Effectiveness of Utilizing Learning Activity Sheets to Improve the Solving Skills involving Sampling Distribution of Grade 11 Students

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Abstract— This study determined the Effectiveness of Utilizing Learning Activity Sheets to Improve the Solving Skills involving Sampling Distribution of Grade 11 Students in Bagahanglad National High School, San Jacinto District in the Division of Masbate-Province, school year 2021-2022. The Descriptive method of research would have utilized in this study. The respondents were 50 Grade 11 students who were currently taking probability and statistics subject 25 of them as Control Group and 25 as Experimental Group.

The study used quantitative method to describe the improvement level of the grade 11 learners in Probability and Statistics subject along the identified topic and a test was used to know the effectiveness of LAS in improving the performance of Grade 11 in Probability and Statistics along Sampling Distribution. Data were gathered through test administration. A researcher-made learning activity sheets and test questions were utilized as the main instruments of the study. The data were tabulated, checked, analysed and interpreted using mean, and t-test.

The findings of the study revealed that the Performance Level results in Pre-test of the control and experimental group along the identified topic belongs to below 75 and interpreted as low performance while the Performance Level results in post-test of control group are almost belongs to below 75 and experimental group where almost bracket 85-89 and interpreted as very satisfactory. Learning Activity Sheets is proven effective in enhancing the solving skills involving sampling distribution. It also revealed that it helped them to solve sampling distribution easier and faster, and clearly understand the concepts. It also helped them to enhance their knowledge and solving skills involving sampling distribution.

The computed t-test for Control group was 5.764 which were larger than the critical value of 1.856. The computed t-test for experimental group was 9.563 which were larger than the critical value of 1.847. This result showed that the post-test result was higher than the pre-test result.

Based from the findings it was concluded that most of the students from experimental group got a passing result in the identified topic. The majority of the grade 11 students did not meet the expectations of the lesson and it has a low performance. The post-test result is higher than the pre-test result. The results revealed that the LAS was effective instructional materials to the grade 11 students. The Learning Activity Sheets is proven effective in enhancing the solving skills of the students in Probability and Statistics subject.

Based from the conclusions results, the following recommendations are constructed: the LAS in Probability and Statistics be proposed for additional study and improvement to guarantee high mastery of the learning competencies. The LAS may not only have focused on unlocking difficulties but also provide more activities during and after the mathematical problems. Design training and workshop to the teachers in secondary to improve the new instructional materials in probability and Statistics. Trainings and seminar workshop should impose to the students in order for them to alleviate the performance in Mathematics as a whole. Research parallel to this may also be conducted in other subjects and on wider scope.

Keywords— Effectiveness, Learning Activity Sheets, Performance, Learners.

I. INTRODUCTION

Face to face classes of students and teachers within the school has been deferred due to the pandemic. This pandemic has cover firmly to the operation of Modular Distance Learning as an urgent response to guarantee continuity of education. The Philippines is in the process of adjusting to the new normal form of education at present, and continuous innovations of educators and active participation of other stakeholders are the driving force for its success (Sambayon, 2020).

Distance Learning refers to a learning delivery modality, where learning takes place between the teacher and the learners who are physically remote from each other

during teaching. This modality has three types: Modular Distance Learning (MDL), Online Distance Learning (ODL), and TV/Radio-Based Instruction. Modular learning is the most popular type of Distance Learning. In the Philippines, this learning modality is presently used by all public schools because according to a survey conducted by the Department of Education (DepEd), learning through printed and digital modules developed as the most preferred distance learning method of parents with children who are registered this academic year. This is also in thought of the learners in rural areas where internet is not reachable for online learning (Dangle, 2020)

The teacher takes the accountability of intensive care the improvement of the learners. The learners may ask support from the teacher via e-mail, telephone, text message/instant messaging among others. Where possible, the teacher shall do home visits to learners needing remediation or assistance. Printed Modules will be distributed to students, parents or guardians by the teachers or through the Local Government Officials (Lacsa, 2022)

The use of modules reassures self-determining study. One of the aids of using modules for instruction is the attainment of better self-study or learning skills among students. Students participate themselves in learning the ideas presented in the module. They grow a sense of obligation in completing the tasks provided in the module. With little or no support from others, the learner's improvement on their own. They are learning how to learn; they are empowered. Other advantages of modular instruction include more choice and self-pacing for students; more variety and flexibility for teachers and staff; and improved flexibility of instructional materials (Sumaoang, 2020).

