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Effectiveness of R.E.A.C.T. strategy in teaching chemistry among secondary school students

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Abstract
"*Education is a conscious and deliberate process in which one's personality acts upon another in order to modify the development of the other by the communication and manipulation of knowledge*" (Dash, 2003).The principal goal of science education is to create men and women who are capable of doing new things, creative inventive and discoveries not simply of repeating what other generations have done. It is a recognized that important objective of the teaching and learning of chemistry is to promote understanding and applications of its principal and concepts. An equally important objective should be the training of the mind, the developing of the skills and infusion of right attitude. A student of science should be able to observe, think logically and draw conclusions and to make right decisions with such background of training he or she could meet any challenge in whatever position of responsibilities he or she is employed. An R.E.A.C.T. strategy relates experiences. R.E.A.C.T. strategy is an attraction seeking strategy. The student's attention can be grasped by using techniques like concept mapping, mind mapping, circle mapping, jigsaw technique, think-pair-share and role play model. Since all the techniques creates a unique impact on students', R.E.A.C.T. Strategies can be recognized as a new window to teach chemistry among students. When a new chapter is opened, students always run their eyes over the eye catching figures, flow chart etc. in it. So, using these techniques will definitely catch the student's visual senses and will be able to transfer the content easily into the cognitive level.

Keywords: R.E.A.C.T strategy, teaching chemistry, secondary school students, effectiveness

Introduction

Education is one of the most important things in one's life. It plays a vital role in one's journey. The more knowledge we have the more we grow up. Education develops man's faculty, especially of supreme truth, beauty and goodness in which perfect happiness essentially consists. 21st century is the age of science. Modern science has achieved wonders. It has increased human efforts and comfort and has given man powers to fit only for the goods. Man is no longer a toy in the hands of nature. Man is like a good servant leading a helping hand to men inside and outside his home. '*Science should be taught as a way of thinking and that the process skills are best equipped by discovery*' (Brunner, 1962). *Chemistry is that branch of science, is a method and habit of thought and that learning in skills and teaching technique should be selected according and should be well closely linked with pupils emotions and common interest*' (Newburg 1953). In learning chemistry, R.E.A.C.T. strategy can acquire permanent importance. Curricula and instructions based on contextual learning strategies have to be structured to encourage the five essential engagement strategies. They are:

- **R - Relating**

Allow learners to relate the content to everyday sites, events and experiences to know information to be processed. Link the concept with something else that the student already knows.

- **E-Experiencing**

Experiencing is the heart of contextual learning. The learners are able to manipulate equipment and materials to experience the fact. Hand - on activities and teacher explanation helps students to discover new knowledge.

- **A-Applying**

Allow learners to apply the content to a new concept. Students apply their knowledge to real world situations.

- **C-Cooperating**

Allow sharing of content with the peers. Students solve the problem as a team to reinforce knowledge and collaborative skills.

- **T-Transferring.**

It is the transfer of the learned content to the new content. Students take what they have learned and apply it to new situations and context.

The learning experiences have to be created in accordance with the experience that uses R.E.A.C.T. strategies. The R.E.A.C.T. strategy was designed to help learners with new developed skills and refresh the knowledge regarding the past studied material. The Center for Occupational Research and Development (CORD) has developed the R.E.A.C.T. strategy in 1999 and updated in 2016. CORD is a non-profit organization dedicated to leading change on educational since 1979.R.E.A.C.T. strategy is one of the strategies that can be used in a new contextual model which in its learning not only focuses on the relation with real life experiences but also priorities in the intermediate match between the concepts inside the discipline.

Need and Significance of the Study

The National Curriculum Framework (NCF) developed by the National Council of Educational Research and Training

(NCERT) in 2005 recommended a paradigm shift from rote learning to learning by understanding. It suggests that the school should facilitate the process of knowledge construction and help them to become independence thinkers capable of solving their everyday problems. The existing teaching practice is of ' information loaded ' education which put a lot of stress on students. Most of the knowledge that student acquire at school alien to their individual learning of things. The acquired knowledge can't be used, tested and verified by students making it a 'dead knowledge'. R.E.A.C.T. strategy is a attraction seeking strategy. The student's attention can be grasped by using techniques like concept mapping, mind mapping, circle mapping, jigsaw technique, think-pair-share and role play model. Since all the techniques creates a unique impact on students', R.E.A.C.T. Strategies can be recognized as a new window to teach chemistry among students. When a new chapter is opened, students always run their eyes over the eye catching figures, flow chart etc. in it. So, using these techniques will definitely catch the student's visual senses and will be able to transfer the content easily into the cognitive level.

Objectives of the Study

- To prepare different R.E.A.C.T. strategies for teaching chemistry among secondary school students.
- To find out the effectiveness of R.E.A.C.T. strategy in teaching chemistry over activity oriented method.

