

WRITING CAPSTONE RESEARCH PROJECT FOR SENIOR HIGH SCHOOL: A MODIFIED GUIDE MANUAL

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DOI: <https://doi.org/10.54476/ioer-imrj/822412>

ABSTRACT

There is an inadequate manual guide for capstone projects resulting in unsatisfactory outputs of capstone research projects. This proves to be a problem that needs to be addressed by crafting a manual guide that is aligned with the student's needs. It was conducted at the Holy Cross of Davao College. The descriptive-evaluative design was used. A sample of 80 participants from the Grade twelve level and 20 participants from the science and research area were selected using a Purposive Sampling Technique. A College Capstone Procedures Manual and Enhanced Guide Manual were given to the participants and an Acceptability Test was administered. The Enhanced Guide Manual was patterned from the College Capstone Guide Manual which was validated by Experts. The acquired data were examined using descriptive statistics like mean and standard deviation and the Independent Sample T-test at 0.05 level of significance was used to evaluate the hypotheses. The Enhanced Guide Manual scored Strongly Acceptable in areas of Content, Clarity, Appeal to Target Users, Learning Activities, and Format, while its Originality was assessed as Acceptable. Also, there is a significant difference between the College Manual and the Enhanced Guide Manual. This instructional material can alleviate learners' performances by utilizing providing worthy assets in their progress.

Keywords: Descriptive-evaluative design, Purposive Sampling Technique, Acceptability Test, Independent Sample T-test

INTRODUCTION

It is prevalent across the globe that there are inadequate guide manuals resulting to

unsatisfactory outputs of capstone research projects, thus, making it one of the prevailing problems that every capstone research teacher and research teacher is generally facing. This significant problem commonly occurs at the senior high school level as this is a specialized course on

the strand of Science, Technology, Engineering, and Mathematics (STEM). This needs a concrete solution as Capstone Research Project is a course that essentially prepares the students for their work, tertiary courses, and professional endeavors.

Across the globe, in Nigeria, the Department of Technology and Vocational Education at Ebonyi State University experiences inadequate guide manual materials in learning Electrical and Electronics Technology Education. The condition directly affects the outcome of the student's academic performance on the mentioned course subject. It generally results in students' low academic performance in continuous assessments score and poor acquisition of practical skills (Ogbu, 2015).

In the Philippines, the study of Aparecio (2018) was conducted on selected public basic education senior students of Region X, Northern Mindanao, Philippines. The absence of a guidebook in developing a Capstone Project fallout to unsatisfactory performance of the learners.

Locally, the lens of this concern also focuses on the Senior High School Department of one of the private schools in Davao City. Without a guide manual specifically for Capstone Project, it resulted in students' low scores and minimal work productivity on the course Capstone Research Project for two consecutive years to the implementation of the new curriculum.

The researcher has studied and investigated the conditions to put an alleviation these problems through modification of an existing guide manual. This study aims to address the issues of the development, presentation, and communication of a capstone research project. The learners, educators, practitioners, administrators, stakeholders, and researchers with parallel research can benefit from this study. It could also be a benchmark and a basis for other practitioners to come up with and develop learning resources for a capstone research project and promote the betterment of the scientific craft.

This study was anchored on the instructional-design theory of Reigeluth (1999) concerns the development of instructional aids, like a workbook, textbook, manual, guidebook, and worktext, that includes cognitive, emotional, social,

and physical activities. It also describes the importance of the design, development, and crafting of a learning material that includes two major components which are the method of instruction and instructional situation.

OBJECTIVE OF THE STUDY

This study aims to modify and evaluate a guide manual for writing a capstone research project for Senior High School – STEM strand.

Particularly, the following objectives were formulated:

1. To measure the level of acceptability of the College Capstone Research Project Guide Manual in the following criteria:
 - 1.1. content;
 - 1.2. clarity;
 - 1.3. appeal to target user;
 - 1.4. originality;
 - 1.5. learning activities; and
 - 1.6. format.
2. To measure the level of acceptability of the modified Capstone Guide Manual for Senior High School in the following criteria:
 - 2.1. content;
 - 2.2. clarity;
 - 2.3. appeal to target user;
 - 2.4. originality;
 - 2.5. learning activities; and
 - 2.6. format.
3. To determine the significant difference between the evaluation of the student respondents on the College Capstone Guide Manual and Modified Guide Manual in Writing Capstone Research Project for Senior High School in the following:
 - 3.1. content;
 - 3.2. clarity;
 - 3.3. appeal to target user;
 - 3.4. originality;
 - 3.5. learning activities; and
 - 3.6. format.
4. To determine the significant difference between the evaluation of peers on the College Capstone Guide Manual and Modified Guide

Manual in Writing Capstone Research Project for Senior High School in the following:

- 4.1. content;
- 4.2. clarity;
- 4.3. appeal to target user;
- 4.4. originality;
- 4.5. learning activities; and
- 4.6. format.

