

Effectiveness of Self Learning Modules on Achievement in Biology Among Secondary School Students

Dr. Padmapriya P.V.^[1]

Abstract:

Educational technology implies the use of all modern media, methods, materials, practices, theories and principles for maximizing the learning outcomes. It facilitates learning by control of environment, media, and method. Russell (1974) defines module as a short unit of instruction dealing with a conceptual unit subject matter. The paucity of challenging educational material which will not stifle the creativity of the learner, better met within modular scheduling. Modules help to develop self learning capacity among the learner. The present study is an attempt to find out the effectiveness of self learning modules on biology learning.

Key words: Self Learning module, Instructional module, modular approach

I. INTRODUCTION

Modern era is an age of globalization and liberalization in which new technologies are helping the teachers and the learners in disseminating information which is normally not possible through any other means. Educational innovations and technology emphasize various approaches to teaching-learning. Educational technology implies the use of all modern media, methods, materials, practices, theories and principles for maximizing the learning outcome. It facilitates learning, by control of environment, media and method. In student centered approach, the strategies are designed to provide the students with a highly flexible system of learning, which is geared to individual's life and learning styles. Recent interactive implementations of the world wide web and other instructional strategies like self learning modules and computer based learning system offers opportunities for sharing ideas, posing questions and presenting individual discoveries at the time of convenience and better at the time of thought.

The basic purpose of this individualized system of instruction is to develop critical thinking an intellectual process of activity conceptualizing, applying, analyzing, synthesizing and evaluating information gathered from observation, experience, reflection or communications

II. SELF LEARNING MODULES

A module is a short unit of instruction dealing with a single conceptual unit of subject matter. It is a self contained and independent unit of instruction with the primary focus on a few well defined objectives.

According to Purushothaman (1986) a teaching/learning module should have four criteria.

- Present or define a set of learning situations
- have its own carefully specified function and be directed at clearly defined objectives.
- Include tests designed to guide the learner or teacher and provide them with feed back.

- be capable of fitting into a variety of learning paths, methods and situations.

A module consists of the following components.

- Statement of purpose
- Desirable pre-requisite skills.
- Instructional objectives.
- Entry behaviour test.
- Transaction of instruments.
- Criterion test
- Pretest
- Post test

Self learning module allows the learner to learn at their pace, learner can acquire knowledge, skills and attitude in the absence of a teacher.

III. REVIEW OF RELATED STUDIES

In the APEID report (1976) a module was defined as a set of learning opportunities organized around a well defined topic which contains the elements of instruction, specific objectives, teaching learning activities and evaluation. The following studies envisage the efficacy of learning modules.

Dishner (1975) conducted An experimental study to investigate the effectiveness of the modules, by comparing students who were taught by proficiency modules, with students taught by traditional approach. There were fifty seven students in the two control groups and sixty students in the two experimental groups. In the four of the five units and in the total tests the students taught by the proficiency module performed significantly better than the students taught by the conventional method. Kryspin (1974) reported that self instructional module can be used as an effective teaching learning device in educational psychology course. Windell (1975) from his study with self instructional teacher training module revealed that the modules are effective to produce reliable changes in trainees knowledge and skill in the use of

^[1] Assistant Professor, N.S.S. Training College, Pandalam Pathanamthitta, Kerala

techniques for determining the reading level of the exceptional children. Lampe (1984) developed and evaluated five self-instructional modules to provide basic knowledge on the identification and correction of reading difficulties. The modules were used for diagnostic prescriptive reading instruction, word recognition skills, the informal assessment of reading difficulties and the correction of reading difficulties. Results from the evaluation showed that the modules were suitable for the intended purpose. Kumar (1990) conducted a study on the Effect of Teacher assisted Modular Approach in learning Physics in Secondary schools of Kerala State. The study concluded that the Teacher Assisted Modular approach is more effective than Textbook approach in teaching physics.

IV. OBJECTIVES OF THE STUDY

To find out the effectiveness of self learning modules on achievement in biology at secondary level.

V. METHODOLOGY

The present study is an attempt to study the effectiveness of self learning modules on achievement in biology, so the investigator selected experimental method with pretest post test non equivalent group design.

Sample consists of 70 IXth standard students of Ernakulam District Studying Kerala state syllabus.

The main tools used for the study were

- Self learning Module on “Photosynthesis”
- Achievement test in biology

An entry test was prepared based on the concepts relevant to Photosynthesis. A pre achievement test was administered before experimentation. The experimental group was taught through modular approach and the control group was taught through existing activity oriented method, after the experimentation post test was administered and scores were analyzed by applying relevant statistical techniques such asie. Mean, Standard deviation, ANCOVA, Critical ratio.

Table 1: Consolidated results of analysis of variance of total scores on achievement under each category of objectives; Knowledge, understanding, application, skill.

