

Supplementary Materials for Least Mastered Competencies in Teaching Biology 10

Brent Rza G. Aragon, L.P.T.

brentrza.aragon@deped.gov.ph
 Public School Teacher, Sta. Catalina Integrated National High School, Majayjay, Laguna, 4005, Philippines

Abstract

The main purpose of this study is to further elicit the use of supplementary materials for least mastered competencies in teaching Biology 10. This specifically aims to answer the level of acceptability of supplementary materials in teaching Biology, students' mean performance in Biology 10, and the significant difference between the students' mean performance in Biology 10 in terms of pre-test and post-test.

The present study used the descriptive quantitative research method in gathering information. The scope of this study is centered only on measuring the acceptability of supplementary materials for least mastered competencies in teaching Biology 10. The data and information were gathered by using a survey questionnaire composed of 35 questions that are answered by the 130 grade 10 students from Sta. Catalina Integrated National High School as respondents of this study. The researcher also conducted a pre-test and post-test before and after the use of supplementary materials.

Moreover, the primary data-gathered instrument used was a questionnaire with a 5-point Likert Scale with ratings of (5) Strongly agree, (4) Agree, (3) Moderately agree, (2) Disagree, and (1) Strongly disagree. Weighted Mean and Standard Deviation were used to determine the level of acceptability of supplementary materials in teaching Biology 10. In addition, paired t-test will be used to determine the significant difference in the students' mean performance in Biology 10.

The overall results of the study revealed that the supplementary material for Biology 10 is very high. Specifically, the content, design adaptability, suitability, and usability, having an overall mean of 4.32, 4.34, 4.29, and 4.40 and 4.32 respectively, indicates that it received positive feedback from the students and can be effectively used for teaching Biology 10.

Similarly, the students' mean performance in Biology 10 in terms of Pre-test was very satisfactory with a mean score of 31.47 and a standard deviation of 2.18. As for the Post-test, the students performed on an outstanding level, with a mean score of 34.17 and a standard deviation of 2.72. Findings show that from the very satisfactory it became outstanding, meaning that students learned from the lesson using the supplementary materials.

Furthermore, there is an observed significant difference between the tests. This is evidenced by the computed t statistic which is -8.843, which implied that the post-test scores were higher than the pre-test scores due to the negative result. Additionally, the computed t-statistic is beyond the critical t-value of 1.979 and the computed p-value is less than the significance alpha of 0.05, hence the significance of the test.

Based on the data gathered in this study, the researcher arrived at the conclusion that the null hypothesis stating that "There is no significant difference on the students' performance in Biology 10 in terms of pre-test and post-test" is rejected which calls for the acceptance of the alternative hypothesis.

Keywords: Least Mastered Competencie; Supplementary Material; Teaching Biology

1. INTRODUCTION

Covid-19 Pandemic had brought drastic changes in the Philippine education system, schools shifted from the traditional face to face to blended distance learning. One of the major concerns to these new normal modalities is enhancing the performance of the students in the least learned competencies. As education drives to shift our society, everyone has been forced to adapt in a new normal. Educators are challenged to modify new teaching strategies that were able to sustain the needs of the learners. Agree, educators should not only focus on giving the students the materials that mainly came from the Department of Education (DepEd), they should at least try to look for other resources and instructional materials to provide more effective learning.

In connection with this Oclarit (2017) stated that despite the lack of environment, the need of students to be often exposed to experimental practices still plays an important role. The incorporation of innovative techniques such as technology integration in teaching-learning processes, specifically in science will help them to experience these activities in a distinctive way.

Moreover, Stickler et al, (2010) explained that with the advent of ICT, the teaching and learning process now provides an interactive knowledge atmosphere with the use of abstract subject animations and simulations, where students become violent in their learning and providing students with opportunities to create and grasp complex concepts more clearly, especially in science.

Furthermore, not only with the use of technological tools but also giving additional resources will also help the students to study their lesson more proficiently. Supplementary material is a ubiquitous feature of scientific articles, particularly in journals that limit the length of the articles. While the judicious use of supplementary material can improve the readability of scientific articles, its excessive use threatens the scientific review process and by extension the integrity of the scientific literature. (Pop and Salzberg, 2015)

Other supplementary materials such as games and visual materials could also help students in learning Biology. In addition, the students perceive the technical details and jargons to be complex. This perception hinders the learning process. The Comic strips gives life to the abstract nature of theoretical concepts. Thus, by the addition of comic book as a supplementary element, we add fun element to the teaching-learning process. This brings in greater involvement of students. During the course of the experiment, it is observed that, the recall rates of students exposed to comic strips has been better or comparable to the students taught using existing methodology, the comic strip as a supplement adds fun element to the teaching-learning process. (Ganesh, 2017)

In line with the discussion above, the researcher wants to further elicit the use of supplementary materials for least mastered competencies in teaching Biology 10 which was acquired from the test results of Grade 10 learners from Sta. Catalina Integrated National High School from school years 2018-2019, 2019-2020, and 2020-2021. The topics are (1) Role of Hormones in the Male and Female Reproductive System; (2) The Nervous System; (3) Protein Translation; (4) Evidences of Evolution; and (5) Population Growth and Carrying Capacity.

