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RESEARCH ARTICLE

AN ANALYSIS OF HIGHER SECONDARY STUDENTS CHALLENGES WITH CHEMISTRY LEARNING

Suresh B.[1] and Dr. G. Vanmathi[2]

1. Research Scholar (Reg.No 21112102031003), Department of Chemistry, Kamaraj College, Thoothukudi - 628003, Tamil Nadu, India.
2. Associate Professor, Department of Chemistry, Kamaraj College, Thoothukudi - 628003, Tamil Nadu, India.

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Abstract

Every facet of contemporary society is impacted by the benefits and influence of science. In today's society, chemistry is essential to satisfying people's needs and desires, and it has become a major human endeavor. The basis for all other sciences is chemistry. Learning new information and abilities as well as comprehending the relationships that relate the problem's solution to it are the main objectives of chemistry education. The complexity of chemistry instruction at the upper secondary level has increased. This study's primary goal was to identify the difficulties chemistry students have in their studies and offer suggestions for improving their performance in upper secondary school. In the Thoothukudi district of Tamilnadu, India, 200 higher secondary students who were all taking chemistry as one of their subjects participated in the research. The findings showed that higher secondary pupils have more complex comprehension issues with chemistry ideas. Based on the students' class level (Standard XI and XII) and location, there was no discernible variation in the challenges they faced when learning physics; nevertheless, there were discernible disparities based on the gender.

Introduction:-

The cultural life of modern society, a product of science, has been significantly influenced by chemistry. The impact of chemistry practically guides the thoughts, emotions, and behaviors of contemporary individuals. Studying chemistry leads to changes in behavior and enhances the learner's character and personality. Chemistry fosters creative thinking and constructive imagination. Additionally, it is a subject that allows ideas to be tested and confirmed through experiments. Learners develop a habit of seeking the truth, which in turn influences their behavior patterns. These skills can be applied by students to solve personal and social problems. Chemistry is fundamental to all sciences. The progress of chemistry determines the possibilities of development in wide range of sciences.

Aim of Chemistry Teaching:-

The aim of chemistry teaching is acquisition of information and skills and to attain understanding of the relationship which relates the answer to the problem. The task of teaching learning of chemistry at the higher secondary level has

Corresponding Author:- Suresh B.
Address:- Research Scholar (Reg.No 21112102031003), Department of Chemistry, Kamaraj College, Thoothukudi - 628003, Tamil Nadu, India.

become more complex. The excitement and diverse possibilities of chemistry must be infused into the minds of the pupils in an appropriate, interesting and dynamically evolving way. The conventional way of teaching – learning chemistry is considered as a passive of gaining and storing a specific quantum of knowledge in the form in which it is presented.

The chemistry teaching should emphasize processes rather than facts, such as performing experiments, taking observation, collecting data, objectives analysis and classification of data, objectives analysis and drawing inferences. These process skills help in changing attitudes and values that make up the scientific temper among the learners. The teachers' duty will not be mere the transmit of information but more of a facilitating of learning. Chemistry learning provides a lot of problems solving situations and it has a great intellectual value. It helps to develop the habit of critical observation among students. Chemistry helps in reporting things and events without bias. This helps in promoting intellectual honesty among students. Study of chemistry develops the positive attitude like open mindedness, reasoning, weighing evidences and unbiased thinking

Students Problems in Learning Chemistry at Higher Secondary Level:-

When students move into higher secondary levels, they are essentially trained from the ground up in experiments. The method used to address experimental problems that deviate greatly from theoretical ones is another type that is not given enough attention, not even in upper secondary education. Since students are trained to perform the experiments knowing only the "hows" and not bothering with the "ways" of the experiments, the main emphasis remains on carrying out the experiments as prescribed by the curriculum and obtaining the "right result" in the process.

