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ORIGINAL ARTICLE

EFFECTIVENESS OF JERRY LUCA AND HARRY LORAYNE MEMORY MODEL IN TERMS OF MEMORIZATION OF SOME CHEMISTRY CONCEPTS AND REACTIONS TOWARDS THE MODEL AT 10+2 LEVEL

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1.1.0. INTRODUCTION:

Today we are facing much challenge, in the field of education. As Educationists have developed new theory and principles for achieving maximum goals, so education can serve for the betterment of nation and society. Technological advancement and knowledge-explosion has totally changed the scenario of teaching-learning process. Today our education is not limited to teaching or imparting the information to the children according to the prescribed syllabus at a specific school level; rather serves much broader objectives and concept.

New education system require well-defined and well-structured methods for developing skills like creative thinking, social skills, memorization and management skills, which are directly helpful in the individual development.

Therefore, for the solution of that problem, educationist and psychologists develop new theory and principles, which are able to fulfill these objectives. Models of teaching one of the ways to achieve subject specific skill based objectives.

1.1.1 Meaning and Definition of Models of teaching:

The process of teaching is very complex, which includes classification of concepts, facts and generalization. As learning styles of the learners are different, therefore variety in different approaches of teaching is required for the fulfillment of different instructional goals. Secondly, education has multidimensional objectives. Hence, teaching learning process requires different approaches to realize different sets of objectives. Therefore a new prescribed teaching strategies, which are designed to fulfill specific instructional objectives and goals known as Models of Teaching has emerged. Models of teaching are not the substitute of teaching skills methods but it is complementary to it.

Joyce and weil (1978 defined models of teaching as "A plan or action that can be used to shape curriculum to design instructional material and to guide instructions in the classroom settings." It means that models of teaching consist of guidelines for designing educational activities and environment.

According to rash, "a model of teaching comprises of guidelines for designing education activities and the environment directed towards the realizations of specific goals." Paul D. and

egged et al (1979) focused upon the Goals of instructions and defined models of teaching, as "models are prescriptive teaching strategies designed to accomplish particular instructional goal."

Buddhisagar (1986) defined model as "a systematically developed outline where in the activities for teacher and students are spelt out, arranged in particular sequence and carried in an appropriate environmental for attaining well defined objectives."

Sansanwal and singh (1989) defined models of teachings as "a blue print wherein theory based well sequenced replicated steps is given for the creation of certain instructional effects in the learner."

Gunta, Asters and schwab (1990) defined teaching models as "a step by step procedure that leads to specific learning outcomes"

According to passi, Singh and Sansanwal (1991) "a model of teaching consists of guidelines for designing educational activities and environment."

Thus models of teaching are also used to design instructional materials and to guide instruction. Teaching models are just instructional design. They describe the process of specifying and producing particular environmental situation that causes the student to interact in such a way that special change occurs in his/her behavior.

1.1.2. Characteristics of Models of teaching:

Following are the characteristics of models of teaching-

- Models are based on well-defined principles.
- Models include well-organized and systematic steps.
- Models can be repeated in the same way as used earlier.
- A teaching model provides a specific outline of teaching activities.
- Each model creates certain instructional effect.
- In models, there are shared responsibilities of teacher and students.
- Learning outcomes are written in behavioral terms.
- The appropriate stimulus situations are selected for emitting desired response of the learner.
- The learning conditions are specified for observing the students response.
- The criterion behavior is defined for student performance.
- The teaching tactics are specified for creating the interaction between student and environment.
- The learning situations and teaching tactics can be improved and modified for the desirable change in student behavior.
- These models may be helpful in formulating and developing theories of teaching.

1.2.0. MEMORY MODEL

Jerry Luca & Harry Loryane developed memory model of teaching. Psychologist have done extensive research on the processes of attending and memorizing. A number of distinctions have emerged from the research that is useful in the construction of such models. The first is that the process of memorizing is probably one of the important information processing phenomena. Many items presented to an individual in a short time and but only those on which attention is directed enter into memory and only those receiving rehearsal are maintaining long enough to

secure the processing necessary to establish a basis for long-term recall. Second, there is a need to attend to it in such a way that rehearsing of the content should be done for recalling it later. The establishment of attention and the process of rehearsal that facilitates cues appear to increase capability to store and retrieve informations.

