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RESEARCH ARTICLE

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COMPETENCY-BASED SELF-LEARNING MODULE ON STATISTICS IN RESEARCH FOR GRADE 8- SPECIAL SCIENCE CLASS

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ABSTRACT

This study developed a Competency-based Self-Learning Module on Statistics in Research for Grade 8- Special Science Class. This study aimed to develop and validate self-learning modules on Statistics in Research. Specifically, it sought answers to the following questions: 1) what are the least mastered competencies of students on Statistics in Research; 2) what self-learning modules are to be developed based on the least mastered competencies of the students; 3) what is the level of validity of the developed self-learning module on Statistics in Research in terms of content, format, presentation and organization, accuracy and up-to-datedness of information; 4) what is the level of readability of the developed self-learning module on Statistics in Research. A descriptive-development design was employed. The researcher used a validated instrument. The study found out the following: The least-mastered competencies of students who took the Statistics in Research for S.Y. 2020-2021 are Perform various tests about some parameters, construct ANOVA tables, perform F test based on the ANOVA table, and compute Pearson's coefficient of correlation. Moreover, there are 10 modules with 19 learning competencies. Also, the level of validity of the developed
Self-learning module is very satisfactory and is within the reading level of the Grade 8.

INTRODUCTION

Education is having a big role in everyone's life; thus, learning is very relevant in man's daily living. Amidst of different circumstances that the nation is facing today, the Department of Education needs to continue to educate Filipino children. What a country can best offer to its people is the quality education. A quality education leads to a quality employment, and a quality employment leads to a better life.

One of the problems that eventually hound the country's education program would be the unavailability of learning materials. According to Mateo (2019), the Alliance of Concerned Teachers (ACT) scored the Department of Education (DepEd) over the supposed lack of printed learning materials documented in various public schools nationwide. In a statement, the ACT said the DepEd has failed to provide learning modules for some subjects, including Music, Arts, Physical Education and

Health for Grade 1; Araling Panlipunan for Grades 2-7 and 9; Science for Grades 5-6; Filipino for Grades 6-8; and Math for Grades 6-8 and 10. It also cited the lack of learning modules for Grade 11 in the General Academics; Humanities and Social

Sciences; Accountancy and Business Management; and Technical and Vocational Livelihood (Shielded Metal Arc Welding) strands. The Division of La Union, particularly the Naguilian District, is just one of the many districts in the division, which is faced with the challenges of the educational restructurings conveyed about the K to 12 programs. Based on the Division Memorandum No. 62 (2021), the reproduction of Self-Learning Module for Grade 4 to Grade 10, except for EPP, TLE and elective subjects will be spearheaded by the Central Office with 1:3 ratios. EPP, TLE, and elective subjects must be locally prepared and produced.

Based on the current situation in the educational system, the researcher, and other teachers in the Division of La Union shared common reactions, observations and outlooks in terms of teaching the subject. For learning to take place, the proponent keeps on simplifying difficult topics easier in her subject.

The researcher is optimistic that developing a Self-Learning Module, which is directly based on the learning competencies in Statistics in Research, can be a great help to improve the performance of Grade 8- Special Science Class. The Statistics in Research is an elective subject, which has been taught to Grade 8- Special Science Class during Third and Fourth Quarter.

This study was designed with the premise that Statistics in Research (elective subject) can be taught significantly to Grade 8-Special Science Class using self-learning modules. There are six modules for the Third Quarter and four modules for the Fourth Quarter. Specifically, the topics included in the instructional module for the Third Quarter Statistics in Research 8 are the following: (1) Standard Normal Distribution;(2) Areas Under Normal Curve; (3) The Central Limit Theorem; (4) Student's t-distribution; (5) Chi-square distribution; (6) Introduction about Statistical Hypothesis Testing; and (7) One-Sample Testing Problems. On the other hand, the topics included in the instructional module for the Fourth Quarter Statistics in Research are the following: (1) Two-Sample Testing; (2) Pearson's Coefficient of Correlation; (3) Test About Correlation Coefficient; (4) Linear Regression; and (5) One Way Analysis of Variance. The researcher strongly believes that the Self-learning module can remedy the inadequacy of instructional materials in school, can enrich the teaching of Statistics in Research and can help facilitate distance learning.

STATEMENT OF THE PROBLEM

This study aimed to develop and validate self-learning modules on Statistics in

Research for Grade 8 Special Science Class. Specifically, this study sought answers the following questions:

1. What are the least mastered competencies of students on Statistics in Research?
2. What self-learning modules are to be developed based on the least mastered competencies of the students?
3. What is the level of validity of the developed self-learning module on Statistics in Research in terms of:
    a) content,
    b) format
    c) presentation and organization
    d) accuracy and up-to-dateness of information?
4. What is the level of readability of the developed self-learning module on Statistics in Research?

METHODOLOGY

This study utilized the descriptive- development design. According to McCombes (2019), a descriptive research aims to describe a population, situation or phenomenon accurately and systematically. It can answer what, where, when and how questions, but not why questions. A descriptive research design can use a wide variety of research methods to investigate one or more variables.

It is developmental study in the sense that it is disciplined inquiry conducted in the context of the development of a product or program for purpose of improving the thing being developed. There were five experts in the field of Mathematics from the La Union Schools Division who served as evaluators of the proposed self-learning module. They have taught Statistics for at least 4 years and with a teaching position of Teacher III to Master Teacher I.

