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RESEARCH ARTICLE

PROPOSED INSTRUCTIONAL MATERIALS IN TEACHING BIOLOGICAL TECHNIQUES.

Dr. Nerrie E. Malaluan, Dr. Erma M. Alcayde.

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Corresponding Author

Nerrie E. Malaluan.

Abstract

The study was undertaken to assess the teaching of Biological Techniques in College of Teacher Education (CTE) at Batangas State University System. It specifically covered the identification and assessments of the current instructional materials being utilized by faculty in teaching the different topics in Biological Techniques. The study also looked into the problems met by faculty in handling the subjects which served as bases data for conceptualization of proposed instructional materials in teaching Biological Techniques.

The descriptive method of research was used with the questionnaire as the main data gathering instrument. Eighteen CTE faculty who are teaching Biological Techniquesserved as the respondents of the study. No sampling was applied in determining the respondents. Frequency, percentage, ranking and weighted mean were the statistical tools used in quantifying the data gathered.

Results of the study revealed that the instructional materials in teaching Biological Techniques like power point presentations and videos are very often used by science teachers. All the teachers assessed that the instructional material used in teaching Biological Techniques as attained to a very great extent. Moreover, science teachers strongly agree that lack of appropriate textbook for the course and inadequate activities were the problems in teaching Biological Techniques. The proposed instructional materials when used may enhance students' learning in Biological Techniques.

It was recommended in the study that the proposed instructional may be presented to the Book and Instructional Material Committee of the University. Moreover, it was recommended the proposed instructional materials may be used in all Campuses of Batangas State University to make the teaching of Biological Techniques effective and a similar study may be conducted focusing in other areas in Science.

Introduction:-

Education is a crucial factor in improving the quality of people's life. It is imperative then, that the people be equipped with knowledge and skills in facing the challenges of the times. The world today talks about global competitiveness and need for an educational system that will drive people to excel. It appears that it is technology that will raise the Philippines to the highest level of prosperity.

The educational system is considered one of best vehicles in development. In fact, an important aim of the program, Philippines 2000 is the development of education through improvement of instruction. Administrators had implemented and tried out various innovations but because of the fast changing development in this field, the educational system is still faced with a very crucial problem, that of producing quality students.

To maintain the vision of science education, change is needed in the entire system. This can be done with the help of the teachers. They are central to education, but they must not be placed in the position of being solely responsible

for reform. Teachers will need to work within a collegial, organizational and policy context that is supportive of good science teaching. In addition, students must accept and share responsibility for their own learning.

In the vision of science education, effective teachers of science should create an environment in which the students work together as active learners while students are engaged in learning about the natural world and scientific concepts expand their knowledge about science . Teachers then must have the theoretical and practical knowledge as well as the abilities to effectively go about science learning and science teaching processes.

Whatever the intended changes in science teaching are, the teacher in any level of education has to face the day to day challenges of using varied teaching techniques and strategies that will make science learning more meaningful to the students. In order to achieve the goals in science education, science teachers are needed to be more flexible in their teaching strategies and methodologies. They, therefore, must be abreast of the continuing changes and innovations in the classroom teaching and the outside world.

Teaching can only be effective and student learning is enhanced when teachers set clear learning objectives and have instructional activities to support these learning objectives. Goal-oriented practice and assessments are important to provide opportunities for students to demonstrate and practice the knowledge and skills articulated in the objectives, and for instructors to offer targeted feedback that can guide further learning.DepEd Memo.99 s. 2010 stated that the science teachers should enhance their skills in writing research and investigatory projects, enriching the curriculum through content and teaching strategies, and developing instructional materials to enhance quality learning interaction in the classrooms.

As science learning may not at times interesting to students, they need instructional materials to be motivated. Instructional materials are aids in the transfer and in the learning of subject matter. They are forms of communication and must therefore be delivered in a manner that is equally effective for learners. The goal of the instructional materials is to enhance the content knowledge, as well as the thinking skills and problem solving abilities of students. They also encourage learning among students through promotion of positive dispositions toward science and technology and of themselves as learners. Considering the benefits of instructional materials, the teacher as the class facilitator needs to use instructional materials.

As mentioned by Rojas (2001), science and technology is the key to achieve progress and its primary aim is to help Filipino learners gain a functional understanding of scientific concepts and principles linked with real life situations. Students are helped to acquire scientific skills, attitudes and values necessary to analyze and solve daily problems. With this, acquisition of modern science equipment, facilities and other instructional materials in schools are important.

It has been observed, however, that despite efforts to improve science instruction, there is low performance in science. The main factors which can be cited to account for the low performance in science of the Filipino students include the lack of science culture and deficiencies regarding the school curriculum, the teaching learning process, instructional materials and teacher training. One of the roots of the unsatisfactory achievement of the students is the congested curriculum. Other aggravating problems are the lack of textbooks and other instructional materials, lack of science equipment and poorly equipped laboratory rooms.