1.1 Objectives of the Study

This study aimed to determine the acceptability of the supplementary materials in teaching Biology 10. Specifically, it sought to answer the following questions:

1. What is the level of acceptability of supplementary materials in teaching Biology 10 in terms of:
 - 1.1 content;
 - 1.2 design?;
 - 1.3 adaptability?;
 - 1.4 suitability?; and
 - 1.5 usability?
2. What is student's mean performance in Biology 10 in terms of:
 - 2.1 Pre-test; and
 - 2.2 Post-test?
3. What is student's mean performance in Biology 10 in terms of:
 - 3.1 Pre-test; and
 - 3.2 Post-test?

2. METHODOLOGY

2.1 Research Design

The research was administered using quantitative type of research. Specifically, the researcher created and stylized a questionnaire type of descriptive quantitative research - the Likert scale to be specific. This simply enabled researcher to gather information from the chosen respondents without the respondents having any difficulties in answering the questions required for the researcher to have information regarding the acceptability of the supplementary material in teaching Grade 10 Biology. The independent variables consist of Supplementary material and the dependent variable consist of acceptability of supplementary materials in teaching Biology 10 in terms of content, design, adaptability, suitability and usability and the student's performance which will be based on pre-test and post-test.

Based on the procedure stated above, the researcher was fully convinced that quantitative research was essential to the kind of investigation he ventured to undertake.

As gleaned from the statement by Bhandari (2021) , a quantitative research is the process of collecting and analysing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

2.2 Respondents of the Study

The respondents that were used in the study were the one-hundred thirty (130) grade 10 students from Sta. Catalina Integrated National High School. In selecting the respondents, the researcher used the random sampling technique.

2.3 Research Instrument

In order to collect data needed, research instruments were used. Questionnaires will be use to gather information from the respondents. It includes questions/ statements about the acceptability of supplementary materials in teaching Biology

10. Questionnaire is answerable by using rate scale or the respondent rate. It used to gather the data that were assessed by the grade 10 students from Sta. Catalina Integrated National High School.

In the questionnaire, a five-point rating scale indicated below was used to determine of the selected respondents.

| Point | Range | Remarks | Verbal Interpretation |
|-------|-------------|------------------|-----------------------|
| 5 | 4.20 – 5.0 | Strongly Agree | Very High |
| 4 | 3.40 – 4.19 | Agree | High |
| 3 | 2.60 – 3.39 | Moderately Agree | Moderately High |
| 2 | 1.80 – 2.59 | Disagree | Low |
| 1 | 1.00 – 1.79 | Strongly Agree | Very Low |

For the completion of the supplementary material (module), some major information was gathered from the Grade 10 Learners' Material provided by the Department of Education. Moreover, various reliable internet resources and instructional videos from different video platform like YouTube and Vimeo were taken into consideration. Furthermore, using the Learner's Packet prepared and crafted by several instructors and educators from Region IV-A (CALABARZON) was used as guide. All of the information gathered from the aforementioned sources were compiled, and arranged out by the researcher. After this, he used Canva, an online editing platform for creating the cover, design and other visual and aesthetic aspects of the module.

Upon crafting the supplementary material, science teachers, together with the researcher's head teacher, were asked to validate its content. Errors and major modifications were considered and corrected. This also served as the signal to start the distribution of the module, which was then used and validated by the respondents.

In the construction of the questionnaire described above, an extensive review of various books, publications, and internet sites was used. An initial draft of the research tool was prepared and presented to the professors and panel members for comments and suggestions. Validation was done to assess the representation of the items with those of others dealing with the same area of investigation. The assistance of the adviser relevant to the content of the questionnaire was solicited.

The final form of the questionnaire will be reproduced and administered to the respective respondents.

For the creation of the questionnaire, extensive readings and researches from different published and unpublished materials from the internet sites were done. Before having the its final version, an initial draft was created and presented to the panel members for suggestions. Moreover, this was also assessed and validated by the researcher's department head teacher. This process was carried out to compare the items' representation to that of others working on the same topic. The adviser's assistance with the content of the questionnaire was requested.

2.4 Statistical Treatment

The statistical treatment of data was used to compute then analyze and interpret the data given by the respondents. After administering the questionnaire to the respondents, all the data were gathered, analyze and interpreted. The responses was tabulated using google forms as the basis for the statistical treatment of the data. To analyze and interpret the data gathered, the following statistical tools will be utilized in the study.

To determine the level Contactless Interactions in terms of Instructions, Feedback and Support, Learning Resources, Performance Assessment and Performance Monitoring. The Mean and Standard Deviation were used.

To determine the level of Students Remote Learning Tasks in terms of Aesthetic Sensitivity, Knowledge and Practice of Sports, Motor and Sports Skills and Performance Tasks. The Mean and Standard Deviation were also used.

To determine the level of Performance in Physical Education in terms of grades. The frequency and percentage were used.

To determine the significant relationship between Contactless Interactions to the Students Remote Learning Tasks. The Pearson Product-Moment Correlation Coefficient was used.

To determine the significant relationship between Contactless Interactions to the Performance in Physical Education. The Pearson Product-Moment Correlation Coefficient was also used. To compute, analyze, and interpret the data provided by the respondents, statistical data treatment was used. All of the data was gathered, analyzed, and interpreted after the respondents completed the questionnaire. The gathered data were tabulated, and interpreted with the help and utilization of the following statistical tools.

