

Guided Inquiry Design (GID) as a Pedagogical Practice in Teaching Practical Research



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ABSTRACT: This study determined the performance of grade 12 senior high school students in Practical Research using Guided Inquiry Design during the school year 2022-2023. The study utilized the quasi-experimental research design employing pretest and posttest in Practical Research 2 during the 4th quarter. The participants of this study were 55 Grade 12 students in HUMSS F for the experimental group and 51 students of in HUMSS G for the control group. Purposive sampling technique was utilized in determining the samples of the study. This study determined the performance of grade 12 senior high school students in Practical Research using Guided Inquiry Design during the school year 2022-2023. The study utilized the quasi-experimental research design employing pretest and posttest in Practical Research 2 during the 4th quarter. The participants of this study were 55 Grade 12 students in HUMSS F for the experimental group and 51 students of in HUMSS G for the control group. Purposive sampling technique was utilized in determining the samples of the study. This study concludes that the GID was effective in enhancing the students' learning outcomes based on the increase of the posttest result and mean difference between the pre-test and posttest. The finding implies that the students in the experimental group who were exposed to GID performed better than the control group with no exposure to GID. It is important to apply GID in class because it develops pedagogical practices that scaffold students' independent inquiry in learning. Since GID instruction is based on team teaching and inquiry circles, this greatly helps students collaborate with each other which is vital in producing a final output in Practical Research. The researcher will continue to apply GID in teaching to improve existing practices. The researcher recommends that the School Heads will encourage the teachers to use GID in teaching. Teachers can engage in team teaching and inquiry circles to ignite more the interest of the students. Other researchers can use the findings of this study as avenues for future research.

KEYWORDS: guided inquiry design; inquiry circle; team teaching, Practical Research

INTRODUCTION

Teacher's delivery of instruction in the classroom plays a significant role in making teaching-learning process effective. Teachers are empowered to carry out quality instruction by using varied instructional and formative assessment strategies for students' learning (DepEd Order 42, S. 2016,1). This study investigated the effectiveness of Guided Inquiry Design in the students' learning in Practical Research 2.

The research-based Guided Inquiry Design Framework offers a strong framework for inquiry-based learning. Students need time to familiarize themselves with a topic and freely explore it before they can form a focus (Kuhlthau et al., 2015,1).

The aim of Guided Inquiry Design is to make the students construct their own knowledge using the sources available to them (Alamettälä and Sormunen, 2018,5). Guided Inquiry Design, according to (Kuhlthau *et al.*, 2012,4), helps in igniting the interest of the students to build background knowledge in formulating research questions.

In the study of (Juniar et al., 2020,1) the findings revealed that using Guided Inquiry Design in teaching improved the students' learning outcomes from pre-test 81.88 to 85.49 in posttest. Likewise, (Heath 2015,5) emphasized that it develops the skills and competence of the students in writing. Guided Inquiry Design improves the students' ability to synthesize and interpret information.

The Baliwasan Senior High School- Stand Alone is a pioneering, stand-alone, public secondary institution which operated on June 13, 2016. The school caters to students coming from major junior high schools (JHS) of the city and neighboring provinces. As a pioneering institution, the school envisions to produce well-equipped graduates who are competent in research writing.

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However, students have poor performance in research writing. They could hardly express their ideas in writing sentences and paragraphs.

Apparently, if this insufficiency will not be addressed, the school will not be able to produce graduates who are efficient researchers and competitive enough to face the challenges of today's world. Hence, they need a strategy that will motivate them to improve their performance in writing research.

This present scenario at Baliwasan Senior High School-Stand Alone has inspired the researcher to conduct this action research in order to enhance the performance in Practical Research. The action research addresses the needs of the students for them to become better and more efficient researchers. It focuses on developing their skills through the use of instructional strategies. It is for this reason that the researcher embarked on this study to determine the effectiveness of the Guided Inquiry Design applied in Practical Research.

The study focused on the effectiveness of Guided Inquiry Design in teaching Practical Research for Grade 12 learners of Baliwasan Senior High School-Stand Alone, Baliwasan District, SY 2022-2023. The teacher used Guided Inquiry Design in teaching Practical Research before the post-test. The pre-test and posttest in Practical Research were given to Grade 12 learners. The study can initiate the Policymakers to support the teachers in utilizing strategies such as the GID so that the students will have the motivation and eagerness to venture into research writing. This support can be particularly useful to Research teachers considering the fact that the subject is passive in nature. With the Guided Inquiry Design, students will be inspired to write and discover new knowledge.