The study of chemistry is concerned with how objects interact with one another when they follow specific laws, which are almost always quantitative. When studying physical systems, it becomes imperative to follow quantitative logical connections. Mathematics is the study of the laws regulating all such connections. Therefore, a great deal of mathematics' procedures and rules apply directly to the comprehension of chemistry. In all but the most straightforward circumstances, mathematics offers by far the most convenient means of tracing the logical relationships that emerge during the analysis of physical systems, hence chemistry requires the application of mathematical tools. Pupils struggle to distinguish between the various chemistry concepts.

Need of the Study:-

As they studied chemistry concepts, students merely committed the formulas to memory and replicated them on the answer sheet. They are able to explain the meaning of the symbols used in formulas, but the students are unable to do so because they struggle to understand the abstract ideas of chemistry. The researcher is therefore eager to learn more about the challenges that upper secondary students face when learning chemistry.

Objectives of the Study:-

The following objectives are framed by the investigator,

1. To find out the intensity of the problems encountered by the students in learning chemistry concepts.
2. To find out the significant difference if any between the various groups of biographical variables in experiencing the problems of Higher Secondary students in learning chemistry concepts.
3. To give some remedial measures to solve the problems of Higher Secondary students in learning chemistry concepts.

Hypotheses of the Study:-

The following hypothesis were framed by the investigator for the present study,

1. The intensity of the problem encountered by the students in learning chemistry concepts at higher secondary level is found to be at high level.
2. There is no significant difference between the mean scores of boys and girls higher secondary students in respect of their problems in learning chemistry.
3. There is no significant difference between the mean scores of rural and urban higher secondary students in respect of their problems in learning chemistry.
4. There is no significant difference between the mean scores of higher secondary students studying in the standard XI and XII standard in respect of their problems in learning chemistry.

Methodology:-

The present investigation was undertaken by using normative survey method. The methodological details like sample, tools used, procedure of data collection, scoring procedure and statistical techniques are given below.

Sample:-

The sample of the present study consisted of 200 higher secondary students who are studying chemistry as the one of the subject in standard XI and XII at higher secondary schools situated in Thoothukudi district of Tamilnadu, India have been chosen through simple random sampling technique.

Tools Used:

In the current study, a questionnaire was utilized by the researcher to identify the difficulties pupils were having understanding chemistry ideas at the upper secondary level. The researcher created the Questionnaire for Problem in Learning Chemistry. There are forty items in the final version of the problem in learning chemistry questionnaire. This instrument has a minimum score of 40 and a maximum score of 120. Every item on this scale has three possible answers: "greater extent," "lesser extent," and "not at all." These answers result in scores of 3, 2, and 1, respectively. Using the split-half approach and the Spearman-Brown prophecy formula, the tool's reliability is determined to be 0.65. The researcher employed content validity in this procedure based on the judgment of the expert.

Statistical Techniques Used:-

In the present study, the statistical techniques such as descriptive (Mean and Standard Deviation) and differential analysis (“t” test) were used.

Analysis and Interpretation:

Percentage Scores of Higher Secondary Students’ challenges with Chemistry Learning

The percentage scores of Higher Secondary Students’ challenges with Chemistry Learning is decribed in the following table as-

Table 1:-

Category	Maximum Score	Obtained Score	Percentage
Overall	**15425**	**20000**	**77.13**

According to Table 1, 77.13% of pupils had difficulty understanding chemistry concepts at the upper secondary level. Therefore, it can be concluded that the majority of student’s experience difficulties as a result of the subject matter being below their comprehension level.

Comparision of an analysis of Higher Secondary Students’ challenges with Chemistry Learning in the context of gender

The comparision of an analysis of Higher Secondary Students’ challenges with Chemistry Learning in the context of gender is described in the following table as-

Table 2:-

Gender	N	Mean	SD	Calculated ‘t’ value	Level of Significance
Male	**100**	**95.569**	**13.5696**	**4.5656**	**Significant at 5% level**
Female	**100**	**104.99**	**14.5298**		

Table 2 shows that, at the 0.05 level of significance, the higher secondary students' acquired "t" values in relation to their location are greater than the crucial value of 1.96. When studying chemistry ideas at the upper secondary level, boys and girls score differently on average when it comes to experiencing difficulties. Consequently, it can be concluded that girls encounter more chemistry-related problems than boys do.