Mean and standard deviation have been used to determine the level of acceptability of supplementary materials in teaching Biology 10. The computation of the Mean was used to convert the responses into scores as basis for determining the verbal interpretation as scaled into five optional answers while the use of standard deviation was used to have a better idea on how the data entries differ from the mean.

Paired t-test will be used to determine the significant difference in the students' mean performance in Biology 10.

3. RESULTS AND DISCUSSION

This section contains the data that was collected, statistically treated, presented, analyzed in tables, and interpreted in relation to the study's problems and hypotheses. The findings were presented in the order in which the study's research questions were posed.

Level of Acceptability of Supplementary Materials in Teaching Biology 10

The research was made to investigate the acceptability of the supplementary material (module). This was done through a series of questions via a questionnaire and it comprises seven variables to be examined – in terms of content, design, adaptability, suitability, and usability. Furthermore, the results of the research were validated by having the pre-test and post-test scores of the respondents.

Table 1 shows the Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Content. It presents the statements, mean, overall mean, standard deviation, remarks and verbal interpretation in terms of Content.

Table 1. Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Content

| STATEMENT | MEAN | SD | REMARKS |
|---|------|------|----------------|
| 1. Language used is understandable and specific. | 4.51 | 0.59 | Strongly agree |
| 2. Meaningful information regarding the topic is directly provided. | 4.43 | 0.61 | Strongly agree |
| 3. Instrument's length and level of complexity are appropriate for the users. | 4.19 | 0.64 | Agree |
| 4. Information is effective and helpful to complete the given task. | 4.34 | 0.60 | Strongly agree |
| 5. The organization of information is clear. | 4.38 | 0.64 | Strongly agree |
| 6. Topics are relevant to daily activities of the learner. | 4.29 | 0.60 | Strongly agree |
| 7. Content is present in creative way and motivate students to explore. | 4.15 | 0.61 | Agree |

Overall Mean = 4.32

Standard Deviation = 0.62

Verbal Interpretation = Very High

Table 1 illustrates the level of acceptability of supplementary materials in teaching Biology 10 in terms of Content. Among the statements above, "Language used is understandable and specific" yielded the highest mean score ($M=4.51$, $SD=0.59$) and was remarked Strongly agree. This is followed by "Meaningful information regarding the topic is directly provided" with a mean score ($M=4.43$, $SD=0.61$) and was also remarked Strongly agree. On the other hand, the statement "Content is present in creative way and motivate students to explore" received the lowest mean score of responses with ($M=4.15$, $SD=0.61$) and was remarked Agree.

Overall, the level of acceptability of supplementary materials in teaching Biology 10 in terms of Content attained a mean score of 4.32 and a standard deviation of 0.62 and was Very High among the students.

Content of the supplementary materials may be sufficient, enough and useful for the respondents. Finding shows that it is rated very high which implies that the language used is understandable, the information in the module is meaningful, effective and helpful, the topics are arranged clearly and the ideas and information are presented clearly. Specifically, the numerical result on the level of acceptability of the supplementary materials in teaching Biology 10 in terms of content means that the information and ideas are all relevant and useful for teaching Biology.

Table 2 shows the Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Design. It also presents the statements, mean, overall mean, standard deviation, remarks and verbal interpretation in terms of Design.

Table 2. Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Design

| STATEMENT | MEAN | SD | REMARKS |
|--|------|------|----------------|
| 1. Construction of materials are well organized. | 4.47 | 0.57 | Strongly agree |
| 2. Sequence of materials (lesson, activities and tasks) are well designed. | 4.44 | 0.63 | Strongly agree |
| 3. Patterns are used to make a more precise version for the learners. | 4.01 | 0.59 | Agree |
| 4. The design of the modules is designed according to the course curriculum. | 4.44 | 0.62 | Strongly agree |
| 5. Lessons and task are appropriately made for the users. | 4.46 | 0.57 | Strongly agree |
| 6. Activities are aligned with the course and help students mastered various topics in Biology. | 4.40 | 0.63 | Strongly agree |
| 7. Design comprising of differentiated instructions and task that can enhance learner's knowledge and mastery of the lesson. | 4.19 | 0.63 | Agree |

Overall Mean = 4.34

Standard Deviation = 0.61

Verbal Interpretation = Very High

Table 2 illustrates the level of acceptability of supplementary materials in teaching Biology 10 in terms of Design. Among the statements above, “Construction of materials are well organized” yielded the highest mean score ($M=4.47$, $SD=0.57$) and was remarked Strongly agree. This is followed by “Lessons and task are appropriately made for the users” with a mean score ($M=4.46$, $SD=0.57$) and was also remarked Strongly agree. On the other hand, the statements “Patterns are used to make a more precise version for the learners” and “Design comprising of differentiated instructions and task that can enhance learner’s knowledge and mastery of the lesson” received the lowest mean score of responses with ($M=4.01$, $SD=0.59$) and ($M=4.19$, $SD=0.63$) and was remarked Agree.

Overall, the level of acceptability of supplementary materials in teaching Biology 10 in terms of Design attained a mean score of 4.34 and a standard deviation of 0.61 and was Very High among the students.