Innovation, Intervention And Strategy

This study utilized **Guided Inquiry Design** as the intervention. According to (Kuhlthau et al., 2012,4), Guided Inquiry Design is based on the idea that an invited teacher in class who possesses the expertise of the topic makes the students more motivated. Using team teaching and inquiry circles make the students collaborate with others.

Guided Inquiry Design involves team teaching and inquiry circle. **Team teaching** is conducted with the presence of an invited teacher, an expert in the field of research, who teaches on specific topics in Practical Research as the need arises. It also engages students in collaboration, which help them work together and converse on specific topic and tasks. According to (Bennett & Fisch, 2013,1), having two teachers fully engaged and active in the learning environment is effective.

Inquiry circle is a weekly activity where all members of the group meet together to work on the different tasks in the research process. Each group has a leader and assistant leader who leads in accomplishing the tasks given by the teacher. The purpose of team teaching and inquiry circle in practical research is to enhance students' leadership skills and encourage them to contribute to the development of their research project. At the end of the semester, they are expected to defend their research project before a panel.

Guided Inquiry Design is important because it develops pedagogical practices that scaffold students' independent inquiry in learning Practical Research concepts. This teaching strategy is expected to improve the performance level of Grade 12 students in Practical Research by allowing them to learn independently at their own pace after scaffolding is done by the teacher.

There may be a lot of circumstances that create difficulty for students to improve their performance in research, such as lack of interest in the subject, having difficulty to write, and probably, parents' support at home. All of these things may lead to one factor: the strategy to use in the classroom. With this notion, the topics of this research made a great impact in providing the researcher with a greater understanding of the processes involved in establishing an environment that would enhance students' performance using the Guided Inquiry Design.

Baliwasan Senior High School-Stand Alone is one of the stand-alone schools in Zamboanga City Division. It is expected that the school performs well in Practical Research. However, students are found passive in writing. It is therefore recommended that research must be conducted among the target respondents of the study.

The Guided Inquiry Design was conducted in Practical Research 2 class of Humanities and Social Sciences 12 section F to see the effectiveness in the experimental group.

1. After giving the pre-test to both groups, the control group had the traditional lesson discussion during the Practical Research 2 period and the experimental group used Guided Inquiry Design.
2. Team teaching was applied weekly for one month. An invited Guests who possessed expertise in research and statistical treatment trained the students on how to tabulate the data using Microsoft excel, present the data using tabular and graphical forms, process and analyze the quantitative data using the SPSS, draw conclusion and formulate recommendations.

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3. Inquiry Circle was then applied in class weekly, where all members of the group met together to work on the different stages in the research process. Each group had a leader and assistant leader who led in accomplishing the tasks given by the teacher.
4. Activities were given to the students every meeting. Written activities were recorded and documented for one month.
5. After the intervention, a posttest was administered to both the experimental and control groups.

Action Research Questions

This study aimed to determine the effectiveness of Guided Inquiry Design in teaching Practical Research for Grade 12 learners at Baliwasan Senior High School-Stand Alone.

Specifically, this study sought to answer the following problems:

1. What is the mean score of the experimental and control groups in Practical Research 2 before the conduct of the Guided Inquiry Design?
2. What is the mean score of the experimental and control groups in Practical Research 2 after the conduct of the Guided Inquiry Design?
3. What is the mean difference of the experimental and control groups in Practical Research after the conduct of Guided Inquiry Design?
4. Is there a significant difference in the mean difference of the experimental and control groups in Practical Research before and after the conduct of Guided Inquiry Design?

METHODOLOGY

Research Design

In this study, the researcher utilized the quasi- experimental research design employing pre-test and posttest in Practical Research during the 4th quarter. This is quantitative research to determine the performance of grade 12 senior high school students using Guided Inquiry Design in teaching Practical Research.

Quasi-experimental designs identify a comparison group that is as similar as possible to the treatment group in terms of baseline (pre-intervention) characteristics (White and Sabarwal 2014, 4).

Participants and/ or other sources of Data and Information

The respondents of this study were the 55 Grade 12 students in HUMSS F and 51 Grade 12 students in HUMSS G who were enrolled in Practical Research during the second semester of school year 2022-2023. The respondents were chosen based on the following criteria: least in pre-test results compared with other sections handled by the researcher; poor academic performance in midterm; and poor performance in writing research. The researcher utilized the purposive sampling technique in determining the study samples, hence, the intervention was intended purposely for 12 HUMSS F.

