



EFFECTIVENESS OF TEACHING PERIODIC TABLE USING ICT INTEGRATED PLAYWAY METHOD FOR ELEVENTH STANDARD STUDENTS

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ABSTRACT :

This paper aims to study the effectiveness of ICT integrated play way method in teaching periodic table to eleventh standard students. Based on the objectives of the study, experimental method was adopted. The sample consists of 48 students studying in eleventh standard in a private school in Palakkad district, Kerala. Pretest and posttest were conducted to the students and the gain scores were compared. The findings of the study revealed that there is a significant mean score difference in learning chemistry (Periodic Table) between pretest, posttest and retention test of control and experimental group students. The developed ICT integrated play way method of learning chemistry (Periodic Table) for eleventh standard students is highly effective for learning chemistry.



KEYWORDS : Playway method, Periodic Table.

INTRODUCTION

Play way method enhances the spirit of play in educational institutions and is the best way for a child to learn through the medium of guided play in a friendly natural environment (Fredrich Froebel, 1982).

In this 21st century, the term "technology" is an important issue in the field of education. Integration of ICT in education refers to the use of computer based communication that incorporates into daily classroom instructional process (Ghavifekr, S. & Rosdy, W.A.W. (2015). ICT is commonly used as an umbrella term for a wide collection of computer-based instruction and sharing resources. By ICT we refer to a collection of computer based learning materials which are exploited to support teaching and learning, communication and collaboration, self-expression for the promotion of developmental domains of students.

ICT integrated play way method is structured on technology oriented activity based learning. It encourages creative skills and self-expression. Play-way method of learning using ICT is a complete instructional package that enables overall development of the child by developing in terms of feelings, intellect and skills parameters. It focuses on subjective development and emotional development of the child. It provides the driving force for learning as the entire method involves activity-based ICT integrated learning. It encourages expression and creative skills among students.

Chemistry is a complex topic involving a lot of terminology and this complexity can be reduced with the intervention of technology. In other words the intervention is driven by pedagogy rather than technology. There are several opportunities for including technology in the chemistry teaching. The

teaching and learning of chemistry is found to be difficult because of the poor understanding of the basic concepts. Information and communication technology can facilitate students' collaboration and enhance knowledge. The infusion of technology into education is gaining popularity as an effective platform for enhancing the teaching and learning process. As play way method is technologically-innovative, the investigator decided to prepare an ICT based instructional package in chemistry on the topic periodic table using play way method and the instructional material is delivered online to the students, where the retention and attention levels can be enhanced.

NEED AND SIGNIFICANCE OF THE STUDY

Integration of technology in schools is needed in order to achieve desired learning objectives and improve the quality of learning in all subject areas. It is significant that when teachers adopt innovative teaching blended with technology in the teaching process drastic changes will occur in the learning process. There is a need to encourage technology based learning at various levels in education.

Periodic table consists of an arrangement of elements according to atomic numbers in groups and periods in the form of a table. Though it seems to look attractive and easy, a student may feel difficulty to understand in a normal class. It will be useful for teachers to formulate technology based instructional design and to develop innovative methods of teaching periodic table using technology instead of traditional methods that meets the needs of teachers and learners in their respective fields.

Play way method using technology includes immense exploration and learning with fun and joy. Teaching periodic table in chemistry by ICT integrated play way method helps the students to learn easily without stress. The play method provides maximum interaction and correspondence with others in the classroom and helps children to master vocabulary through fun and enjoyment. The play method provides room for children to use their creativity and develop their imagination. Play allows children to learn through experience, enhances confidence and self-esteem and also develops interest (SubadrahMadhawa Nair, et. al. 2014).

Hence the investigator developed play way method for learning periodic table using online technology for eleventh standard students. Using this technology oriented package, learner can learn periodic table at self-pace, develop interest, practice in leisure time and understand easily. The trend in education at present aims at giving complete preparation to the pupils and hence, it is more important to see how the instructions are conveyed rather than what is conveyed (Mary Delphine, 2016).