Worksheets have been used in teaching practices for a long time. In modern time, worksheets have even become a powerful force of curriculum in some countries. Teachers use worksheets for the purposes of supportive studying, promoting active learning, levitation interest in learning mathematics, and assessment. Many studies suggest that well-designed worksheets have had positive impacts on students' learning achievement (Lee, 2014).

The policy under DepEd Order No. 18 series of 2020, aims to establish the guidelines that will enable the Department of Education (DepEd) to provide learning resources and implement the Basic Education - Learning Continuity Plan (BE - LCP) to ensure that learning opportunities should be provided to the learners in a safe manner, using various learning delivery methods. Learning Activity Sheets were included in SLMs and are used to evaluate the learners' level of knowledge during the course (D.O. #18. S. 2020)

Today, one method for sustaining the modular teaching approach is to use learning activity sheets (LAS) as supplemental learning resources for students. LAS are print or digital activities designed to foster learning environments. An activity sheet is typically a piece of paper with questions or activities on which students can either write their answers or participate in the activity (DepEd, 2016).

The LAS is a measure of learners' activity in understanding to integrate or perform what they've learned. The sheet is crucial in encouraging children to absorb and internalize the information presented. The teacher can monitor learners who have grasped the content and those who have not yet grasped it while concentrating on the activity sheet. This sheet is one of the teaching materials used to enhance the teacher's function and is critical to the learning process' efficacy. With LAS that are based on scientific principles, the teacher's role is reduced to that of a facilitator rather than the primary source of learning. Students are expected to identify difficulties, consider alternate solutions, and assess the settlement results while working on activity sheets. Because it was made general, the learners were only taught about the subject that had previously been taught by the teacher, and no problem-solving abilities were taught (Lacsa, 2022).

The primary focus of appropriate teaching is to bring about a desirable change in the behavior of learning. It is brought about by the teacher using teaching strategies to achieve the objectives of the lesson. This makes teaching more difficult yet very challenging because it requires different methods and techniques for different learner abilities and behavior.

These circumstances as stipulated by different authors are observed to be also true in Grade 11 students of Bagahanglad National High School. The researcher had observed students' low level of achievement in solving sampling distribution. These students performed better on rote learning and poorly on items that require comprehension, and problem-solving skills. With this in mind, the researcher would like to investigate whether a Learning Activity Sheets is of great help in improving the solving skills involving sampling distribution of Grade 11 students from Bagahanglad National High School. Also, this could be an instructional tool in the teaching of Probability and Statistics subject for a better

teaching-learning experience that could be utilized by all types of learners. It is on this juncture that the researcher engaged in this research endeavor to purposely looking into how effective of utilizing Learning Activity Sheets to Improve the Solving Skills involving Sampling Distribution of Grade 11 Students in Bagahanglad National High School.

This study designed to determine the Effectiveness of Utilizing Learning Activity Sheets to Improve the Solving Skills involving Sampling Distribution of Grade 11 Students in Bagahanglad National High School S.Y. 2021-2022.

Specifically, it sought to answer the following problems:

1. What is the performance level in the pretest of control and experimental group along sampling distribution?
2. What is the performance level in the posttest of control and experimental group along the identified topic?
3. Is there a substantial alteration between the performance level of pretest and posttest of the control group and experimental group along the identified variable?
4. How effective are the Learning Activity Sheets in improving the performance of grade 11 in Solving sampling distribution?
5. What training Design could be proposed to address the needs of the respondents?