It is for this reason that the National Science Education standards require that science teachers make use of science tools and instructional materials, media and technological resources accessible to students. Furthermore, the standards require that instructional materials be developed on the bases of the interests, knowledge, understanding, abilities, needs and experiences of the students. Depending on the delivery method, creating new instructional materials may be the most expensive stage of the process. Video and multimedia tend to be particularly expensive media to produce, but even a good print package or thoroughly prepared instructor-led course will involve a great deal of time and thought.

The researchers who are currently employed at the Batangas State University have become more aware on the performance of the Biological Science major students and experienced that the uses of varied instructional materials consume time in preparation of materials rather than mastering the subject matter. There are decisions to be made in selecting materials to provide specific scientific skills and knowledge to the learners. The researchers' quest to maximize the teaching- learning process and in their desire to contribute to the development of professionals who

are highly skilled in science and technology, attempted to work on instructional materials to reinforce and enhance the learning of science concepts and at the same time to solve the problems met by teachers when it comes to instructional materials.

The researchers believe that this instructional material in Biological Techniques will facilitate the teaching and learning of science and technology and also create interest and enthusiasm to both the students and teachers.

Methodology:-

The descriptive method of research was adopted with the aid of researcher's made questionnaire as the primary tool in gathering data. Eighteen Values teachers who are teaching in the first year level served as the respondents of the study. No sampling was applied in determining the respondents. Frequency, percentage, ranking and weighted mean were the statistical tool used in quantifying the data gathered.

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Results and Discussions:-

Instructional Materials Used in Teaching Biological Techniques in the College of Teacher Education

The different instructional materials currently used by the respondents in teaching Values Education were determined in this study. These are shown in Table 1.

Table 1:- Instructional Materials Currently Utilized in Teaching Biological Techniques

Instructional Materials	Weighted Mean	Verbal Interpretation	Rank
1. Textbooks	2.26	Sometimes	5
2. Laboratory Manual/ workbook	2.39	Sometimes	6
3. Flat displays(flip charts, wall charts, poster)	3.49	Often	3
4. Transparencies	2.5	Often	4
5. Power Point presentations	3.58	Very Often	1
6. Videos	3.45	Very Often	2
Composite Mean	2.95	Often	

As reflected in the table, teachers used the powerpoint presentations very often in teaching Biological Techniques. It obtained an average weighted mean of 3.58 which ranked first among the six items. Teachers disclosed that they presented the lessons using powerpoint presentation for the students to easily understand the step by step procedures in preserving biological specimens.As cited by Woolfolk's(2007) study the instructional materials are effective in delivering quality education and are used by educators in motivating learners and audio-visual materials can promote the most effective kind of learning.

The teachers cited further that they used videos very often as justified in average weighted mean of 3.45 and ranked second in the rank order distribution. This means that the respondents also used videos as a supplementary material in teaching Biological Techniques for the students to actually see the proper way of doingthe different techniques. This is relative to Heard's (2002) concept that video technology is another valuable tool for instruction as it can demonstrate, explains, and replay data.

On the other hand, textbooks were sometimes used by the respondents with weighted mean of 2.26, ranked fifth. It indicates that only some of the teachers used textbook because there is no available textbook in the subject which are based in the competencies in the syllabus that they used. As such the students are required to do some research using the internet for references. This finding is in contrast to Siscar's (2009) study which revealed that science teachers used text books in teaching as one of the instructional materials.

Given the lowest rating by the respondents was the used of laboratory manual and work book which was assessed as sometimes utilized reflected in average weighted mean of 2.39. Presumably, only few teachers have this kind of instructional materials due to unavailability of manual in this area of science.

Summing up, the average composite mean of 2.95 was an indication that science teachers often utilized instructional materials in teaching the subject. This implies that they believed that there will be effective teaching learning processes if they use various multisensory instructional materials like textbooks, workbooks and others. Such

materials can substitute for first hand experiences and enhance understanding, so that they become an integral part of the learning activity.

Assessment of the Existing Instructional Materials:-
The science teachers assessed the existing instructional materials being used in presenting the different topics in Biological Techniques. These are shown in Table 2.
Table 2:- Assessment of the Existing Instructional Materials.

