Modular Instruction in Biology: It's Effect on Students' Performance

ARCHEL A. BEDAURE

archelbedaure@yahoo.com
Carlos Hilado Memorial State College-
College of Fisheries
Negros Occidental, Philippines

Abstract - This investigation ascertained the effect of modular instruction on the performance in Biology of freshmen fishery students at the Carlos Hilado Memorial State College (CHMSC) - College of Fisheries during the second semester of the school year 2009-2010. Experimental research using the pre - test, post - test control group design was employed to achieve the objectives of the study. Participants were grouped into the experimental and the control groups. The experimental group was exposed to modular instruction while the control group was exposed to lecture-discussion approach. The pre-test performances of both experimental and control groups were fair. The post-test performance of the experimental group taught by modular instruction was superior while that of the control group taught by lecture-discussion was very good. A significant difference was found between the pre - test of the modular and lecture-discussion groups in favor of the latter group. A significant difference was found between the post - test results of the control group in favor of the experimental group. Significant differences were found between the pre - tests and post -tests of the experimental and control groups hence, modular instruction was better than the lecture -discussion approach in effecting students' performance in Biology.

INTRODUCTION

One of a teacher's most challenging tasks is to accommodate teaching or instruction to the individual differences of students. Given the diversity of students, Elliott, et al. (2000) believed that most of the methods or techniques that teachers use to provide appropriate levels of instruction have serious drawbacks. For instance, ability groups in which students remain in heterogeneous classes can work to the disadvantage of the far advanced or below-performing students. Group-based mastery learning, on the other hand, does not require permanent ability groups of students; one danger here is that in the traditional class period, corrective instruction can slow down the entire class.

One important issue is matching tasks to students' abilities, or vice versa.Teachers must adapt instruction to the students' level of knowledge and development, motivate them to learn, and manage their behavior. Consequently, for instruction and learning to become effective, the teacher must be concerned with: the quality of instruction which means that instruction must make sense to the students; the appropriate strategy to use; the incentive to the students for them to learn; and sufficient time for learning to occur.

Whatever approach a teacher uses should have certain important features to be effective, among which are: a clear focus and explicit learning outcomes that students understand and are held accountable for learning; material or materials presented in a manner that elicits active inquiry and interest; guidance provided by the teacher as students interact with new materials or tasks; and feedback about the quality of students' learning.

One instructional strategy which has recently gained popularity is modular instruction. According to Goldschmid and Goldschmid (1992), a module is a self-contained independent unit of a planned series of learning activities designed to help a student accomplish certain well-defined objectives. The learner is able to proceed at his own rate and choose his own learning mode. Ideally, a module should include a pre-

test, objectives, criteria for success, instructional activities, a post-test, and remedial instruction.

Generally considered as one very important area of study is the world of Natural Science, one component of which is Biology. Today, many innovations have been made to enhance the teaching of science including Biology. One of its primary concerns is on the research-based direction for instructional refinements. Revision as an endless developmental process requires a large extent of producing instructional materials in bringing about the desired learning outcome.

Anchored on this developmental process, tertiary education or post secondary schooling referred to in the Education Act of 1982 as higher education leading to a degree in specific profession or discipline, recognizes a growing realization that it is best to provide students a variety of learning situations rather than attempt to develop a standard method of instruction for all courses.

To properly address the need for instructional innovation, this study is intended to focus on modular instruction in Biology and determine its effect on students' performance. Further, to facilitate the inquiry into the effectiveness of modular instruction, the study aimed to determine whether the use of module in biology would show positive results as compared to the lecture-discussion approach in teaching.

FRAMEWORK OF THE STUDY

This research work is anchored on a number of theories or ideas on the efficacy of instruction by leading educators worldwide discussed hereunder.

Ornstein (1992) averred that teacher behavior and teaching methods consistently relate to student's achievement, although different teacher behavior and teaching methods have different effect on different students, grades, subjects, classroom groups, and school settings. In order to facilitate learning, he further believed, the teacher must learn to match an instructional method with its appropriate tasks with the students' abilities and background knowledge. Success in matching or in the choice of the most appropriate strategy can be judged by student's performance.