II. METHODOLOGY

This study determined the effectiveness of utilizing learning activity sheets to improve the solving skills involving sampling distribution of Grade 11 Students in Bagahanglad National High School, San Jacinto District in the Division of Masbate-Province, school year 2021-2022. The study employed the descriptive method of research using a test questions and learning activity sheets as the main instrument in its data gathering component.

The study was conducted at Bagahanglad National High School where the researcher also taught. The respondents included 50 Grade 11 students who were taken probability and statistics subject. The students came from different sections. The appropriate statistical tool such as t-test to determine the difference between pre-test and post-test of control group and experimental group along the identified variable was used in this study.

The researcher focused at the Bagahanglad National High School where she is presently teaching. The respondents were composed of 50 Grade 11 students of Bagahanglad National High School, Bagahanglad, San Jacinto, Masbate, who were taken probability and statistics subject.

The population of Grade 11 students is 108 from different sections, each section composed of 35 students. To get the sample, purposive sampling was done. 24% of the respondents were the control group and the other 24% of the respondents were the experimental group.

The researcher utilized a test-questionnaire to determine the effectiveness of utilizing learning activity sheets to improve the solving skills involving sampling distribution of Grade 11 Students in Probability and Statistics subject along the identified topic.

To determine the index of difficulty and the reliability of the questionnaire the researcher devised a table of equivalent for the percentage equivalent and description and used the Cronbach's alpha score for the level of reliability.

Difficulty Indices	
91% - 95%	Very Easy
76% - 90%	Easy
25% - 75%	Average
10% - 24%	Difficult
5% - 9%	Very Difficult

Cronbach's Alpha Score	Level of Reliability
0.0 – 0.20	Less reliable
>0.20 – 0.40	Rather reliable
>0.40 – 0.60	Quite reliable
>0.60 – 0.80	Reliable
>0.80 – 1.00	Very reliable

The instrument for data gathering was composed of 12 items questions about probability and statistics subject along the identified topic. The instrument reviewed to make sure that it could generate authentic and valid results. A dry run in San Jacinto National High School was conducted, item analysis was conducted to validate the instrument, the results of all items bracket between 25%-75% difficulty index and interpreted as Average, and the level of reliability bracket between 0.60-0.80 and interpreted as reliable. The researcher then solicited comments and suggestions from the panel members before proceeding to its final distribution to the respondents.

The researcher guided by the following steps in the data gathering procedures. Firstly, the acquisition of the approval of the proposal by the panel, a written permission from the Schools Division Superintendent, and Secondary School Head of Bagahanglad National High School.

The Learning Activity Sheets is the intervention being used in Probability and statistics subject along the identified topic the Sampling Distribution which is distributed after the pre-test of the respondents. The pre-test was conducted one day before the distribution on April 4, 2022 and the post-test was administered after the retrieval of the three learning activity sheets where in the students used to solve problems in Probability and statistics subject involving sampling distribution, it is for experimental group and module from division office for control group on April 4, 2022

The respondents given instructions in answering the test-questionnaire and it would 100% retrieval. April 4. 2022 was the distribution of the questionnaires. The respondents were given instructions by the researcher. They would advise to answer it promptly according to the instruction using the learning activity sheets. There would be enough time to answer the test-questionnaire.

Upon the retrieval of the test-questionnaires and learning activity sheets, an unstructured interview was done regarding to the effectiveness of LAS in answering the problems. Total of 100% of the test-questionnaires would retrieve. Finally, the data would collect, tallied, tabulated, analyzed and interpreted.

The secondary sources of data would take from unstructured interview, curriculum guide, and readings from books, unpublished graduate thesis, and journals. The researcher was also use resources from the Internet to widen the ideas and scope of the study. The statistical measures and tools used in this study were the mean, interview, and the t-test.

Mean is used to determine the performance level of the students in pre-test and post-test along the identified topic: Sampling Distribution.

