

Effectiveness of Eclectic Method on Achievement Test and Retention Test in Learning Chemistry at Higher Secondary School Students

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Abstract: The research paper describes an effectiveness of eclectic method of innovative and technology teaching among XI standard School Students. Traditional new teaching methods and approaches were provided with some changes. Need of hour is to focus on the role of using new methods and technologies in learning and Teaching. The literature review indicated the effective use methods, technologies that improve learners learning skills, which enhances the effective learning. Teaching skills are related with the art of teaching strategies of various methodologies and techniques. The main objectives: To find out whether there is any significant difference in the achievement test, Retention test and chemistry Equation balancing (ABCD) method of Haloalkane and Haloarenes with respect to control group and experimental group (pre test - Post test). Hypothesis: formulate null hypothesis were used, methodology: Experimental method solamon four group design. Sample: 120 students were adopted in this study groups were dividend of experimental group (I & II) and control group (I & II). The students adopting in purposive random sampling Technique. Reliability of the Tool: The Reliability of the tool was calculated Split-half method and the calculated reliability was (i) Achievement test in Haloalkane and Haloarenes (0.986) (ii) Retention test in Haloalkane and Haloarenes (0.913), (iii) chemistry equation balancing (ABCD) method (0.82) Tools: (i) Eclectic method and validated for the topic – Haloalkane and Haloarenes of XI Chemistry, (ii) Achievement Test (ATHAHA), (iii) Retention Test (RTHAHA) (iv) chemical equation balancing (ABCD) method. Statistical Analysis: Descriptive, Differential, Correlation, Analysis were used in the current study.

Key words: Eclectic, Chemistry, Achievement Test, Retention Test, Haloalkane and Haloarenes.

INTRODUCTION

Education technology can greatly enhance the eclectic method in teaching chemistry. Here are some ways to incorporate technology: 1. Virtual Laboratories: Use virtual labs and simulations to allow students to conduct experiments and observe reactions in a safe and controlled environment. This provides practical experience without the need for a physical lab. 2. Online Resources: Utilize educational websites, YouTube channels, and interactive apps to provide supplementary materials, such as video demonstrations, tutorials, and quizzes to support different learning styles. 3. Chemistry Software: Employ chemistry-specific software for molecular modelling, data analysis, and visualization. Programs like Chem Draw or Avogadro can help students explore molecular structures and reactions. 4. Online Collaboration: Encourage collaborative learning through platforms like Google Workspace or Microsoft Teams, where students can collaborate on projects, share notes, and discuss complex topics. 5. Augmented Reality (AR) and Virtual Reality (VR): AR and VR apps can immerse students in 3D molecular structures and chemical reactions, making abstract concepts more tangible and engaging. 6. Personalized Learning: Use adaptive learning platforms that tailor lessons and assignments to individual students' strengths and weaknesses, ensuring that each student receives a custom-tailored education. 7. Data Analysis Tools: Introduce students to data analysis software like Excel or online tools for graphing and analyzing experimental data. 8. Online Discussion Forums: Create online forums or discussion boards for students to ask questions, share ideas, and engage in discussions related to chemistry topics. 9. Open Educational Resources (OER): Incorporate freely available OER materials, such as textbooks, lecture notes, and research articles, to provide students with diverse sources of information. 10. Assessment Tools: Use online assessment tools for quizzes, tests, and assignments, allowing for immediate feedback and progress tracking. By

integrating these technology-driven elements, educators can effectively adapt the eclectic teaching method to meet the diverse needs and preferences of students studying chemistry.

Teaching chemistry with education technology involves using digital tools and resources to enhance the learning experience. Here are some strategies and technologies that can be employed: 1. Interactive Simulations: Use interactive simulations and virtual laboratories to help students visualize and experiment with chemical reactions, molecules, and laboratory procedures. 2. Digital Textbooks: Provide access to digital textbooks and e-books, which often include multimedia elements, interactive quizzes, and links to additional resources. 3. Online Videos: Curate or create educational videos that explain complex chemical concepts, conduct experiments, and showcase real-world applications of chemistry. YouTube and platforms like Khan Academy are valuable resources. 4. Learning Management Systems (LMS): Utilize LMS platforms like Moodle, Canvas, or Google Classroom to organize course materials, assignments, and discussions in one place. 5. Collaborative Tools: Encourage collaboration through tools like Google Docs and Google Slides, where students can work together on projects and presentations. 6. Chemistry Apps: Recommend or provide chemistry-related apps for smartphones and tablets that offer interactive lessons, periodic table references, and chemical equation balancers. 7. Webinars and Virtual Conferences: Engage students in webinars or virtual conferences featuring experts in the field, enabling them to learn about the latest advancements and applications in chemistry. 8. Augmented Reality (AR) and Virtual Reality (VR): Explore AR and VR applications to create immersive experiences that help students explore complex chemical structures and reactions. 9. Online Quizzes and Assessments: Use online quiz platforms like Quizlet, Kahoot, or dedicated LMS assessment tools to evaluate students' knowledge and provide instant feedback. 10. Data Analysis Software: Introduce students to data analysis software like Excel or specialized chemistry software for graphing and analyzing experimental data. 11. Open Educational Resources (OER): Incorporate freely available OER materials, including textbooks, lecture notes, and research articles, to provide diverse sources of information. 12. Chemistry Blogs and Podcasts: Recommend chemistry-related blogs and podcasts to encourage self-directed learning and exploration of current topics in the field. 13. Social Media: Create a class or course-specific social media group for discussions, sharing interesting chemistry news, and connecting with peers. 14. Online Chemistry Communities: Encourage students to participate in online chemistry forums and communities to ask questions and engage in discussions with experts and enthusiasts. Integrating these education technologies can make chemistry more engaging, accessible, and effective for both teachers and students, fostering a deeper understanding of this complex subject.