1.2.1. Principles of Memory model

Following four general principles of memory have particular relevance to educational practices;

- Attention is essential for learning
- Short-term memory is the bottleneck in the human memory system.
- Memory is selective.
- The limited capacity of short-term memory is not necessarily a bad thing.

1.2.1. Phases

The model of teaching that has developed from Lorayne and Lucas's work includes four phases;

- Attending to the material
- Developing connections
- Expanding sensory images
- Practicing Recall.

These phases are based on the principles of attention and the techniques for enhancing recall.

1.2.2. Syntax of the Model

Phase I: Attending to the material

Phase one call for activities that require learner to concentrate on the learning material and organize it in a way that it can be remembered. In this phase focusing on what needs to be remembered the major ideas and examples listing the ideas separately and rephrasing them in one's own words in another task that forces attention. Finally reflecting on the material, comparing ideas, determining the relationship among the ideas is a third activity.

Phase II: Developing connections

Phase two includes techniques such as the link system, substitute words (in case of abstractions), and key words for long or complex passages, the notion is to connect the new material to familiar words, pictures, or ideas, and to link images or words together.

Phase III: Expanding sensory images

One the initial associations have been identified, the images can be enhance asking the student to associate with more than one sense and by generating humorous dramatizations through ridiculous association and exaggeration.

Phase IV: Practicing recall

The students are asked to practice recall of the material.

The memory model is applicable to all curriculum areas where material needs to be memorized. It can be used with groups (a chemistry class mastering the table of elements) or individuals (a student learning a poem, story, speech or part in a play) it has many used in teacher- led "memory sessions" it can be used independently.

1.2.3. Instructional and Nurturant Effects

The memory model of teaching is specifically designed to the capacity to store and retrieve information. It nurture a sense of intellectual power a growing consciousness of the ability to master unfamiliar material, as well as imagery skills and attention to one's environment. The most important is the student's recognition that learning is not a mysterious, innate process over which they have no control. The mastery of some simple mnemonic system may lead some people to realize, for first time that they can control and modify their own mental activities. In addition, this realization may encourage them to undertake that self-experimentation with their own learning and remembering procedures. This is such an important part of intellectual development.

- **Mastery of fact and ideas:**

Awareness of how to learn and how to improve learning results in a sense of mastery and control over one's future.

- **A system for memorizing:**

The improvement of imaging capacity and the realization those creative forms of thinking are an essential part of convergent, information- oriented learning.

- **Creative attitudes and capacities:**

Creative thought is encouraged.

1.3.0. RATIONALE OF THE STUDY:

Number of researches have been conducted on information processing family are; Agrawal, R. and Mishra, K.S (1998), studies about the effect of RCAM model of teaching enhancing attainment of science concepts. Bhaveja, Bharti (1989), conducted a study of

information processing models of teaching in schools of India. Bawa, M.S. (1991), studied conceptual learning and research possibilities. Bhaveja, Bharti and Gupta Suman (1991), studied effectiveness of the Advance Organizer Model in developing the teaching competence of student, teachers and their attitude towards teaching. Viney (1992), studied effectiveness of different models of teaching in terms of achievement in mathematical concepts and attitude in relation to intelligence and cognitive style. Mohanty (1992), studied the effectiveness of using the Juris Inquiry Model and Concept Attainment Model in the cognitive development in the moral judgment. Sharma, V (2008), studied the effect of comparison of the synectics model and traditional method of teaching in terms of creativity, risk taking and achievement in science.

Kayatri Alias Usha S (1989), Studied effectiveness of Jerry Luca Memory Model in learning botany. Prema and Kayathri (1994) studied Jerry Luca memory model in learning botany. Kumar (2005) conduct a comparative study of the effectiveness of social inquiry and memory model on puiol's achievement in science and their self-concept. From the above it is evident that only three studies related to memory model were conducted. Memory model is specifically designed to increase the capacity to store & retrieve information.

