



# A Study of the Effectiveness of Self-Instructional Material (SIM) for Higher Education

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**Abstract:** *The present study was aimed to find the effectiveness of Self-instructional Materials (SIM). Comparison of the increased learning through SIM and through Direct Teaching was done in this study to know about the effectiveness of SIM at Higher Education. The results did not show significant difference between two groups' learning outcomes. However, various factors are involved in learning activity. Factors like students' attention, effectiveness of direct teaching etc. do affect the level of learning. So, depending upon the above factors and quality of Self-instructional Material, the level of learning may differ.*

**Keywords:** *component; Higher Education, Self-learning Material*

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## I. INTRODUCTION

Learning is a complex process. Subjects like Physics and Mathematics requires lot of imagination, self-thinking and practicing problem solving. Gaining conceptual understanding of physics is difficult for many students. There are limits to what can be done in class to help students learn physics in such a manner. Doing more requires *individualized instruction* and *productive out-of-class effort* on the part of the student. There has been much research into physics education over the last twenty years, particularly at the introductory college or university level. In India, interest in Physics Higher Education Research (PHER) is increasing and much required as well. Especially the effect of materials or alternative methods of teaching at higher education level in Physics is subject of discussion.

Self-learning developed when teaching methods meant for all members of a group failed to meet the varying needs of individual student. All underlying assumption in this method of instruction is that human-beings learn many things through their own efforts. Every individual has a natural desire to learn on his own. Another assumption is that every individual is unique; he or she learns according to his or her abilities. Hence, any teaching system based on presentation of information to a group cannot take into account the wide variations in the rates at which individual students learn. As the students entering secondary education vary in their abilities, interests and needs, there is a pressing need for a wide range of instructional alternatives which may cater to their individual differences.

## II. EXPERIMENTAL DESIGN

The experimental design is pre-test, post-test controlled group design. A pre-test was taken on the subject to be taught. In this method of purposive sampling, two groups of equal competence of which one group was taught by direct method (DT) and other was given Self-Instructional Material (SIM) to learn on their own. Post-test for both the group and comparison of pre-test and post-test scores were analyzed.

A topic which tests the fundamental understanding of a subject is a good tool for testing students. A basic topic at higher level physics is the development of quantum physics in early 20th century. It covers both quantum and classical mechanics which are important parts of physics. "Evolution of Quantum mechanics from failures of Classical mechanics" was the topic on which Self-Instructional Material was prepared. A good reference book on the topic was used to make the SIM. It was a cartooned explanation followed by questions to be answered to reinforce the understanding.

## III. PROCESS OF DATA COLLECTION

To collect the data from the Sample taken out of the available population, two groups have been created from undergraduate science students. One group was for direct teaching and the other for preparing on their own with the help of Self-instructional material. First, pre-test was taken for all students to know their learning for the subject chosen. Later, DT group was taught by



direct teaching method by the author and the SIM group was given a self-instructional material to study on their own. After two hours of teaching and self-preparation by students, post-test of the same achievement test paper was taken and again scores counted. Table 1 is showing rises' in scores of each individual either by DT or by SIM.

TABLE-1  
Percentage rise in scores of DT and SIM group

Student Initial	% rise by DT	Student Initial	% rise by SIM
SMK	46	VKK	32
NLM	22	GD	38
PD	38	MJ	26
PP	20	KD	42
JP	34	NP	20
PRP	46	KV	42
KP	34	SN	22
MB	44	AS	38
JN	10	HI	38
<b>Mean rise</b>	<b>32.7</b>	<b>Mean rise</b>	<b>33.1</b>

Table 1 is showing percentage rise in scores for Direct Teaching and SIM group. It is also evident that the mean rise for both groups (32.7 and 33.1) is almost same. The scores of both groups were also compared using t-test. The comparison of pre-test, post-test and mean rise for two groups yielded t-values 0.7574, 0.35 and 0.021 respectively which means the scores were not significantly different in all cases.

#### IV. DISCUSSION AND CONCLUSION

The increase in level of learning, for this specific case, indicates that both way of teaching (DT and SIM) are equally effective. While this study was conducted, it was observed that if students are interested in learning and if good material is provided, they do work hard and a good rise in learning occurs. This is evident from the increased scores of SIM group. The students were excited in having a nicely prepared Self-instructional Material and such increased interest may contribute well to their learning. Thus, design is an important aspect in making instructional material. McLoughlin (1999) noted that knowledge about individual differences needs to be integrated and connected directly with the design process, so that instructional materials are not only flexible, but also supportive of diversity and capable of accommodating a wide range of learning styles. SIM method is one of the alternative methods of teaching. In this context, Beaudoin, M. (1990) suggested that the role of a teacher is being transformed dramatically. In addition to being adept at both content and process, faculty must recognize the role of instructional technology as a learning resource. The teacher is increasingly an intermediary between students and available resources. Teachers must know something about the potential of technology to facilitate learning and to enhance their own effectiveness.

As far as Physics Teaching is concerned, Systematic studies of student learning have revealed a wide gap between the objectives of most physics teachers engaged in traditional forms of teaching and the actual level of conceptual understanding attained by most of their students (McDermott L.C., 1991). The present study shows that Direct Teaching method is also equally effective. However, various factors are involved in outcomes of DT method. The intensity of teaching may not always remain same; sometimes the lecture goes on very fluently however that may not happen on all days. Bawa M.S. (2003) suggested seven point appraisal scale to assess the quality and effectiveness of a lecture. According to that the teacher performances on various parameters like Introduction to the subject, content clarity, examples, pace of presentation, rapport with students, voice modulation and doubt clearance are important aspect in the learning process. Thus, proper planning becomes an important aspect of Direct Teaching method. It boosts the confidence of a teacher in handling of a class. If majority of the aspects described above are positive, the Direct Teaching is the most useful and cost-effective technique.

The major conclusions are:

- A. A well-intentioned, well-made Self-instructional Material (SIM) does work well for the learner. One can really self-learn with good SIM.
- B. Direct Teaching is not at all outdated. It depends on certain factors on its effectiveness. If those factors synergizes, that can also results into a good learning. In fact, direct teaching is cost-effective; it gives opportunities to learners to clear the difficulties quickly at the time of learning.

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**Dr. Ravindra Jadav** received the M.Sc in Physics and Ph.D. in Space Physics from Saurashtra University. From 2003-2010, he worked at Bahaudin Science College, Junagadh as Assistant Professor (Physics). Currently he is at Gujarat Arts and Science College, Ahmedabad, India. He has been involved in Solar Terrestrial Connections, Atmospheric Modelling and Physics Education Research.