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EFFECT OF SELF-STUDY MATERIALS ON LEARNING AMONG SENIOR SECONDARY SCHOOL STUDENTS

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Abstract
The self-learning materials are designed based on learning theories, to a large extent on the basis of an eclectic approach combining behaviouristic, cognitive and constructivist learning theories. The self study materials are written in a way that does not require any intermediary or teacher to explain the content. These are prepared in such a way that the distance learners normally do not require additional materials to learn the concepts or subject matter. The self study materials are designed in a way that provides necessary directions to the learners to study and progress. One important front for improving the quality of learning in any subject is the provision of an effective teaching-learning material. There are many methods, models and techniques which can be used to make an instructional process effective. Self study material is one of them. Use of self study material makes the teachers' job easy and can solve some of the problems of present classrooms. Thus the learner may live at a considerable distance from an appropriate institution, the learners' job may not allow him the free time or the time at the right part of the week to attend classes or the learner may be disabled and unable to attend classes. The learner's learning need may not fit with the available courses in various ways, the learner may require a particular competence in a relatively short time, the learner may need to learn bits of the subject which are underemphasized or not touched upon by most courses. This calls for a flexible approach to learning in the form of self study material. Self-learning encourages learners to take on greater responsibility for their own learning. Thus learners are encouraged to consider their own learning needs and in some cases to undertake substantial analysis of them. In this way, the learners become aware of possible goals, stages, and sequences in learning the subjects.

Key Words: Self-Study Materials, Learning, Senior Secondary School Students.

Introduction

Self study implies that the individual or a learner studies himself through his self efforts. As a teaching device self study may be defined as an attempt on the part of teacher to persuade students to pick the path of independent learning resulting in the habit of acquiring knowledge or skills through his own independent efforts.

According to psychologists no two individuals are alike. There are individual differences. The individuals differ in their habits, interest's, ideas, thoughts, actions, attitudes, aptitudes, feelings etc. In a class, students also differ in their habits, attitudes, previous knowledge, intelligence etc. Every student is Unique so far as behaviour is concerned. The habits are expressed in their thoughts, feelings and action. Different student differ so far as learning is concerned. Some students cram content material. Some students understand subject matter when they write it. Some comprehend and subject matter by listening to it. Some learn by observation. The habits possessed by students in carrying out study is different subjects is also different.

In order that learners learn in their own time and at their own pace with little or no supervision, self study materials are designed to facilitate the learning process. Self directed learning can be challenging, even for the brightest and most motivated students. The success and effectiveness of distance education

systems largely depends on the study materials. Self study materials depend on exploiting the various means and ways of communication to suit it to the needs of learners.

Self study materials are closer to reference material than learning texts which acts as an aid to the teacher rather than a learner. SSMs are instruments of learning. Learner centeredness of distance mode requires development of self study processes. SSMs can perform the functions of a live teacher, and thereby how a distance learner may have all the learning experiences which a student may have in a classroom situation. SSMs include all the material prepared to stimulate independent learning. The study materials aim at providing necessary guidance, hints and suggestions to the learners at each stage of learning. The SSMs in the form of easy explanations, sequential development, illustrations, learning activities etc. The material performs the role of a teacher who can guide, instruct, moderate and regulate the learning processes in classroom situations. Thus the course material should direct the entire process of learning.

Review of Related Literature

Konusikova et al. (2009), put forwarded an article deals with planned research which is part of a dissertation in the field of didactics with the title "Creation and effectiveness of instructional texts for directed self learning at secondary technical schools." It illustrates the importance of directed self learning by pupils and of the creation of high quality self-instructive learning texts for pupils of secondary vocational schools.

Meyer (2010), develops the concept of 'independent learning' is associated with, or part of, a number of other educational concepts and wider policy agenda of contemporary relevance such as 'personalised learning', 'student-centred learning' and 'ownership' of learning. It has been seen as one of the essential elements of 'personalised learning' and as vital to the continuing development of a system of school education that promotes high quality and lifelong learning and social equity and cohesion.

