



EXPERIENTIAL LEARNING: ART INTEGRATED LEARNING IN SCIENCE

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ABSTRACT :

The purpose of the study is to ascertain the effect of teaching with and without Art Integrated Learning (AIL) on academic performance of grade nine students in science. The sample consists of 40 students selected by purposive sampling methods. The pre-test and post-test administered on all groups. Quasi-Experimental research design was applied to study. Treatment lasted for period of fifteen days. Data collected with 40 items multiple choice Science achievement test, called (SAT). The tool was analyzed by using (dependent t-test). Result of the study reveals that there is difference in academic achievement of the students between, who were taught electrolysis of Water by using drama and by using traditional chalk and board method.



KEYWORDS : Chemistry, drama, Electrolysis, and Art Integrated Learning.

INTRODUCTION :

Drama, dance, music, art, may be significantly effective tool to communicate, teach, learn and assess science, creative drama is most effective for improving thinking skills, the use of creative drama teaching methodology in class-room environment is child-centered and in which learning process results development of students in any curriculum. Drama as methods of teaching catalyzed students to develop and improve their divergent thinking, creativity, communication and conceptual understanding. The application of drama enriches student's imagination and willingness to act/pretend as a means of reinforcing academic, emotional and interpersonal objectives. Drama as activity may reflect positively not only on the student's behaviour but also personality. Drama is one of the effective methods of teaching. The approach of drama leads students to discover their inner strength of "knowing" into concrete vision. Drama may be used in teaching to supply social, academic, personal and interpersonal goals. This emphasizes the use of student's imaginative suits and intelligence to help them learn through their own activities and practices because learners process information differently. The concept of dramatics also helps the growth of language and vocabulary while stimulating high level cognitive process. The class-room based experience based on creative drama may provide a genuine experiential learning and also joyful learning and guide students to become aware of use of their imagination.

In education, many curricular focus on symbolic ways of thinking both alphabetical and mathematical. Dance education provides an opportunity to the intentional development of thinking through the modalities of perception, action and emotions. In the dance class room the whole person present environment will become the object of the study. The dance class room is a laboratory to experiment with

the students of non-verbal thoughts. Concepts may be learned by creation of a “memory dance” that is choreographed well where movements will remind the child about the meaning of concepts.

Art Integrated Learning is a cross-curricular approach to class-room Teaching-Learning in secondary school between teaching subjects while teaching of art (visual/performing). Art becomes primary pathways to learn the concept /topic/subject and also the form of assessment. Art Integrated Learning makes learning joyful and imbibes greater appreciation and understanding of art form being utilize to this purpose. Art Integrated Learning is a stronger contends for experiential learning.

APPLICATION OF DRAMA:

In class room situation, drama may be used in three ways, structure, semi-structured and explorative drama. In structured drama teacher is a central figure and decides the activity. In explorative drama, students develop the activity spontaneously. In semi-structured drama, it is the combination of both teachers (are less active) and students (are less independent). In this present study structured drama is used.

In the present study formation and decomposition of water is presented in drama. Two students acted as oxygen atom and four students acted as hydrogen atom. One student acted as electricity. One student acted as curious school students in class-room and one student acted as senior teacher. The curious students wanted water to decompose. Total 40 students were in grade nine class and 20% students participated in this activity.

Costume was designed for drama by science teachers, white costume for oxygen with ‘O’ letter and blue costume for Hydrogen atom bearing the alphabet ‘H’ on their chest. The blue and white colour stands as a symbolic representation of water. The student acted as electric current wear an apron with electric sign display on it. The curious students were in school uniform and the science teacher is in casual dress. The science teacher used hammer, a plastic hand saw and glass bottle with acid label on it. The drama was presented on the school auditorium was 15m². Anode and cathode were students on stands 20cm in height and 50x100cm in width in the background of stage.

The script was written by a Science teacher with the help of an English teacher. Role of each student was explained and written script was given to the students. Teacher explains the students that hydrogen molecules have single bond and oxygen molecule is having double bond, atom must be perfectly positioned/oriented to make the reaction successful. Teacher provided time to discuss their role. The discussion among students where held, regarding- the positions in the stage and the entry. As teacher role is minor, teacher pretended to stay among students with little interference. Dialogues delivered by the students were also recorded.

Dialogues of students in drama as experiential learning activity:

There were two oxygen atoms. They grabbed each other hands representing double bond of oxygen. They discuss with each other.

Oxygen 1: Ya, am too much bored today.
Oxygen 2: Why are you too much bored? What happened?
Oxygen 1: See, our life is too ordinary, so it is much boring.
Oxygen 2: Be honest and frank, are you really bored of me?
Oxygen 1: No dear, not at all. You are my best- best friend, because we have double bond. But now, I want to meet new atoms and make new molecule with brand new properties.
Oxygen 2: yes dear, you are absolutely right. In fact I was also thinking the same, but I could not express it.