Design is interchangeably connected to creativity, but unlike creativity, design focuses on the inside part of the product including the patterns, strategies and layout used to create more effective instructional materials. Respondents give possible feedback on how the researcher used techniques and prioritize the design being connected to the course curriculum. It showed that the construction of materials and its sequence are well-organized, based on the course curriculum, is appropriate for the learners and the activities are well-aligned with course and will help them achieve mastery of the topic. Overall, the result implies that the design of the supplementary materials is aligned with the needs of the students.

On the other hand, the table below shows the Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Adaptability. The table also shows the statements, mean, overall mean, standard deviation, remarks and verbal interpretation in terms of Adaptability.

Table 3. Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Adaptability

| STATEMENT | MEAN | SD | REMARKS |
|---|------|------|----------------|
| 1. Provide the needs of the learner despite of the current educational system. | 4.42 | 0.57 | Strongly agree |
| 2. Address prior problems encountered by the students and help them learn with their own paced. | 4.47 | 0.55 | Strongly agree |
| 3. Let the students evaluate their progress and self-reflect on their needs. | 4.42 | 0.58 | Strongly agree |
| 4. Contains activities that are responsive and interactive. | 4.02 | 0.64 | Agree |
| 5. Topics are break evenly so that learners will not be bombarded with the lessons they have. | 4.15 | 0.61 | Agree |
| 6. Use activities that are timely and suitable for the target learners. | 4.16 | 0.60 | Agree |
| 7. Enable the learners to control their own knowledge of system and learn through the additional supplementary materials given. | 4.44 | 0.57 | Strongly agree |

Overall Mean = 4.29

Standard Deviation = 0.59

Verbal Interpretation = Very High

Table 3 illustrates the level of acceptability of supplementary materials in teaching Biology 10 in terms of Adaptability. Among the statements above, “Address prior problems encountered by the students and help them learn with their own paced” yielded the highest mean score ($M=4.47$, $SD=0.55$) and was remarked Strongly agree. This is followed by “Enable the learners to control their own knowledge of system and learn through the additional supplementary materials given” with a mean score ($M=4.44$, $SD=0.57$) and was also remarked Strongly agree. On the other hand, the statements “Contains activities that are responsive and interactive” received the lowest mean score of responses with ($M=4.02$, $SD=0.64$) and was remarked Agree.

Overall, the level of acceptability of supplementary materials in teaching Biology 10 in terms of Adaptability attained a mean score of 4.29 and a standard deviation of 0.59 and was Very High among the students.

Since learning modalities changed due to pandemic, addressing the needs of the students in the education also became hard. To the great extent, that all of the instructional materials, teaching strategies and even the resources need to adapt in the new normal. The response of the students in terms of design are varied and may differ depending on their own experience using the supplementary materials. Specifically, based on the numerical results, it was revealed that the supplementary material provides the needs of the learner despite of the current educational system, addresses prior problems encountered by the learners, lets them assess and evaluate their progress and it enables them to control their own knowledge of system and learn through the additional supplementary materials given.

Table 4 shows the Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Suitability. The table also shows the statements, mean, overall mean, standard deviation, remarks and verbal interpretation in terms of Suitability.

Table 4. Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Suitability

| STATEMENT | MEAN | SD | REMARKS |
|--|------|------|----------------|
| 1. Content formats are planned and designed according to the needs of the students. | 4.44 | 0.61 | Strongly agree |
| 2. Provides adequate information that are needed by the learners. | 4.40 | 0.63 | Strongly agree |
| 3. Gives clarification on the lessons and/or topics that are least mastered by the students. | 4.39 | 0.59 | Strongly agree |
| 4. Provides information that caters the needs of the students. | 4.38 | 0.59 | Strongly agree |
| 5. Deliver knowledge that are clear, precise and easy to understand. | 4.41 | 0.64 | Strongly agree |
| 6. Forego the very traditional learning system and uses interactive activities which will help students learn more. | 4.40 | 0.58 | Strongly agree |
| 7. Uses real-world examples and hands-on activities so that learners are able to experience learning more efficiently. | 4.39 | 0.62 | Strongly agree |

Overall Mean = 4.40**Standard Deviation = 0.61****Verbal Interpretation = Very High**

Table 4 illustrates the level of acceptability of supplementary materials in teaching Biology 10 in terms of Suitability. Among the statements above, "Content formats are planned and designed according to the needs of the students" yielded the highest mean score ($M=4.44$, $SD=0.61$) and was remarked Strongly agree. This is followed by "Deliver knowledge that are clear, precise and easy to understand" with a mean score ($M=4.41$, $SD=0.64$) and was also remarked Strongly agree. On the other hand, the statements "Provides information that caters the needs of the students" received the lowest mean score of responses with ($M=4.38$, $SD=0.59$) and was remarked Strongly agree.

Overall, the level of acceptability of supplementary materials in teaching Biology 10 in terms of Suitability attained a mean score of 4.40 and a standard deviation of 0.61 and was Very High among the students.

The result of the study shows that the developed supplementary materials is suitable for teaching Biology. Moreover, based on the numerical results, it implies that the supplementary material evaluated shows positive outcome in terms of its content format which were designed and planned according to the needs of the students. Also, the provided adequate information that are needed by the learners is appropriate, gives clarification on the lessons and/or topics that are least mastered, provides information that are clear and precise, foregoes the very traditional learning system and uses interactive activities which will help students learn more. And lastly, shows real-world examples and hands-on activities so that learners are able to experience learning more efficiently. Overall, it means that the developed material can be helpful for teaching Biology in non-traditional face-to-face classes. However, it only depends on the choice of the instructor/teacher to make use of the mentioned module in teaching least mastered competencies in Biology 10.