Research Instrument

The instrument in this study was a researcher-made test which was composed of 35 items in multiple-choice test and 5 points in essay in Practical Research 2. The essay focused on the discussion of the data in a given table. It was rated using an analytic rubric which includes: substance and mechanics in writing-5 points. The instrument was pilot tested to the non-respondents for item analysis. It was subjected to an item analysis test to test its reliability and validity. Twenty-five copies of the instruments were administered to the non-respondents with similar characteristics with the respondents. The data were then inputted and analyzed using the Norm-Reference-Item Analysis. The result showed that the reliability was .892, which implies that the instrument was accepted and reliable. The result indicates that most of the items were accepted based on the Index of Discrimination and level of difficulty and the decision was "retained," hence the instrument was ready for data gathering.

Data Gathering Procedure

Data gathering was conducted after the approval of the research proposal. First, the researcher secured approval from the Schools Division Superintendent through a letter to gather data from the Grade 12 students of Baliwasan Senior High School-Stand Alone. The researcher presented the permission letter to the District Supervisor and school principal. Having the permission granted, the researcher administered the pre-test to all sections handled by the researcher. The researcher chose HUMSS 12 G and HUMSS 12 F to be part of the study since these sections obtained the least scores. The researcher oriented the students in HUMSS 12 F on the purpose of this educational experiment using the Guided Inquiry Design and gave the Consent for their approval of the inclusion in the study. Next, the researcher performed routine activities by using a Guided Inquiry Design. Team teaching and inquiry circles were conducted weekly for one month. This served as the treatment. Then, posttest materials were administered to both the experimental and control groups. Lastly, the researcher did the tabulation, analysis and interpretation of data.

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Data Analysis

The researcher utilized Mean to determine the mean scores and the mean difference before and after the conduct of Guided Inquiry Design (GID) in Practical Research to the experimental and control groups. Moreover, Paired-Samples T-test was used to determine the significant difference in the pre-test and posttest of the experimental and control groups.

RESULTS AND DISCUSSION

Students' performance before the intervention. Table 1 presents the mean scores of the students in Practical Research 2 of the control and experimental group before the intervention.

Table 1. Mean scores of the experimental and control groups in Practical Research 2 before the Conduct of the Guided Inquiry Design.

Experimental Group				Control Group			
Mean Score	SD	Equivalent Grade	Description	Mean Score	SD	Equivalent Grade	Description
20.39	3.25	75	Fairly Satisfactory	11.79	2.26	71	Did not meet expectation

Legend:

90-100 = Outstanding 85-89 = Very satisfactory 80-84 = Satisfactory
 75-79 = Fairly Satisfactory Below 75 = Did not meet expectations
 (DepEd Memo No. 042, s. 2020)

As shown in table 1, the mean score of the Experimental Group is 20.39, which is described as *Fairly Satisfactory*, while the Control Group has a mean score of 11.79, which is described as *Did not meet expectation*. The standard deviation of 3.25 of the experimental group implies that the scores are extreme and far from the mean while in the control group, the standard deviation is 2.26 which implies that the scores are close and lie within the mean. Looking at the data closely, the Experimental Group got a higher mean than the Control Group. This means that the students in both experimental and control groups have to learn and master the competencies in Practical Research. Being a critical skill as well as a potential tool for learning (Arnold et al., 2017), writing is not an easy task, according to Galbraith and Baaijen (2018,1).

Students' performance after the intervention. Table 2 presents the mean scores of the students in Practical Research 2 of the control and experimental group after the intervention.

Table 2. Mean scores of the experimental and control groups in Practical Research 2 after the Conduct of the Guided Inquiry Design.

Experimental Group				Control Group			
Mean Score	SD	Equivalent Grade	Description	Mean Score	SD	Equivalent Grade	Description
25.13	2.05	86	Very Satisfactory	13.25	3.08	72	Did not meet expectation

Legend:

90-100 = Outstanding 85-89 = Very satisfactory 80-84 = Satisfactory
 75-79 = Fairly Satisfactory Below 75 = Did not meet expectations
 (DepEd Memo No. 042, s. 2020)

As shown in table 2, the mean score of the Experimental Group is 25.13, which is described as *Very Satisfactory*, while the Control Group has a mean score of 13.25, which is described as *Did not meet expectation*. The standard deviation of 2.05 of the experimental group implies that the scores are narrowed and close to the mean while in the control group, the scores are extreme and scattered, hence the scores are far from the mean. Looking at the data closely, the Experimental Group got a higher mean than the Control Group.

The study's findings confirm (Kayaalp et al., 2022, 1) that students in the experimental group outperformed those in the control group in terms of academic achievement and self-regulation abilities.

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Mean difference of the control and experimental groups in the pretest and posttest. Table 3 presents the mean difference of the students in practical research 2 after the conduct of GID.