OBJECTIVES OF THE STUDY

1. To develop web based content for learning chemistry (Periodic Table) using play way method among eleventh standard students.
2. To find out the effectiveness of play way method in teaching chemistry (Periodic Table) among eleventh standard students.
3. To find out the retention of learning chemistry (Periodic Table) using playway method among eleventh standard students.

HYPOTHESIS OF THE STUDY

1. There will be significant mean score difference in learning chemistry (Periodic Table) between pretest and post test of control group students.
2. There will be a significant mean score difference in leaning chemistry (Periodic Table) between pretest and retention test of control group students.
3. There will be a significant mean score difference in leaning chemistry (Periodic Table) between post test and retention test of control group students.
4. There will be a significant mean score difference in leaning chemistry (Periodic Table) between pre test and post test of experimental group students.

5. There will be a significant mean score difference in leaning chemistry (Periodic Table) between pre test and retention test of experimental group students.
6. There will be a significant mean score difference in leaning chemistry (Periodic Table) between posttest and retention test of experimental group students.
7. There will be a significant mean score difference in leaning chemistry (Periodic Table) between the gain scores of control and experimental group students.
8. There will be a significant mean score difference in retention of learning chemistry (Periodic Table) between the control and experimental group students.

RESEARCH DESIGN

The investigators have adopted experimental method for the present study. Further, the researcher adopted parallel group design for manipulating the independent variables in the quasi experimental design. The sample of the study was eleventh standard students studying in a private school of Palakkad district. The sample size was 48. The total sample taken for the study consists of 24 control group and 24 experimental group students. The sample was selected using random sampling technique.

RESEARCH TOOL

For this study, the investigator developed an ICT based instructional package in chemistry (Periodic Table) for class 11 students using playway method. Criterion referenced test was constructed and validated for pre, post and retention test by the investigators.

HYPOTHESES TESTING

Hypothesis No: 1

There will be a significant mean score difference in leaning chemistry (Periodic Table) between pretest and posttest of control group students.

Table-1
Mean score difference in learning chemistry between pre test and post test of Control group students

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	p value
Learning outcome in chemistry (Control Group)	Pretest	24	6.33	7.17	1.523	23	43.00*	.000
	Post test		13.50		1.063			

According to Table-1, the calculated t-value is statistically significant at 0.05 level and hence the hypothesis No.1 is accepted. It is also found that the mean score of post test phase is higher than that of the pre test phase which is due to the teaching of content unit through conventional method.

Hypothesis No: 2

There will be a significant mean score difference in leaning chemistry (Periodic Table) between pretest and retention test of control group students

It is seen from Table-2, the calculated t-value is statistically significant at 0.05 level. So the hypothesis No.2 is accepted. It is also found that the mean score of retention test phase is higher than that of the pre test phase which is due to the teaching of content unit through conventional method.

Table-2**Mean score difference in learning chemistry between pre test and retention test of control group students**

Name of the Variable	N	Mean	Difference in mean	SD	df	t value	P value
Learning outcome in chemistry (Control Group)	24	6.33	8.38	1.52	23	32.96*	.000
		14.71		0.46			

Hypothesis No: 3

There will be a significant mean score difference in leaning chemistry (Periodic Table) between pretest and posttest of control group students.

Table- 3**Mean score difference in learning chemistry between post test and retention test of control group students**

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	p value
Learning outcome in chemistry (control Group)	Post test	4	13.50	1.21	.06	3	7.599*	.000
	Retention Test		14.71					

From the Table-3, the calculated t-value is statistically significant at 0.01 level. It is also found that the mean score of retention test phase is higher than that of the post test phase. It is due to the manipulation of content unit through conventional method and reinforcement in regular classroom teaching after post test phase. Hence hypothesis No.3 is accepted.

Hypothesis No: 4

There will be a significant mean score difference in leaning chemistry (Periodic Table) between pretest and posttest of experimental group students.

