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Using Creative Assessment to Evaluate Learners' Performance in Science 10

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Abstract

This study sought to ascertain the usefulness of picturesque evaluation in gauging students' intellectual progress in Science 10. Additionally, this study sought to ascertain the pre-test and post-test results of the students in the control and experimental groups with regard to coordinated nervous, endocrine, and reproductive system functions, synthesis and mutation, biodiversity and evolution, and ecosystem; to ascertain whether there is a significant difference in the post-test results of the control and experimental group; and to ascertain the implications of picturesque assessment in measuring t. Six (6) sections of grade 10 with forty-five (45) each were enrolled in San Antonio National High School for the academic year 2021–2022, and the study was conducted using an experimental research design. The performance of the students was assessed using a test created by the teacher and approved by a group of professionals. The respondents' ratings for the conventional and picturesque assessments were determined by the study using descriptive statistics like mean and frequency distribution. The possibility of a significant difference between the test results of the two groups exposed to each assessment instrument was also examined using the T-test. The coordinated activities of the neurological, endocrine, and reproductive systems, protein synthesis and mutation, biodiversity and evolution, and ecology all showed a substantial difference between the control and experimental groups. Additionally, it shown how picturesque assessment shows a considerable improvement in gauging pupils' performance achievements.

Keywords: Academic performance, assessment, picturesque, science 10, visual representation

Introduction

"The utilisation of scientific knowledge improves living standards and satisfies many fundamental human needs, which is why society values it" (Rull, 2014).

According to DepEd Order No.43, s. 2013, "The science curriculum in the Philippines for grades 1–10 aims to create environmentally conscious, technologically educated, and productive citizens. They must have strong interpersonal, lifelong learning, communication, and scientific attitudes and ideals. These abilities will be learned through a curriculum that emphasises knowledge applicable to the actual world and incorporates inquiry-based learning strategies".

"The implementation of K–12 basic education programmes aims to provide Filipino students with the knowledge and abilities they will need to meet the challenges of the twenty-first century" (DepEd Order No. 21 s. 2019).

The implementation of the programme includes classroom evaluation. It enables educators to monitor and assess students' progress and modify their training as necessary. According to DepEd Order No.31 s. 2020, alternative methods and strategies for assessing and supporting learning are needed in remote learning and blended learning in order to foster growth and mastery. The MPS (Mean Percentage Score) on a test is used to gauge how much fundamental education is improving in each school. A MPS score less than 75% indicates that the pupils' test results do not meet the upper average because 75% is the national accomplishment objective set by the department of education and is the standard criterion.

San Antonio National High School is categorized as the main school in San Antonio, Quezon with more than 1,800 enrolees. In the case of 305 grade 10 students from the previous school year (2020-2021), the average MPS was only 56.44%. According to the national education testing and research center, an MPS ranging from 35% to 65% has a descriptive equivalent of average performance. The result from the previous year indicates that SANHS did not achieve the national standard set by the DepEd and in the division of Quezon. Various programs and interventions such as enrichment activities, training of teachers, and providing relevant learning materials have been tried to improve the performance of the learners but the result only showed slight improvement.

Objectives of the Study

The purpose of this study was to:

1. Ascertain the pre-test and post-test results of the students in the control and experimental groups with regard to coordinated nervous, endocrine, and reproductive system functions; synthesis and mutation; biodiversity and evolution; and ecosystem;
2. Ascertain whether there is a significant difference in the

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post-test results of the control and experimental group; and
3. Ascertain the relevance of picturesque assessment in measuring the learning outcomes.

Methodology

The researchers employed an experimental design. The point of the study was to examine any observed discrepancies between the experimental and control groups. The group participants are formed by random assignments. The control group used the conventional method of assessment while the experimental group used a picturesque assessment. All groups are given the same set of lessons discussed with the same set of learning competencies to attain comparable results. Determine if there is a significant difference in the performance of the students when grouped according to conventional and picturesque assessments.

The respondents of the study belong to the grade 10 classes who are enrolled in San Antonio National High School during the school year 2021-2022. The researchers use six (6) sections of grade 10 with forty-five (45) students each. All groups composing heterogeneously students were all of the same age and level in terms of prior knowledge of the topics covered in grade 10 Science

A teacher-made test is the primary instrument of this study. It consists of sixty (60) items pre-test and post-test adjacent to the competency for the third quarter of the K-12 science curriculum guide. It is divided into four (4) units; Coordinated Functions of the Nervous, Endocrine Reproductive Systems; Protein Synthesis and Mutation; Biodiversity and Evolution; and Ecosystem comprises 15 items each.

Phase I. *Preliminary Stage.* In this part, the study is conducted by seeking the necessary permission from the school authority. Upon approval, the researchers proceeded to the actual phases of the study.

Phase II. Facilitating Learning. In this phase, a pre-test is conducted to assess the prior knowledge of the students. The test instruments are validated by the external validators comprising Science teachers, English teachers, Headteachers, Master teachers, and Research specialists. After the completion of the pre-test, the teacher proceeds to the implementation of the lesson. The researchers developed a weekly home learning plan (WHLP), modular learning activities, and performance tasks for the topic which is based on the most essential learning competencies (MELCs) and budget of works (BOW) reflected in pivot 4A and K-12 curriculum guide in science. The lesson covered the concepts for the third quarter that will be divided into four units; Coordinated Functions of the Nervous, Endocrine Reproductive Systems, Protein Synthesis and Mutation, Biodiversity and Evolution, and Ecosystem.