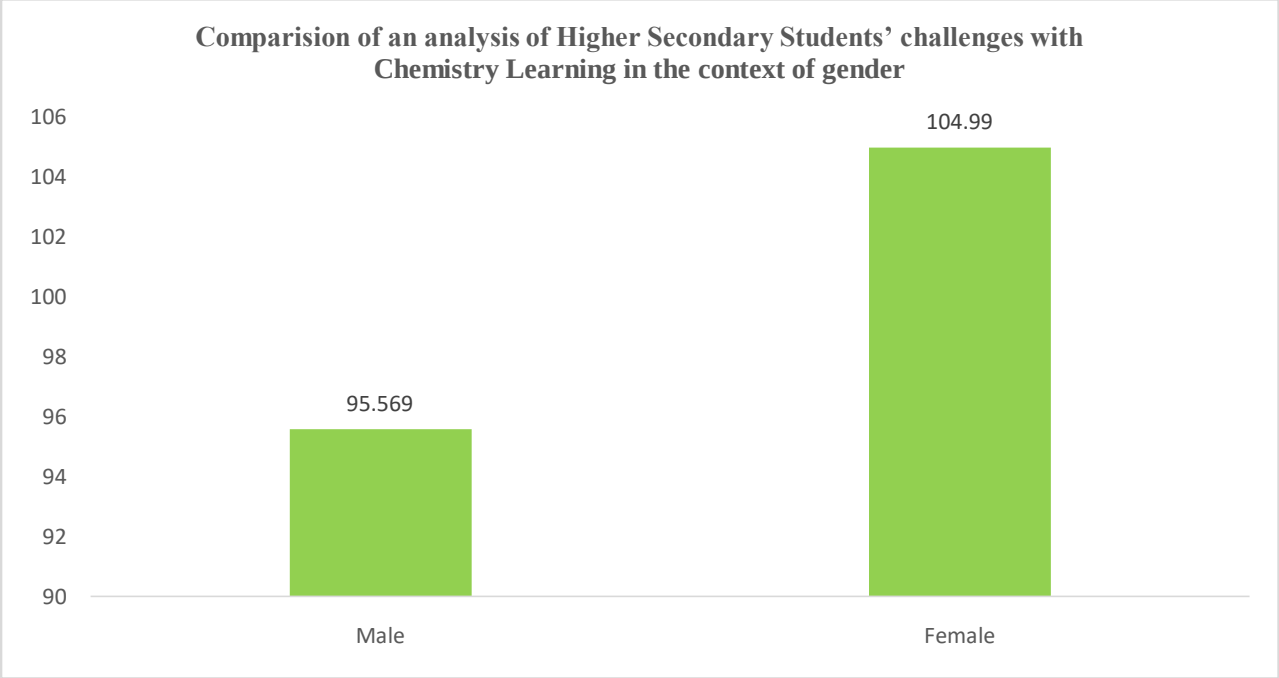
Comparision of an analysis of Higher Secondary Students’ challenges with Chemistry Learning in the context of Locale