This view is supported by Elliott, et al. (2000), he believed that

effective teachers must have a wide range of activities and strategies in their instructional repertoire for interacting with students and facilitating learning. Such strategy may involve or include lectures, questioning, problem-solving, practice and drill, and the like. Although teachers can use different approaches, effective teaching has common features. What the teacher does is to adapt instruction or "match the mix" between student aptitudes and the method and materials used.

According to Riasat 2005, the key element, he said, is mastery learning, for it is this goal that all other means are intended to achieve. Mastery learning is tied closely to the quality of instruction and must be considered in the light of individual learners. Do the students understand what they are to learn and how are they to learn it? It is the answer to this question that illustrates the interaction between students' ability and quality of instructions and curricular material. Since schools are highly verbal, ability to understand is linked to language ability and reading comprehension. Modifying instruction by using a variety of techniques - tutorial, group, text, and media - can benefit students' comprehension.

Based on the Southeast Asian Ministers of Education Regional Center for Educational Innovation and Technology (SEAMEO INNOTECH), as cited by Mijares, 2008, the idea of using modules as a strategy for learning within the context of education is relatively recent. One of its functions is to upgrade content of the text where old materials are replaced with updated information. It is used to cater individual differences in learning. A variety of instructional activities are used to optimize learning on given topics. It provides an avenue for active participation where students learn by doing. Each is actively involved in manipulating the instructional materials.

This form of instruction is usually successful in courses that stress acquisition of knowledge. Berliner (2007) also discussed the implication of academic achievement as one of the variables that educational psychologists have found to be important in classroom teaching which include the time teachers allocate to instruction, the amount of content they cover, the percent of time that students are engaged in learning, the congruence between what is taught and what is tested, and the ability of the teacher to give clear directions, provide feedback, hold students accountable for their behavior, and create a

warm, democratic atmosphere for learning. These findings suggest a continuing process of innovations on instructional materials, as further cited by Mijares, 2008.

In contribution to this guiding principle on instructional innovations, the researcher attempted to study the effect of modular instruction in biology on freshmen fishery students' performance. She designed a module for use by modular instruction.

She theorized that by using modular instruction in teaching Biology to students in an experimental setting, she would be able to determine its effect on students' performance and thereby determine its worth as an instructional strategy. The usual method used by teachers in teaching the subject – lecture - discussion, was to be the control variable.

To provide a vivid presentation of the direction of the study, the schematic diagram illustrating the framework of the study is hereby reflected.
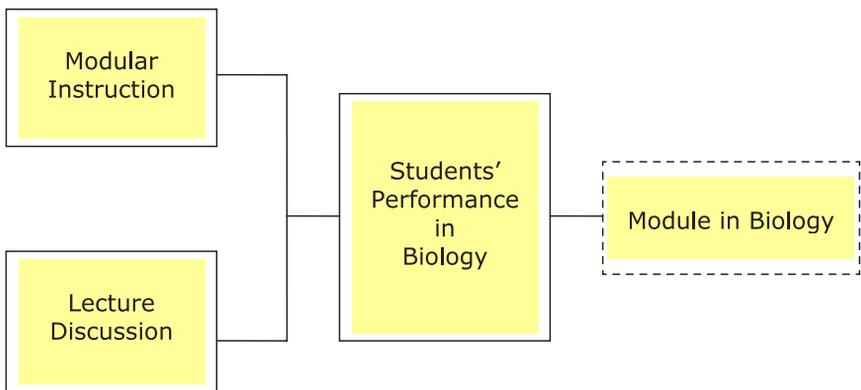
OBJECTIVES OF THE STUDY

It specifically sought to: establish the pre-test performance of the freshmen students on modular instruction and on lecture-discussion approach; establish the post-test performance of both groups; determine the significance of differences between the pre-test as well as the post-test performance of both groups; determine the significance of the difference between the pre-test and post-test performance of the modular group; and finally, determine the significance of the

difference between the pre-test and the post-test performance of the lecture-discussion group.