Table 5 shows the Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Usability.

Table 5. Level of Acceptability of Supplementary Materials in Teaching Biology 10 in terms of Usability

| STATEMENT | MEAN | SD | REMARKS |
|---|------|------|----------------|
| 1. Usable according to the learning target | 4.38 | 0.60 | Strongly agree |
| 2. Teachers can appropriately use it to teach Biology. | 4.49 | 0.59 | Strongly agree |
| 3. Provides additional information that can help students learn more about Biology. | 4.39 | 0.58 | Strongly agree |
| 4. Comprises with activities and content needed for the deeper understanding of the lesson. | 4.48 | 0.57 | Strongly agree |
| 5. Allow the students to explore and learn more facts about the courses. | 4.01 | 0.60 | Agree |
| 6. Provides specific language that are easy to understand. | 4.05 | 0.60 | Agree |
| 7. Materials can be used to help students master knowledge specific topics in Biology. | 4.48 | 0.57 | Strongly agree |

Overall Mean = 4.32**Standard Deviation = 0.59****Verbal Interpretation = Very High**

Table 5 illustrates the level of acceptability of supplementary materials in teaching Biology 10 in terms of Usability. Among the statements above, "Teachers can appropriately use it to teach Biology" yielded the highest mean score ($M=4.49$, $SD=0.59$) and was remarked Strongly agree. This is followed by "Comprises with activities and content needed for the deeper understanding of the lesson" and "Materials can be used to help students master knowledge specific topics in Biology" with a mean score ($M=4.48$, $SD=0.57$) and were also remarked Strongly agree. On the other hand, the statement "Allow the students to explore and learn more facts about the courses" received the lowest mean score of responses with ($M=4.01$, $SD=0.60$) and

was remarked Strongly agree. Overall, the level of acceptability of supplementary materials in teaching Biology 10 in terms of Usability attained a mean score of 4.32 and a standard deviation of 0.59 and was Very High among the students

Answers of the respondents are very diverse wherein there are some statements that they remarked as high and some others are very high. It further implicit that the usability of supplementary materials may varied depending on the how the respondents perceive its uses.

Table 6 presents the Students' Mean Performance in Biology 10 in terms of Pre-Test and Post-test.

Table 6. Students' Mean Performance in Biology 10 in terms of Pre-Test and Post-test

| RANGE | PRE TEST | | POST TEST | | REMARKS |
|------------------------------|-----------|-------------------|-----------|-------------|---------------------------|
| | FREQUENCY | PERCENTAGE | FREQUENCY | PERCENTAGE | |
| 33 to 40 | 46 | 35.38 | 86 | 66.15 | Outstanding |
| 25 to 32 | 84 | 64.62 | 44 | 33.85 | Very Satisfactory |
| 17 to 24 | 0 | 0.00 | 0 | 0.00 | Satisfactory |
| 9 to 16 | 0 | 0.00 | 0 | 0.00 | Fairly Satisfactory |
| 0 to 8 | 0 | 0.00 | 0 | 0.00 | Did Not Meet Expectations |
| Total | 130 | 100.00 | 130 | 100.00 | |
| Overall Mean | | 31.47 | | 34.17 | |
| Standard Deviation | | 2.18 | | 2.72 | |
| Verbal Interpretation | | Very Satisfactory | | Outstanding | |

As per the pre-test, out of one hundred thirty (130) respondents, eighty-four (84) attained scores between 25 to 32 which was very satisfactory. The remaining forty-six (46) obtained scores between 33 to 40 which was outstanding.

As per the Post-test, out of one hundred thirty (130) students, eighty-six (86) were able to score between 33 to 40 which was outstanding. The remaining 33.85% of the population or forty-four (44) respondents scored between 25 to 32 which was very satisfactory.

Overall, the students' mean performance in Biology 10 in terms of Pre-test was very satisfactory with a mean score of 31.47 and a standard deviation of 2.18. As for the Post-test, the students performed on an outstanding level, with a mean score of 34.17 and a standard deviation of 2.72.

It is very noticeable that there are changes in the pre-test and post-test conducted by the researcher. Finding shows that from the very satisfactory it became outstanding which means that students learned from the lesson using the supplementary materials.

Table 7 shows the Significant Difference between the Students' Mean Performance in Biology 10 in terms of Pre-Test and Post-test.

Table 7. Significant Difference between the Students' Mean Performance in Biology 10 in terms of Pre-Test and Post-test

| Performance | Mean | Variance | t-statistic | Critical t | p-value | Analysis |
|-------------|--------|----------|-------------|------------|---------|-------------|
| Pre-Test | 31.469 | 4.732 | -8.843 | 1.979 | 0.000 | Significant |
| Post-test | 34.169 | 7.382 | | | | |

In table 7, there is an observed significant difference between the tests. This is evidenced by the computed t statistic which is -8.843. This implies that the Post-test scores were higher than the pre-test scores due to the negative result. Furthermore, the computed t statistic is beyond the critical t-value of 1.979 and the computed p-value is less than the significance alpha of 0.05, hence the significance of the test.