- To determine the performance level, the mean was used.
- To determine the difference between pre-test and post-test result of control and experimental group along the identified topic, the t-test was used.
- To determine the descriptive interpretation of the level of performance, the researcher devised a table of equivalent for the percentage equivalent and description.

Performance Level	Qualitative Description
90 – 100	Outstanding
85 – 89	Very Satisfactory
80 – 84	Satisfactory
75 – 79	Fairly Satisfactory
Below 75	Did Not Meet Expectations

To determine the effectiveness of learning activity sheets, the interview was used.

III. RESULTS AND DISCUSSIONS

The presentation of data includes the following: Performance Level results in Pre-test along the identified topic, Performance Level results in Post-test along the identified topic and the significant difference between the pre-test and post-test results of the control and experimental groups along the identified topic in probability and statistics subject. Training Design to address the needs of the students is also presented.

I. Performance Level results in Pre-test along Sampling Distribution

Table I shows the Performance Level results in Pre-test of the control and experimental group along the identified topic.

Table I: Performance Level Result in Pre-test along Sampling Distribution

Topic	Performance Level of Experimental Group	Description	Performance Level of Control Group	Description
SAMPLING DISTRIBUTION	58	Did Not Meet the Expectations	58	Did Not Meet the Expectations

It shows that the performance level of Experimental Group in Sampling Distribution was 58% while the performance levels of the control Group in Sampling Distribution was 58% the same with Experimental Group. Of which all the respondents got below 75 performance level in the identified topic. This implies

that majority of the students did not meet the expectations. This is supported by Gurney (2021), teaching is effective and efficient when students are taught the right content, having enough learning materials and high ratio of teachers' time on the teaching activity. This requires a teacher to have passion in

sharing knowledge with students while motivated with school management system.

II. Performance Level results in Post-test along Sampling Distribution

This section determines the post-test results and the performance level of grade 11 students along the identified topic in Probability and Statistics subject.

Table II: Performance Level Results in Post-test along Sampling Distribution

Topic	Performance Level of Experimental Group	Description	Performance Level of Control Group	Description
SAMPLING DISTRIBUTION	91.58	Outstanding	76.67	Fairly Satisfactory

Table II shows the Performance level results in Post-test of the control and experimental group along Sampling Distribution. Of which the experimental group got an outstanding performance level of 91.58% while the control group got a fairly satisfactory performance level of 76.67%. It is clearly seen that most of the students from experimental group got a passing result in Sampling Distribution compared to control group. This implies that using Learning Activity Sheets has a great impact on their understanding of ideas and concepts during Statistics and Probability subject.

This result can be strongly supported by Lapinid (2021) stated that it was prevailed that though the use of Self Learning Modules is effective in improving the performance of the learners in Mathematics, it could also have gleaned that utilizing the contextualized learning modules and Learners Activity Sheets is also helpful in augmenting the difficult learning competencies that the learners could experience during the delivery of the most essential learning competencies.

III. Significant difference between the Pre-test and Post-test of the Control and Experimental Groups along Sampling Distribution

Table III: Significant difference between the Pre-test and Post-test Results along Sampling Distribution

Statistical Bases	Statistical Analysis	
	Control Group	Experimental Group
Degree of Freedom	11	11
Level of Significance	.05	.05
Critical Value	1.856	1.847
Computed t-test	5.764	9.563
Decision on Ho	Reject	Reject
Interpretation	Significant	Significant

Table III showed that there was a significant difference between the Pre-test and Post-test of the control and experimental groups along Sampling Distribution. In Control group, the inference was based from the computed value of 5.764 which was greater than the critical value of 1.856 when the degree of freedom of 11 at .05 level of significance. This result showed that the Post-test result was higher than the Pre-test result. In Experimental group, the inference was based from computed value of 9.563 which was greater than the critical value of 1.847 when the degree of freedom of 11 at .05 level of significance.