HYPOTHESIS

The following hypotheses were advanced:

1. There is no significant difference between the pre - test performance of students on modular instruction and those on the lecture -discussion approach.
2. There is no significant difference between the post - test performance of students on modular instruction and those on the lecture -discussion approach.
3. There is no significant difference between the pre and post - test performance of the modular group.
4. There is no significant difference between the pre and post - test performance of the lecture - discussion group.

MATERIALS AND METHODS

The focus of this investigation is to determine the effect of modular instruction in Biology towards the performance of freshmen students of CHMSC-Binalbagan campus. Accordingly, this investigation uses the experimental type of research. This design uses the treatment variable in the experimental group and the usual way of doing things (Lecture - discussion), in the control group. Before the treatment, a pre-test was made, and after the treatment, a post-test to ensure that results can be attributed to the treatment only.

The participants of this investigation were the 66 Freshmen students of CHMSC-Binalbagan campus who were taking up Foundations of Biological Science course during the Second Semester of the School Year 2OO9-2010.

In equating the two groups, the grade of the participants in Natural Science 1 subject was taken from their first semester's record filed in the Registrar's Office of CHMSC-Binalbagan campus. The Natural Science 1 grades of the students were used as valid marks and as bases in equating the two participating groups.

The grade in Natural Science 1 of each group was arranged from highest to lowest. The students with highest and lowest grades were eliminated. There were 33 respondents from experimental group (modular) and 33 from the control group (lecture-discussion approach) who have equal means and were identified as subjects for this research. To ensure its validity, the same treatment of data was used in dichotomizing the grade in natural science 1 of the two groups.

To determine the level of performance of the two groups in terms of theoretical knowledge, the mean scores equivalent were computed based on the approved grading system of the College, as stated in Circular No. 15, Series 1961.

This grading system is reflected as follows:

Score	Grade Equivalent	Description
27-30	1.0	Excellent
24-26	1.5-1.1	Superior
21-23	2.0-1.6	Very Good
18-20	2.5-2.1	Good
15-17	3.0-2.6	Fair

The grade ranges from 3.0 to 2.6 are rated Fair; from 2.5 to 2.1 are rated Good; the grade of 2.0 to 1.6 are rated Very Good; from 1.5 to 1.1 are given the equivalent rating of Superior; and, 1.0 is rated Excellent.

The researcher employed other statistical tools to treat the gathered data to equate the two groups on the basis of grade in natural science 1 and age, the means and standard deviations of the students were computed. To test the significance of the difference between the means of independent samples, the t-test was used.

In equating the two groups in age, the exact dates of birth of the subjects were taken from the birth certificates of students filed in the Registrars Office of Carlos Hilado Memorial State College-Binalbagan campus.

The ages of students in each group were arranged from youngest to oldest. Treatment was made by eliminating those who were very young and those who were very old. Median or the middlemost value

was used by the researcher in dichotomizing ages.

Table 1 shows the number of respondents, the means, the standard deviation and the probability test value on the basis of their grade in Natural Science 1.

Table 1. Comparison of the experimental and control groups as to grade in natural Science 1

Group	n	mean	sd	t-alpha	t-prob
Experimental	33	1.76	0.21	0.05	0.31
Control	33	1.82	0.24		

p < .05 significant at .05 alpha

As reflected in Table 1, the results show that the modular group has a mean of 1.76 with a standard deviation of 0.21, while the control group obtained a mean of 1.82 with a standard deviation of 0.24. When the results of the two groups were computed, it yielded a probability test value of 0.31 which is higher at .05 level of significance. Since there is no significant difference between the two groups, this result shows that they were equated as to their average grade in Natural Science 1.

Table 2 shows the comparison of the means, standard deviations, standard error of the difference between means and the critical ratio of the two groups in age. The exact dates of birth of the students were taken from their birth certificates submitted at the Registrar's office.