From the findings above, we can infer that at 0.05 level of significance, the null hypothesis "There is no significant difference on the students' performance in Biology 10 in terms of pre-test and post-test" is rejected. This calls for the acceptance of the alternative which incites that there is a significant difference between the two.

As mentioned above, finding reveals that there are changes in pre-test and post-test conducted by the researcher. In connection with this, the result of the study also presents that there is a significant difference between the two. This may further imply that the supplementary materials helped the students to learn and gain knowledge in least mastered competencies in Biology 10.

4. CONCLUSION AND RECOMMENDATION

On the basis of the foregoing findings, the following conclusion was drawn.

The result of the study reveals that there is a significant difference between the pre-test and post-test. Changes on the students' scores is highly varied. Thus, the researcher further concluded that the null hypothesis stating that "There is no

significant difference on the students' performance in Biology 10 in terms of pre-test and post-test" is rejected which calls for the acceptance of the alternative hypothesis.

Recommendations

In light of the conclusion drawn from the findings, the following recommendations are hereby given.

1. The school should support the development of other supplementary materials that could possibly help the teachers to sustain the learning of the students in the new learning modalities.
2. The enhancement in terms of adaptability, content and usability of the supplementary materials should be given focus. Additional learning activities that are interactive may help in stimulating the learner's interest on studying their lesson.
3. The teachers continuously engage their students in different alternative learning materials that could help them cultivate their own knowledge and learning experiences using these educational materials.
4. Test the effectivity of the supplementary materials in other aspects of learning. It may use for other variables such as cognitive ability of the students, student's academic performance and so much more.

5. ACKNOWLEDGMENTS

The author would like to express his heartfelt gratitude to those who contributed to the success of this study. With respect, he would like to acknowledge the following:

First of all, to our **GOD ALMIGHTY**, without him, this research would not be achievable and possible; **Laguna State Polytechnic University**, for the unforgettable experience of worthwhile studying; **Hon. Mario R. Briones, EdD**, University President, for his dedication and boundless service to Laguna State Polytechnic University; **Rosario G. Catapang, PhD**, Associate Dean of the College of Teacher Education, Laguna State Polytechnic University for her support and guidance; **Regine E. Gloria, PhD**, research adviser, for her incomparable suggestions, assistance and guidance from the start to the completion of the study; **Vilma M. Geronimo, PhD**, technical editor, for her worthy and constructive suggestions to finish the study. **Julie Rose P. Mendoza, EdD**, subject specialist for her guidance in accomplishing the study; **A/P Marie Ann Gonzales**, internal statistician, for assistance for checking the computations and interpretations of the study; **Benjamin O. Arjona, EdD**, external statistician, for giving his dedication in computing and giving the results and data of the study; **Dr. Nimfa Dimaculangan PhD**, for correcting the language of the research manuscript; **Dr. Michael William Puna III, PhD**, external panel for the extended review and check technical terms used in the study; **Nenita B. Evasco**, the School Head of Sta. Catalina Integrated National High school, for her permission to become respondents of the study; **Students of Sta. Catalina Integrated National High School** for their unselfish and wholehearted cooperation shown when distributing and answering the questionnaire; **Sta. Catalina Integrated National High School Family** for supporting him to continue accomplishing his research; **Mr. Neil John R. Zarzua, Mr. Jasper Niel V. Ramirez and Mr. Mark Vincent M. Arasa** for helping the researcher throughout the research; Ever supportive and loving family, **Mrs. Rosalie G. Aragon, Mr. Ronald C. Aragon, Gza Loureen G. Aragon, John Reakwon G. Aragon, and Marion Shyheim G. Aragon**, for their encouragement and concern when the researcher is having difficulty with his study; **Vichelle E. Acejo**, for her undying support, love and inspiration throughout the researcher's study; To his classmates, for their support, encouragement and never-ending love while doing and finishing his research.

6. REFERENCES

- Abbasi, K., et. Al., (2013). The effect of learning via module versus lecture teaching methods on the knowledge and practice of oncology nurses about safety standards with cytotoxic drugs in Shiraz University of Medical Sciences. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3917132/>
- African Literature Reviews 2020. Content and style in Literature. Retrieved from <https://africanliteraturereviews.wordpress.com/content-style-in-literature/>
- Alelaimat, A. R. (2012), The Effect of Educational Modules Strategy on the Direct and Postponed Study's Achievement of Seventh Primary Grade Students in Science, in Comparison with the Conventional Approach. Retrieved from https://www.google.com/url?sa=t&source=web&rct=j&url=https://files.eric.ed.gov/fulltext/EJ1081470.pdf&ved=2ahUKEwj3pd29qqrwAhXvw4sBHwBQBc8QFjAAegQIAxAC&usq=AOvVaw2kOArROj_tSICnRWoRoGh9
- Barnau, A. & Džuganová, B. 2017. The Effects of Captioning Videos on Learning English for Special Purposes. Retrieved from https://scholar.google.com/scholar?hl=tl&as_sdt=0%2C5&q=Barnau+and+D%2C5%BEuganov%C3%A1+2017&btnG=#d=gs_qabs&u=%23p%3DEIHrYSa0ecUJ
- Bajrami, Menduh (2020). The Use of Supplementary Materials for Teaching High School Students in EFL. Retrieved from: <http://anglisticum.org.mk/index.php/IJLLIS/article/view/2133>
- Boisestate University (n.d.) Using a modular approach to course design. Retrieved from <https://www.boisestate.edu/ctl-idea/teaching-with-tech/primer/using-a-modular-approach-to-course-design/>
- Bujosa, M., Howard, M., Mcneill, K. and Loper, S. (2017). Designing and using multimedia modules for teacher educators: Supporting teacher learning of scientific argumentation. Retrieved from <https://d-miller.github.io/DRK12/topic1/8407.pdf>
- Butcher, C., Davies, C. And Highton, M. 2019. Designing learning: from module outline to effective teaching. Retrieved from https://scholar.google.com.ph/scholar?hl=tl&as_sdt=0%2C5&as_vis=1&scioq=%22literature+study%22+usability+of+mobile+aplications&q=designing+modules+for+learning&oq=designing+mod#d=gs_qabs&u=%23p%3DwmAmQB9j18J