Phase III. Gathering of data for Statistical Analysis. At the end of each unit, two groups of students will take a post-test. The control group will use the conventional method of assessment and the experimental group will use a picturesque assessment. The data gathered will undergo statistical analyses and interpretation.

The collected data is subjected to different statistical measures and tools to help the researchers in presenting, analyzing, and interpreting the data gathered.

Descriptive statistics such as mean and frequency distribution are used to determine the scores of the respondents subjected to the assessment tools.

Results and Discussion

Table 1: Pre-test Results for the Two Groups of Science 10 Students

Pre-test Scores	Unit 1. Coordinated Functions of the Nervous, Endocrine & Reproductive Systems		Unit 2. Protein Synthesis and Mutation		Unit 3. Biodiversity and Evolution		Unit 4. Ecosystem	
	A	B	A	B	A	B	A	B
13-15	1	0	4	11	0	0	0	0
10-12	8	22	14	34	8	21	2	2
7-9	40	52	25	39	28	40	23	37
4-6	66	49	63	38	53	52	64	64
0-3	20	12	29	13	46	22	46	32
Mean Scores	5.79	6.08	5.69	7.77	4.79	6.25	4.41	5.08

Table 1 shows the result of the mean and distribution of pretest scores of the two groups of students employed in science 10. It reveals that most of the students from the two groups under the topic of coordinated functions of the nervous, endocrine and reproductive systems, protein synthesis and mutation, biodiversity and evolution, and ecosystem fall under developing with mean and raw scores of 4 to 6. However, 52 and 39 students in the experimental group in Units 1 and 2, respectively, fall under approaching proficiency with raw scores of 7-9. At the developing level, students exhibit initial awareness of different concepts and ideas about the topic. On the other hand, approaching proficiency, students develop fundamental knowledge, skills, and core understanding but still find it hard to apply their knowledge to come up with concrete reasoning.

During the conduct of the study, students were subjected to a multiple-choice type of test that was divided into four units. The result implies that most of the students appeared to have limited knowledge of many scientific terms mentioned about the topic. And they still find it hard to fully grasp the concepts included in each unit.

Table 2: Post-test Scores of the Two Groups of Students in Science 10

Pre-test Scores	Unit 1. Coordinated Functions of the Nervous, Endocrine & Reproductive Systems		Unit 2. Protein Synthesis and Mutation		Unit 3. Biodiversity and Evolution		Unit 4. Ecosystem	
	A	B	A	B	A	B	A	B
13-15	20	95	26	84	6	64	1	104
10-12	38	34	45	41	40	53	41	14
7-9	51	6	32	7	52	16	45	11
4-6	25	0	28	3	35	2	42	6
0-3	1	0	4	0	2	0	6	0
Mean Scores	9.13	12.98	9.34	12.58	8.28	11.98	7.73	12.80

The table reveals the mean and distribution of post-test scores of the control and experimental groups employed in science 10. It shows that upon the exposure of the two groups of students to conventional and picturesque assessment, significant improvements occurred which led them to reach approaching proficiency and proficiency level.

In the topic that involves coordinated functions of the nervous, endocrine and reproductive systems, the majority of the students that were subjected to conventional assessment obtained scores that fall under approaching proficiency. However, most of the students exposed to picturesque assessment attained outstanding levels with raw scores of 13 to 15 and a mean score of proficient with 12.98. This means that this group developed visual thinking that helps them to better understand and associate ideas, words, and concepts with images. In the questions about organ systems, students were able to identify the functions of each part and describe how the nervous system coordinates and regulates feedback mechanisms. According to Buckley et.al (2020), incorporating visual representation into practice creates stimulating learning experiences for learners.

In the assessment about protein synthesis and mutation, most of the students who were subjected to the conventional type of test achieved a proficient level. On the other hand, the majority of students exposed to the picturesque assessment are found to be at an outstanding level. This reveals that visual representation allows the students to look at the problems differently in a way that they will understand. During the conduct of the study, it was observed that through pictures and images students were able to contextualize the ideas and comprehend better, particularly in determining the amino acid sequence.

In the topic that involves biodiversity and evolution, most of the students engaged in conventional assessment obtained scores that fall under approaching proficiency. Conversely, the majority of the students subjected to picturesque assessment attained scores in outstanding level. It can be inferred that this group process the information using significant representation to arrive at the correct and precise analysis. In the conduct of the study, by replacing plain text with images students were able to determine the physical features of the organisms, identify how organisms changed over time, and recognize evidence that supports the theory of evolution.

Conclusions

Based on the data gathered, the following conclusions are drawn

1. The majority of the students from the two groups scored on the pre-test that fall under developing as to coordinated functions of the nervous, endocrine, and reproductive systems, protein synthesis and mutation, biodiversity and evolution, and ecosystem.
2. The majority of the control group students received post-test results that are close to proficiency. The majority of the experimental group's students, however, are discovered to be performing at an exceptional level in every course.
3. The coordinated activities of the neurological, endocrine, and reproductive systems, protein synthesis and mutation, biodiversity and evolution, and ecosystem function were found to significantly differ between the control and experimental groups. The study's findings led to the following conclusion, which was reached. When the test of difference was conducted, the hypothesis that there is no significant difference between the post-test scores of the students in the experimental group and the control group was not supported and therefore not sustained.
4. Based also on the result of the study, using picturesque assessment shows significant improvement in measuring students' academic performance.

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