Table 2. Comparison of the experimental and control groups as to age

Group	n	mean	sd	t-alpha	p-value
Experimental	33	18.00	1.03	0.05	0.34
Control	33	17.76	1.00		

p < .05 significant at .05 alpha

As shown in Table 2, the mean score of the modular group is 18 and the standard deviation is 1.03, while the control group got a mean of 17.76 with a standard deviation of 1. 00. The probability test value of 0.34 is greater at .05 level of significance which means that two groups are considered equal in age.

The test instrument used in the study was a researcher-made questionnaire. The items in the questionnaire were based on the course contents of the identified topics in Biology. For the appropriateness of use, a face validation was made together with the validation of the proposed module as assessed by the jurors. After the validation, the test instrument was revised.

A test-retest method was conducted to the 33 college students who were not the subjects of the study and with the same characteristics as the actual respondents.

Table 3. Reliability test using pearson r correlation

		post test
pre test	Pearson Correlation	.728
	p-value	.000
	N	33

Correlation is significant at 0.05 level (2-tailed).

Based on the result of Pearson r correlation, given the p-value of 0.00 which is less than 0.05 revealing a significant result, implies that there is a significant relationship between the members of the dry run group which means the questionnaire established high reliability.

At the onset of the experiment, the freshmen students who were to participate in the study were grouped into the control and experimental groups. They were equated on the basis of their grades in Natural Science 1 and age.

Their means and standard deviations were computed and the significance between means was tested through the t-test. No significant difference were found between the experimental and control groups when they were compared as to grade and as to age, so they were

equated. After they were equated, both groups were briefed and were given careful instructions on procedures to be observed as follows:

A. Modular Instruction (Experimental group). At the start of the experiment, the students were given the direction on how to use the module. Each student was provided with a material. Since this teaching strategy is an individualized instruction, the module was designed for effective self-learning. Students progress according to their own pace. The instructional material begins with an introduction, general and specific objectives.

The module also presented program requirements or the pre-requisite knowledge and learning skills, the time frame, the learning episodes and the procedure on how to use the module. Furthermore, the material provides the basic information and fundamental development of theoretical and conceptual skills. Included in the module are exercises and individual and group activities.

Topics are presented in small segments where the learner can answer each bit in the lesson before going to the next learning task. The module begins with a pre - test and ends with a post - test to check students mastery of the concepts and skills developed within the lesson. A pre-test of 30-items were given to the students before they go through the activities. They were made to write their responses on a separate answer sheet. The score obtained in the pre-test determined their learning needs while the post-test described their delayed recall and mastery of the lesson. Before the start of the study, the students in modular group were briefed as to the purpose of the experiment, strict implementation and safe keeping of the modules for the validity of the results.

They were also urged to cooperate to the fullest to avoid possible leakage of information which can spoil the experiment. To avoid such, the module was distributed to every student gradually based on the topic or as the time needs. The post - test was checked by the students with the presence of the teacher, using the key to correction found at the last pages of the module. After which, the lessons in the module has started and ended with learning activities and exercises which were designed to assess the students learning skills.

B.   Lecture-Discussion Approach (Control group). The control group was teacher-directed. The teacher gave a brief introduction about the contents of the topic and suggested various reference books and textbooks for students' use. Students were then required to go through the relevant pages of these books and come prepared for discussion of the topics on a specified day. The topic of discussion was announced to the students well in advance. The teacher motivated the students and guided their thinking. The comprehension of the class was promoted through lectures and discussion using chalk and board and other teaching media such as DLP Projector. They were directed to take down notes while the teacher did lectures and discussions.

The control of time and the span of the lesson were dependent on the teacher. Students learning were measured through class participation, individual and group activities and daily quizzes.

The students were given their own photocopies of the handouts which contain textual information if necessary especially when they are required to answer their assignments. They were asked to copy the written instructions on the blackboard. The reference materials and the sequence of lessons used by the teacher were also the same as those students in the experimental group except on the design of the instructional material used. The same quizzes, pre and post-experiment and periodic tests were given to the two groups of students except on the use of modules.