The nature of chemistry demands the skill of recall, memorization and intellectual power, content mastery and better understanding of concept. Therefore there is need to study the effectiveness of Memory Model for chemistry teaching, as the nature of subject demands memorization skills.

1.4.0. STATEMENT OF PROBLEM

The present study has been entitled as:

Effectiveness of Jerry Luca and Harry Lorayne Memory Model in terms of memorization of some chemistry concepts and reactions towards the model at 10+2 level

1.5.0. OBJECTIVES

The objectives were as follows-

- To compare the adjusted mean memorization scores of experimental and control group in chemistry by taking intelligence as covariate.
- To study the effect of treatment, personality and their interaction on memorization in chemistry of the students.
- To study the reactions of student towards memory model.
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1.6.0. HYPOTHESES

The following hypotheses were framed:

- There will be no significant difference between the adjusted mean memorization score in chemistry of experimental and control group by taking intelligence as covariate.
- There will be no significant effect of treatment on memorization score of experimental group.
- There will be no significant effect of personality on memorization score of experimental group.

- There will be no significant effect of interaction between treatment and personality on memorization score of experimental group.

1.7.0. METHODOLOGY

The methodology for the present study is given under different heads.

- **Sample:**

The present study was experimental in nature. The sample for this study comprised of sixty eleventh class students of two different schools situated in two different locations.The sample was selected through purposive sampling technique. Two intact classes were selected for the present study. The Medium of instruction was Hindi. The age Group of students was 15-17 years. All the students belonged to the average socio-economic status of the society.

- **Tools**

The following tools were used in the present investigation:

- Maudsley Personality Inventory (M.P.I.) adopted by Jalota and kappor (1971) was administered for measuring Extroversion and introversion dimensions of personality.
- The Group verbal test of general mental ability was by Jalota and Kapoor was used to measure Intelligence of the students.
- The students reaction towards Memory Model was assessed with the help of reaction Scale developed by the Investigator.

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- Experimental Design

The present study was Experimental in nature. Posttest Control group design was employed. Its layout is

R	X	O1
R	C	O2

Where: X = Experimental

C	=	Control group
O1	=	Observation
O2	=	Observation

Two groups, viz, Experimental and control group were randomly assigned to the treatment. The students belonging to Experimental group were taught through Memory Model and students belong to the control group taught through Traditional method. The group, which received through developed lessons based on Memory Model, named as Experimental group, and the group that received the treatment of Traditional method, designated as control group. Both the schools were 10-12 kilometers apart so as there no chances for interaction. The instruction based on Memory Model was developed for teaching chemistry of class XI. Dependent variables of the study were memorization, reactions towards Model. The independent variables had two

levels of treatment i.e. Memory Model based instruction and traditional method. Intelligence was taken as covariate.

- **Procedure of data collection**

The permission from the principal of both schools viz Yashwant public school and Govt. senior secondary school was taken. Orientation of the model was given and introduction of the students was taken for establishing rapport with them. The investigator taught selected five concepts based on chemistry through memory model. In present study there were two groups namely experimental and control group. The students belong to experimental group was taught through memory model while student belonging to control group was taught through traditional method.

After completion of the experiment, reaction scale and memorization test was administered on the experimental group. During the Experiment, the Intelligence and personality test were administered on the students of both experimental and control groups.

1.8.0. ANALYSIS AND INTERPRETATION OF RESULTS

The results of the study have been discussed under different heads.

- **Comparison of mean memorization score by considering intelligence as covariate**

The first objective was to compare the adjusted mean memorization scores of experimental and control group in chemistry by taking intelligence as covariate.