Hypothesis of the Study

- There will be significant difference in the mean scores of Achievement in chemistry of the secondary school students treated with R.E.A.C.T. strategy over Activity Oriented Method.

Methodology in Brief

Methodology in brief refers to the various methods and techniques employed in the study. It specifies the method of research used, sample of the study, methods and tools used for data collection and statistical techniques used for the study. Methodology is intended to provide a work plan of the study. The study is to find the Effectiveness of R.E.A.C.T. strategy for teaching chemistry among secondary school students.

- **Method of data Collection**

Method is a style of conducting a research depending on the nature of the problem. The investigator adopted experimental method using pre and post-test on non-treatment control groups and experimental groups to investigate about the problem. The experimental method is a systematic and scientific approach to research in which investigator manipulates one or more variables and controls and measures any change in other variables. It helps the investigator to formulate generalizations.

- **Tools for data Collection**

In the present study the following tools were adopted for collecting the necessary data:

- Lesson transcripts based on R.E.A.C.T. strategy for the topic Non-metals in chemistry
- Lesson transcripts based on Activity Oriented Method for the topic Non-metals in chemistry
- Achievement test in Chemistry prepared by the investigator

- **Statistical Techniques**

A "t–test" is used as statistical technique for this experimental study. It is a type of inferential statistics which is used to determine if there exist significant differences between the means of two groups which may be related in certain features.

- **Sample of the Study**

The sample of the study consists of 61 students of standard IX belonging to St. Mary's Mahila Mandiram Girls High School, Adoor, Pathanamthitta. The investigator selects two classes from the school for the experimental study. Out the two classes; one is selected as the control group and the other as the Experimental group.

Analysis and interpretation of data

Comparison of the pre-test scores of students in the experimental and control group with regard to the achievement in chemistry for the total sample.

The pre-test scores of experimental and control group are tabulated in the Table 1. The mean, standard deviation and t-value is calculated

Table 1: Test of significance of difference between the means of pre-test scores of achievement in chemistry in the Experimental and Control group for the total sample.

Group	No.	Mean	S.D	t-value	Level of Significance
Control	32	7.96	3.15	0.145	Not significant
Experimental	29	7.84	3.45		

From the above table, it can be interpreted that, the mean score of control group is 7.9687 and that of experimental group is 7.8448. The standard deviation of Control group is about 3.1522 and the experimental group is 3.4569.

With these two values the t value was calculated out tobe0.1458. This reveals that the two groups selected for the studies are homogenous group, that is, there exists no significant difference in their Pre- test Scores

Comparison of the post-test scores of students in the experimental and control group with regard to the achievement in chemistry for the total sample.

Table 2: Test of significance of difference between means of Post test scores of achievement in chemistry in the Control and Experimental group for the total sample.

Group	No.	Mean	S.D	t-value	Level of Significance
Control	32	11.40	3.90	2.84	Significant at 0.01 level of significance
Experimental	29	14.74	3.36		

The Mean Score of Post-test (14.7413) of Experimental group is higher than the Mean score of Post-test (11.4068) of Control group. Also it is found that the t-value 2.8413 is significant at 0.01 level of significance, which means there exists significant difference in the Post-test scores of Experimental and Control group. This reveals that R.E.A.C.T. Strategy in teaching chemistry among Secondary School Students is effective than Activity oriented Method.

Major Findings

- There exists no significant difference between the Means of Pre-test Scores of Achievement test in chemistry in the Control and Experimental group.
- There exists significant difference in the Post-test scores of Experimental and Control groups. This reveals that R.E.A.C.T. strategy in teaching chemistry among Secondary School students is effective than Activity Oriented Method.

Educational Implications

- The study throws light on the fact that the R.E.A.C.T. strategy used in teaching chemistry is effective in enhancing mastery in the topic non-metals. Hence, this method can be adopted for improving the knowledge of chemistry among the students.
- The method develops a positive attitude among students in learning chemistry.
- The R.E.A.C.T. Strategy contributed a teaching strategy which results in betterment of students by :
- Developing critical thinking.
- Developing reflective thinking.
- The Strategy can make students active during teaching-learning process.
- The Strategy can make teachers to be more creative

Conclusions Based on the Study

The teaching learning process by using R.E.A.C.T. Strategy gives the positive effect in improving the students' knowledge in chemistry. This is shown by student's enthusiasm in reflecting with their knowledge on the content. Students should always be motived by bringing in a variety and using different strategies. Teacher should always be on the lookout for the best methods to motivate the children. The finding of this study implies that teachers should utilize the R.E.A.C.T. Strategy in the classroom for the better transaction of the content. This will create a good atmosphere in the classroom and will help in the improvement of learner’s performance in chemistry.

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