REVIEW OF RELATED LITERATURE

Suleman and Qaiser et al. (2016) investigate the effect of eclectic learning approach on the academic achievement and retention of students in English at elementary level. A sample of forty students of 8th grade randomly selected from Government Boys High School Khurram District Karak was used. It was an experimental study and that's why sample subjects were classified into two equal groups on the basis of pre-test scores. For data collection, pre-test post-test equivalent groups design was used. Descriptive statistics i.e., mean, standard deviation and inferential statistics i.e., t-test were employed for analyzing the data. After analyzing the data, it was come to light that eclectic learning approach has a positive effect on student's academic achievement and retention. Eclectic learning approach was found more productive, effective and successful in teaching of English as compared to traditional learning approach at elementary level. So, eclectic learning approach should be adopted by the teachers for improving student's performance in English at elementary level.

Binduk Varghese and G.Singaravelu, (2018) studied effectiveness of eclectic method in learning chemistry among the students of standard IX. Objectives of the study: 1. To find out the significant difference in achievement mean score between the pre test of control group and post test of control group. 2. To find out the significant difference in achievement mean score between the pre test of Experimental group and post test of Experimental group. 3. To find out the impact of Eclectic method in learning Chemistry. Methodology: Equivalent group Experimental method was adopted in the study. Participants: One hundred and twenty students of standard IX were selected as sample from Kerala. Instrumentation: Researcher's self-made achievement test was used as instrumentation for the study. Findings: Eclectic method is more effective than traditional methods in learning chemistry for the students of standard IX. The Result of the study revealed that the Eclectic method for teaching and learning of chemistry is more effective than conventional method in the classroom among the

selected students. The study confirmed the learning through Eclectic method which helped in improving the achievement scores of students in Chemistry. Hence, it is the need of the day to develop and introduce such Eclectic method that may be suitable for Indian schools, for the betterment of all the students.

ECLECTIC METHOD

The term Eclectics has been derived from the verb root “elect” which means “to choose and pick up”.

The good idea's concept and principle from various schools, that have been chosen, picked up and blended together to make a complete philosophy. It can be considered as a philosophy of choice. It is a conceptual approach that doesn't hold rigidly to a single paradigm (or) set of assumptions, but instead draws upon multiple theories, styles or ideas to gain complementary insights into a subject or applies different theories in particular cases.

The Eclectic method is the idea of choosing from different methods the appropriate aspects to suit for one's teaching purposes and situation more precisely, the eclectic method does not impress the teacher in a circle, it allows him to decide and select the best techniques of all methods and approaches depending on a particular objective to suit the student needs.

The Eclectic method is considered as a combination of different learning approaches which allows the teacher to reject the weak aspects and retain only the ones that are applicable in a particular situation to fulfil his aim of effective teaching.

Eclectic method is a combination of different learning. Based on, only the best parts that is beneficial from a variety of teaching. Then the weaknesses of a particular teaching method can be avoided, as its name indicates. Eclectic method is not an ESL teaching method. But an approach, according to the British council An Approach is a way of looking at teaching and learning this means that the approach we follow as Teacher is going to determine what method activities and techniques we will apply in our classes. There was and probably never will be a method for all (D. Nunan). The Eclectic method is a combination of different method of Teaching and learning Approaches (Kumar 2013)

NEED AND SIGNIFICANCE OF THE STUDY

Students in Tamilnadu standard XI had some difficulties learning chemistry. Traditional teaching methods used in classroom transactions were ineffective in achieving the expected scoring of marks by students in chemistry. Traditional methods of chemistry class room transactions at standard XI have created monotony and decreased learners' interest. Consequently, the researcher worked to identify a new teaching and learning approach for chemistry, called the eclectic method, and determined how well it worked with the chosen students.

Science has been a compulsory subject up to Class XI and XII in the country for the past two decades, but it remains largely irrelevant to most students and of unacceptable quality. For the vast majority of students, Science is just another demanding and difficult subject to be learned by rote, with no meaningful learning outcomes, and only a small minority of students graduate with outstanding science intellectual ability comparable to international standards. Chemistry plays a critical role in a country's scientific and technological development. Despite efforts to encourage more students to study Chemistry, in subject has the lowest popularity index among school science subjects in India. As a result, it is necessary to seek out an innovative strategy that could be implemented to improve students' achievement and retention in the subject.

STATEMENT OF THE PROBLEM

The aim of the present study was to find out whether the students in Standard XI from four different types of schools had some difficulties learning chemistry using conventional methods of instruction. Conventional methods did not improve the learners' chemistry competency. Many students failed to continue their studies in rural and urban areas due to difficulties with learning chemistry. As a result, the researcher selected the topic entitled "Effectiveness of the Eclectic Method on Academic Achievement and Retention in Learning Chemistry at Higher Secondary School Students."

SCOPE OF THE STUDY

The study examines the relative effectiveness of Eclectic Method on the achievement in Chemistry of Eleventh students. It is hoped that the findings of the study can be useful for the learners, teachers, trainers and curriculum designers. And Boosting students by using various methods, specifically the Eclectic method, for teaching students' weak points in chemistry could be a successful task. Learners in government schools focus on the Eclectic method, which aims to broaden the learners' horizons with eagerness. The Eclectic method of learning Chemistry enchants all types of students. For teaching Chemistry, it can be advanced to all high schools and higher secondary levels.