METHODOLOGY

This study utilized a quantitative research design descriptive-evaluative design for the acceptability test of the modified guide manual as it is a type of research method that deals with the results of the data being gathered through the different sources of data as well represented by the variables being structurally set. This type of research design gives the value of the quantified meaning of the result of the study and identified which information is useful in coming up with a generalization and an answer to the study that gives the implication of it.

The study was conducted at one of the private schools in Davao City. The first group of participants was eighty (80) students which were purposively chosen from the Grade 12 – Science, Technology, Engineering, and Mathematics strand.

Aside from the students as the participants, there was a second group of participants for peers. The researchers' twenty (20) peers from Science Subject Area and Research Subject Area were selectively chosen to test the level of acceptability of the College Capstone Policies and Procedure Manual and Enhanced Guide Manual in Writing Capstone Research Project for Senior High School. There are thirteen (13) Science Subject Teachers and seven (7) Research Subject Teachers. The selected participants are very essential for the success of the study as they are the only learners that can be applied with the developed module as emphasized.

There were two research instruments used in this study, which are the Expert Validator's Instrument and the Questionnaire of the Acceptability Test of Capstone Guide Manual.

First, the *Expert Validator's Instrument* was an adopted standardized evaluation tool for the

High School Instructional Materials of Holy Cross of Davao College Inc. - Basic Education Department. A letter was sent to the Principal and the Academic Coordinator for permission for the retrieval, access, and implementation of the adopted Expert Validator's Instrument. It was used by the validators for the evaluation and validation of the modified capstone guide manual.

Furthermore, the second research instrument used in this study was an adopted *Questionnaire of the Acceptability Test of Capstone Guide Manual*. A letter of request to use and permission to access his Questionnaire of the Acceptability Test was sent to Butron. The adopted questionnaire of the aforementioned was used for the weighted mean on the acceptability level of the clarity, content, appeal to the target user, originality, and format as a guidebook in writing investigatory projects, originally.

Data Gathering Procedure. An orientation of research purpose to the participants regarding selection, risks, and benefits was separately conducted to the student participants on their respective class schedules. Also, the same orientation was given to the peer participants in the conference room of Holy Cross of Davao College – Bajada Campus. An Informed Assent, Informed Consent, and letter to the guardian or participants were sent to the participants as mentioned, STEM Grade 12 – Queen of All Saints Class and Our Lady of Fatima Class, and the peers.

As the CCGM was made available, the acceptability test began, and the students and peers were given an hour to answer the checklist as the researcher was the implementer and the one who conducted the test. After the time constraint, the researcher collected, collated, and checked the respondent's answers.

The enhancement of the modified Guide Manual in Writing Capstone Research Project for Senior High School has undergone several drafts with the coordination of experts particularly Academic Coordinator, Ethics Committee Member, and Software Developer. The modified guide manual was also evaluated and validated by two (2) Grammarians, two (2) Engineers, and an Instructional Material Expert Committee Member.



Lastly, after the implementation or experimentation of the modified guide manual, the acceptability test began the students and peers were given an hour to answer the checklist as the researcher was the implementer and the one who conducted the test. After the time constraint, the researcher collected, collated, and checked the respondent's answers.

