ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

OPEN ACCESS

VOLUME–XI, ISSUE–IV

JULY – AUGUST 2024

Original Research Article

BUILDING BRIDGES IN EDUCATION: EFFECT OF DIFFERENTIATED INSTRUCTION ON ACADEMIC ACHIEVEMENT

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Abstract:

Academic Achievement is an effective means of assessing the extent to which students have mastered the concepts taught in a classroom. These tests are usually administered at the end of a teaching learning process to gauge the extent of learning that has taken place after a concept has been taught to the students. It is a means by which the success of a teaching program and the efficiency of the teacher and the process used can be measured. To ensure better academic performance, teachers need to use strategies that cater to differential student needs. Differentiated instruction is one such approach. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction. A research was conducted to study the Effect of Differentiated Instructional Strategies on the Academic Achievement of Higher Secondary School students. The paper throws light on the findings of the study and also highlights how differentiated instruction can help improve the academic achievement of diverse students in a classroom.

Introduction:

'Academically good students have better employment benefits, higher income, higher self-esteem and self-confidence, low levels of anxiety and depression, and are less likely to engage in substance abuse.'

Be it any course or module, till date academic achievement stands as the sole parameter of gauging the extent of student's understanding of concepts. It is also the most widely used means of testing the application level of knowledge gained. It is a time tested and proven method of rating the learner and commenting on his/her level of mastery. Use of differentiated instructional strategies will enhance the learning ability of the learners due to the varied approach in delivering the content. This will reflect in the form of improved academic achievement on the part of the learners. Academic achievement can be tested in both formative and summative ways, using teacher made reference tests as well as through standardized tests. These tests have a standardized pattern of assessment which eliminates any scope of bias on the part of the examiner. Pre-test and post-test can be conducted to understand the true improvement in performance and to take care of any intervening factors.

Use of differentiated instructional strategies in the classroom helps cater to the individual needs of the learners. Each individual is unique and differs in the learning styles, interests, previous level of knowledge and level of understanding and retention. A single teacher needs to customize her lesson plans to satisfy the varying needs within a classroom. This is possible through Differentiated Learning Strategies, so that the wants of every student are fulfilled.

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The traditional method of instruction follows the typical "One size fits all" approach, which does not cater to the individual needs and differences within a classroom. Differentiated Instructional Strategies, if properly chalked out can help customize the entire teaching learning process. It is a tailor-made approach to make the teaching learning process more effective and meaningful. Given the enormous size of the classrooms as well as the constraint of time, educators are intrigued by the challenges of giving personal time to students to satisfy their varied needs. With Differentiated Instruction every learner's needs and wants can be well taken care of be it, his/her pace of learning, learning style, interest or level of readiness. Differentiated Instruction helps cater to the audio-visual learners, the Aural learners, the Kinaesthetic learners as well as the Read/Write learners. Differentiation can be done through content, process, product or learning environment. Interactive sessions can be tailormade and provided to the learners in groups or individually to ensure better understanding and retention of concepts, and Academic Achievement is a tool that helps quantify the comprehension and application of the skills taught.

Research Methodology:

The present study was aimed at finding the effectiveness of Differentiated Instructional Strategies on the Academic Achievement of Higher Secondary Students. The researcher has designed an online module i.e. the independent variable namely "Differentiated Instructional Strategy Module" in Chemistry of Standard XI of SSC Board to study its effect over the dependent variable Academic Achievement. In the present study, the researcher has used Quasi Experimental design as the study had to be done with intact classes and randomization was not feasible.