DELIMITATIONS OF THE STUDY

Research in general can have limitations due to many factors. It is the responsibility of the researcher to ensure that the research is conducted as carefully as possible in order to be trusted. The following limitations of this study were unavoidable:

1. The present study is restricted to students in Standard XI.
2. The study concentrated only on Chemistry from the science textbook for standard XI in the Tamilnadu state board syllabus.
3. Addressing the results as determined by the monthly test, homogeneity between the control and experimental groups was confirmed.
4. Due to the need for a computer lab and the experimental nature of the current investigation, the sample size is constrained. Only 120 students in standard XI make up the total sample.
5. The entire Chemistry curriculum covered a wide range of topics. The researcher cannot create a multimedia package for all of them. Furthermore, such an effort would necessitate more time and money. As an outcome, the current research is limited in the topic 'Haloalkane and Haloarenes' alone. If time had allowed, this would have been expanded to other areas as well.
6. The study was confined only to low achievers.
7. The present study is confined to select four schools (Government, Government Aided, Corporation and Matriculation) located in Cuddalore district of Tamilnadu.
8. The study is confined to Tamil and English medium students alone.
9. The study is confined to Eleventh standard students belong to Higher secondary schools of Cuddalore district only.

OBJECTIVES OF THE STUDY

1. To find out achievement test in Haloalkane and Haloarenes whether there is any significant difference between Pre test of Experimental Group-I and Post- Test of Experimental Group-I in learning Chemistry at XI.
2. To find out achievement test in Haloalkane and Haloarenes whether there is any significant difference between Pre test of Control Group-I and Post- Test of Control Group-I in learning Chemistry at XI.
3. To find out achievement test in Haloalkane and Haloarenes whether there is any significant difference between Post test of Experimental Group-II and Post- Test of Control Group-II in terms of (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.
4. To find out achievement test in Haloalkane and Haloarenes whether there is any significant difference between Post test of Experimental Group-I and Retention test-I.
5. To find out achievement test in Haloalkane and Haloarenes whether there is any significant difference between Post test of Experimental Group-II and Retention test-II.
6. To find out the difference between the Experimental Group and Control Group Chemical equation Balancing (ABCD) method, in terms of (1) pre test of Experimental Group-I and post test of Experimental Group I, (2) pre test of Control Group I and post test of Control Group I, (3) pre test of Control Group I and post test of Experimental Group I, (4) pre test of Control Group I and post

test of Experimental Group I, (5) post test of Control Group I and post Experimental Group I, (6) post test of Experimental Group I and post test of control Group I.

7. To find out whether there is any significant correlation between chemical equation balancing in ABCD method and Achievement post experimental group I & II.

HYPOTHESES OF THE STUDY

1. There is no significant difference between Pre test of Experimental Group-I and Post-Test of Experimental Group-I with respect to the achievement of Haloalkane and haloarene in learning Chemistry at XI.
2. There is no significant difference between Pre test of Control Group-I and Post- Test of Control Group-I with respect to the achievement of Haloalkane and haloarene in learning Chemistry at XI.
3. There is no significant difference between Post test of Experimental Group-II and Post- Test of Control Group-II with respect to the achievement of Haloalkane and haloarene in learning Chemistry at XI in terms of (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.
4. There is no significant difference between Post test of Experimental Group-I and Retention test-I with respect to (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.
5. There is no significant difference between Post test of Experimental Group-II and Retention test-II with respect to (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.
6. There is no significant difference in the Chemistry Equation Balancing (ABCD) method of Students at XI with respect to the Sub categories. (1) pre test of Experimental Group-I and post test of Experimental Group I, (2) pre test of Control Group I and post test of Control Group I, (3) pre test of Control Group I and post test of Experimental Group I, (4) pre test of Control Group I and post test of Experimental Group I, (5) post test of Control Group I and post Experimental Group I, (6) post test of Experimental Group I and post test of control Group I.
7. There is no significant relationship in the chemical equation balancing (ABCD) method and achievement post-experimental group I & II of students at XI with respect to the sub categories. Post experimental group I, post experimental group II, ABCD experimental group I, ABCD experimental group II.

METHODOLOGY

Experimental study Saloman four group techniques were adopted in this study.

SAMPLE

The sample was selected from whole population of Cuddalore district in Tamil Nadu. The total one hundred and twenty samples were picked out by employing the purposive random sampling technique from four higher secondary schools. Experimental group I & II and Control group I and II (30 students for each groups).

DATA ANALYSIS

H0-1: There is no significant difference between Pre test of Experimental Group-I and Post-Test of Experimental Group-I with respect to the achievement of Haloalkane and haloarene in learning Chemistry at XI.

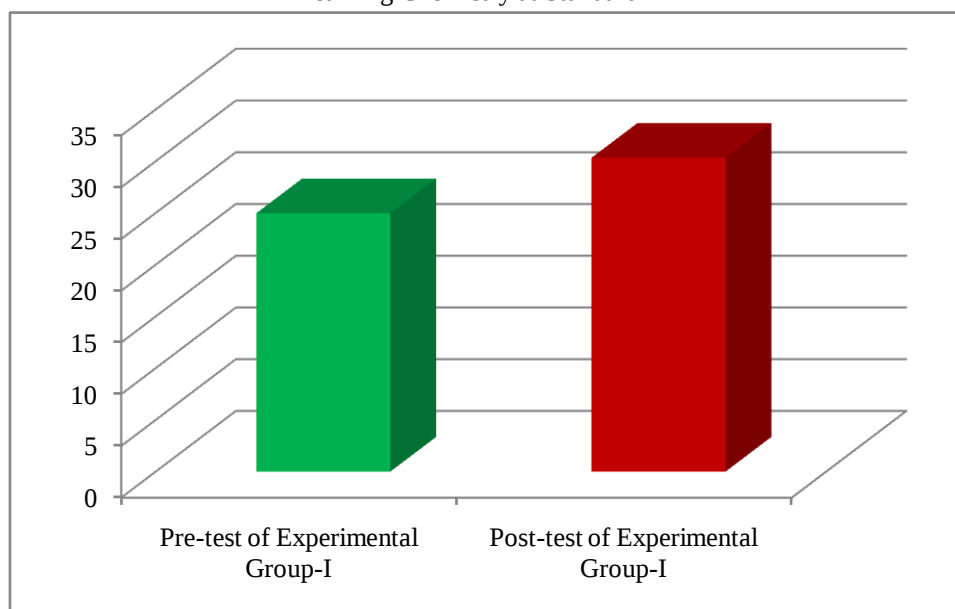
Table - 1

Mean scores between Pre-test of Experimental Group-I and Post-test of Experimental Group-I in learning Chemistry at Standard XI.