Therefore, there were two levels of treatment, namely Memory model and traditional method. The data related to memorization in chemistry were obtained by administered the memorization test developed by the investigator. This test was administered at the end of the treatment. The data were analyzed with the help of one-way ANCOVA. The result are given in table1.1

Table 1.1
Summary of ANOVA for memorization by considering Intelligence as covariate

Source of variance	df	SS.y.x	Mss.y.x	Fy.x
Treatment	1	5039.181	5039.181	85.802**
Error	57	3347.637		
Total	60	24822.000		

From the table it can be seen that the adjusted F-value of Memorization is 85.802** which is significant at df 1/57 at 0.01 level of significance. It indicates that adjusted mean chemistry memorization gain scores of memory model and traditional groups differ significantly from each other when intelligence was taken as covariate.

In other words, treatment produced significant differential effect on Memorization of students. In the light of this null hypothesis namely that the adjusted mean Memorization scores

of students taught through memory model will not significantly from those taught through traditional when intelligence was taken as covariate." is rejected. Further the adjusted Mean Memorization (My.x 24.530) of students taught through memory model is significantly higher than those taught through traditional method (My.x 5.603). Therefore, Memory model was found to enhance the Memorization of students significantly more than the traditional method, when both the groups were matched statistically with respect to intelligence.

- **Effect of Treatment, Personality and their interaction on memorization**

The Second objective was to study the effect of treatment, personality and their interaction on memorization of students. There were two levels of treatment, namely memory model and traditional method. Introvert and extrovert were two levels of personality. Thus, there were two levels of treatment and two levels personality. First level treatment was measured with the help of memorization test developed by the investigator. This test was administered at the end of the treatment. The scores were used for the purpose of analysis. Maudsely personality inventory was administered to the students of both the groups before starting the treatment. The data were analyses by employing 2x2 factorial analysis of variance. The result is given in table 1.2

Table 1.2
Summary of 2x2 factorial ANOVA

Source of variance	Df	SS	MSS	F
Treatment	1	6864.288	6864.288	122.578**
Personality	1	959.479	959.479	17.134**
Treatment X personality	1	387.804	387.804	6.925**
Error	56	3135.975		
Total	60			

- **Effect of treatment on memorization**

From the table it is evident that the F-value for the treatment is 122.578** at the df 1/56 that is significant at .01 levels. It indicates that Memory model and Traditional group differ significantly. Further control group memorization means score is 4.647 and memorization mean score of experimental group is 26.087 which is significantly higher. In the light of this, the null hypothesis that "There will be no significant effect of treatment on students' Memorization" is rejected. It may therefore be said that Memory Model is found to be more effective than Traditional method.

- **Effect of Personality on memorization**

From the table it is evident that the F-value is 17.134 at the df 1/56. which is significant at 0.01 level. It indicates that the memorization of the Introvert and extrovert students differ significantly. Further, it indicates that the mean score of extrovert students is 11.359 and for Introvert students the mean score is 19.375, which is significantly higher. In the light of this, the null hypothesis that "there is no significant influence of per4sonality on students Memorization." is rejected. It may therefore be said that the introvert students are superior to the extrovert

student. This means personality influence the memorization of the student. This result is supported by Sharma and Verma (1979), Joshi (1979), Bhusan (1981) and Mahapatra (1993) which reported that the personality influence the Memorization.

- **Effect of interaction between Treatment and Personality**

From the table it is observed that the F-value for the effect of interaction between treatment and personality is 6.925** df 1/56, which is significant at 0.01 level of significance. It indicates that the mean memorization scores in chemistry of students taught through memory Model is significantly differ from the students belong to Traditional groups. Further mean scores of experimental group and extrovert students. Further mean scores of experimental group and extrovert students was 19.531 and experimental group and introvert students was 32.643. The mean scores of control group and extrovert students were 3.188 and traditional and introvert was 6.107 respectively. In this context, the null hypothesis "That there will be no significant effect of interaction between treatment and personality" is rejected. It may, therefore be said that interaction of personality and treatment is significant.

- **Reaction towards the Model**

The third objective was to study the reactions of students towards the memory model of experimental group. The reaction towards memory model was assessed at the end of treatment The Reaction scale towards Memory Model contained 22 statements related to different aspects of Memory Model. against each statements, a five point rating scale was given on which students were to give responses. Thus the mean score of the students could range 22 and

The data related to this was analyzed by calculating the percentage. The results are presented in the table.