RESULTS AND DISCUSSION

1. Level of Acceptability of the College Capstone Guide Manual of the Students and Peers with Respect to Different Criteria

Table 1
Level of Acceptability of the College Capstone Guide Manual of the Students and Peers with Respect to Different Criteria

	Students		Peers		Total	
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description
A. Content						
Category Mean	2.8	Acceptable	2.01	Fairly acceptable	2.64	Acceptable
B. Clarity						
Category Mean	2.74	Acceptable	2.21	Fairly acceptable	2.63	Acceptable
C. Appeal to the Target User						
Category Mean	2.66	Acceptable	2.17	Fairly acceptable	2.56	Acceptable
D. Originality						
Category Mean	2.69	Acceptable	2.35	Fairly acceptable	2.62	Acceptable
E. Learning Activities						
Category Mean	2.67	Acceptable	2	Fairly acceptable	2.53	Fairly acceptable
F. Format						
	2.71	Acceptable	2.23	Fairly acceptable	2.61	Acceptable

The criteria for "Clarity," which is the presentation of the activities in a hierarchy from simple to difficult, had the lowest mean for the students. With a mean score of 2.49, it received a grade of "fairly Acceptable" (FA), while the other criteria received an "Acceptable" rating (A). Furthermore, the peers gave the content a mean rating of 1.75 out of 5, indicating that it provided a variety of activities ranging from straightforward manipulation to more complicated ones for idea and skill development. It was rated as Not Acceptable (NA) while the rest of the criteria was rated as fairly acceptable. The abovementioned criteria are the most important criteria to be modified and developed in the college guide manual.

The level of acceptability on the College Capstone Guide manual administered to the

students and peers suggests that the learning activities, appeal to the target users, and content must be enhanced for a higher acceptability rate. Even though there are still other domains to consider but the researcher must prioritize the three domains as suggested. Preference of the students on the appeal to the target users is not a new concept as proved in the study of Fidalgo (2017), in which the student's preference was affected by more interesting context, easier-to-understand, and provides meaningful illustrations.

2. Level of Acceptability of the College Capstone Guide Manual

Table 2
Level of Acceptability of the College Capstone Guide Manual

	Mean	Standard Deviation	Qualitative Description
Students			
Content	2.80	.575	Acceptable
Clarity	2.73	.597	Acceptable
Appeal	2.66	.516	Acceptable
Originality	2.69	.622	Acceptable
Learning Activities	2.67	.567	Acceptable
Format	2.71	.528	Acceptable
Mean	2.71	.443	Acceptable
Peer			
Content	2.01	.521	Fairly Acceptable
Clarity	2.21	.508	Fairly Acceptable
Appeal	2.17	.478	Fairly Acceptable
Originality	2.35	.523	Fairly Acceptable
Learning Activities	2.00	.629	Fairly Acceptable
Format	2.23	.524	Fairly Acceptable
Mean	2.16	.423	Fairly Acceptable
Over-all Mean	2.60	.489	Acceptable

Peers rated Fairly Acceptable for the College Capstone Guide Manual's Content, Clarity, Appeal to the Users, Originality, Learning Activities, and Format as their mean, respectively, is in the range of 2.51 to 3.25. Peers had a mean of 2.16 which rates the College Capstone Guide Manual as Fairly Acceptable. Moreover, the level of acceptability of all the participants, combined, was Acceptable as its mean was 2.60 with a standard deviation of .489. These results revealed that peers' lowest mean for acceptability was on its Learning Activities and Content which highly suggests that the researcher can modify the aforementioned criteria for a higher acceptability rate of the peers.

The results suggest that the peers are specific to the content of the instructional material which is justified by an article by Bugler (2017) emphasizing that one of the criteria of the teachers



on judging and choosing instructional materials is its content and depth of knowledge which must be able to show a great coherence the alignment of the curriculum standards. This article is also consistent with the criterion set by the National Academy of Science (2020), which includes the coherence, consistency, and coordination framework for Science Content based on criterion 1. Nevertheless, the domains must focus on the enhancement of the guidance manual for the senior high school level.

3. Level of Acceptability of the Modified Guide Manual in Writing Capstone Research Project for Senior High School the Students and Peers with Respect to Different Criteria

Table 3
Level of Acceptability of the Modified Guide Manual in Writing Capstone Research Project for Senior High School of the Students and Peers with Respect to Different Criteria

	Students		Peers		Total	
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description
A. Content						
Category Mean	3.6	Strongly Acceptable	3.52	Strongly Acceptable	3.6	Strongly Acceptable
B. Clarity						
Category Mean	3.475	Strongly Acceptable	3.55	Strongly Acceptable	3.5	Strongly Acceptable
C. Appeal to the Target User						
Category Mean	3.5	Strongly Acceptable	3.64	Strongly Acceptable	3.54	Strongly Acceptable
D. Originality						
Category Mean	3.133	Acceptable	3.2	Acceptable	3.133	Acceptable
E. Learning Activities						
Category Mean	3.52	Strongly Acceptable	3.68	Strongly Acceptable	3.56	Strongly Acceptable
F. Format						
Category Mean	3.52	Strongly Acceptable	3.56	Strongly Acceptable	3.5	Strongly Acceptable