Instructional Materials	Weighted Mean	Verbal Interpretation	Rank
1. Are relevant to the course content	3.68	To a Very Great Extent	5
2. Are made, clear, simple and easy to understand by the students	3.80	To a Very Great Extent	2
3. Entirely suited to specific purpose of the course	3.82	To a Very Great Extent	1
4. Suitable for the level and type of students	3.15	To a Great Extent	12
5. Increase student's awareness and appreciation to the topic	3.74	To a Very Great Extent	3
6. Encourage and stimulate student's development of critical thinking	3.65	To a Very Great Extent	7
7. Enhance student's multiple intelligences	3.36	To a Great Extent	10
8. Provide a common experiences for all students	3.60	To a Very Great Extent	8
9. Develop intellectual capability	3.71	To a Very Great Extent	4
10. Provide relevant preparation on the subject matter	3.5	To a Very Great Extent	9
11. Provide wide learning competencies	3.67	To a Very Great Extent	6
12. Contain clear and helpfully work out examples	3.33	To a Great Extent	11
Composite Mean	3.59	To a Very Great Extent	

Allthe teachers assessed that the instructional material used in teaching Biological Techniques as attained to a very great extent. They were entirely suited to specific purpose of the course with a weighted mean of 3.82; are made, clear, simple and easy to understand by the students with a weighted mean of 3.80; increase student's awareness and appreciation to the topicwith a weighted mean of 3.74; develop intellectual capability with a weighted mean of 3.71; are relevant to the course content with a weighted mean of 3.68; provide wide learning competencieswith a weighted mean of3.67; encourage and stimulate student's development of critical thinkingwith a weighted mean of3.67; provide a common experiences for all studentswith a weighted mean of 3.60; and provide relevant preparation on the subject matterwith a weighted mean of 3.36. One possible reason for the high assessment was the teachers were able to utilize the available instructional materials effectively because they are presented within the level of intelligence of the first year college students.

There were three items which were assessed as attained to a great extent. These were: enhance student's multiple intelligences with a weighted mean of 3.36; contain clear and helpfully work out examples with a weighted mean of 3.33; and suitable for the level and type of students with a weighted mean of 3.15. The respondents observed that the instructional materials made the students interested and able to understand science concepts and principles.

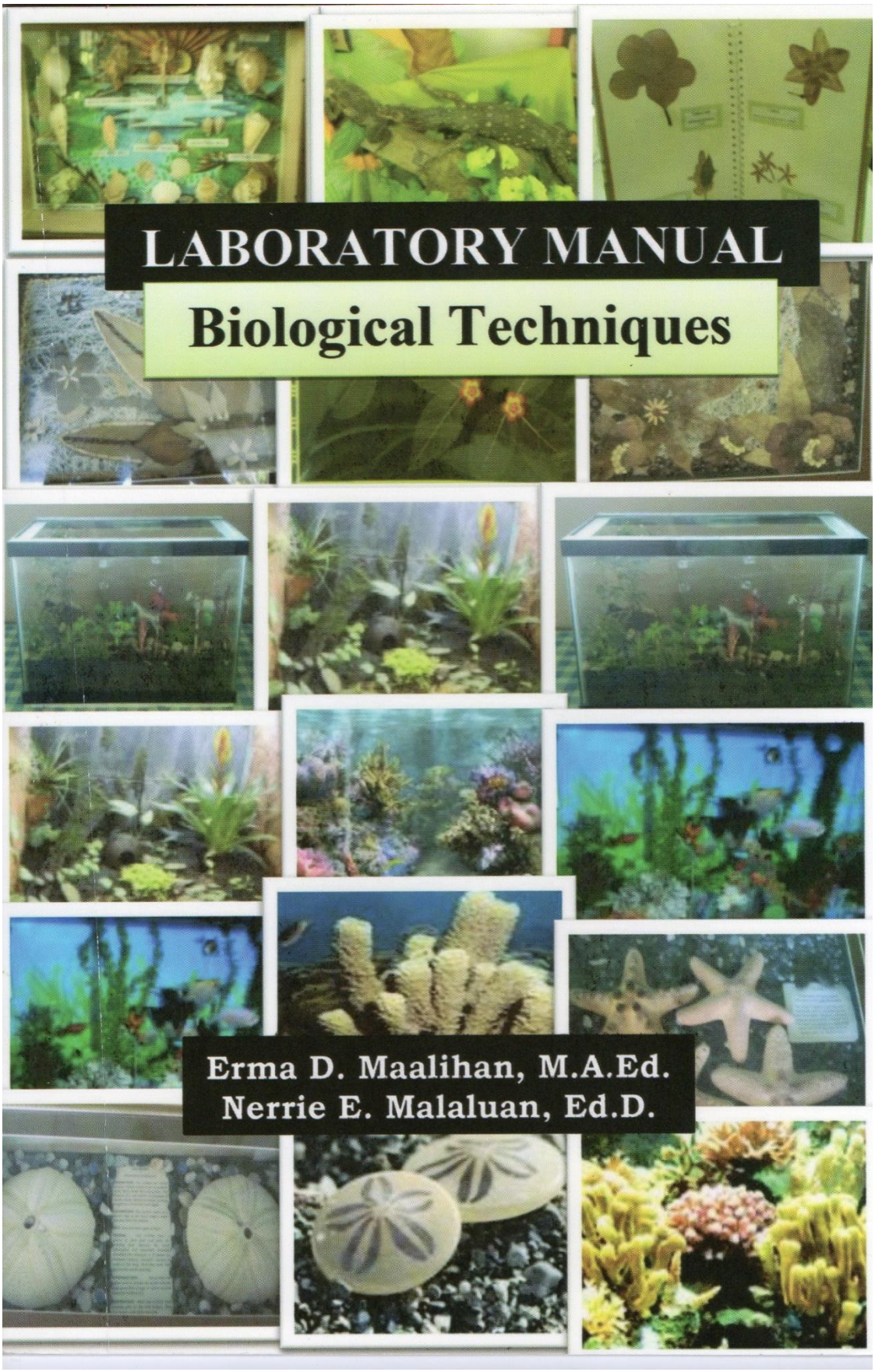
The average composite mean of 3.59 showed that the science teachers assessed the instructional materials to a very great extent. This finding implied that the purpose of using the instructional materials greatly help the students understand the application of science concepts and principles. This result is in agreement with Libid's (2000) idea that instructional materials arouse the interests of learners that make science learning more effective.