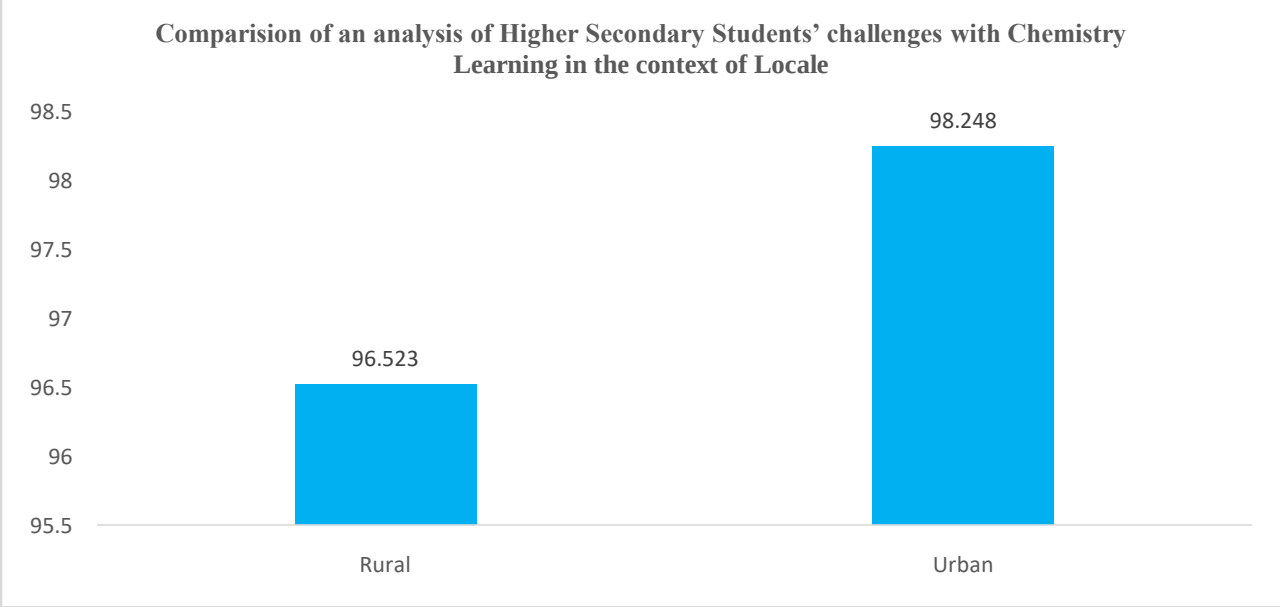
The comparision of an analysis of Higher Secondary Students’ challenges with Chemistry Learning in the context of locale is described in the following table as-

Table 3:-

Locale	N	Mean	SD	Calculated 't' value	Level of Significance
Rural	89	96.523	14.625	0.0598	Not Significant
Urban	111	98.248	17.659		

Table 3 shows that, at the 0.05 level of significance, the higher secondary students' acquired "t" values in relation to their location are smaller than the crucial value of 1.96. Therefore, there is no discernible difference in the mean scores of students from rural and urban areas when it comes to encountering difficulties when learning chemistry ideas. Therefore, it can be concluded that students studying in both urban and rural settings have similar difficulties understanding chemistry ideas.





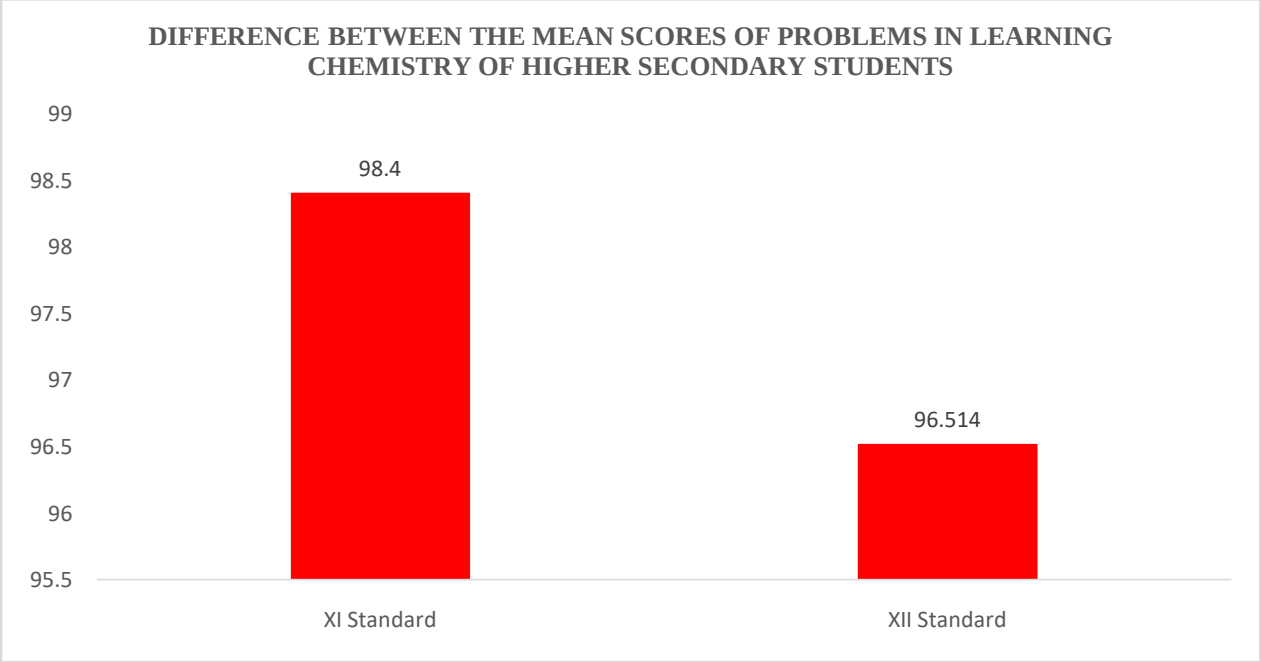
Comparision of an analysis of Higher Secondary Students' challenges with Chemistry Learning in the context of Class