Wanniarachchi (2010), investigated how constructivist approach and principles support for the development of self-learning materials that promote learner engagement and motivation of out-of-school children. The traditional design process is based on objectivist learning theories and it promotes passive learning rather than active learning.

Zumbrunn et al. (2011), have studied Self-regulated learning is recognized as an important predictor of student academic motivation and achievement. This process requires students to independently plan, monitor, and assess their learning. However, few students naturally do this well.

Das (2012), has focused on the quasi-experimental study, the traditional method adopted for teaching general science to Class IX students was compared with teaching through self-study material for teaching general science to same students. The basic purpose of the study was to study the effectiveness of the developed SSM in comparison to the traditional teaching method for teaching general science to Class IX students.

Sagitova(2014), put focus on a successful learner in the modern society should be able to integrate knowledge from different sources, educate and self-educate throughout the life in order to be competitive in an increasingly globalized labor market. To involve students in self-education process and encourage their independence in learning we have developed an elective course for students "Learning to learn across the lifespan".

Rahman (2015), has investigated on assessment in education must, first and foremost serve the purpose of effective learning. Assessment has an important role in a self- learning activity using self-learning material. It is a dynamic component of distance learning. Due to spatial and temporal separation between teachers and learners, assessment provides perhaps the only indication of the student progress in the learning process.

Objectives of the Study

The study aimed at achieving the following objectives:

1. To develop self study material on Chemistry for senior secondary school students.
2. To study the learning achievement of senior secondary school students.
3. To study the effect of self study material on learning among senior secondary school students.

Hypothesis of the Study

There exists a significant effect of self-study learning on achievement of senior secondary school students.

Methodology

The present study is an experimental study. According to our research objective, a total number of 30 senior secondary students were purposively selected from M.P.C Junior College, Baripada, Mayurbhanj. An achievement test is used as a tool assesses the students' performance. The test has been divided into four sections and comprised of 40 items for assessing students' achievement in biological science. The various sections of the test comprise of multiple choice, one-word substitution, match the following, fill in the blanks from the bracket, give characteristics types of questions. All the questions are planned in order to check students' cognitive ability.

Standardization of the test:

Syllabus of Chemistry of class XI prescribed by CHSE, Odisha was studied thoroughly. Experienced teachers in this field were consulted to make clear objectives outcomes and to know the emphasis to be given to various areas of Chemistry of class XI. A blue print of the syllabus was prepared as shown in the table -1.

Blue print of the test

Table - 1

Sl. No.	Sections	No. of items	% of weightage
I	Basic concepts of Chemistry	15	33%
II	Structure of Atom	12	27%
III	Classification of Elements & Periodicity in properties	10	22%
IV	Chemical Bonding and Molecular structure	08	18%
Total Items		45	100%

After preparing the blueprint of test items, a tryout of test having 45 items was prepared. Items were of multiple choice, one-word substitution, match the following, fill in the blanks from the bracket, give characteristics types of questions. This test was administered to 30 students of M.P.C. Junior College, Baripada. After scoring all papers, item analysis was done and the difficulty values are considered. Thus only 40 items were retained for the final test.

Final Form of the test

Final form of the test consisting of 40 items and the distribution of items for the final form of test is shown in Table 2.

Final Form of the test

Table - 2

Sr. No.	Sections	No. of items	% of weightage
I	Basic concepts of Chemistry	10	25%
II	Structure of Atom	10	25%
III	Classification of Elements & Periodicity in properties	10	25%
IV		10	25%
	Total items	40	100%

The reliability of the study was established with the help of split half method. The reliability of the test is 0.68(N=10). The 'r' value 0.68 has been formed to be significant, showing that the test is highly reliable.

Content validity of the items was done by carrying out critical discussions with language experts, ICT experts at the time of development of final draft of items. The experts were of the opinion that most of the items were fully adequate and relevant to measure the achievement of secondary students (class XI). Statistical techniques like't- test' and percentiles are used to analyze data.