Test	N	Mean	Std.Deviation	T value	df	P value	S/NS
Pre-test of Experimental Group-I	30	24.97	3.735	9.913	29	0.00	S
Post-test of Experimental Group-I	30	30.33	2.322				

The above table reveals that the calculated 't' value for Pre-test of Experimental Group-I and Post-test of Experimental Group-I is 9.913 which are greater value than the table value of 1.96 at 5% level. The null hypothesis is rejected at 0.05 levels. Hence, there is a significant difference between Pre-test of Experimental Group-I and Post-test of Experimental Group-I in learning Chemistry at Standard XI.

Graph 1: Mean scores between Pre-test of Experimental Group-I and Post-test of Experimental Group-I in learning Chemistry at Standard XI



H0-2: There is no significant difference between Pre-test of Control Group-I and Post-Test of Control Group-I with respect to the achievement of Haloalkane and Haloarene in learning Chemistry at XI.

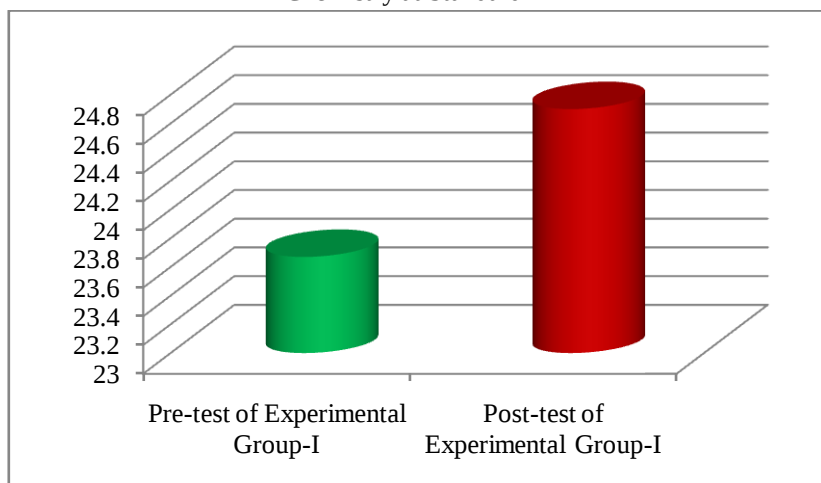
Table - 2

Mean scores between Pre-test of Control Group-I and Post-test of Control Group-I in learning Chemistry at Standard XI.

Test	N	Mean	Std. Deviation	T value	df	P value	S/NS
Pre-test of Control Group-I	30	23.67	3.52	1.91	29	0.065	NS
Post-test of Control Group-I	30	24.70	2.42				

The above table Shows that the calculated 't' value for Pre-test of Control Group-I and Post-test of Control Group-I is 1.91 which are lesser value than the table value of 1.96 at 5% level. The null hypothesis is accepted at 0.05 levels. Hence, there is no significant difference between Pre-test of Control Group-I and Post-test of Control Group-I in learning Chemistry at Standard XI.

Graph 2: Mean scores between Pre-test of Control Group-I and Post-test of Control Group-I in learning Chemistry at Standard XI



H0-3: There is no significant difference between Post test of Experimental Group-II and Post test of Control Group-II in terms of (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.

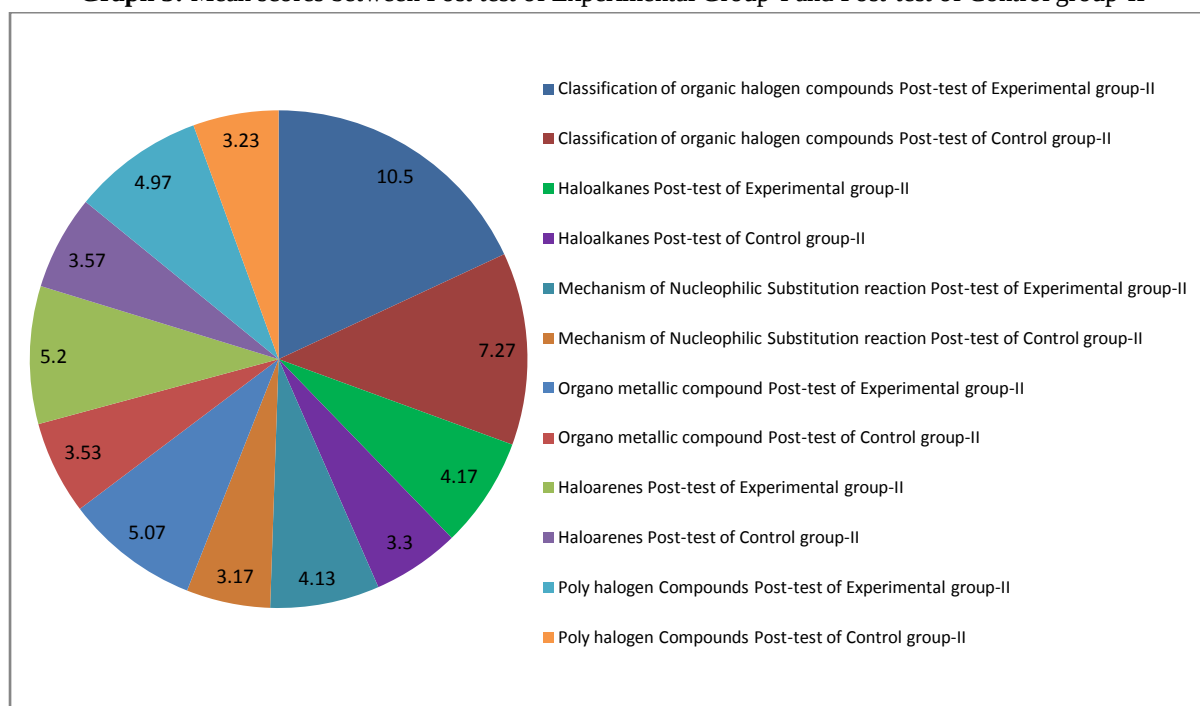
Table - 3
Mean scores between Post test of Experimental Group-I and Post-test of Control group-II.