Figure 2 shows the schedule of the pre - tests and post - tests, interval of days, weeks and the number of months it took for the conduct of the experiment. The legend consists of different colors which correspond to the schedule of implementation shown in the chart.

Week	November					December					January				
	M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F
1	9		11		13										
2	16		18		20										
3	23		25		27										
4								2		4					
5						7		9		11					

6						16		17								
7																2
8												5		7		9
9												12				

Figure 2. GANTT chart for the pre-test and post-test performance of the experimental and control groups

Total number of days: 22 meetings.

Legend:

      ■ = Pretest and Post-test in Lessons 1-6 in biology

      □ = Implementation of Module in biology (21 hours from November 9, 2009 to January 12, 2010.)

As shown in the figure, at the start of the 2nd semester, the implementation of Modular instruction in biology started on November 9, 2009. The pre –test of the two groups was given on that day, the post – test was given after the completion of the six lessons. There were 21 meetings or 21 hours spent for the experiment which maximized the required number of hours and days for the mid-term of the 2nd semester. Biology is offered to the freshmen Business Management students in the second semester for three (3) hours or for three (3) meetings per week. As indicated in the chart, January 14 and 15, 2010 were scheduled for the mid-term exam based on the College calendar.

Statistical Treatment

1. To determine the level of the pre-test and post-test performance of freshmen fishery students on modular instruction and lecture-discussion approach made use of the mean and standard deviation.

2. To determine the significant difference in the pre-test and post-test performance between freshmen fishery students on modular instruction and those on lecture-discussion approach made use

of the t-test for independent sample.
3. To determine the significant difference between the pre and post test performance of the experimental group, the t-test was used for independent sample.
4. To determine the significant difference between the pre and post-test performance of the lecture-discussion (control) group, the t-test was used for independent sample.

RESULTS AND DISCUSSION

1. The pre-test performance of students using modular instruction in terms of theoretical knowledge in lessons 1-6 is lower compared to the mean observed in the pre-test performance of the control group. The pre-test performance of both groups was interpreted as fair. the mean scores equivalent were computed based on the approved grading system of the College, as stated in Circular No. 15, Series 1961.

Table 4. Level of pre-test performance of the experimental and control groups

treatment	m	interpretation	sd
modular	2.95	fair	.24121
lecture-discussion	2.80	fair	.25510

As reflected in the table, the performance of the participants in terms of theoretical knowledge shows that the experimental group got a mean of 2.95 which described their performance as Fair in the pre-test, while the control group obtained a mean of 2.8 which also described their performance as Fair in the pre-test. This shows that the two groups similarly performed in the pre-test.

Psychological and educational testing depends almost entirely upon the phenomenon of individual differences and therefore upon variance. The significance of any score is ordinarily its usefulness in placement of a person somewhere in the group. The standard deviation

therefore describes the spread or scatter of a certain sample from a point of reference which is usually the mean.

The standard deviation of both groups show a certain extent of homogeneity as they are not too far spread, the difference between the standard deviations of both being approximately 0.05.

It may also be further observed from their mean grades that the lecture – discussion group scored higher and obtained a better rating in the pre – test than the modular group even if the verbal descriptions of their scores are the same.

2. The post-test performance of students using modular instruction in terms of theoretical knowledge in lessons 1-6 was superior while the post - test performance of students on lecture - discussion was very good. Students on modular instruction performed better than the students taught using the lecture-discussion approach.

Table 5. Level of post-test performance of the experimental and control groups

A post – test was administered to the participants in the study after 22 days of the experiment, which period constituted the mid – term period of the semester in which the study was conducted.

treatment	m	interpretation	sd
modular	1.50	superior	.30825
lecture-discussion	1.90	very good	.33400

Table 5, shows that the experimental group got a mean of 1.5 which described their performance as Superior, while the control group obtained a mean of 1.9 which described their performance as Very Good. This shows that the experimental group performed better than the control group.