- Cahyaningrum, D., Wahyuni, D., & Sulistyawati, H. (2016, January). Supplementary Materials Based on Constructivism Principles for Students' Effective Learning. In *Proceeding of International Conference on Teacher Training and Education* (Vol. 1, No. 1).
- Cohn C. 2016. Understanding Content Strategy Terms Clearly Retrieved from: <https://www.compukol.com/understanding-content-strategy-terms-clearly/>
- Danielson, J. 2014. Is the effectiveness of lecture capture related to teaching approach or content type?. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0360131513003011>
- Elcomblus Staff. (2020). The outcomes of student learning. Retrieved from <https://www.elcomblus.com/the-outcomes-of-student-learning/>
- Foss, K., Seals, C., Hague, D., and Mitek, A., (2021). The Effectiveness of Supplementary Materials in Teaching the Veterinary Neurologic Examination. Retrieved from: <https://jvme.utpjournals.press/doi/abs/10.3138/jvme-2021-0014>
- Galih I. et al. 2019. of student work sheets based on analogy content in physical learning to improve critical thinking ability of high school students Informative, Interesting, Relevant: Three Rules for Creating Quality Content in Digital Marketing. Retrieved from: https://www.huffpost.com/entry/informative-interesting-r_b_4914330
- Ganesh, L. (2017). The Effect of Comic Strips as a Supplementary Material to Teach Computer Networks. Retrieved from <https://ieeexplore.ieee.org/abstract/document/6751091>
- Habte, A. (2016). The development of supplementary materials for English language teaching in a scarce resource environment: an action research study. Retrieved from: <https://etd.uwc.ac.za/handle/11394/7387>
- Hanim F. et. al. 2017. The Effect of Students' Worksheet Based on Skill of Science and Motivation Process toward Learning Outcomes at Grade 4 SDNegeri 164330 Tebing tinggi. Retrieved from: <http://www.iosrjournals.org/iosr-jrme/papers/Vol-7%20Issue-5/Version-7/I0705075761.pdf>
- Hwang, I., Tam, M., Lam, S. and Lam, P. (2018). Review of Use of Animation as a Supplementary Learning Material of Physiology Content in Four Academic Years. Retrieved from <https://www.academic-publishing.org/index.php/ejel/article/view/1644>
- Johnson A. And Jones C. 2019. Content Relevance and Usefulness: Why You Need It and 4 Ways to Achieve It. Retrieved from: <https://review.content-science.com/content-relevance-and-usefulness-why-you-need-it-and-4-ways-to-achieve-it/>
- Lasquite, M. 2016. Visual Literacy and Visual Communication: Their Role in Today's Content Marketing. Retrieved from https://visme.co/blog/visual-literacy-visual-communication-content-marketing/?fbclid=IwAR2dO43GBAySBW7Z4slCVLTTrzt0QneZLnZygeLQtpUh5CS_37xW-dylovI
- Logan, R., Johnson, C. and Worsham, J. (2021). Development of an e-learning module to facilitate student learning and outcomes. Retrieved from <https://www.sciencedirect.com/science/article/abs/pii/S1557308720301177>
- Mondal, G. C. & Majumder, P., (2020). Factors that Determine the Choice of Instructional Strategies in Teaching at Secondary Schools, Academia.Edu. Retrieved from: https://www.researchgate.net/publication/344307897_FACTORS_THAT_DETERMINE_THE_CHOICE_OF_INSTRUCTIONAL_STRATEGIES_IN_TEACHING_AT_SECONDARY_SCHOOLS
- Nepomuceno 2016. Development of E-Learning Module. Retrieved from: https://www.researchgate.net/publication/313759438_Development_of_E-Learning_Module_in_Basic_Electricity
- NSU Florida (2020). The Benefits Of Using Supplemental Resources In The Online Classroom, Using Kolb's Experiential Learning Cycle, And Sharing Video In Courses. Retrieved from: <https://www.nova.edu/lec/This-Week-in-the-LEC/2020/June/This%20Week%20In%20The%20LEC%20The%20Benefits%20of%20Using%20Supplemental%20Resources%20in%20the%20Online%20Classroom,%20Using%20Kolbs%20Experiential%20Learning%20Cycle,%20and%20Sharing%20Video%20In%20Courses.html>
- Nurhajati, D. (2016). Project-Based Learning used to develop supplementary materials for writing skill. *The Asian EFL Journal Professional Teaching Articles*, 2, 51-56.
- Nusir, S., Alsmadi, I., Al-Kabi, M., And Shardaqa, F. 2011. Designing an interactive multimedia learning system for the children of primary schools in Jordan. Retrieved from https://scholar.google.com.ph/scholar?hl=tl&as_sdt=0,5&as_vis=1&scioq=%22literature+study%22+usability+of+mobile+applications&qsp=1&q=interactive+multimedia+learning+modules&qst=ib#d=gs_qabs&u=%23p%3DS_26vw3C8kYJ
- Oclarit G. 2017. Effectiveness of Virtual Laboratory as Innovativestrategy in Improving Student's Learning outcomes In *Physic*. Retrieved from: <https://www.academia.edu/35865624/>
- Otjen, J, And Thapa, M. 2014 .Techniques for creating video content for radiology education. *Radiographics*. Retrieved from <https://pubs.rsna.org/doi/abs/10.1148/rg.347130122>
- Pantaleo 2015. Visual Approach Retrieved from https://digscholarship.unco.edu/cgi/viewcontent.cgi?article=1324&context=dissertations&fbclid=IwAR1_WMA1tyOQz_EVTvWL_GM8yxK_PmUuJubp6ctzCYLkU0Epy8F4zz4MWfo
- Peng, Q., Liu, Y. and Gu, P. (2017). Improvement of Product Adaptability by Efficient Module Interactions. Retrieved from <https://asmedigitalcollection.asme.org/IDETC-CIE/proceedings-abstract/IDETC-CIE2014/V004T06A044/253993>
- Perera (n.d.). The Selection and Use of Supplementary Materials and Activities. Retrieved from: <https://www.tktcambridge.com/module-two/the-selection-and-use-of-supplementary-materials-and-activities/>
- Pop, M. and Salzberg, S. (2015). Use and mis-use of supplementary material in science publications. Retrieved from <https://link.springer.com/article/10.1186/s12859-015-0668-z>
- Ramadhan F. and Irwanto A. 2017. Using Virtual Labs To Enhance Students' Thinking Abilities, Skills, And Scientific Attitudes. Retrieved from: <https://www.researchgate.net/publication/326189362>
- Retrieved from: <https://www.oreilly.com/library/view/does-your-content>
- Richards, J. & Rodgers, T., (2014). *Approaches and methods in language teaching*. Cambridge: Cambridge University Press. Retrieved from https://books.google.com.ph/books/about/Approaches_and_Methods_in_Language_Teach.html?id=HrhkAwAAQBAJ&redir_esc=y