Dimensions	Tests	N	Mean	SD	95% Confidence Interval of the Difference		t	df	P value	S/NS
					Lower	Upper				
Classification of organic halogen compounds	Post-test of Experimental group-II	30	10.50	1.306	2.556	3.910	9.766	29	.000	S
	Post-test of Control group-II	30	7.27	1.337						
Haloalkanes	Post-test of Experimental group-II	30	4.17	.592	.561	1.173	5.794	29	.000	S
	Post-test of Control group-II	30	3.30	.466						
Mechanism of Nucleophilic Substitution reaction	Post-test of Experimental group-II	30	4.13	.434	.665	1.269	6.547	29	.000	S
	Post-test of Control group-II	30	3.17	.699						
Organo metallic compound	Post-test of Experimental group-II	30	5.07	.450	1.279	1.788	12.324	29	.000	S
	Post-test of Control group-II	30	3.53	.681						
Haloarenes	Post-test of Experimental	30	5.20	.610	1.384	1.883	13.379	29	.000	S

	group-II									
	Post-test ofControl group-II	30	3.57	.504						
Poly halogen Compounds	Post-test ofExperimental group-II	30	4.97	.414	1.424	2.042	11.470	29	.000	S
	Post-test ofControl group-II	30	3.23	.774						

From the table 3it is clear. That the 't' value of the Post test of Experimental Group-II and Post test of Control Group-II of Experimental Group-I in terms of (a) Classification of organic halogen compounds(b) Haloalkanes(c) Mechanism ofNucleophilicSubstitution reaction(d) Organo metallic compound(e) Haloarenesand (f) Poly halogen Compounds is found to be 9.76, 5.79, 6.54, 12.32, 13.37 and 11.47 respectively at 0.05 level of significance. It is concluded that 3.a, 3.b, 3.c, 3.d, 3.e, 3.f differ significantly in their Post test of Experimental Group-II and Post test of Control Group-II.

Graph 3: Mean scores between Post test of Experimental Group-I and Post-test of Control group-II



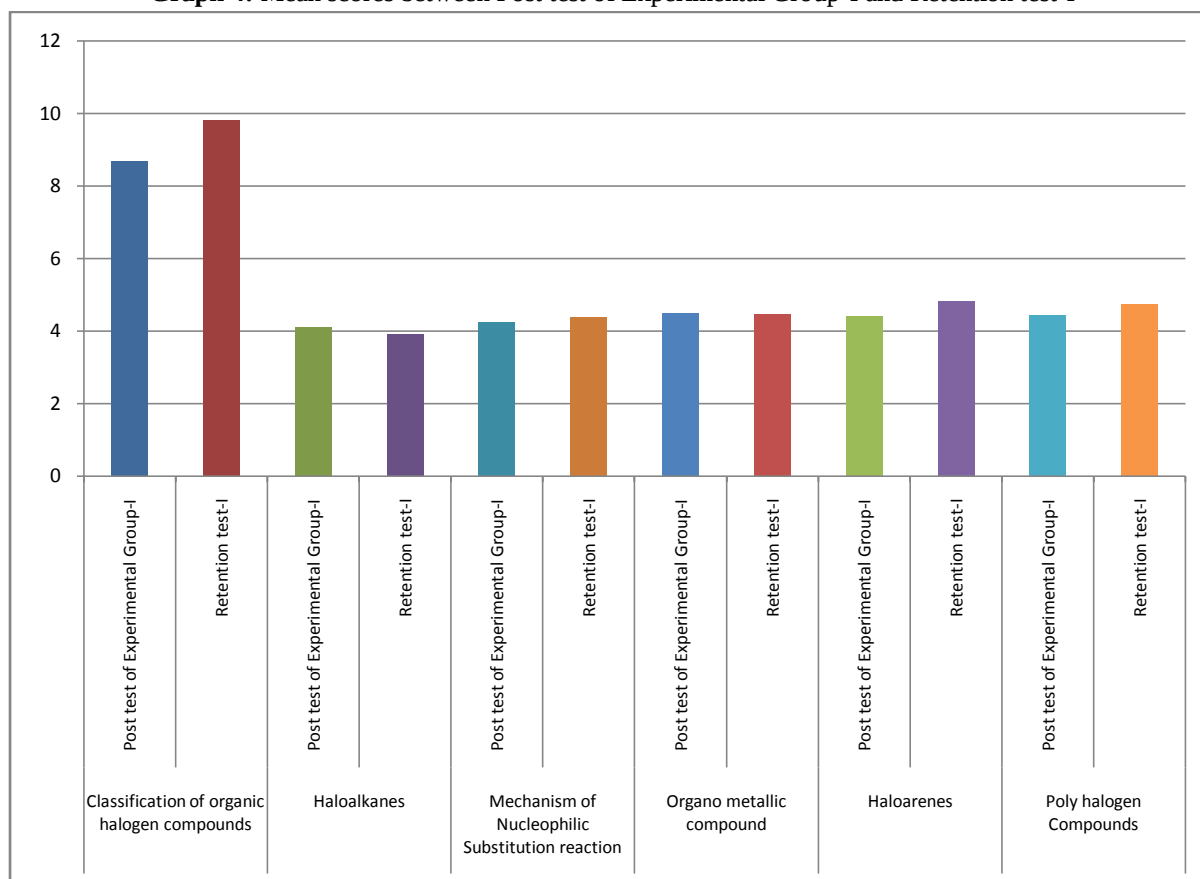
H0-4: There is no significant difference between Post test of Experimental Group-I and Retention test-I with respect to (a) Classification of organic halogen compounds(b) Haloalkanes(c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.