It can be noted that the students rated acceptable for their originality while the rest of the criteria were rated as strongly acceptable. The guidebook's layout and look were given an acceptable rating by the peers because they set it apart from other guides and offer a wide range of useful assessment criteria. Furthermore, the rest of the criteria were rated as strongly acceptable. In totality, the students and the peers have given an acceptability rate of strongly acceptable for all the criteria except for its originality which was rated as acceptable.

The level of acceptability of the Enhanced Guide Manual in Writing Capstone Research Project for Senior High School administered to the

students and peers suggest that all the domain is highly accepted and enhanced except their originality. The trend of this data with a higher level of acceptability on the enhanced guide manual is much similar to the research study of Estremera (2016), which reveals a higher acceptability rate or “excellently acceptable” in terms of its usability, content, style, and learning activities.

4. Level of Acceptability of the Modified Guide Manual in Writing Capstone Research Project for Senior High School

Table 4
Level of Acceptability of the Modified Guide Manual in Writing Capstone Research Project for Senior High School

	Mean	Standard Deviation	Qualitative Description
Students			
Content	3.59	.253	Strongly Acceptable
Clarity	3.48	.300	Strongly Acceptable
Appeal	3.50	.289	Strongly Acceptable
Originality	3.15	.474	Acceptable
Learning Activities	3.53	.270	Strongly Acceptable
Format	3.50	.244	Strongly Acceptable
<i>Mean</i>	<i>3.46</i>	<i>.191</i>	<i>Strongly Acceptable</i>
Peer			
Content	3.51	.255	Strongly Acceptable
Clarity	3.55	.309	Strongly Acceptable
Appeal	3.61	.263	Strongly Acceptable
Originality	3.18	.295	Acceptable
Learning Activities	3.64	.211	Strongly Acceptable
Format	3.53	.217	Strongly Acceptable
<i>Mean</i>	<i>3.50</i>	<i>.161</i>	<i>Strongly Acceptable</i>
<i>Over-all Mean</i>	<i>3.47</i>	<i>.186</i>	<i>Strongly Acceptable</i>

Peers rated strongly acceptable for the Modified Capstone Guide Manual’s content, clarity, appeal to target users, learning activities, and format while originality was rated as acceptable. The peers had a mean of 3.50 which rates the Capstone Policies and Procedure manual as strongly acceptable. These results show that the researcher enhanced the aforementioned criteria for a higher acceptability rate of the peers. Moreover, the level of acceptability of all the respondents, combined, was strongly acceptable with a mean of 3.47.

As there are also references considered for the editor’s text which contributes to the level of its originality. The level of acceptability is also measured in the research of Mahinay (2017) on e-books which has also a satisfactory acceptability level after an analysis of the domain credibility, affordability, and ease of use was considered.



Nevertheless, the shown data in Table 6 is a positive trend as its level of acceptability increases.

5. Difference in the Level of Acceptability (Student) of College Capstone Guide Manual and Modified Guide Manual in Writing Capstone Research Project for Senior High School

Table 5
Difference in the Level of Acceptability (Student) of College Capstone Guide Manual and Modified Guide Manual in Writing Capstone Research Project for Senior High School

		N	Mean	SD	p-value	Interpretation
Content	Manual	20	3.51	.255	.000	Significant
	Capstone Policies	20	2.01	.521		
Clarity	Manual	20	3.55	.309	.000	Significant
	Capstone Policies	20	2.21	.508		
Appeal	Manual	20	3.61	.263	.000	Significant
	Capstone Policies	20	2.17	.478		
Originality	Manual	20	3.18	.295	.000	Significant
	Capstone Policies	20	2.35	.523		
Learning Activities	Manual	20	3.64	.211	.000	Significant
	Capstone Policies	20	2.00	.629		
Format	Manual	20	3.53	.217	.000	Significant
	Capstone Policies	20	2.23	.524		

As indicated in Table 5, it suggests the null hypothesis was rejected as there was a significant difference between the content, clarity, appeal to users, originality, learning activities, and format of the college capstone guide manual and the modified guide manual. All the above-mentioned shows a p-value less than .05 as it was tested at a .05 level of significance. Furthermore, these results suggest that there was an improvement project on the enhanced guide manual in terms of content, clarity, appeal, originality, learning activities, and format.