Based on these results, it can be seen that modular instruction brought about better performance and therefore better learning of students than the lecture – discussion approach.

3. The null hypothesis stating that there is no significant difference on the pre-test performance between the modular and lecture-discussion group was rejected, since results showed a significant difference between the two groups.

As shown in Table 6, when the pre-tests of the two groups in lessons 1-6 were compared, the computed probability value is lesser than the 0.05 level, indicating that the difference was in favor of the lecture – discussion group who had the higher mean score, indicating that their prior knowledge was better than that of the experimental group prior to the experiment.

This result, led the researcher to reject the hypothesis, which stated that no significant difference exists between the pre – test performance of the modular and the lecture - discussion groups.

Table 6. Difference in the pre - test performance between the students on modular instruction and lecture - discussion.

Group	df	M	SD	t-value	t-prob	Interpre-tation	Decision
Modular		2.95	.24				
	64			2.777	.007	Signifi-cant	Reject Null Hypothesis
Lecture Discussion		2.80	.25				

p < .05 significant at .05 alpha

4. The null hypothesis stating that there is no significant difference on the post-test performance of the modular and lecture-discussion group was rejected, since results showed a significant difference between the two groups.

Table 7 shows the computed t - value of – 4.711 at df 64 at .05 level, the result yielded a significant difference in favor of the experimental group. This means that the group taught by the modular approach performed better than the group taught by the lecture-discussion

method on the basis of the post-test results pertaining to Lessons 1-6.

In addition, the results also revealed the effectiveness of the modules augmenting instruction and improving the theoretical knowledge of the learners. This module provided for both the teacher and students varied activities required in designing novel materials for instruction. This learning package comprises concepts, activities both for theoretical and manipulative skills. Every activity is provided with strategic procedure at the end of every lesson. Its component has concretized pretty well the principle of allowing each student to proceed at his/her own pace. In this study, the use of module was considered as reinforcement in teaching biology. With the help of the teacher and modules, every student was provided with wider opportunities to learn in terms of theoretical knowledge in lessons 1-6.

Table 7. Difference in the post-test performance between the students on modular instruction and lecture - discussion.

Group	df	M	SD	t-value	t-prob	Interpre-tation	Decision
Modular		1.5	.31				
	64			-4.711	.000	Signifi-cant	Reject Null Hypothesis
Lecture Discussion		1.9	.33				

$p < .05$ significant at .05 alpha

In addition, the results also revealed the effectiveness of the modules augmenting instruction and improving the theoretical knowledge of the learners. This module provided for both the teacher and students varied activities required in designing novel materials for instruction. This learning package comprises concepts, activities both for theoretical and manipulative skills. Every activity is provided with strategic procedure at the end of every lesson. Its component has concretized pretty well the principle of allowing each student to proceed at his/her own pace.

In this study, the use of module was considered as reinforcement

in teaching biology. With the help of the teacher and modules, every student was provided with wider opportunities to learn in terms of theoretical knowledge in lessons 1-6.

Based on this result, hypothesis 2 which postulated that no significant difference exists between the two compared groups was rejected.

5. The null hypothesis stating that there is no significant difference between the pre and post-test performance of the modular group was rejected, since results showed a significant difference between the two tests.

As shown in Table 8, results of the statistical analysis on the pre-test and post-test of the experimental group by the use of the t – test yielded the t – value of 20.992 with df at 64, at .05 level, this indicated a significant difference in favor of the post – test, affirming the improvement in the performance of the students in biology who were taught by modular instruction in Lessons 1-6.

Table 8. Difference in the pre-test and post-test
performance of experimental group

Type of test	df	M	SD	t-value	t-prob	Interpre-tation	Decision
Pre-test		2.95	.24				
	64			20.992	.000	Signifi-cant	Reject Null Hypothesis
Post-test		1.5	.31				

p < .05 significant at .05 alpha

These findings further revealed that the experimental group learned better after the intervention of modules in terms of theoretical knowledge. Students learned better with the use of modules since they were provided with sequential topics and activities wherein previous topics could be reviewed many times as they wanted. The concepts and theories were well defined with illustrations and concrete examples in

terms of graphical representations of vague ideas. The teacher took over when confusions arose.