Table -4
Mean scores between Post test of Experimental Group-I and Retention test-I.

Dimensions	Tests	N	Mean	SD	95% Confidence Interval of the Difference		t	df	P value	S/NS
					Lower	Upper				
Classification of organic halogen compounds	Post test of Experimental Group-I	30	8.67	.994	1.736	.531	3.848	29	.001	S
	Retention test-I	30	9.80	1.324						
Haloalkanes	Post test of Experimental Group-I	30	4.10	.305	.028	.528	1.795	29	.083	NS
	Retention test-I	30	3.90	.481						
Mechanism of Nucleophilic Substitution reaction	Post test of Experimental Group-I	30	4.23	.430	.388	.121	1.072	29	.293	NS
	Retention test-I	30	4.37	.615						
Organo metallic compound	Post test of Experimental Group-I	30	4.50	.509	.196	.263	.297	29	.769	NS
	Retention test-I	30	4.47	.629						
Haloarenes	Post test of Experimental Group-I	30	4.40	.498	.646	.221	4.176	29	.000	S
	Retention test-I	30	4.83	.461						
Poly halogen Compounds	Post test of Experimental Group-I	30	4.43	.504	.597	.003	2.068	29	.048	S
	Retention test-I	30	4.73	.640						

From the table 4 it is clear. That the 't' value of the Post test of Experimental Group-I and Retention test-I in terms of (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes and (f) Poly halogen Compounds is found to be 3.84, 1.79, 1.07, 0.29, 4.17 and 2.06 respectively at 0.05 level of significance. It is concluded that 4.a, 4.e, 4.f differ significantly in their Post test of Experimental Group-I and Retention test-I and 4.b, 4.c, 4.d do not differ significantly in their Post test of Experimental Group-I and Retention test-I.

Graph 4: Mean scores between Post test of Experimental Group-I and Retention test-I



H0-5: There is no significant difference between Post test of Experimental Group-II and Retention test-II with respect to (a) Classification of organic halogen compounds(b) Haloalkanes(c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes (f) Poly halogen Compounds.

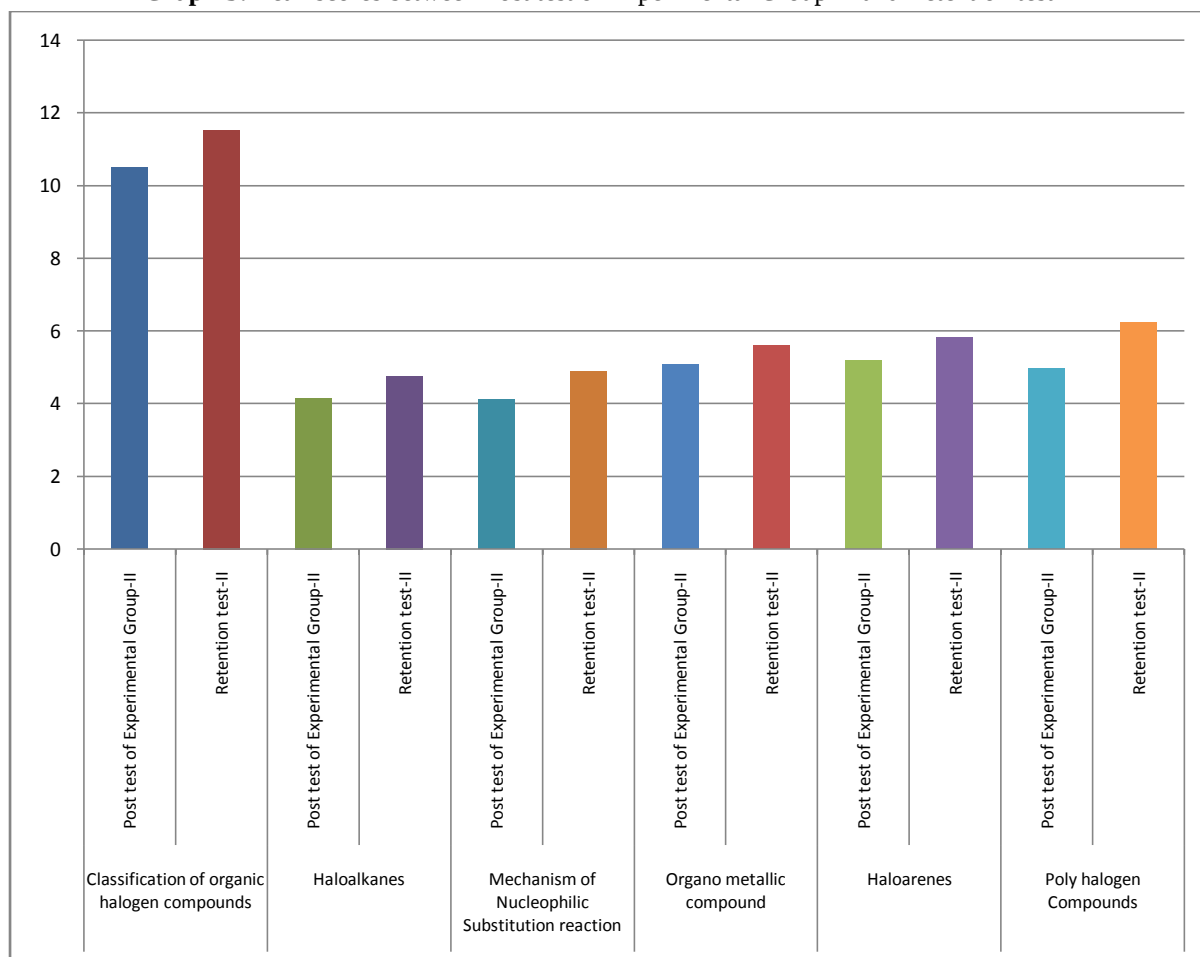
Table - 6
Mean scores between Post test of Experimental Group-II and Retention test-II.