- **Reaction towards the treatment**

The reactions in the present study were analyzed by calculating percentage**.**

S.No.	Statement	Strongly Agree	Agree	Undecided Disagree	Disagree	Strongly Disagree
1	That it was interesting to learn with this model	60%	36.66%	3.33%	0	0
2	This Model does not help in developing thinking capacity of the students	6.66%	0	3.33%	23.33%	66.66%
3	This Model is not provide opportunity in class being mentally active	0	20%	10%	10%	60%
4	That the Memory Model is more effective	60%	33.33%	0	6.66%	0
5	This Model provides more chances for teacher	36.66%	46.66%	0	3.33%	10%

	student interaction					
6	This model helps in developing critical thinking capacity	46.66%	50%	0	3.33%	0
7	That the Memory Model enables the content; easy and effectively learned	50%	43%	3.33%	3.33%	0
8	This Model helps in developing logical reasoning	43.33%	46.66%	6.66%	3.33%	0
9	That study with the help of this Model is lacking interest	3.33%	20%	10%	20.66%	36.66%
10	The study with the help of this model creates discipline problems	6.6%	6.66%	16.66%	16.66%	53.33%
11	capacity of expressing own ideas is developed by this Model	40%	60%	0	0	0
12	This Model method is more interesting as compare to the Traditional method	60%	33.33%	6.66%	0	0
13	The power of concentrating towards other's ideas and thoughts is developed by this Model	0	23.33%	16.66%	23.33%	36.66%
14	This memory Model method is not is less approachable to large groups	46.66%	46.66%	3.33%	3.33%	0
15	The concepts understanding and memorization of them is easier by this Memory Model	6.66%	13.33%	13.33%	30%	36.66%
16	That the syllabus is not complete on time by this Model	46.66%	53.34%	0	0	0
17	Not the all subject are taught by this model	0	0	10%	43.33%	23.33%
18	The content is memorized for a long time	6.66%	13.33%	13.33%	26.66%	40%
19	In the Model method I am	50%	40%	3.33%	3.33%	0

	less attentive as compared to the Traditional method					
20	The model help in thinking diversified aspect.	3.33%	6.66%	3.33%	53.33%	33.33%
21	I am unable to explain the principles and facts by this Model method	46.66%	36.66%	3.33%	6.66%	3.33%
22	reactions towards the model are highly favorable	9.0%	8.33%	13.33%	43.33%	26%

1) From the table it is evident that for the first statement, about 96.66% students have given their reactions in favour of the statement "That it was interesting to learn with this model" and only 3.33% student has reacted undecided. It indicates that the memory model is effective as compare to traditional method.
2) The second statement says that "This Model does not help in developing thinking capacity of the students", 89.99% students given their reaction in against of this statement, 3.33% student unable to say anything and 6.66% students given their reaction in favour of this statement. It indicates that the model help in developing thinking capacity.
3) On the third statement that "This Model is not provide opportunity in class being mentally active" 70% students have given their reaction in against of this statement, 20% students have given their reaction in favour of this statement and 10% students reacted undecided. It indicates that this model help in being mentally active.
4) The fourth statement "That the Memory Model is more effective", 93.33% Students reacted in favour of this and only 6.66% student opted disagree. This indicates that the majority of the students believe that the Memory Model is Effective method of teaching.
5) The fifth statement "This Model provides more chances for teacher student interaction", 83.32% students reacted in favour of the statement, and 13.33% students reacted against the statement. It means that the Memory model provides an excellent chance for the teacher student interaction.
6) The sixth statement "This model helps in developing critical thinking capacity", 96.66% Students favour this statement and 3.33% students reacted against the statement. It indicates that the memory model helps in developing critical thinking
7) The seventh statement says, "That the Memory Model enables the content; easy and effectively learned", 93.0% Students agree with the statement 3.33% student reacted disagree and 3.33% students opted undecided. It indicates that the Memory Model is helping the students in making their content concept easy and attainable effectively.
8) The eight statement is "This Model helps in developing logical reasoning", 89.99% students have given response in savior of this statement, 6.66% student reacted undecided and 3.33% student not agree with this statement. It indicates that this Model develops logical thinking supported by majority of the students.
9) The ninth statement is "That study with the help of this Model is lacking interest", 57.32% student's does not agree with this statement and 10% student reacted undivided and 23.33%

student have given response in favour of this statement. It indicates that this Model makes the study interesting.