Problems Met by Faculty in Biological Techniques:-
Table 3 presents the problems encountered by science teachers in teaching Biological Techniques.

Table 3:- Problems Met by Faculty in Biological Techniques.

Instructional Materials	**Weighted Mean**	**Verbal Interpretation**	**Rank**
1. Lack of appropriate textbook for the course	3.58	Strongly Agree	1
2. Limited instructional materials	3. 50	Strongly Agree	3
3. Inadequate activities for students	3.56	Strongly Agree	2
4. Lack of laboratory equipment and materials	2.30	Disagree	6
5. Lack of supplies and chemicals to be used to apply the different biological techniques	2.49	Disagree	5
6. Difficulty in encouraging students to participate in class discussions and activities	1.5	Disagree	7
7. Difficulty in preparing activities to attain the desired objectives of the lesson	3.49	Agree	4
8. I have a little interest to teach the subjects	1.49	Strongly Disagree	8
9. I can't fully understand the concepts and principles	1.38	Strongly Disagree	10
10. I find the subject very difficult to teach	1.29	Strongly Disagree	9
Composite Mean	2.50	Agree	

As reflected in the table, the respondents agree on the problems met in teaching Biological Techniques. Topping the items was lack of appropriate textbook for the course. It obtained a weighted mean of 3.58. The result infers need for adequate and appropriate book for the subject. The respondents also agreed that inadequate activities were also one of the problems they met, this got a weighted mean of 3.50. Apparently, these problems and their solutions are in teacher's hands. But these are easier said than done. Some of the respondents experienced that they had less time to prepare activities to explain comprehensively difficult topics due to lack of sources or references. This is similar to Donquines' (2005) study that teachers find difficulty in giving different activities to students because of limited time.


LABORATORY MANUAL
Biological Techniques
Erma D. Maalihan, M.A.Ed.
Nerrie E. Malaluan, Ed.D.

Proposed Instructional Materials in Teaching Biological Techniques:-

The proposed supplementary material containslectures that will enable students to learn, explore, experience, love and live science. It also contains different laboratory activitiesto provide varied opportunities for teachers and students to maximize and make science learning more meaningful and relevant. These activities are meant to enhance the cognitive and critical thinking skills of the students to the content at the same time these can promote interactions and positive social skills. When students work cooperatively on the tasks, quality results will be achieved. Through hands-on experiences, students will make science learning genuine, exciting and entertaining.

The researcher believes that the proposed instructional material will be very helpful to Biological Techniques teachers since the topics included are those that appeared in the approved syllabus for the subject.

Conclusions:-

From the findings of the study, the following conclusions are drawn.

1. The instructional materials in teaching Biological Techniques like Power Point Presentations and Videos are very often used by science teachers.
2. All the teachers assessed that the instructional material used in teaching Biological Techniques as attained to a very great extent.
3. Science teachers strongly agree that lack of appropriate textbook for the course and inadequate activities were the problems in teaching Biological Techniques.
4. The proposed instructional materials when used may enhance students' learning in Biological Techniques.

Recommendations:-

From the findings and conclusions of the study, the following recommendations are offered:

1. The proposed instructional may be presented to the Book and Instructional Material Committee for evaluation.
2. The proposed instructional materials may be used in all Campuses of Batangas State University to make the teaching of Biological Techniques effective.
3. A similar study may be conducted focusing in other areas in Science.

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