This result revealed that the post-test result was higher than the pre-test result. The results revealed also that the Learning Activity Sheets was effective instructional

materials to the grade 11 students. Moreover, the use of the Learning Activity Sheets in Statistics and Probability subject was very effective. It helped to enhance the performance of grade 11 students.

In the studies of Anggraeni (2020), learner's mental development starts from the concrete thinking stage because the learner's world is the real world. Learners always see objects that are nearby as something whole. Therefore, learning should be done from the immediate environment of students, namely oneself and then developing in the family environment, and the wider environment, namely school. The teacher's effort to realize the desired learning achievement was formed Student Activity Sheet which can be one way that can be done to help students and facilitate students in

learning. Student Activity Sheets that create an effective bond between teacher and student can increase student activity and will have an impact on increasing learning outcomes. Therefore, the hypothesis was accepted wherein there is an important difference between the pre-test and post-test of the control and experimental groups in probability and statistics along sampling distribution.

IV. Effectiveness of Utilizing Learning Activity Sheets to Improve the Solving Skills involving Sampling Distribution

Learning Activity Sheets was proven effective in enhancing the solving skills of the students in Probability and Statistics subject along Sampling Distribution. Based on the interview, it helped them to understand problems easier and faster, and clearly understand the concepts. It also helped them to enhance their knowledge and skills along Sampling Distribution in Probability and Statistics subject.

Che-Di Lee (2020) found that worksheets have been used in teaching practices for a long time. In modern time, worksheets have even become a driving force of curriculum in some countries. Teachers use questionnaires for the determinations of supportive studying, promoting active learning, raising interest in learning science, and assessment. Many studies suggest that well-designed worksheets have had positive impacts on students' learning achievement.

FINDINGS

Based from the data gathered, the following findings were revealed:

1. The Performance Level results in Pre-test of the control and experimental group along Sampling Distribution belongs to below 75 and interpreted as low performance.
2. The Performance Level results in post-test of the control are almost belongs to below 75 and experimental group where almost bracket 85-89 and interpreted as very satisfactory performance.
3. There is a significant difference between the Pre-test and Post-test of the control and experimental groups along Sampling Distribution. In Control group, the inference is based from the computed value of 5.764 which is greater than the critical value of 1.856 when the degree of freedom of 11 at .05 level of significance. This result showed that the post-test result is higher than the pre-test result. In experimental group, the inference is based from computed value of 9.563 which is greater than the

critical value of 1.847 when the degree of freedom of 11 at .05 level of significance.
4. Learning Activity Sheets is very effective in improving the performance of the students in Probability and Statistics subject. Based on the interview, it helps them to compute the mathematics problem easier and faster, and clearly understand the concepts. It also helps them to enhance their knowledge and skills in Probability and Statistics subject.
5. Training Design could be proposed to address the needs of the grade 11 students.

CONCLUSIONS

Based form the findings, the following conclusions are drawn;

1. It is clearly seen that most of the students from experimental group got a passing result along Sampling Distribution.
2. The majority of the grade 11 students did not meet the expectations of the lessons and it has a low performance.
3. The post-test result is higher than the pre-test result. The results revealed that the Learning Activity Sheets is effective instructional materials to the grade 11 students.
4. The Learning Activity Sheets is very effective in improving the performance of the students in Probability and Statistics subject
5. Proposed Training Design based on the Result of the Study.

RECOMMENDATIONS

Based from the conclusions of the study, the following recommendations are made:

1. The Learning Activity Sheets in Probability and Statistics be submitted for further study and enhancement to ensure high mastery of the learning competencies.
2. The Learning Activity Sheets may not only focus on unlocking difficulties but also provide more activities during and after the mathematical problems.
3. Design training and workshop to the teachers in secondary to improve the new techniques in probability and Statistics.
4. Trainings and seminar workshop should impose to the students in order for them to alleviate the performance in Mathematics as a whole.
5. Research parallel to this may also be conducted in other subjects and on wider scope.

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