To obtain the performance of students, four criterion tests are developed on selected units and administered to the students of experimental group before instruction (pre-test) and after instruction (post–test). After that average scores of each student on pre-test and post-test was found out. Effectiveness of the SSM was studied by comparing mean pre-test performance with mean post-test performance. Further, effectiveness of the SSM was studied in terms of performance of students on different criterion tests and performance as a whole. To compare the pre-test performance and post-test performance of students,'t' value was calculated. Table-3 shows the't' value and the result of analysis done.

Table 3: Pre-test and Post-test Comparison of Performance of Students on Criterion Test

Variable	Pretest		Post-test		't' value
Learning	Mean (Mx)	S.D.	Mean (My)	S.D.	4.87
	40.69	5.06	27.62	29.91	

The results of analysis in Table-3 indicate that 't' value of performance is 4.87 which is significant at .01 level of significance. This means that significant gains occur in students' performance on learning. Further, in order to verify the effectiveness of the SSM in terms of performance on learning, post-test scores of the students were analyzed by computing percentiles. The results are given below in Table 4.

Fig. 1 Significance relationship between mean score of pre-test and post-test of performance of students

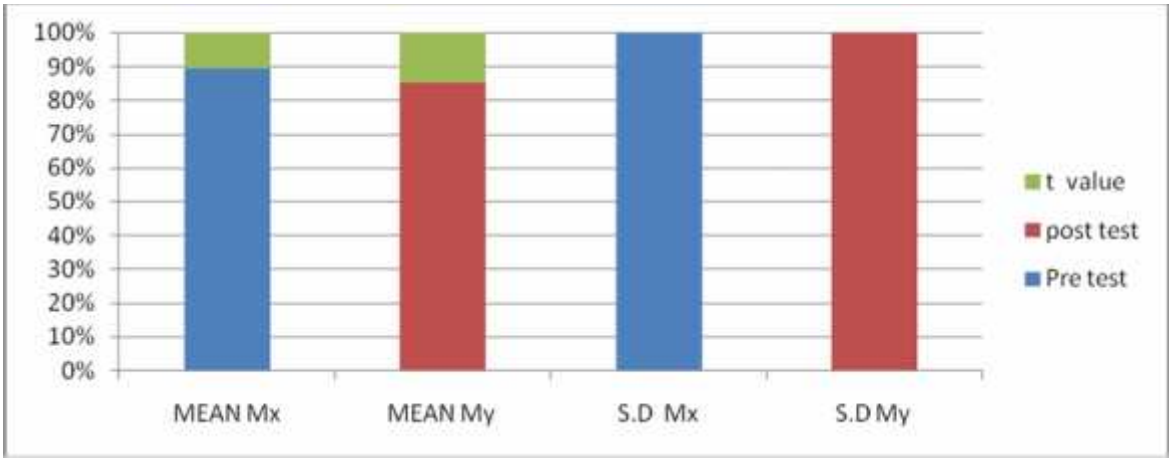

Table 4: Scores Obtained by Students on Different Criterion Tests

Criterion Tests					
Percentiles	Unit I	Unit II	Unit III	Unit IV	Mean Performance
P90	79.83	78.00	85.70	86.33	83.17
P80	70.17	73.17	79.90	81.50	75.90
P70	65.00	68.10	72.75	73.83	70.10
P60	60.17	62.30	61.50	64.17	63.00
P50	47.80	52.00	53.25	54.50	54.50
P40	38.50	48.17	46.00	46.00	46.00
P30	31.25	38.50	38.50	43.75	38.50
P20	25.10	28.80	29.17	36.50	29.17
P10	19.17	19.17	24.33	25.30	24.33

The results presented in Table 4 indicate that more than 70 per cent students secured above 30 per cent marks, 60 per cent students secured above 45 per cent marks except criterion test 1, 40 per cent students secured more than 60 per cent marks on all the criterion tests, and more than 10 per cent students secured above 80 per cent marks on different criterion tests.