The Pre-test Post-test Non-equivalent Groups Design was used. The study was conducted on a sample of 103 Science students of std XI from SSC Board of JVM's New English School and Junior College. Simple Random Sampling was done to select two divisions of std XI from SSC Board of JVM's New English School and Junior college. Incidental Sampling was then used to assign one class as the experimental group and the other class as the Control group. The Control group consisted of 47 students and the Experimental group consisted of 56 students. The tool used for the study was an achievement test made by the researcher which was given to the experts for validation along with the weightage tables, blue-print & question-wise analysis. After the modifications as suggested by the experts, the questionnaire was finalized The researcher administered the pre-test in both the experimental and control group. Next the Differentiated Instructional Strategy (DIS) online module was used as Intervention for the experimental group whereas the control group was not given the treatment. The topics of chemistry were taught to the experimental group using the researcher made DIS module. Each session was of 50 minutes duration and conducted online using the Zoom platform. The control group was also taught the same topics using the whiteboard on the zoom platform in the traditional approach. A total of 22 sessions were taken to cover the two topics namely- Chemical Bonding and The Modern Periodic Table.

Findings & Discussion:

Objective 1: To compare the pre-test scores of Academic Achievement of the Experimental group and the Control group of Std XI Science students.

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Hypotheses 1: There is no significant difference between the pre-test scores of Academic Achievement of the Experimental and the Control group of Std XI science students.

Pre-test	N	Mean	SD	t value	Level of Significance 0.05	$H_o$accepted/rejected
Exp Gr	56	4.91	2.79	0.074	Not Significant	Accepted
Con Gr	47	4.87	2.45			

Interpretation:

The mean values of the Pre-test of Experimental group is 4.91 and that of the Control group is 4.87 while the standard deviation of the Experimental group is 2.79 and that of the Control group is 2.45

The t value of 0.074 is less than the t critical value of 1.98 for 0.05 significance level and hence it is not significant. Therefore, the hypothesis is accepted.

Objective 2:

To compare the post-test scores of Academic Achievement of the Experimental group and the Control group of Std XI science students.

Hypotheses 2:

There is no significant difference between the post-test scores of Academic Achievement of the Experimental and the Control group of Std XI science students.

Post-test	N	Mean	SD	t value	Level of Significance 0.05	$H_o$accepted/rejected
Exp Gr	56	19.29	5.91	6.64	Significant	Rejected
Con Gr	47	13.10	3.42			

Interpretation:

The mean values of the Post-test scores of Experimental group is 19.29 and that of the Control group is 13.10 while the standard deviation of the Experimental group is 5.91 and that of the Control group is 3.42

The t value of 6.64 is greater than the t critical value of 1.99 for 0.05 significance level and hence it is significant. Therefore, the hypothesis is rejected.

Objective 3:

To compare the pre-test and post-test scores of the Academic Achievement of the Experimental group of std XI science students with reference to gender.

Hypotheses 3:

There is no significant difference between the pre-test and post-test scores of the Academic Achievement of the Experimental group of Std XI science students with reference to gender.

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Experimental Group	N	Mean	SD	t value	Level of Significance 0.05	H_0 Accepted/Rejected
Female Pre-test	15	5.5	2.92	6.67	Significant	Rejected
Female Post-test	15	18.2	6.78			
Male Pre-test	41	4.70	2.75	15.43	Significant	Rejected
Male Post-test	41	19.70	5.59			

Interpretation:

In case of Females, the t value for the Pre-test and Post-test scores of Academic Achievement of the Experimental Group is 6.67 which is greater than the t critical value 2.09 at 0.05 level of significance. Hence it is significant at 5% level of significance

In case of Males also, the t value for the Pre-test and Post-test scores of Academic Achievement of the Experimental Group is 15.43which is greater than the t critical value 3.00 at the 0.05 level of significance. Hence it is significant at 5% level of significance

Thus there is a significant difference in the Pre-test and Post-test scores of the experimental group with reference to gender.

Objective 4:

To compare the pre-test and post-test scores of the Academic Achievement (AA) of the Control group of std XI science students with reference to gender.

