Model 5E and Metacognition on Physics

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(Received 21 Sept, 2017; Accepted 27 Dec, 2017; Published 31 Dec, 2017)

ABSTRACT: Traditional learning is fail in this volatile world filled with ambiguity. Learning is considered as a constructive, cumulative, self-oriented, situated, collaborative and individually different process of knowledge. It is becoming crucial to aware students how to learn new information along with the information itself to enable them more successful. This awareness of students executes the information and one's cognitive process in learning is called metacognition. To obtain a desired level of learning, it is necessary to improve metacognitive skills which control one's own learning process. A student with good metacognition skills can focus his or her attention on learning unit; make a distinction between important and unnecessary information; use effective strategies to keep the information in long term memory and retrieve it when necessary. The 5E model creates the learning and teaching situations in classroom. Student-teacher creates a situation / opportunity / problem to the curiosity among learners leading aspects in Engage phase. Student-teacher facilitates the learner with various activities such as discussion, group tasks, etc. in Explore phase. Student-teacher facilitates them in meaning making in Explain phase. Student-teacher facilitates learner in expanding their understanding and in developing interpretative/ creative abilities as well as reflective and critical thinking in elaborate phase. Student-teacher mentions the process of integrating the assessment with learning in Evaluate phase. .

Keywords: Learning teaching model 5E; Metacognition and Physics.

INTRODUCTION: The 5E model is an organizer for the teacher to structure and sequence potential learning experiences in a systematic and synergistic way consistent with a constructivist view of teaching and learning.[1] The 5E model consists of engage, explore, explain, and evaluate phases.[8] In engage phase is a "mind-on, hand-on" phase, explore phase is an excellent time to use cooperative learning, explain phase is phase to establish and expand concepts, elaborate phase is an opportunity to involve students in new situations and problem that require the application of identical or similar explanations, and evaluate phase is feedback phase.[7, 6 & 3]

Metacognitive knowledge is "knowledge or beliefs about what factors or variables act and interact in what to affect the course and outcome of cognitive enterprises". [5] The major categories of these factors or variables are persons, task and strategy. The person category encompasses everything that a person believes about the nature of him/himself and other people as cognitive processors. It refers to the kind of acquired knowledge and beliefs that concern what human being are like to cognitive organisms. The task category concerns the information about the object available to a person during a cognitive enterprise. Thinkers must recognize that different tasks entail different mental operations.[2] The strategy category includes a great deal of knowledge that can be acquired concerning what strategies are likely to be effective in achieving what goals and in what sort of cognitive undertakings. Flavell uses the person-task-strategy taxonomy to define metacognitive knowledge.[4]

Objective: To study the effectiveness of metacognitive knowledge for physics among higher secondary students with reference to learning teaching model 5E (Engage, Explore, Explain, Elaborate, Evaluate).

MATERIALS AND METHOD: In the present study of effect of learning teaching model 5E and metacognition on physics, was conducted by the researcher.

Methodology: Keeping in mind the present research, the research has been used experimental method to conduct this study.

Tools and Techniques: The following tools were used by researcher to conduct this study:

(I) Questionnaire
(II) Student's Interview
(III) Reflection essay
(IV) Metacognitive Skill Inventory (MSI)

Sample of the study: The sample of the study consisted of 400 students of higher secondary students of

Maharashtra state. The sample was taken from different division of Maharashtra. The selection of schools was done on Random Basis by lottery system.

Statistical technique: Statistical techniques such as percentage, mean, standard deviation and t-test were used for the study.

RESULTS AND DISCUSSION:

Analysis and Interpretation of Data through Student's Interview: To study the effect of learning teaching model 5E and metacognition on physics, researcher used student's interview which is based on Flavell's model.

Metacognitive knowledge about people: The metacognitive knowledge about people is represented in table 1.

Table 1: Shows the effect of metacognitive knowledge about people and learning teaching model 5E on physics.

Metacognitive component	Frequency		Percentage	
	Yes	No	Yes	No
Metacongnitive Knowledge about people	1222	378	76.37	23.63

Interpretation: From above table 1, it could be interpreted that 76.37% is related to metacognitive knowledge about people, which shows that level of metacognitive knowledge about people is high. From the table, it can be observed that during the learning teaching model 5E, metacognitive knowledge about people is most effective.

Metacognitive knowledge about strategies: The metacognitive knowledge about strategies is represented in the table 2.

Table 2: Table shows the effect of metacognitive knowledge about strategies and learning teaching model 5E on physics.

Metacognitive component	Frequency		Percentage	
	Yes	No	Yes	No
Metacongnitive Knowledge about strategies	1331	269	83.18	16.82

Interpretation: From above table 2, it could be interpreted that 83.18 % is related to metacognitive knowledge about strategies which shows that level of metacognitive knowledge about strategies is very high. From the table, it can be observed that during learning teaching model 5E, metacognitive knowledge about strategies is most effective.

Metacognitive knowledge about task: The metacognitive knowledge about task is represented in table 3.

Table 3: Shows the effect of metacognitive knowledge about task and learning teaching model 5E on physics.

Metacognitive component	Frequency		Percentage	
	Yes	No	Yes	No
Metacongnitive Knowledge about task	1198	402	74.87	25.13

Interpretation: From above table 3, it could be interpreted that 74.87% is related to metacognitive knowledge about task, which shows that level of metacognitive knowledge about task is very high. From the table, it can be observed that during learning teaching model 5E, metacognitive knowledge about task is most effective.

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