It indicates that the students are satisfied with the domains of the manual that appears to be enhanced on the enhanced Guide Manual in Writing Capstone Research Project for Senior High School. The positive and upward curve of acceptability is not new as the student respondents in the study 'Science-based modular work text for enhancing grammar learning of first-year high school students in the science high school' conducted by Mopera (2011) as cited by Ansari (2015), got an overall rating of very acceptable based on the criteria; content, clarity, appeal to

target users, and originality after modifications were made on the analysis of data made beforehand. This study shares the same upward and positive curve.

6. Difference in the Level of Acceptability (Peers) of College Capstone Guide Manual and Modified Guide Manual in Writing Capstone Research Project for Senior High School

Table 6
Difference in the Level of Acceptability (Peers) of College Capstone Guide Manual and Modified Guide Manual in Writing Capstone Research Project for Senior High School

		N	Mean	SD	p-value	Interpretation
Content	Manual	80	3.59	.253	.000	Significant
	Capstone Policies	80	2.80	.575		
Clarity	Manual	80	3.47	.300	.000	Significant
	Capstone Policies	80	2.73	.597		
Appeal	Manual	80	3.50	.289	.000	Significant
	Capstone Policies	80	2.65	.516		
Originality	Manual	80	3.14	.474	.000	Significant
	Capstone Policies	80	2.69	.622		
Learning Activities	Manual	80	3.52	.270	.000	Significant
	Capstone Policies	80	2.66	.567		
Format	Manual	80	3.50	.244	.000	Significant
	Capstone Policies	80	2.70	.528		

These results suggest that there is an improvement project on the enhanced guide manual in terms of content, clarity, appeal, originality, learning activities, and format. It indicates that the peer-respondent are satisfied with the domains of the manual that appears to be enhanced on the enhanced Guide Manual in Writing Capstone Research Project for Senior High School. As it appears on the previous data that the peers have higher standards for the qualification of the instructional material, it is not also deniable that these peers can be satisfied with the conditions that domains are properly achieved and enhanced through the data analyzed which appears to be the same on the Development and Validation of Physical Science Workbook for Senior High School of Rogayan (2017). As experts rated 'very much acceptable' to the workbook, given that it was anchored to the analysis, design, development, implementation, and evaluation model, which is also used in this study.

CONCLUSIONS

Based on the summary of findings, the following conclusions were drawn:

1. The College Capstone Guide Manual was acceptable in terms of content, clarity, appeal to the target user, originality, learning activities, and format according to the perception of the students and peers.
 2. The students and peers have the same level of perception that the Modified Guide Manual in Writing Capstone Research Project for Senior High School will be a good instructional material that can alleviate learners' performances by providing worthy assets in its progress.
 3. Students perceived that there was an improvement from the College Capstone Guide Manual to the Modified Guide Manual in Writing Capstone Research Project for Senior High School in terms of content, clarity, appeal to target user, originality, learning activities, and format.
 4. Students perceived that there was an improvement from the College Capstone Guide Manual and Enhanced Guide Manual in Writing Capstone Research Project for Senior High School in terms of content, clarity, appeal to target user, originality, learning activities, and format.
 5. Crafting the Modified Guide Manual in Writing Capstone Research Project for Senior High School stretches various challenges for the researcher/editor.
3. This Enhanced Guide Manual in Writing Capstone Research Project for Senior High School is highly recommended to the Senior High School teachers and administration.
 4. It also encourages the administration to support the success of its publication, dissemination, and implementation, as it is for the senior high school teachers and for the students to elicit their academic potential. Eventually, develop a feedback system for the close monitoring and enhancement of the instructional material.
 5. A further/similar/comparable study may be conducted to test the validity and acceptability of the guidebook by implementing it to use by other academic institutions. It is also suggested that qualitative studies may be conducted to support this existing study.

RECOMMENDATIONS

These suggestions are made in light of the facts and conclusions:

1. Educators are suggested to make an eye on crafting validated instructional materials to supplement the traditional method of teaching for the learners to enhance their performance in writing capstone research projects.
2. The author, editor, or educators of the instructional materials are encouraged to consider the appeal to the target users with stimulating activities, exploratory experiments that generates critical thinking

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