Hypotheses 4:

There is no significant difference between the pre-test and post-test scores of the Academic Achievement (AA) of the Control group of Std XI science students with reference to gender

Control Group	N	Mean	SD	t value	Level of Significance 0.05	H_0 Accepted/Rejected
Female Pre-test	23	4.85	2.54	10.96	Significant	Rejected
Female Post-test	23	14.35	3.29			
Male Pre-test	24	4.96	2.39	8.86	Not Significant	Rejected
Male Post-test	24	12.1	3.24			

Interpretation:

In case of Females, the t value for the Pre-test and Post-test scores of Academic Achievement of the Control Group is 10.96 which is GREATER than the t critical value 2.02 at 0.05 level of significance. Hence it is significant at 5% level of significance

In case of Males, the t value for the Pre-test and Post-test scores of Academic Achievement of the Control Group is 8.86 which is GREATER than the t-critical value 2.02 at the 0.05 level of significance. Hence it is not significant at 5% level of significance

Thus there is a significant difference in the Pre-test and Post-test scores of the experimental group with reference to gender

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Major Findings:

- The study reveals that there is no significant difference between the pre-test scores of Academic Achievement of the Experimental and the Control group of Std XI science students. However, there is a significant difference between the post-test scores of Academic Achievement of the Experimental and the Control group of Std XI science students. This implies that there has been substantial improvement in the Academic Achievement of the Experimental group due to the intervention of Differentiated Instructional Strategies module. This study brings out the role of education in providing knowledge and skills that facilitate better understanding and retention of concepts leading to improved academic achievement. The findings are in accordance with the study conducted by Alsahi, Abdulrehman & others (2021) on the Impact of Using the Differentiated Instruction (DI) Strategy on Student Achievement in an Intermediate Stage Science Course.
- There is a significant difference between the pre-test and post-test scores of the Academic Achievement (AA) of the Control group of Std XI science students with reference to gender There is also a significant difference between the pre-test and post-test scores of the Academic Achievement (AA) of the Experimental group of Std XI science students with reference to gender
- There is a significant increase in the post test scores of Academic Achievement of both Males and Females of both the Experimental and Control groups. In the Control group the Females show a better performance while the Males reflect a better performance in the Experimental group.

Researcher's Observations:

A survey and interviews of some students belonging to the experimental group revealed that the students thoroughly enjoyed the differentiated instruction. Majority of them agreed that these strategies added life to the chemistry lessons. The instructional Strategies catered to their individual needs and helped in better retention of concepts. They said that they looked forward to the sessions eagerly. The interactive videos, Podcasts and Quizzes were extremely interesting and the break-out rooms where the students worked together to carry out an activity or solve a quiz were the highlights of the sessions, that they enjoyed to the maximum.

Suggestions to teachers to enhance Academic Achievement:

- The findings suggest that Differentiated Instructional Strategies should be used in the classroom to do away with the individual differences within the classroom and promote better understanding of concepts.
- They also make the lessons more interesting and interactive leading to better classroom participation.
- Use of traditional teaching methods do not cater to individual learner's needs.
- Teachers could also use other methods of instruction, such as Blended learning, Role Play, Group learning, Game based learning, Project based learning, etc to involve the students and help them forget their individual differences.
- Arrange lessons such that students learn by doing in small groups. Give students assignments that promote creativity and critical thinking. Whenever possible, instead of lecturing material, allow students to grapple with and debate it, to conduct experiments, or to participate in projects.
- Use of differentiated Instructional Strategies aids in developing a positive classroom culture.

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- The studies suggest that gender differences do not have much impact on the Academic Achievement of the students.
- Proper lesson plans , customized to cater to the individual students within the classroom based on their previous knowledge, interests, learning ability is essential to attain better learning outcomes.
- Differentiated evaluation techniques along with content delivery will definitely help in better retention of concepts by the learners.

Conclusion:

Thus use of Differentiated Instructional Strategies leads to enhanced Academic Achievement of all learners and is not impacted by gender differences.

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Cite This Article:

Ms. Murali L.* (2024).** *Building Bridges in Education: Effect of Differentiated Instruction on Academic Achievement.* In Educreator Research Journal: Vol. XI (Issue IV), pp. 11–17. **DOI:** ***https://doi.org/10.5281/zenodo.13627486