Categories of objectives	Source of variation	df	SSx	SSy	MSx	MSy	Fx	Fy	Level of significance.
All categories together	Among means	1	5.2	504.94	5.2	504.6	1.17	40.9	Fx>0.05
	with ingropus	68	297.14	827.5	4.37	12.19			Fy<0.01
Knowledge	Among means	1	0.01	43.78	0.01	43.78	0.02	36.4	Fx>0.05
	with ingropus	68	50.42	85.56	.759	1.24			Fy<0.01
Understanding	Among means	1	.286	21.64	.286	21.64	.38	11.9	Fx>0.05
	with ingropus	68	50.46	85.56	.759	1.24			Fy<0.01
Application	Among means	1	.6	120.02	.6	12.02	.87	7.3	Fx>0.05
	with ingropus	68	54.6	110.08	.82	1.73			Fy<0.01
Skill	Among means	1	5.08	388.9	5.08	388.9	1.04	82.9	Fx>0.05
	with ingropus	68	50.42	84.6	4.89	4.6			Fy<0.01

Table 2: Consolidated results of analysis of covariance of total scores under each category of objectives: Knowledge, understanding, application, skill.

Categories of objectives	Source of variation	df	SSx	SSy	SSxy	SSyx	MSyx	SDyx	Fy.x	Level of significance.
All categories together	Among means	1	5.2	504.9	50.01	158.7	158.7	3.4	15.2	P<0.01
	with ingropus	67	297.14	827.5	158.79	740	10.07			
Knowledge	Among means	1	0.01	43.78	1.07	57.02	57.02	1.01	50.3	P<0.01
	with ingropus	67	50.42	85.56	3.4	70.18	70.18			
Understanding	Among means	1	.286	21.64	1.24	21.64	1.34	1.4	11.2	P<0.01
	with ingropus	67	50.46	121.43	9.5	.77	1.8			
Application	Among means	1	.6	120.02	2.8	12.36	12.36	1.3	7.8	P<0.05
	with ingropus	67	54.6	110.08	.82	1.73				
Skill	Among means	1	5.08	388.9	10.12	316.9	316.9	2.2	60.1	P<0.01
	with ingropus	67	50.42	84.6	3.4	72.16	72.16			

Table 3: Consolidated results of analysis of adjusted means of the post test scores for total achievement and objective wise achievement of control and experimental group.

Categories of objectives	Groups	N	Mx	My	Myx	t value	Level of significance
All categories together	Experimental group	35	5.2	13.2	12.9	6.49	P<0.01
	Control group	35	4.9	7.8	7.92		
Knowledge	Experimental group	35	1.53	3.3	3.45	8.2	P<0.01
	Control group	35	1.52	1.8	1.77		
Understanding	Experimental group	35	1.09	2.87	2.85	3.5	P<0.01
	Control group	35	1.03	1.76	1.78		
Application	Experimental group	35	1.2	2.4	2.43	2.8	P<0.01
	Control group	35	1.1	1.6	1.59		
Skill	Experimental group	35	1.53	4.4	4.2	2.8	P<0.01
	Control group	35	1.26	2.4	2.69		

The obtained F_x and F_y ratios were tested for significance. The table value of F ratios not significant even at 0.05 level. Since the F test applied to the initial score (X), F_x falls far short of significance at 0.05 level. It is clear that the means do not differ significantly. The table value of F ratio is highly significant. So it can be interpreted that there is significant difference between the post test scores of the two groups.

The analysis of the covariance of the scores of the pre test and post test of the experimental and control groups were computed.

Since the obtained F_{yx} ratio is highly significant at 0.01 level of significance, The significant F_{yx} ratio shows that the means of the post-test scores of students in the experimental and control groups have significant difference. The significant F_{yx} ratio also shows that the means of the post-test scores of students in the experimental and control groups differ significantly even after they have been adjusted for difference in the pre-test scores. So it can be inferred that the achievement of biology among secondary school students taught through self learning module is significantly better than those taught through the activity oriented method of instruction.

The adjusted means of the post-test scores (Y means) of students in the experimental and control groups were compared and the difference between the adjusted 'Y' means were tested for significance. The calculated 't' value is significant at 0.01 level. The significantly greater adjusted 'Y' mean of the experimental group than the control group indicates that experimental group is superior to control group, on achievement in biology. It may therefore be interpreted that the students taught through self learning module has better achievement in biology than those taught through activity oriented method of instruction.

The consolidated results of analysis of variance and covariance of the pretest and post test scores of control and experimental groups for total scores and scores under each category of objectives shows that experimental groups taught through self instructional module was found to be superior to the control group taught through the existing activity oriented method. So the results throw light on the effectiveness of self instructional module in teaching Biology over existing activity oriented method of instruction.

VI. EDUCATIONAL IMPLICATIONS

The present study implies that this is a self-learning style in which immediate reflection of the self is possible, which will motivate the students to regulate and manage their own learning styles, and thereby to create an interest and attitude towards science among the students as they are free to learn at their own pace. Hence teachers should promote self learning among the students to make them better learners. With help of modules students can learn according to their own pace and interest which boosts their confidence in their own learning. The teachers should prepare self learning modules and packages in different subjects and thereby they could make the teaching learning environment more active and interesting.

VI. CONCLUSION

The students treated with modular approach achieved higher mean scores than those students taught through activity oriented method. The study reveals the effectiveness of self instructional module on achievement among secondary school students and the administrators must take necessary steps to give special training to teachers in developing modular packages.

VII. REFERENCES

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