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"Effectiveness Of Using Modular Method In Teaching Biological Science Among Freshman Students At Sulu State College Amidst New Normal."

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Abstract:

A module is an innovative teaching strategy that deals with arranging learning experiences in education which helps much the teachers delivers instructions in lieu of pandemic. The strategy of learning modules has become part of all level of teaching. A learning module is a self-learning package dealing with one specific unit of subject matter. It can be used in any setting convenient to the learner and may be completed at the learner's own pace which may be used individually or in small groups. It is structured in such a way that learner can identify the objectives he /she wants to achieve. Select the appropriate material, follow a learning sequence by selecting from a variety of methods of presentation, and evaluate his/her own achievements.

In module, learning teacher's role is a facilitator of learning rather than the traditional dispenser of knowledge. Sufficient theory and practice are available for the application of modular teaching in our classrooms. Therefore as, a prelude this study was conducted in order to check the Effectiveness of Modular method in teaching biology among Science education students." A Factorial design (2x2) was used for the treatment of data. The Science education students studying biology constituted the population of the study.

Students enrolled in biology subjects randomly selected were taken as the sample of the study. A treatment of developed self-paced modular and non-modular instruction was provided to fifty (50) respondents and the two modules were distributed for four weeks.

The teaching lasted for four weeks via asynchronous and at the end of treatment, a teacher made post-test parallel to pretest was administered to measure the level of retention in biology concepts. To determine the effects of modular teaching on the level of retention, the significant difference between the mean average percentage scores of groups at .05 level was tested by applying t-test dependent samples and correlation. Data analysis revealed that the performances of students in the modular self- paced instruction were almost equal in biological base at the beginning of teaching learning process. The students exposed to modular self-paced instruction in which they learn the modules through reading and intervention of the teacher were done via zoom once a week since distance learning was implemented due to pandemic. .The test was administered via learning management system provided by the school. ZOOM apps was used in discussing the modules. However, comparison of mean average percentage scores of the two classes in the two modules shows no significant advantage. The null hypothesis was rejected, the students in the modular self-paced instruction learning from home have improvements in retention compared to students learning from home without modules and there was a significant difference between mean percentage scores between the pretests and posttests in the two modules used among respondents. Hence, the ultimate result of the study indicated that modular self-paced instruction is effective instructional method of teaching. Further; modular learning is favorable in the level of retention in biology concepts. The results of this study provide base for the application of modular approach in the biology classes as well as for further research in this field and further application of this method to other subject areas and levels.

Key Words: Effectiveness: Module: Modular Method: Modular instruction: Retention of Concepts:

1. INTRODUCTION: The Covid -19 pandemic has caused huge changes in all aspects in the Philippines. Everyone are affected, Industry have fall down including Education sectors are not spared. However, the uncertainty of this pandemic does not hamper Sulu State College from delivering quality instruction to its students amidst pandemic.

Consequently, the problems on how students could be reached especially those in the farm plunk areas where transportation and internet connection is not available.

This malady is now on the hands of the teachers in the college level. The teachers now carry the burden in finding strategy to continue delivering quality education despites of pandemic. The ultimate success of the teachers in improving the performance of the students in college learning defends on their ability to discover strategies to help address the existing problems. Innovative methods, techniques and strategies of teaching that can be adopted to improve the performance and develop the attitudes especially towards science, conscious and interest of students in science activities that can appropriately augment the poor performance and deficiency in science. Many teaching methods, techniques and strategies have been tried, tested, and experimented. But there is no yet known single method, technique and strategy that is appropriately applicable in teaching which indicates effectiveness to improve students' achievements.

Teaching and learning in the college level now comes in different styles and forms due to pandemic .in which face to face is not allowed. College educators are now experimenting on the new methods of teaching and learning which aim at improving the quality of education and the quality of citizens produced by schools especially in science. As new styles and forms of teaching and learning are developed, these bring advantages and disadvantages as well. Educators nowadays devote themselves on assessing the

efficiency of these new styles in teaching and learning. If pandemic would continue, teachers and students by then should be prepared to discover innovative strategies in order to produced quality graduates amidst pandemic.

Statement of the problem:

The purpose of this study was to determine the effectiveness of modular method in teaching Biology among freshman college students, School year 2020-2021 Specifically, this study sought to answer the following questions:

1. What is the level of retention of biological science concepts using modular instruction?
2. What is the level of retention of biological science concepts using non-modular instruction?
3. Do the groups of students using modular and non-modular - instruction differ significantly in their levels of retention in biological concepts?
4. Is there a significant difference between the Pre –test and Post –test in the level of retention of biological science concept using self- paced instruction.

2. METHODOLOGY

2.1 Subsection

This study used the pre-test and post- test only control group design of the quasi-experimental method of research using assessment and evaluation tools.

Research Sample

This study used 50 Science Education students in the School of Education as participants in the modular learning of which 25 education students exposed in modular and 25 students were using non- modular method. Students A were given two modules for two weeks using self-paced instructions. Students B were not given modules but based only on explanation made by teacher. Therefore, Reading and analyzing were done alone and by themselves since face to face is not allowed.