Questions were entertained to cater to query and immediate reinforcement was then established. Through the help of a module, absenteeism with valid reasons was solved since all the topics discussed could be read and understood even without the teacher.

This finding led to the rejection of hypothesis 3 which stated that no significant difference exists between the pre – test and post – test performance of the experimental group.

6. The null hypothesis stating that there is no significant difference between the pre and post-test performance of the lecture-discussion group was rejected, since results showed a significant difference between the two tests.

Table 9. Difference in the pre-test and post-test performance
of the control group

Type of test	df	M	SD	t-value	t-prob	Interpretation	Decision
Pre-test		2.8	.26				
	64			12.136	.000	Significant	Reject Null Hypothesis
Post-test		1.9	.33				

p < .05 significant at .05 alpha

As shown in Table 9, the computed t – value arrived at was 12.136 with df of 64 at .05 level, this value indicated a significant difference between the two groups. This means that there was improvement in the performance of the students in Biology from the pre – test to the post – test.

Based on the pre-test and post-test results in theoretical knowledge from lessons 1-6, the control group has shown improvement after the lecture - discussion method. This means that this method of teaching also offered good results. The teacher in the lecture-discussion method provided the control group available perspective about the subject

matter in times of difficulties. The teacher illustrated clear examples for the students who needed vivid and concrete examples and ideas. Students in this group were provided with handouts and lectures to clarify abstract and complex ideas into simple form. The handouts contained textual information with the same topics as the experimental group.

Based on the obtained result, hypothesis 4 which postulated that no significant difference exists between the pre – test and post – test performance of the control was rejected.

Altogether, biology teachers involving the module represent well the emerging nontraditional and unconventional teaching styles.

This type of instruction easily breaks the space-time syndrome closely related to traditional teaching of Biology –in which both the teacher and students stayed together in the classroom, at the same time in order that the teaching-learning process can conveniently proceed. Under the modular instruction, students can continue learning by themselves even without the presence of the teacher.

A study conducted by Silkwood (2000) contradicts with the findings of Mijares, Agpaoa, Cenarosa, Solano, and Haneghan where his findings imply no significant difference between the modular taught section and the traditionally taught section. The performance of the two groups failed to be statistically significant and gave no support on the effectiveness of modular teaching method while the study conducted by Maximo as cited by Mijares (2008), Agpaoa (2006), Riasat (2005), Cenarosa (2005), Solano (2003), and Haneghan as cited by Halpern (2002) which concentrated on the development of modules focused on their respective specification which aimed to achieve quality education, supports the findings of this research study. They found out that experimental group obtained better performance than the control group in their post-test mean score results. This suggests that modular instruction is far better than the traditional methods of teaching.

CONCLUSIONS

Both the experimental and control groups were similar with fair performance on the pre-test. The modular group performed better in the post - test than the control group. The post-test results confirmed the advantage of using modular instruction over lecture-discussion approach in teaching Biology. This result led the researcher to conclude that using the modular instruction in Biology brings about better students' performance than using the lecture-discussion method since modular instruction allows students to learn at their own pace and according to their individual capacities. Generally, modular instruction is a more effective teaching-learning process for Biology course compared to lecture-discussion method since modular instruction provides students with an opportunity to learn at their own pace and according to their ability level and need. In spite of the fact that students in the modular approach outscored the students working in the lecture-discussion method, there are still factors to be considered on the performance of students like their background regarding the basic knowledge of the subject.

RECOMMENDATIONS

It is hoped that this teaching-learning innovation would give ideas to teachers to help them design instructional modules to produce quality graduates both in education and technology courses. Furthermore, the insights which the students may gain from experience can be translated into a more sensitive understanding of the learning process.

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