At the same time, when the two oxygen atoms were discussing, two hydrogen atoms (H1 and H2) entered the stage slowly. Hydrogen atoms were smaller when compared to oxygen atoms. They are hand in

hand representing single bond. Both hydrogen atoms were also not happier with their relationships and want to make a new compound. By accident they met oxygen atoms and they discussed their ideas of forming a new compound. Their discussions are as follows:

Oxygen 1: Are you planning to form a new molecule? Are you ready to form covalent bond by sharing two electrons?
 Hydrogen1+Hydrogen 2: okay
 Oxygen 2: you will forget me soon. What will I do when you leave me?
 Oxygen 1: yes, yes, I have totally forgotten about you.
 O1 (to Hydrogen1): Just a moment, if I will form a new molecule with you, my friend will be alone and a single oxygen atom cannot survive.
 Hydrogen1: it is not an issue. We may call a hydrogen molecule to help your friend.
 Hydrogen2: Wait a minute. We will call our friend.
 H1 and H2 move towards their friend to call. At the same time, oxygen atoms are talking to each other.
 Oxygen 2: I don't know what to do? How should I form a bond?
 Oxygen 1: It is too easy. You will share your electron and you will form a covalent bond. Hydrogen atoms move towards them
 Oxygen 1: yes, they have come. Are you ready to form a new molecule?
 Oxygen 2+Hydrogen1+Hydrogen 2+Hydrogen 3+Hydrogen 4: yes, we are ready

Oxygen and Hydrogen collide with one another to form water molecules. They form two water molecules. Water molecule can decompose into Oxygen and Hydrogen by chemical methods called Electrolysis. Water cannot decompose by physical methods. The curious student wants to decompose the water molecule by physical methods.

Curious Student: May I separate them?
 Science Teacher: yes, you can break these bonds. Bond breaking is little difficult.
 Curious Student: Teacher, I am strong enough to break these bonds, look carefully, I will make them separate easily.

Curious student tries to separate them but he was not successful.

Curious Student: yes, it is difficult but I will. I may break this bond by using a hammer. But how can I find? Do you have one?
 Science Teacher handed over the hammer to the curious student.

Science Teacher: please take it and try.

Curious student tries to separate them using hammer but he was nervous as he failed.

Curious Student: ya, really you are right. It is difficult to break the bond by using a hammer or using a handsaw. But, how may I succeed in this attempt? Do you have an idea?

When the curious student expects help from Science teacher to decompose water molecules, teacher points electricity among audience. But electricity wants something from curious student.

Curious Student: Can you decompose this water molecule?
 Electricity: yes, definitely, I can. It is very easy for me. Even I can decompose you, but there is one problem!
 Curious Student: I will address your entire problem. What do you need?
 Electricity: As pure water does not conduct electricity, you have to show me a road that contain ion.
 Curious Student: You require a road with something on it..... is it acid?

Electricity: Absolutely!

When curious student gives acid to electricity, it decomposes water to Oxygen and Hydrogen. Oxygen migrated towards cathode and Hydrogen towards anode.

Statement of the Problem:

The researcher is science teacher teaching science for past 30 years at secondary classes and Chemistry of senior secondary classes. He experience in teaching that students lack in conceptual understanding in science. In attempt to find out solution, researcher conducted this personal study.

Purpose of the study:

The present study aimed to investigate the role of Art Integrated Learning in improving student's conceptual understanding in Science.

Significance of the study:

In this world which, is characterized by flux of change in all aspects of life, it became crucial that education may help students to cope up with the change and teachers should use various approach in teaching in order to motivate and affect attitude toward learning subjects: in our case it is Science subject of grade nine. In the present study, researcher aimed to highlight that using drama as an effective teaching tool in class room can help to build this wishful change.

Research Design:

Experimental design was employed to present study. Randomizing, pre-test, post-test control was designed. Three tests were given: one pre-test and two post-test. Pre-test and post-test consist of twenty MCQ which was prepared by the researcher were same but students were not aware of this. The pre-test was given one week before intentionally. Pre-test and post-test one was conducted to measure students achievement in atom, element, compound, chemical reaction, anode, cathode, electrons, electrolysis, chemical bond, physical method and chemical methods, concepts at beginning and end of treatment. The validity of content test was checked by giving test to 20 students of same grade or another grade. The reliability test was alone with students of same school and was found 0.86. Table-1 exemplifies the same means in pre-test and post-test -01. Each item was given five points scale. Total items were twenty.