- Salame, I. & Nikolic, D., (2021). Examining Some of the Challenges Students Face in Learning about Solubility and the Dissolution Process, *Interdisciplinary J ENV SCI ED*, Volume 17, Issue 3 - In Progress, Article No: e2237. Retrieved from <https://www.ijese.com/article/examining-some-of-the-challenges-students-face-in-learning-about-solubility-and-the-dissolution-9333>
- Spratt, M., Pulverness, A., & Williams, M. (2011). Selection and use of supplementary materials and activities. In *The TKT Course Modules 1, 2 and 3 (TKT Course)*, pp. 161-165). Cambridge: Cambridge University Press. doi:10.1017/CBO9781139062398.027
- Stickler, U. et al 2017. Synchronous communication technologies for language learning: Promise and challenges in research and pedagogy Retrieved from: https://www.researchgate.net/publication/317828426_Synchronous_communication_technologies_for_language_learning_Promise_and_challenges_in_research_and_pedagogy
- Tek Mani Karki (2016). *Supplementary Resource Materials in English Language Classrooms: Development and Implementation*. Retrieved from: <https://www.nepjol.info/index.php/TUJ/article/view/24791/20897>
- Toro, V., et. al., (2019). The Use of the Communicative Language Teaching Approach to Improve Students' Oral Skills. Retrieved from <https://www.google.com/url?sa=t&source=web&rct=j&url=https://files.eric.ed.gov/fulltext/EJ1200055.pdf&ved=2ahUKewjxj4v20KrwAhVFBKYKHWIACB4QFjAAegQIBBAC&usg=AOvVaw0HUpkjQnnjC2M2Q6cVMEDQ>
- Villegas, R., Yang, J., Hong, S., Lin, X. And Lee, H. 2017. Decomposing motion and content for natural video sequence prediction. Retrieved from https://scholar.google.com.ph/scholar?hl=tl&as_sdt=0%2C5&as_vis=1&q=content+of+the+video&btnG=#d=gs_qabs&u=%23p%3DL9iuyxNqKZcJ
- Wasserman J. n.d. 2.4.13 Overview of Learning Activities/ Retrieved from: http://www.pcrest.com/research/fgb/2_4_13.pdf What is content evaluation—and why do it?
- Weller (2021). How to Teach Effectively Using Supplementary Materials. Retrieved from: <https://barefootteflteacher.com/how-to-teach-effectively-using-supplementary-materials-dc22a0153de6>
- Wiley University Services (n.d.). Using Supplemental Resources in the Online Classroom. Retrieved from: <https://ctl.wiley.com/using-supplemental-resources-online-classroom/>