

A STUDY ON EFFECTIVENESS OF DIFFERENTIATED INSTRUCTION ON HIGHER SECONDARY SCHOOL STUDENT'S ACHIEVEMENT IN MATHEMATICS.

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ABSTRACT

The study was carried out to determine the effectiveness of differentiated instruction on higher secondary school student's achievement as compared to the traditional method of teaching in the subject of mathematics in Cuddalore District, Tamilnadu. Post-test equivalent group design experimental study was used for the statistical analysis of the research at 0.05 levels of significance. As the target population were the higher secondary school students, a sample of 25 students were selected. Control group was taught the topic Two dimensional Analytical Geometry (Exercise 6.1 of Tamilnadu Government Text Book) through normal lecture method. Treatment group was taught the topic Combinatory and Mathematical Induction (Exercise 4.1 of Tamilnadu Government Text Book) through Differentiated Instruction. Differentiation of content, process, product, affect and learning environment is created. An achievement test was prepared by the researchers with contained 25 items as a whole. Effectiveness index was used for the further calculation through IBMSPSS23. The student's achievement in both the group is high. The effectiveness of differentiated instruction on higher secondary school student's achievement is low. The prediction model statistically significant, $f(1, 24) = 6.095$, $p < .001$, and accounted for approximately 46 % of the variance of effectiveness index of achievement ($r=0.458$ adjusted $r^2=0.209$). The group of the study was relatively strong indicators of effectiveness index of differentiated instruction of higher secondary school students.

Key words: Effectiveness, Differentiated instruction

INTRODUCTION

Even within a single classroom, each student has a unique approach to learning. This includes differences in thought processes, perceptions of the information being presented, the kind of information being presented, emotional stability, and the order in which lessons are delivered. Since each of us differs in nature, not every student learns from the same resource, follows the same procedure, or follows the same order of lessons. It has been repeatedly demonstrated that one size does not fit all when it comes to clothing, shoes, or education. For pupils in a single class, the textbook's contents and learning objectives are standardised, but it is up to the teacher to alter how the material is presented and in what order.

NEED OF THE STUDY

A teaching strategy known as differentiated instruction adjusts lessons to the individual learning demands of each student. Every student has the same educational objective. But instruction differs according to the interests, preferences, skills, and challenges of each learner. Therefore, teachers must arm themselves with teaching technologies for the twenty-first century. One of the best teaching methods for pupils nowadays is differentiated instruction. In order to create novel teaching strategies, it is crucial to research the efficiency of differentiated instruction among higher secondary students and their academic performance.

OBJECTIVES OF THE STUDY

1. To evaluate the effect of differentiated instruction for students in higher secondary schools.
2. There is significant relationship between effectiveness indexes of differentiated instruction with their subsamples.
3. To identify the predictor of the effectiveness index of differentiated instruction of students in higher secondary schools.

HYPOTHESIS OF THE STUDY

1. The effectiveness index of differentiated instruction for students in higher secondary schools is low.
2. There is no significant relationship between effectiveness indexes of differentiated instruction with their subsamples.
3. There is no predictor of the effectiveness index of differentiated instruction of students in higher secondary schools.

METHOD OF STUDY

In order to compare the effectiveness of differentiated instruction to the conventional technique of teaching maths at the higher secondary level, an experimental study was conducted. The achievement of the students as measured by their academic performance served as the study's dependent variable, while the teaching technique, or differentiated instruction, served as the study's independent variable. For the study, 25 pupils from the 11th standard were chosen. Traditional teaching methods were used to teach two-dimensional analytical geometry to the students in the control groups, whereas differentiated instruction was used to teach Combinatory and Mathematical Induction to the students in the experimental group. After educating both groups, a teacher-made post-test was immediately given to assess the sample students' academic progress in the field of maths.

	level	Score	No	Percentage
1	Low	0-25	20	80
2	Moderate	26-50	4	16
3	High	51-75	0	0
4	Very High	76-100	1	4
	Total		25	100

The table-1 shows that the 80% of the respondents have low level of effectiveness, 16% of the respondents have moderate level of effectiveness and 4% of the respondents have very high level of effectiveness. **Thus the effectiveness of differentiated instruction on higher secondary school student's achievement is low.**

S.No:	Variables	N	Mean	STD	t/F	Result	
1	Age	15.00	3	70.67	9.24	0.99	NS
		16.00	16	65.00	9.85		
		17.00	6	66.00	17.30		
2	Locality	Urban	16	67.25	12.24	0.44	NS
		Rural	9	63.56	10.48		
3	Group	Comp-Maths	18	62.89	10.06	-2.47	S
		Bio Maths	7	73.71	12.19		
4	Mother qualification	School	21	65.52	12.16	0.09	.NS
		Diploma	2	70.00	2.83		
		College	2	66.00	14.14		

5	Father qualification	School	13	61.54	9.60	1.32	NS
		Diploma	6	72.67	14.40		
		College	6	68.67	9.93		
6	Parent occupation	Cooli	12	65.00	10.80	0.04	NS
		Self	8	66.00	14.66		
		Business	5	68.00	9.80		
7	Parental Income	30K-40K	1	52.00		1.73	NS
		40K-50K	5	75.20	13.39		
		50K-60K	8	59.00	9.26		
		60K-70K	6	64.00	10.73		
		70K-80K	3	70.67	2.31		
		80K-90K	2	76.00	0.00		
8	No of family members	0-5	2	64.44	12.72	1.48	NS
		6-10	9	69.71	7.25		
9	Type of family	Joint	8	71.50	5.83	1.22	NS
		Nuclear	14	63.43	13.30		
		single	3	62.67	12.22		

The above table 2 exhibits the details of mean, S.D, and t/F-value and **relationship between effectiveness index and their sub samples**. It is inferred from the obtained t/f-value that **effectiveness index** is not significant at 5% level in subsamples like age, locality, mothers qualification, fathers qualification, parent occupation, parent income, no of family members, type of family.