Post-test-two was administered immediately after post-test-one. Post-test-2 was hands on activity which was having 40 items. Students were asked to form water molecule out of play dough and tooth pick in various colours given to them and asked to demonstrate the molecule. Twenty points were given to students who formed water molecule properly (oxygen atom drills then hydrogen atom had different colours, and palace at right angle) and 25 points to the students who decomposes water molecule properly (decomposition of water molecule produced two molecule of H and one molecule of O). Total score to post-test-2 is 50 points. To students forty five minutes is given to both pre-test and post-test-one and post-test-2 but additional time is given to students to complete if required.

Table -1: Sample item of Science A Test (SAT):

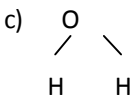
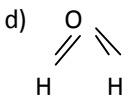
- Which of the following shows the structure of Oxygen molecules?
 - $O=O$
 - O
 - $O-O$
 - $O\equiv O$
- Which of the following shows the structure of Water molecules?
 - $H=O=O$
 - $H-O-H$
 - 
 - 
- Which of the following statement is correct to comparison of molecules of Oxygen and Hydrogen atoms?

Table-2: Pre test:

Group	N	Mean	Sum of rank	Mann Whitney U	Z	P
Experimental Group	40	18	482.00	102.00	2.860	0.009
Control Group	40	20	353.00			

Table -3: post test:

Group	M	Mean	Sum of rank	Mann Whitney U
Experimental Group	40	25.61	496	91.00
Control Group	40	14.83	323	

Result of study (table-1) reveals that there is no significant difference between experimental group and control group. The mean value of Experimental group is 18 and control group is 20 ($t = 188.00$, $t = 7.88$, $p > 0.05$). The Both Experimental group and control group are equivalent. The topic electrolysis of water is taught by using Art Integrated Learning activity as drama to experimental group and to control group by the traditional chalk and talk method.

There was statistical difference between experimental group and control group with respect to post-test score after the study. Result of the study shows that there is a mean score of experimental group exposed to Art Integrated Learning activities as drama was much higher than Control group taught by traditional methods. The significant difference was determined among students by Mann Whitney U-Test (Table-2). The students who performed well on water molecule activity were given twenty five points. Students who managed to decompose water molecule also were twenty five points. Result analysis shows that students in Experimental group have clear conceptual understanding of the concepts. Total 39 students out of 40 in experimental group draw the water molecule accurately. On other hand only 09 students out of 40 draw the water molecule correctly in control group.

The student engagement fosters in Art Integrated Learning and positively facilitate teaching-learning. Active engagement in learning process enhances the conceptual understanding in abstract concepts. Art Integrated Learning stimulates student's interest in chemistry subject. Art Integrated Learning promotes conceptual understanding of atoms, element, and molecules and visualizes the concept in mind clearly. Student's active involvement in drama such as H_2 molecule bond, O_2 molecule bond, electrolysis of water, size of Hydrogen atom, size of oxygen atom, atoms migration towards electrode, anode and cathode help students in experimental group to integrate practice and theory and get three times high achievement score when compared to the control group. Art Integrated Learning activity such as drama promotes the use of language associate and conversation also. Students who are not participating in Art Integrated Learning activity, watches the drama attentively. The students in other classes are also enthusiastic and want to participate in Art Integrated Learning.

CONCLUSION:

The students face difficulty in the understanding of the concepts by traditional and laboratory method, they can be taught by Art Integrated Learning activities. Art Integrated Learning activities make conceptual understanding joyful, easy and satisfactory.

- 1) The concepts in science cannot be shown by laboratory, condition such radioactivity and students face difficulty in conceptual understanding as challenging content for teacher. Art Integrated Learning activities as drama may be employed to teach abstract concept such as radioactivity.
- 2) The study shows that using drama in educational situation plays a constructive role in learning process through improving the student's skills. The significant effect clearly seen on experimental group than

control group. Drama shows improvement in self-confident of students and communication skills. Drama optimizes learning.

Limitations of the study:

- 1) The present study like all other studies has limitations. The study is conducted in a school, where the researcher is working. Hence study has limited scope and result cannot be generalized.
- 2) This study was conducted in the academic year 2018-19. It was used by one teacher and one class in rural area

RECOMMENDATION AND SUGGESTIONS:

Based on the findings of the study the following recommendations are made

- 1) Art Integrated Learning must be the part of curriculum to make teaching most effective.
- 2) Creative drama can be used progressively as a teaching method in other subjects also.
- 3) Other studies are required to investigate the impact of dram as Art Integrated Learning activities on communication skills, creative thinking and critical thinking.
- 4) More activity studies are required to conduct and to investigate the effect of drama. Students learn the subjects more deeply.

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