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EFFECTIVENESS OF UNDERSTANDING BY DESIGN STRATEGY ON ACHIEVEMENT IN PHYSICS AMONG SECONDARY SCHOOL STUDENTS

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ABSTRACT

This study examined whether Understanding by Design (UbD) is an effective strategy for enhancing Achievement in Physics among secondary school students. The investigators adopted Pretest -Posttest non-equivalent group design for the present study. Eighty students from a secondary school were selected as the sample for the study. Achievement test in Physics was the tool used for data collection. Test of significance of difference between means and effect size cohens' d were the statistical techniques used. Mean difference analysis indicated that the mean post test scores of Experimental and Control groups differ significantly in the Achievement in Physics. In this study the investigator found from analysis that UbD strategy is more effective than constructivism method of teaching. Effect size Cohen's d analysis showed that UbD strategy has a large effect on enhancing Achievement in Physics.

Keywords: Secondary School Students, Teaching Strategy, Understanding by Design, Education, Physics.

INTRODUCTION

Education is the systematic process for improving knowledge, skill and understanding about anything at school, college, university or other educational institutions which gives enlightening experiences. Better education is essential for the all round development of an individual. It develops confidence and builds personality. School education plays a great role in everyone's life. The importance of school education lies in the fact that the children of today will become adult citizen of tomorrow. The growth and future of the country highly depends up on quality of the present education system.

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The most difficult problem faced by the educational systems are those associated with the effectiveness of teaching. An effective and fruitful empowerment programs is required for the teachers across the state to adapt instruction to the diverse student abilities, learning styles, personality traits and needs .

A teaching strategy comprises the principles and methods used for instruction. The choice of strategy to be used depends largely on the information or skill that is being taught, and it may also be influenced by the learning style, aptitude, skills, and enthusiasm of the students. The teacher centered strategy of learning; teachers are the by all and end all of everything. Students are treated as an empty vessel, whose primary role is to passively receive information. In this model teaching and assessments are viewed as two separate entities. Student learning is measured through objectively scored tests and assessment.

In activity oriented learning strategy, both the teachers and the students play an active role in the learning process. The teacher's primary role is a mentor and facilitator . The drawback of activity oriented design might be called "hand on without being minds on"- engaging experiences lead only accidentally if at all, to insight or achievement. The activities, through fun and interesting, do not lead anywhere intellectually such activity oriented curriculum lack an explicit focus on important ideas and appropriate evidence of learning, especially in the minds of learners. In neither case students see and answer such questions like what's the point? What's the big idea here? What does this help understand or be able to do? To what does this relate? Hence the students try to engage and follow as best they can hope that meaning will emerge (Wiggins & Tighe, 2005).

In designing science based on UbD Strategy the teacher begins at the end, those skills and understanding that the students are to learn by the end of the unit and works backward to where most teachers start engaging class activities. When the end goal (concept) is clear the planning of the assessment piece begins. Finally the plans to move to the activity. When the learners are Focusing on big ideas, the same can be accomplished through essential questions and continuous feedback. When concept is truly understood it can be explained and is transferable or applied to problem solving. Finally, the planning moves to the activities. UbD is practical and research based. All three stages – the backward design process, design standards, performance task can help teachers self asses and engage in peer review, which can ultimately improve instruction.

Understanding by Design (UbD) is an educational planning approach. UbD was developed by Wiggins and Tighe ,which offers a framework for designing courses and content units called Backward Design. Instructors typically approach course design in a "Forward design" manner, which means consider the learning activities, then attempt to draw connections to the learning

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goals of the course. These learning goals embody the knowledge and skills that the instructors want their students to have learned at the end of the course. Once the learning goals have established the seconds' stage involves consideration of assessment. The backward design frame work suggests that instructors should consider these overarching learning goals and how to teach the content. For this reason backward design is considered a much more intentional approach to course design than traditional method of design.

UbD encourages teachers to think like an assessor before designing specific lesson and activities. Within the clearly identified result and appropriate evidence of understanding in mind, teachers think through the most appropriate instructional activity. The goal is to make teaching and learning process more engaging and effective while always keeping the target in mind. Backward design the teacher is designer, evaluator researcher of effectiveness.

Learning is enhanced when teachers think purposefully about curricular planning. The UbD frame work helps this process without offering a rigid process or prescriptive recipe. The UbD frame work helps to focus curriculum and teaching on the development and deepening of student understanding and transfer of learning (ie, the ability to effectively use content knowledge and skill).

Six facets of understanding the capacity to explain, interpret, apply, shift perspective, empathize, and self-assess-can serve as indicators of understanding. Effective curriculum is planned backward from long-term, desired results through a three-stage design process (desired Results, Evidence, and Learning plan).This process helps to avoid the common problems of treating the textbook as the curriculum rather than as a resource, and activity-oriented teaching in which no clear priorities and purposes are apparent.

The present study is an attempt to find out effectiveness of UbD strategy on achievement in physics among secondary school students.

OBJECTIVES OF THE STUDY

- To compare mean post test scores of experimental and control group for the total sample.
- To find out the effectiveness of UbD strategy on achievement in physics among secondary school students for total sample.