Table -4**Mean score difference in learning chemistry between pre test and post test of experimental group students**

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	P value
Learning outcome in chemistry (Experimental Group)	Pretest	24	6.33	1.8	1.523	23	9.993*	.000
	Posttest		8.13		1.569			

According to Table-4, the calculated t-value is statistically significant at 0.01 level and hence hypothesis No.4 is accepted. It is also found that the mean score of post test phase is higher than that of the

pre test phase which is due to the manipulation of the content unit on periodical table with help of ICT integrated play way method of teaching.

Hypothesis No: 5

There will be a significant mean score difference in learning chemistry (Periodic Table) between pretest and retention test of experimental group students

It is evident from Table-5, the calculated t-value is statistically significant at 0.01 level and hence hypothesis No.5 is accepted. It is also found that the mean score of retention test phase is higher than that of the pre test phase. Further it is verified from the results that the manipulation of content unit through play way method helped the students to retain the learning.

Table-5
Mean score difference in learning chemistry between pre test and retention test of experimental group students

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	P value
Learning outcome in chemistry (Experimental Group)	Pretest	24	6.33	8.38	1.523	23	32.96*	.000
	Retention Test		14.71		0.464			

Hypothesis No: 6

There will be a significant mean score difference in learning chemistry (Periodic Table) between posttest and retention test of experimental group students

Table No. 6
Mean score difference in learning chemistry between post test and retention test of experimental group students

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	P value
Learning outcome in chemistry (Experimental Group)	Posttest	24	13.50	1.21	1.063	23	7.599*	.000
	Retention test		14.71		0.464			

From the Table-6, the calculated t-value is statistically significant at 0.01 level. Hence hypothesis No.6 is accepted. It is also found that the mean score of retention test phase is higher than that of the post test phase. It is due to the manipulation of content unit through play way method and reinforcement in regular classroom teaching after post test phase. Hence hypothesis No.6 is accepted.

Hypothesis No: 7

There will be a significant mean score difference in learning chemistry (Periodic Table) between the gain scores of control and Experimental group students

Table-7
Mean score difference in learning chemistry between the gain scores of control and experimental group students

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	P value
Learning outcome in chemistry (Gain score)	Control group	24	1.79	5.38	0.884	23	21.778	0.000
	Experimental group		7.17		0.816			

It is seen from the Table-7, there is a mean gain score difference in learning chemistry between control and experimental group students. The calculated t-value is statistically significant at 0.01 level and so the hypothesis No.7 is accepted. It is concluded that the ICT integrated play way method of teaching is more effective to learn periodic table in chemistry.

Hypothesis No.: 8

There will be a significant mean score difference in retention of learning chemistry (periodic Table) between the control and Experimental group students

According to Table-8, there is a mean score difference in retention of learning chemistry between control and experimental group students. The calculated t-value is statistically significant at 0.01 level and so the hypothesis No.8 is accepted. It is concluded that the play way method of teaching is more effective for retention of learning.

Table No.-8
Mean score difference in retention of learning chemistry between control and experimental group students

Name of the Variable	Test Phases	N	Mean	Difference in mean	SD	df	t value	p value
Learning outcome in chemistry (Retention score)	Control group	24	9.21	5.5	1.56	23	15.44	0.000
	Experimental group		14.71		0.46			

FINDINGS OF THE STUDY

1. There is significant mean score difference in learning chemistry (Periodic Table) between pre, post and retention tests of the control and the experimental groups of eleventh standard students.
2. Learning outcomes of experimental group students are enhanced more than the control group. This is proved by the gainscores of experimental group students over control group students.

3. Retention of learning of experimental group students is more than control group students as reflected in the retention scores of these groups. Experimental group students have high retention scores than control group students.

CONCLUSION

Based on the results and findings of the present study, it is concluded that the developed instructional package using playway method for learning chemistry (Periodic Table) for class eleventh students is a highly effective tool for learning chemistry. Further it is proved that there is retention capability in learning chemistry using play way method. Hence it can be strongly concluded that the students showed effective learning outcome in chemistry only because of the ICT integrated play way method developed for learning chemistry(Periodic Table).This study proves that the play way method on learning periodic table is a highly effective tool for class eleventh students.

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