It is inferred from the obtained t-value that there is no significant difference in Maths- Computer science and Maths Biological Science student's achievement. Since the calculated t-value (-2.47) is significant at 5% level. Therefore the stated alternate hypothesis is rejected and null hypothesis is accepted. **Therefore it is concluded that the Maths- Computer science and Maths Biological Science students not differ in their achievement.**

	Model	B	Std. Error	Beta	Pearson r	Sr ²	Structure Coefficient
1	(Constant)	-2.321	9.608				
	group	17.486	7.083	0.458	0.458	0.209	0.458

Note. The dependent variable **EFFECTIVENESS INDEX**. R=0.458 and R² =0.209.
sr² is squared semi-partial correlation. F (1,24)= 6.095.p=0.021.

Table 3 shows age, locality, group, mothers qualification, fathers qualification, parent occupation, parent income, no of family members, type of family and **treatment group achievement** were used in a stepwise multiple regression analysis to predict **effectiveness index** of the higher secondary school students. The prediction model contained one of the nine predictors and was reached in one steps with **8** variables removed. The model was statistically significant, $f(1, 24) = 6.095, p < .001$, and accounted for approximately **46 %** of the variance of effectiveness index achievement ($r=0.458$ adjusted $r^2=0.209$). effectiveness index is primarily predicted by the higher levels of group of the study. The raw and standardized regression coefficient of predictors together with their correlation with effectiveness index, their squared semi-partial correlations, and their structure coefficients are shown in table-3. The group of the study received the strongest weight in model. The group of the study uniquely accounted for approximately 46% of the effectiveness index. Inspection of the structure coefficient suggests that, **the group of the study was relatively strong indicators of effectiveness index of differentiated instruction of higher secondary school students.**

CONCLUSION

The current study clearly depicts that the group of study was an indicator of achievement in treatment group and Effectiveness index. Maths biological students achievement is better than maths computer science students. Altogether the Students are prepared to learn and achieve more in their academics and related skills when advanced teaching methods are used. Teachers should take essential determination to teach their subject in various innovative teaching techniques to attain master learning for their students. So it is essential for all the teacher to learn innovative techniques like differentiated instruction in teaching to increase its effectiveness.

Universal design for learning, Socio emotional learning, humanistic curricular design must be introduces to the students learning experiences.

REFERENCE:

Blessing, Anakpua & Emmanuel, Nzeakor & Chinyere, Emefo. (2021). Effect of Differentiated Instruction on Students' Achievement in Geometry. *International Journal for Research in Applied Sciences and Biotechnology*. 8. 6 - 12. [10.31033/ijrasb.8.3.2](https://doi.org/10.31033/ijrasb.8.3.2).

Kado, Kado & Dorji, Nedup & Dem, Nim & Om, Dorji. (2022). The effect of differentiated instruction on academic achievement of grade eleven students in the field of derivative in Bhutan, *International Journal of Educational Studies in Social Sciences*, 2(1).

Kado, Kado & Dorji, Nedup & Dem, Nim & Om, Dorji. (2021). The Effect of Differentiated Instruction on Academic Achievement of Grade Eleven Students in the Field of Derivative in Bhutan. *International Journal of Social Sciences and Educational Studies*. 2. 27-34. [10.53402/ijesss.v2i1.37](https://doi.org/10.53402/ijesss.v2i1.37).

Melek Sapan & Enisa Mede (2022).The Effects of Differentiated Instruction (DI) on Achievement, Motivation, and Autonomy among English Learners, *Iranian Journal of Language Teaching Research*, 10(1), 127-144.

Pozas M, Letzel V, Lindner K-T and Schwab S (2021) DI (Differentiated Instruction) Does Matter! The Effects of DI on Secondary School Students' Well-Being, Social Inclusion and Academic Self-Concept. *Frontier in Education*. 6:729027. doi: [10.3389/educ.2021.729027](https://doi.org/10.3389/educ.2021.729027)

Salar and Turgut.(2021). Effect of differentiated instruction in physics lesson, *Science Education International* 32(1), 4-13 <https://doi.org/10.33828/sei.v32.i1.1>.

Sapan, M., & Mede, E. (2022). The Effects of Differentiated Instruction (DI) on Achievement , Motivation , and Autonomy among *English Learners*, 10(July 2021), 127–144.

Suizo, K. D., Lovely, M., & Mendez, S. P. (2023). The effectiveness of differentiated instruction on the learning performance in mathematics among grade – four students, *International Journal of Advance Research and Innovative Ideas in Education*, 9(1), 117–129.

Suleiman, I., Magableh, I., & Abdullah, A. (2022). Effectiveness of Differentiated Instruction on Primary School Students ' Effectiveness of Differentiated Instruction on Primary School Students ' English Reading Comprehension Achievement, *International Journal of Learning, Teaching and Educational Research*,, 19–35. <https://doi.org/10.26803/ijlter.19.3.2>.

Waldron, B., (2020). Instructors' Perceptions of Differentiated Instruction at Four Universities in the United States, Doctoral dissertation, Walden University.

Zens, Abbey, (2021). "The Impact of Differentiated Learning Activities on Student Engagement and Motivation in the English Language Arts Classroom", Dissertations, Theses, and Projects, Minnesota State University. 611. <https://red.mnstate.edu/thesis/611>.