HYPOTHESES OF THE STUDY

- There exist a significant difference between mean post test scores of experimental and control group for the total sample.
- UbD Strategy is more effective when compared to constructivism method of teaching.

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METHODOLOGY

Quasi experimental design was used for this study. Two intact IX Standard classes were selected for the experimental study. The experimental and control groups consist of 40 students each. UbD strategy and constructivism method were employed for experimental and control groups respectively.

Tools and materials used for the Study

Tools and materials used for the present study were as follows

- Lesson Transcript Based on UbD Strategy (Syamaladevi & Safniya, 2016)
- Lesson Transcript Based on constructivism method of Teaching
- Achievement test in Physics. (Syamaladevi & Safniya, 2016)

Procedure adopted

The investigator spoke to the Head Master of the school; M J Higher Secondary School, Elettil about the study and took permission from the authorities concerned. The procedure includes conducting the pretest, giving treatment to the experimental group and control group, and conducting the post test.

Statistical Technique Used for the Study

The major statistical techniques used for analyzing data were Test of Significant Difference between Means and Effect size Cohen's *d.*

ANALYSIS AND INTERPRETATION

Preliminary analysis is an initial step of statistical analysis. The investigator computed the important statistical constant like mean, median, mode, standard deviation, skewness, and kurtosis.

Table 1: Statistical Constants of Pretest Scores on Achievement in Physics of Experimental and Control Group

Groups	Sample size	Mean	Median	Mode	S.D	Skewness	Kurtosis
Experimental Group	40	11.4	11.5	10	3.55	0.152	-0.809
Control group	40	11.27	12	12	3.19	-0.412	-0.003

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From the table 1,it is found the values of mean, median and mode of the pretest scores of experimental group on achievement test is 11.4, 11.5 and 10 respectively. Standard deviation of the distribution is 3.55. Mean, median and mode of the pretest scores of control group on achievement test is 11.27, 12 and 12 respectively. Standard deviation of the distribution is 3.19. This shows that the distribution follows approximately normal.

Table 2: Statistical Data showing the result of Test of Significance of Difference between Mean Pretest Scores of Experimental and Control Group

Groups Compared	Sample Size	Mean	S.D	t- value
Experimental Group	40	11.4	3.55	0.166
Control Group	40	11.27	3.19	

From table 2, it can be seen that the obtained t-value for the pretest scores of experimental and control group is 0.166 which is less than the t value at 0.05 level. It is evident that there is no significant difference between the mean Pretest scores of experimental and control group.

Table 3: Statistical Data showing the Result of Test of Significance of Difference between the Mean Pretest and Mean Post test Scores of Experimental Group

Experimental Group	Sample size	Mean	S.D	t-value
Pretest	40	11.4	3.55	25.76
Post test	40	27.17	2.35	

From table 3, reveals that the t value obtained is 25.76 which is far greater than the t value at 0.01 level (2.58). It is evident that there is a significant difference between the mean pretest post test scores of experimental group.

Table 4: Statistical Data showing the Result of Test of Significance of Difference between the Mean Post test Scores of Experimental and Control Group

	Sample size	Mean	S.D	t-value	Effect size
Experimental Group	40	27.17	2.35	6.06	1.53
Control Group	40	23.15	3.48		

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From table 4, reveals that the t value obtained is 6.06 which is far greater than the t value at 0.01 level (2.58).It is evident that there is a significant difference between the mean post test scores of experimental and control groups.

From table 4, the mean post test scores of the experimental group is greater than the mean post test scores of control group, thus it helps to infer that after treatment the experimental group achieved more than control group. Thus it revealed that UbD Strategy is more effective than existing method of teaching.

CONCLUSION

Findings of the study revealed that the treatment employed by the investigator in the experimental group has significant effect on achievement in physics compared with the existing method of teaching employed in the control group. Effect size Cohen's *d* test was done to test whether the experimental group outer performed the Control group. Results of Cohen's d test revealed that experimental group is far better than control group. It can be concluded from analysis that UbD strategy is more effective than existing method of teaching.

REFERENCES

- Gaff, N. (2011). An effective and agonizing way to learn Backward Design and New Teachers preparation for planning curriculum. Retrieved from ERIC Database (EJ940642).
- Gopika, D. (2014). Effectiveness of concept mapping on achievement in physics of standard VIII students. Unpublished M.Ed. Dissertation. University of Calicut, Calicut, Kerala.
- Kelting-Gibson., & Lynn, M. (2005). Comparison curriculum development practices. Retrieved from ERIC Database (EJ718116).
- Mulcare, D.M.,& Shwedel, A, (2017). Transforming Bloom's taxonomy in to classroom practice: A practical yet comprehensive approach to promote critical reading and student participation. Retrieved from ERIC Database (EJ1142054).
- Wang,D., & Allen,M.(2003). Understanding by Design meets integrated science. Retrieved from ERIC Database(EJ676674)
- Wiggins, G., & McTighe, J. (2011). Understanding by design guide to creating high quality units. Association for Supervision and Curriculum Development (ASCD).