Dimensions	Tests	N	Mean	SD	95% Confidence Interval of the Difference		t	df	P value	S/NS
					Lower	Upper				
Classification of organic halogen compounds	Post test of Experimental Group-II	30	10.50	1.306	1.657	.409	3.387	29	.002	S
	Retention test-II	30	11.53	1.106						
Haloalkanes	Post test of Experimental Group-II	30	4.17	.592	.870	.330	4.539	29	.000	S
	Retention test-II	30	4.77	.430						
Mechanism of Nucleophilic Substitution reaction	Post test of Experimental Group-II	30	4.13	.434	1.056	.478	5.426	29	.000	S
	Retention test-II	30	4.90	.803						

Organo metallic compound	Post test of Experimental Group-II	30	5.07	.450	.806	.261	4.000	29	.000	S
	Retention test-II	30	5.60	.621						
Haloarenes	Post test of Experimental Group-II	30	5.20	.610	.883	.384	5.188	29	.000	S
	Retention test-II	30	5.83	.461						
Poly halogen Compounds	Post test of Experimental Group-II	30	4.97	.441	1.576	.958	8.382	29	.000	S
	Retention test-II	30	6.23	.774						

From the table 5 it is clear. That the 't' value of the Post test of Experimental Group-II and Retention test-II in terms of (a) Classification of organic halogen compounds (b) Haloalkanes (c) Mechanism of Nucleophilic Substitution reaction (d) Organo metallic compound (e) Haloarenes and (f) Poly halogen Compounds is found to be 3.38, 4.53, 5.42, 4.00, 5.18 and 8.38 respectively at 0.05 level of significance. It is concluded that 5.a, 5.b, 5.c, 5.d, 5.e, 5.f differ significantly in their Pre test and Post test of Experimental Group-II.

Graph 5: Mean scores between Post test of Experimental Group-II and Retention test-II



H0-6: There is no significant difference in the Chemistry Equation Balancing (ABCD) method of Students at XI with respect to the Sub categories. (1) pre test of Experimental Group-I and post test of Experimental Group I, (2) pre test of Control Group I and post test of Control Group I, (3) pre test of Control Group I and post test of Experimental Group I, (4) pre test of Control Group I and post test of Experimental Group I, (5) post test of Control Group I and post Experimental Group I, (6) post test of Experimental Group I and post test of control Group I.

Table -6
Mean scores between Experimental Group and Control Group.

Pair	Tests	N	Mean	SD	95% Confidence Interval of the Difference		t	df	P value	S/NS
					Lower	Upper				
Pair-1	Pre test of Control Group -I	30	11.37	3.341	6.351	5.716	8.864	29	.000	S
	Post test of Control Group -I	30	17.40	2.500						
Pair-2	Pre test of Experimental Group- I	30	12.30	3.466	7.098	6.902	15.997	29	.000	S
	Post test of Experimental Group- I	30	19.30	2.466						
Pair-3	Pre test of Control Group -I	30	11.37	2.341	1.151	.716	1.764	29	.000	NS
	Pre test of Experimental Group- I	30	12.30	2.466						
Pair-4	Pre test of Control Group -I	30	11.37	3.341	8.172	7.694	7.928	29	.000	S
	Post test of Experimental Group- I	30	19.30	2.466						
Pair-5	Post test of Control Group -I	30	17.40	2.500	4.873	5.327	10.987	29	.000	S
	Post test of Experimental Group -I	30	12.30	3.466						
Pair-6	Post test of Control Group -I	30	17.40	3.500	2.147	1.653	9.726	29	.000	S
	Post test of Experimental Group-I	30	19.30	2.466						

From the table 6 it is clear. That the 't' value of the Post test of Experimental Group and Control group chemistry equation balancing in the (ABCD) methods in terms of, (1) Control Group I and Experimental Group I, (2) Control Group II and Experimental Group II, (3) Control Group I and Control Group II, (4) Control Group I and Experimental Group II, (5) Experimental Group I and Control Group II, (6) Experimental Group I and Experimental Group II is found to be 8.86, 15.99, 1.76, 7.92, 10.98 and 9.72 respectively at 0.05 level of significance. It is concluded that 6.a, 6.b, 6.d, 6.e, 6.f differ significantly in their Experimental Group and Control Group in ABCD method, and 7.c, do not differ significantly in their Experimental Group and Control Group in ABCD method.

HO-7

There is no significant Relationship in the chemistry equation balancing (ABCD) method and achievement post-Experimental group I and II of students at XI with respect to the sub categories. Post

Experimental Group I, Post Experimental Group II, ABCD Experimental Group I, ABCD Experimental Group II.