In the organization, development, and validation of the Self-learning module on Statistics in Research for Special Science Class, the researcher went through the three stages: Planning Stage, Development Stage, and Validation Stage.

Analysis of Data

The median was employed to determine the level of validity of the self-learning module in terms of Content, Format, Presentation and Organization, and Accuracy and Up-to-dateness of information. To interpret the level of validity along the given areas, the following range with their corresponding descriptive ratings were used.

Statistical Range	Descriptive Equivalent
5	Very Satisfactory (VS)

4	Satisfactory (S)
3	Moderately Satisfactory (MS)
2	Fair (F)
1	Poor (P)

Responses were scored and categorized using the following point of values and descriptive equivalents.

The readability score of the self-learning module was measured using a software: Test Document Readability – Online Utility. The reading difficulty of the self-learning module was determined using the Flesch Reading Ease Score. The following Readability Ease (RE) range of values with their corresponding descriptive value was used.

Flesch Reading Ease Score

Range	**Descriptive Equivalent**
0 - 29	Very Confusing (VC)
30 - 49	Difficult (D)
50 - 59	Fairly Difficult (FD)
60 - 69	Standard (S)
70 - 79	Fairly Easy (FE)
80 - 89	Easy (E)
90 - 100	Very Easy (VE)

To determine the grade level of the reader who could comprehend the text, the

Coleman Liau Index, Flesch Kincaid Grade Level, and Automated Readability Index (ARI) were used. The software automatically presents the grade level (except for ARI) in each factor who could understand the text.

Automated Readability Index outputs the number, which corresponds to the age of the reader that comprehends the text. The following age bracket with the corresponding US grade level is shown.

Age	**Grade Level**
5-6	Kinder
6-7	First Grade
7-8	Second Grade
8-9	Third Grade
9-10	Fourth Grade

10-11	Fifth Grade
11-12	Sixth Grade
12-13	Seventh Grade
13-14	Eighth Grade
14-15	Ninth Grade
15-16	Tenth Grade
16-17	Eleventh Grade
17-18	Twelfth Grade
18-22	College

SUMMARY OF FINDINGS

The salient findings of the study are the following:

1. The top 5 Least-mastered competencies of Students who took Statistics in Research for the S.Y. 2020-2021 are: perform F test based on the ANOVA table, construct ANOVA tables, perform various tests about some parameters of two independent populations, Computes the sum of squares identities, computes Pearson's coefficient of correlation.
2. The Self-learning module on Statistics in Research, which covers the least mastered competencies and all the competencies prescribed by the Department of Education, was developed. These are:
    - Characterize normal distribution
    - Convert non-standard normal into standard normal distribution
    - Draw normal curves and compute probabilities using normal table
    - State the Central Limit Theorem and apply it to various problems
    - Differentiate t- distributions from normal
    - Compute probabilities using t- table
    - Characterize chi-square distribution
    - Compute probabilities using chi-square table
    - Define and explain concepts related to hypothesis testing

Perform various tests about some parameters of a population for the Third Quarter and the learning competencies for the Fourth Quarter are the following:

- Perform various tests about some parameters of two independent populations

- Define and explain concepts related to regression analysis
- Compute regression estimates
- Perform test about regression parameters
- Compute Pearson's coefficient of correlation
- Perform test about population correlation coefficient
- Define and explain concepts related to analysis of variance
- Compute the sum of squares identities and construct ANOVA table
- Perform F test based from the ANOVA table.

3. The level of validity of the developed Self-learning module on Statistics in Research is very satisfactory and is within the reading level of the target users.
4. The readability of the Self-learning module on Statistics in Research is standard and is suited for the Grade 8 level.

Conclusions

Based from the findings of the study, the following conclusions were made:

1. The least-mastered competencies for Statistics in Research who took Statistics in Research for the 6 schools are: Perform various tests about some parameters of two independent populations, construct ANOVA tables and perform F test based from the ANOVA table, and compute Pearson's coefficient of correlation.

2. The Self-learning module on Statistics in Research covers the least-mastered competencies and all the competencies prescribed by Department of Education. There are six learning modules for Third Quarter and four learning modules for Fourth Quarter. The developed Self-Learning Module has the features: Mission, Pre-Assessment, Connect, Energize, Unlock, Enrichment, Accomplishment, and Application. There are QR codes for every module, which direct the learner to the link where they can watch video lessons.

3. The high validity of the Self-learning module implies that it can be used as a learning material in Statistics in Research as to the content, activities, and evaluation.

4. The readability of the developed and validated Self-learning module on Statistics in Research is suitable for instructional use of Grade 8 level. It is usable on the part of student especially in distance learning. It was designed for self-learning, and it can help the teacher to reach the distant learners.

Recommendations

Pertinent to the findings and conclusions made in this study, the researcher enumerated the following recommendations:

1. The foundations for the topics in Statistics in Research for Grade 8- Special Science Class must be thoroughly laid out to facilitate the spiral progression in the succeeding mathematics level.

2. There is a need to provide additional learning materials for Statistics in Research such as video lessons for every Self-Learning Module to facilitate distance learning.

3. Although the validity of the Self-learning module was already established, its effectiveness should be tested.

4. Further study is encouraged to assess the actual readability of the Self learning module for Grade 8- Special Science Class.

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