Hence the results indicate satisfactory students' performance on criterion tests. It means that the developed SSM was found to be effective in terms of performance of the students on criterion tests.
Students' reactions towards the SSM were obtained by administering a reaction scale developed by the investigator. The obtained data were analysed by using percentage and chi-square test. The reaction scale consisted of fifty items covering five aspects of the SSM. There were ten items in each aspect and five options against each item. Students were asked to put a tick mark on one of the options.

First aspect of the reaction scale elicited reactions from the students with respect to their liking/ disliking towards the developed SSM. It was found that 82.76 per cent of students reacted that subject matter presented through the SSM is very easy to follow. 10.34 per cent students were not in a position to react towards this item. Only 6.90 per cent students were not agreed on this item. 75.87 per cent students were

of the opinion that the SSM helps to understand the content without much external support, 6.90 per cent students were unable to decide their responses on this item, whereas 17.24 per cent students were not agreed on this item. 72.41 and 93.10 per cent students agreed that the atmosphere of learning through SSM is healthy in terms of distracting stimuli and it is very interesting to learn through the SSM, respectively. Only 10.35 per cent students disagreed with the former and no one disagreed with the later. However, 17.24 and 6.90 per cent students could not say anything about these two items. Results in terms of percentage indicate that students reacted favourably towards the SSM with regard to instruction through the SSM. Second aspect of the reaction scale was about the presentation of the content.

There were eight positive items in this aspect, such as the subject matter presented in small steps is easy to understand, help of the teacher is sufficient to learn, the linkage of different concepts are well done, the content presented in conversational style is friendly to learn, provision of different examples and explanations for a concept help to learn effectively, there are sufficient illustrations to explain the content, explanation of technical words helps in learning, and integration of different illustrations and examples with the content was quite good. 89.66, 96.55, 75.86, 89.65, 86.20, 65.52, 72.41, and 75.86 per cent students respectively reacted favourably towards these items. 3.45 to 31.03 per cent students were not able to react towards these items and only 3.45 to 17.24 per cent students disagreed with these items. There were two negative items such as there should be compulsion to learn in same sequence and explanation of technical words not necessary. 65.52 and 62.07 per cent students respectively disagreed with these items. 10.34 per cent students were not in a position to react to the former and 31.03 per cent were not in a position to react to the latter. Only 30.13 per cent students agreed with the former and 6.90 per cent on the later. The chi-square values with respect to presentation of content were significant. This reflects that the students liked the presentation of the content. Hence, it can be concluded that the developed SSM was found to be effective in terms of students' reaction towards it.

Findings of the Study

Based on the interpretation of results, the following are the findings of the study:

1. Developed SSM was found to be effective in terms of performance of the students on criterion tests and reaction towards it. More than 70 per cent of students secured more than 30 per cent marks and reaction of the students towards different aspects of the SSM and material as whole was found to be favorable.
2. The performance of students taught through the developed SSM was found to be significantly better than those taught through the traditional method when students overall performance scores were adjusted with respect to intelligence.
3. The developed SSM was found significantly better than the traditional method in terms of development of reasoning ability of students in science when their mean scores were adjusted with respect to intelligence.
4. The developed SSM was not found to have any significant positive effect on scientific attitude scores of the students when compared with the traditional method taking intelligence as a covariate.

Conclusion

The success of learning depends on the quality of the learning materials. Self study materials follow learner-centered approaches. They are designed and developed as per the needs of the learners. Self study is a good study habit and fruitful exercise for acquiring knowledge, information and skills. Once the self study habit is picked up by the student, the process of teaching becomes easy and objective. By the help of self-study materials the intellectual capacities of the student develops and could be used for

acquiring knowledge and information. The self study method makes the students to utilize the leisure time properly to enrich and increase their fund of knowledge and information and also enhance their achievement level. By this learners made systematic and organized.

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