Table 3. Mean difference of the control and experimental groups in Practical Research 2 after the conduct of Guided Inquiry Design

	Experimental Group Mean Score	Control Group Mean Score
Pretest	20.39	11.79
Posttest	25.13	13.25
Mean Gain score	4.74	1.46

Legend:

90-100 = Outstanding 85-89 = Very satisfactory 80-84 = Satisfactory
 75-79 = Fairly Satisfactory Below 75 = Did not meet expectations
 (DepEd Memo No. 042, s. 2020)

As shown in Table 3, the mean difference of the senior high school students in Practical Research 2 is 4.74 for the Experimental group, while for the Control group, the mean difference is 1.46. The finding implies that the students in the experimental group performed better than those in the control group since the Experimental group was exposed to the Guided Inquiry Design.

The study confirms (Juniar et al., 2020,1) that student's learning outcomes which taught by applying the guided inquiry (GI) model increased from pre-test 81.88 to 85.49 in post-test with average N-gain approximately 20%.

Testing the difference in the mean scores of the experimental and control groups. Table 4 shows the result of Paired – Samples T-test on the significant difference in the mean scores of senior high school students in Practical Research 2 before and after the conduct of Guided Inquiry Design.

Table 4. Significant difference in the mean scores of the experimental and control groups in Practical Research 2 before and after the conduct of Guided Inquiry Design

Respondents	Experimental	Control	t-value	P-value	Interpretation
Pretest	20.39	11.79	19.974	.000	Significant
Posttest	25.13	13.25	23.353	.000	Significant

*Significant at @=0.05

Table 4 shows the result of Paired-Sample T-test on significant difference in the mean scores of the experimental and control groups in Practical Research 2 before and after the conduct of Guided Inquiry Design. It is evident that the t-value of the pre-test was 19.974, and the posttest had the t-value = 23.353 with p-values < 0.05, indicated that a significant difference existed. This means that there is a significant difference in the mean scores of the two groups.

This implies that both groups improved their performance in Practical Research 2 by obtaining an increase in the posttest result. It is also evident that students from the experimental group obtained a higher mean score compared to the control group because the experimental group was exposed to the Guided Inquiry Design.

The study backs up Heinström and Sormunen's (2018,1) conclusion that GID's strengths are in structuring the inquiry process, eliciting students' interest, guiding students' progress through the process, and scaffolding the process using tools.

CONCLUSION AND RECOMMENDATIONS

This study concludes that the Guided Inquiry Design was effective in enhancing the students learning outcomes based on the increase of the posttest result and mean difference between the pre-test and posttest. The finding implies that the students in the experimental group who were exposed to the Guided Inquiry Design performed better than those in the control group who did not have an exposure to GID. There was a significant difference in the mean scores of the experimental and control groups in Practical Research 2 before and after the conduct of GID. Guided Inquiry Design is important because it develops pedagogical practices that scaffold students' independent inquiry in learning. Since GID instruction is based on team teaching and inquiry

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circles, this greatly helps students collaborate and converse with each other. This will enhance the students' collaboration, which is vital in producing or creating a final output. The researcher will continue to apply GID in teaching to improve existing practices.

Based on the results, the researcher recommends that the School Heads will encourage the senior high school teachers to use the Guided Inquiry Design in teaching Practical Research and other subjects. Teachers can invite other teachers with expertise in specific topics to teach the lessons in class to ignite more the interest of the students. Inquiry circles can be applied in teaching to promote engagement and collaboration among students. Other researchers can use the findings of this study as avenues for future research.

Action Plan

Objectives	Strategies/ Activities	Time Frame	Persons involved	Resources Needed	Expected Outcomes
Program/ Project : Administration of Pretest & Posttest					
To administer Pre-test & Posttest in the third quarter	Administering the Pre-test & Posttest in 3rd quarter	Second Semester of Every School Year	<ul style="list-style-type: none"> • Subject Group Head • Students 	Printed copies of the Modules, Lesson Plan, Handouts, Pre-test and Posttest	Students equipped with life-learning skills.
Utilization of Guided Inquiry Design in teaching Practical Research for grade 12 students					
To utilize Inquiry Design in teaching Practical Research	Implementation of Guided Inquiry Design in Practical Research weekly	2 nd Semester of every School Year	Subject Group Head Students	Printed copies of the Modules, Lesson Plan, Handouts	Students improved their performance in Practical Research
Team teaching in Practical Research and Inquiry Circle					
To invite an expert in the field of research to speak in Practical Research class and to apply Inquiry Circles	Inviting an expert in the field of research to speak in Practical Research class and engaging the students in Inquiry Circles	Second Semester of Every School Year	Subject Group Head Teachers Students	Printed copies of the Modules, Lesson Plan, Handouts	Students performed better in Practical Research

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