The comparision of an analysis of Higher Secondary Students' challenges with Chemistry Learning in the context of class is described in the following table as-

Table 4:-

Class	N	Mean	SD	Calculated 't' value	Level of Significance
XI Standard	65	98.40	14.214	0.8259	Not Significant
XII Standard	135	96.514	14.78		

Table-4 reveals that the obtained 't' value of the higher secondary students is less than the critical value of 1.96 at the 0.05 level of significance. There is no significant difference between the mean scores of standard XII and standard XII students in the experience of problems when learning chemistry concepts. Hence, it can be inferred that the students of standard XII and standard XII are experiencing problems in learning chemistry concepts.



Findings of the Study:-

1. Learning chemistry concepts in a classroom environment is problematic for 77.13% of higher secondary students.
2. Higher secondary students experience significant differences in the way they experience problems when learning chemistry concepts, depending on their gender. The problems faced by girls in learning chemistry concepts are greater than those faced by boys.
3. Problems arise when learning chemistry concepts in terms of their location and class. Rural and urban students face problems in learning chemistry concepts are found to be equal and also the students of standard XI and standard XII are in experiencing problems in learning chemistry concepts are found to be equal.

Educational Implications and Suggestions:-

1. The goal of a chemistry teacher is to cultivate in their students a favorable attitude toward learning chemistry, as well as interests and study habits.
2. When teaching chemistry, teachers should build strong relationships with their students and create a democratic learning atmosphere. Thus, it will enhance students' psychological capacity to learn.
3. Provides sufficient opportunity to foster problem-solving skills and mathematics-based applications for more complex and abstract concepts in chemistry.

4. P.G. Chemistry teachers must instill in their students a basic understanding of chemistry by creating basic models, flow charts, and three-dimensional images of the numerous tools utilized in the field.
5. Using straightforward instruments for assessing the data utilized in issues, teachers can spark students' creative curiosity. When teaching chemistry, the instructor makes connections and associations with actual natural processes.
6. To keep current with the latest teaching techniques and make chemistry easier to learn, teachers must complete in-service training.

Conclusion:-

The results of this inquiry showed that higher secondary pupils had a very poor achievement level due to their high levels of difficulty acquiring chemistry concepts. All of these issues are taken into consideration from the perspectives of the teacher and the student. Students studying chemistry should have fewer difficulties in the most appropriate and practical ways. Furthermore, teachers should be very concerned about each individual student during class activities. They also need to be aware of the true issues that students are facing because this will help to lessen those issues and boost student efficiency.

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