Research Instrument

In order to measure the variables of the study, the following Biology concepts inventory instrument was administered: This is a multiple choice instrument that used to indicate the level of Biology concepts retention of students. The inventory is a multiple choice test composed of 20 non-mathematical conceptual questions. The questions were based on commonly-observed student retention of the concept about topics generally covered in the biology course. This instrument was adapted from the evaluation of the book at the end of the chapter.

The inventory is a multiple choice test instrument composed of topics in general biology course such as the questions were based on textbooks generally covered in the fundamentals in biology course taught in freshman college classes.

Data Collection Procedure

Before the end of first semester of the school year 2020-2021, the researcher has made an arrangement with the dean of the school of education to allow the researcher to gather data for research purpose. The researcher also prepared the necessary module as teaching materials. The study started in the second semester of the school year 2020-2021. The 50 freshman college students in the two biology classes were distributed equally regardless of gender .The first groups were all exposed to modular self-paced instruction while the second group were not given modules. Synchronous session via zoom were done. After four weeks learning from home using the modular approach and non- modular approach the researcher administered both the Biological Concepts Inventory and the Standardized Test in Biology. The two tests need not be pilot tested since they were already validated in the text.

The questionnaire was composed of 40 items multiple choice test used to determine the inventory of non-mathematical retention of biology concepts. The items were distributed according to the concepts covered during the terms of the study. The following table of specification was used for the concept distribution

Table 1. Table of Specification

Modules	Chapter/units	Questions/numbers	General Concepts
1	5	1-20	Reproduction and development
2	6	21-40	Patterns of heredity

Data Analysis Procedure

The data collected for the study were subjected to different statistical treatments. (1) The level of retention of Biological science concepts using modular self-paced instruction and non – modular were measured through Mean and Standard Deviation. (2) The difference in the level of retention of biological science concept of the groups of students who used self-paced instruction according to gender was measured through t-test.

In the statistical computation, the researcher used SPSS for windows version 20. In the interpretation of data, the researcher used 0.05 significant level of confidence in all statistical treatments.

3. RESULTS AND DISCUSSION

The t- value -20.659 with significant value of .000 is less than .05 and t-value -17.534 with significant value .054 is almost equal at .05 level of confidence. The data indicate that there is significant difference between the mean average percentage scores in the pre-test and post-test results in the modular self-paced approach 1. Apparently, there is almost significant difference between the mean percentage scores in the pre-test and post-test scores of the modular learning. The significant differences of modular teaching when grouped according to gender make sense in this comparison. The data shows that the modular teaching approach is as effective approach.

Furthermore, the t-values -20.659 in module 1 and -17.534 with significant (2-tailed) values .000 and .000 respectively are less than .05 level of confidence. The data suggest that the null hypothesis is accepted. The groups of students using modular learning when grouped according to gender differ significantly in

their mean average percentage scores in the pre-test and post-test using the module 1 and module 2 .

The scores of the group of the students in the self-paced approach significantly differed in pre-test and post-test which indicate their level of retention in biological concepts. Also the scores of the group according to gender which indicate their level of retention in biological concepts.

The t- value between the modular self-faced means that both male and female exposed to modular learning does not differ significantly in their retention level. This can be further inferred that the modular learning is effective in the retention of learning in biology concepts.

In other words, the teacher is free to choose which learning strategies in biology is interesting and encouraging to the students, there is advance merit of using modular method in teaching.

In many instances, during the experimental process, the students were allowed to ask the teacher during synchronous session via video call through FB messenger apps, and google meet depending on teacher's available resources.

This study recommending further for the use of the modular learning due to its capability of creating good relationship with the teachers. However, the teachers should always make a point, in the beginning of the modular learning that there is little difficulty in the distribution of modules since distance learning was implemented. The teacher should be fair in distributing the modules at the same time to avoid being bias.

In the facilitation of the classes the teachers should attach more attention to motivation process. If students are taking for granted their participation via online this is because they have somehow encountering technical problems. As much as possible the teacher should be able to motivate the students to learn after reading the given module. This make the retention level of biological concept more meaningful. Therefore, the teacher using the modular learning must orient the students on proper online etiquettes before engaging them in an online learning.

Table 7 Differences between module 1 and 2 using pretest-posttest score

Modular	Learning	N	Sig.	T	Sig. (2-tailed)
Pair 1	Pretest-posttest Module 1	50	.025	-20.659	.000*
Pair 2	Pretest-Posttest Module 2	50	.054	-17.534	.000*

*Significant at .05 level of confidence (Significant value ≤ .05 level of confidence)

4. CONCLUSIONS: It seems clear from the results of the procedure that modular method is an effective tool in the absence of face to face. However, modular methods show no significant advantage either. The absence of distinct and consistent research results on this topic continues. At present, the modular methods of instruction appear to produce very similar mean average percentage score outcomes regardless of how many times – or at what academic level – studies are done. Critics and advocates of modular teaching in education raise pertinent issues about student interaction, innovation and future trends. Still, without reasonable assurances of its effectiveness, the adoption of modular teaching methods can be difficult to justify except under the dubious reasoning that everyone is doing it.

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