Pair	Tests	N	Groups	r.value	S/NS
1	Achievement post-Experimental Group-I	30	ABCD Experimental Group-I	.324**	S
			ABCD Experimental Group-II	.349**	S
2	Achievement post-Experimental Group-II	30	ABCD Experimental Group-I	.254*	S
			ABCD Experimental Group-II	.135*	NS

*Correlation is Significant at the 0.01 level

** Correlation is Significant at the 0.05 level

From the table 7 it is clear, that the Pearson product moment 'r' value is positive correlation between the pairs. Achievement post Experimental Group-I&II, and ABCD Experimental Group-I&II, is found to be .324, .349, .254, and .135, at (0.05/0.01) level of significance. It is concluded that 7.a(i), 7.a(ii), 7.b(i), differ significantly and 7.b(ii) do not differ significantly in their Achievement post Experimental Group-I&II, and ABCD Experimental Group-I and II.

VARIABLE OF THE STUDY

The variables involved in the study is tabulated as follows

Independent Variables

1. Traditional method
2. Eclectic method (ELM)

Dependent Variables

1. Achievement test in Chemistry
2. Retention test
3. Cause Study
4. Chemical equation balancing ABCD method.

TOOLS

1. Tool for identify hard spots in learning chemistry in XI standard.
2. Eclectic Method
3. Achievement Test in Haloalkanes and Haloarenes
4. Retention Test in Haloalkanes and Haloarenes
5. Chemical equation balancing (ABCD) method

Findings of the study

HO-1

The statistical data show that adopting the Eclectic method to learn Chemistry is more effective. The mean score of Pre-Test of Experimental Group-I is 24.97 and that of the Post-Test of Experimental Group-I is 30.33. The mean score difference between the Pre-Test and Post-Test of Experimental Group-I is 5.63. It is clear that students perform significantly better in Chemistry while using the Eclectic method compared to the Traditional Method. The eclectic method is high while used for learning Chemistry and hence, it is a successful method.

HO-2

The mean achievement score on learning chemistry of higher secondary First year school students in the Pre -test of Control Group-I and Post- Test of Control Group-I at the level do not differs significantly ('t' value = 1.91).

HO-3

The Post-test of Experimental Group-II and Post-test of Control Group-II mean achievement scores on learning Classification of organic halogen compounds ('t' value = 9.766), Haloalkanes ('t' value = 5.794), Mechanism of Nucleophilic Substitution reaction ('t' value = 6.547), Organo metallic compound ('t' value = 12.324), Haloarenes ('t' value = 13.379) and Poly halogen Compounds ('t' value = 11.470) of the experimental and control group students do differ significantly.

HO-4

The posttest of Experimental Group-I and Retention test-I mean scores on learning Classification of organic halogen compounds ('t' value = 3.848), Haloarenes ('t' value = 4.176) and Poly halogen Compounds ('t' value = 2.068) Haloalkanes ('t' value = 5.794), Mechanism of Nucleophilic Substitution reaction ('t' value = 6.547), Organo metallic compound ('t' value = 12.324), Haloarenes ('t' value = 13.379) and Poly halogen Compounds ('t' value = 11.470) of the experimental and Retention test group-II students do differ significantly. And Haloalkanes ('t' value = 1.795), Mechanism of Nucleophilic Substitution reaction ('t' value = 1.072), Organo metallic compound ('t' value = 0.297), do not differ significantly.

HO-5

The Posttest of Experimental Group-II and Retention test-II mean scores on learning Classification of organic halogen compounds ('t' value = 3.387), Haloalkanes ('t' value = 4.539), Mechanism of Nucleophilic Substitution reaction ('t' value = 5.426), Organo metallic compound ('t' value = 4.00), Haloarenes ('t' value = 5.188) and Poly halogen Compounds ('t' value = 8.382) of the experimental and Retention test group-II students do differ significantly.

HO-6

The Chemistry Equation Balancing ABCD method, Mean score on pre test of Control Group I and post test of Control Group I, ('t' value = 8.864), pre test of experimental Group I and post test of Experimental Group I ('t' value = 15.997), pre test of control Group I and post test of experimental Group I ('t' value = 1.764), pre test of Control Group I and post test of Experimental Group I ('t' value = 7.928), post test of control Group I and post test of Experimental Group I ('t' value = 10.98), post test of Experimental Group I and post test of control Group I ('t' value = 9.72), of the ABCD method and pair 1,2, 4,5,6 do differ significantly and pair 3 do not differ significantly.

HO-7

Findings of Correlation Analysis:

Relationship between the chemical equation balancing method (ABCD) and achievement post-Experimental group I and II with respect to sub groups.

There is significant positive relationship chemistry equation balancing (ABCD) method and achievement post-Experimental group I and II, with respect to sub groups.

1. It is concluded that there is no significant correlation between achievement post-Experimental Group-I and ABCD Experimental Group-I. (r value = .324**)
2. It is concluded that there is no significant correlation between achievement post-Experimental Group-II and ABCD Experimental Group-II. (r value = .349**)
3. It is concluded that there is no significant correlation between achievement post-Experimental Group-II and ABCD Experimental Group-I. (r value = .254*)
4. It is concluded that there is no significant correlation between achievement post-Experimental Group-II and ABCD Experimental Group-II. (r value = .135*)

CONCLUSION

The study has briefly discussed and analysed the effectiveness of Eclectic method among Higher Secondary First year students. Teachers and learners help to develop thinking skills and marks. Learning and Teaching more interested chemistry for Haloalkane and Haloarenes, Nowadays Teacher is changing as a facilitator which need to was interactive, teaching and technology very important role of education innovator with the introduction and use of different type of teaching method of strategy.

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