10) The tenth statement in that "The study with the help of this model creates discipline problems", 69.99% student have given response against of this statement, 16.66% student not decided anything and 13.32% student have given response in favor of this statement. It indicates that the model not created discipline problems.

11) The eleventh statement that "The capacity of expressing own ideas is developed by this Model" 100% students have given in favor of this statement. It indicates that this Model develops capacities of developing own ideas expression.

12) The twelfths statement "This Model method is more interesting as compare to the Traditional method", 93.33% students agree with this, 6.66% students reacted undecided about this. It indicates that this Model is superior to the Traditional method.

13) The fourteen statements is that "The power of concentrating towards other's ideas and thoughts is developed by this Model" 93.33% students have given response in favors of this statement, 3.33% disagree and 3.33% student reacted undecided. It indicates that the power of concentrating towards others thoughts and ideas is developed by the help of this model.

14) The fifteenth statement is "This memory Model method is not is less approachable to large groups," 66.66% students response against of this statements, 13.33% reacted undecided and 19.99% students have given response in favors of this statement. It indicates that the memory model is suitable for large groups.

15) The sixteen statement is that the "The concepts understanding and memorization of them is easier by this Memory Model", 100% students agree with this statement. It indicates that this model helps in better understanding of the concepts.

16) The seventeen statements is "That the syllabus is not complete on time by this Model" 66.66% students have given response in against of this statement 10% students reacted undecided and remaining students not opted any categories. It indicates that the course may complete on time.

17) The eighteen Statements are that "Not the all subject are taught by this model" 66.66% students reacted against the statement, 133.33% reacted undecided and 19.99% students agree with the statements. It indicates that the Model is suitable for other subject also.

18) The nineteenth statements are that "The content is memorized for a long time", 90% students favor this statement, 3.33% opted undecided, and 3.33% students are not agree with this statements. It indicates that the model helps significantly for effective Memorization.

19) The twentieth statement is that "In the Model method I am less attentive as compared to the Traditional method" 9.33%, agree, 3.33% reacted undecided and 86.68% reacted against the statement. It indicates that the student's attention is significantly higher in the Model as compare to Traditional method.

20) The twenty first statements is that "The model help in thinking diversified aspect." 83.32% students favour the statement, 3.33% reacted undecided and 9.99% disagree with this statement. It indicates that the Model Method help in thinking of diversified aspects of the content.

21) The last statement is "I am unable to explain the principles and facts by this Model method" 69.33% students disagree, 13.33% reacted undecided and 17.3% students opted agree. It may be said that the Model help in explaining facts and principles.

22) From here it is evident that, reactions towards the model are highly favorable. Therefore, it may be said that the Memory was effective in terms of Memorization.

1.9.0. FINDING AND DISCUSSION

The finding emerged from this study are given below:
Memory Model was found to be significantly effective in terms of Memorization gain scores in chemistry. This finding is supported by the kaythari Alias Usha (1989), Prema and kayathri (1989), Kumar (2005), Sushila (2008) and Nividita (2008).

The reason behind this finding may be that in the Model method the chances of teacher student's interaction are more as compare to Traditional method. In this the students are not passive listeners but they are readily and active listeners. This Memory Model provides opportunity to students to think logically, carefully attending to the content, expressing their own ideas; view points and think in diversified aspects.

The association between new material and things that have previously been learned, senses are involved and attentiveness helps a lot in increasing memorization.

The second finding is that personalities significantly influence the Memorization and interaction between personalities and found to be significantly effective. This finding is supported by Sharma and Verma (1979), Joshi (1979), Bhusan (1981) and Mahapatra (1993) reported that the personality influence the memorization. The reason behind is that the concentration power of introverts students is more as compared to extroverts students.

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