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Instructional Material in Research Methods: Effects on College Students' Academic Performance

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ABSTRACT

Instructional Materials (IMs) make or unmake teaching and learning. There is no one best strategy in teaching for the learners to understand fully what is being taught to them. The main objective of this study was to determine the effects of the instructional material (IM) in Research Methods on the academic performance, self-efficacy beliefs, and attitudes of college students. Two intact classes of pre-service teachers were the participants of the study utilizing the Quasi-Experimental Research Design. Pretests and posttests were administered to the participants of the study before and after the use of IM to ascertain the changes in students' performance, self-efficacy beliefs, and attitude towards Research. There is a significant difference in the performance, self-efficacy beliefs, and attitude of students toward Research in the pre-test and posttest. The IM in Research Methods is effective in enhancing students' learning. This IM is now being used by both pre-service and postgraduate students. Moreover, students are encouraged to use the book for easy understanding of the conduct of research in any field of specialization.

Keywords: Instructional material, effectiveness, attitudes, self-efficacy, performance, students' learning

INTRODUCTION

Instructional materials (IMs) are very vital in the teaching and learning processes. These materials enhance the teachers' teaching skills and styles to present their lessons interestingly and motivate the students to learn the subject meaningfully. These provide the students opportunities to study on their own pace and develop the learner's interest and curiosity to learn more. Likewise, these materials assist the teachers in making the classroom environment conducive for learning. Teaching and learning can be made easier and less stressful with the aid of IMs. They are equally indispensable tools of social and intellectual development of the learners. Students' performance is enhanced with the use of IMs.

Teaching and learning are difficult on the part of the students because of the inadequacy of teaching and learning materials.

According to Abdullahhi (2010) in Igiri & Ekpo (2015), instructional materials like equipment, class size, teacher qualification, and language of test, modules, textbooks, learning guides, laboratory manuals, workbook, etc. are materials locally made to assist the teachers in the teaching learning process and could enhance on the intellectual impact on the use of these materials. These instructional materials can enhance the learning performance of the students, promote meaningful communication, stimulate and motivate students to learn. Likewise, students who have textbooks, computers, internet access, and calculators perform better in examinations than students who did not have the IMs.

A lot of problems were encountered like challenges of teachers, teacher training, textbooks, lack of classrooms, and other basic needs though efforts have been exerted to improve their performance. A study on the effectiveness of Instructional Material (IM) in General Mathematics, Statistics, and Research Methods on the performance of students was conducted by Prado, Tan, and Ucang (2015). They found that the IMs were effective in increasing the performance of the students in Mathematics, Statistics, and Research Methods. Likewise, students have developed a positive attitude towards the subjects, displayed very high self-efficacy beliefs, and were highly motivated to learn the subjects. They recommended to teachers that

they develop their own IM to enhance student learning, to promote successful experiences among students, and to strengthen their self-efficacy beliefs.

It will take a long period of time to write a totally new textbook because of the bidding process, the writing, and the final approval and printing. While it is true that the use of IMs can enhance the learning achievement, connecting the use of particular IMs to student achievement has been difficult, in part because of the complexity of implementation of any instructional system. However, Zeringue et al. (2008) have long documented that IMs matter. Teachers teaching strategies and students' learnings are affected due to lack of IMs.

On the other hand, Osuala (2010), in Igiri & Ekpo (2015), highlights an important aspect of instructional materials. He points out that even though textbooks play an important role in the teaching and learning processes, it does not only help to motivate and develop the interest of the students but enhance respect of teachers' knowledge about the subject. Students' abilities in the average classroom environment require teachers who are educationally qualified to handle the subject. This has been truncated due to the inadequacy of instructional materials. Tahir (2002) admitted that there is a general lack of adequate IMs to address the teaching styles of teachers and learning styles of students. Instructional materials are grossly inadequate for effective teaching and learning.

A study on the impact of instructional materials in teaching and learning of Biology in Senior High School was also conducted. The findings revealed that the use of IMs impact teaching and learning of students in Biology and there is inadequacy of teaching aids in Biology which affects the teaching and learning negatively, and the use of IMs influences the academic achievement of students in Biology. Hence, good IMs should be presented properly and the teacher should employ a very good methodology to enhance good understanding of the subject. They recommended that the institutions should organize workshops, seminars, and conferences to empower the teachers and update their knowledge on new developments on the use of IM. Teachers are also encouraged to produce IMs so that students can see what the teachers are talking about the lessons (Igiri & Ekpo, 2015). In the handbook of research on improving student achievement, it is said that research cannot and does not identify the right or best way to teach. Research

is not limited to scholarly writing but includes disciplines on teaching strategies which in turn are to be covered in IM development. However, research can illuminate which instructional materials are more likely to affect student achievement.

Instructional material in Information Technology was developed because of the limited resources of books found in the library. Students find difficulty in participating in class discussion and in understanding the lesson due to the absence of books. Hence, the academic performance of the students was affected according to Quisumbing et al. (2017). Likewise, Aktakefi pointed out that there is a dire need of instructional materials for information explosion and the possibilities of technological development. Moreover, IMs affect what teachers teach and consequently what students learn.

FRAMEWORK

Human beings are the actors of their own behavior. The development of this instructional material in Research Methods is anchored on the Social Cognitive Theory of Bandura (2001). According to this theory, learning is influenced by the individuals' cognitive, behavioral, and environmental factors. Furthermore, this theory gives emphasis that observational learning leads to the development of the critical thinking of human beings. Additionally, Bandura (2001) originally proposed that an individual's beliefs of efficacy expectations are major determinants of activity choice. Moreover, Bandura's Social Cognitive Theory (1986) also supports this study. According to this theory, self-efficacy beliefs influence the choices people make and the courses of action they pursue. Individuals tend to engage in tasks about which they feel competent and confident. Self-efficacy beliefs exercise a powerful influence on the level of accomplishment that individuals ultimately realize (Salvan and Prado, 2013). Likewise, Dewey's Pragmatism theory (1938) commonly known as "learning by doing" states that in the learning process students learn best and their commitment to learning is highest when they are actively involved and engaged in the learning situation. Moreover, the Self – Determination Theory of Deci & Ryan (1985) asserts that competence, relatedness,

and autonomy are psychological needs that every individual should have because these serve as the foundation and anchorage of this study. These needs are associated to the motivational process that allows self-regulated learning. In order that students should succeed they should have strong personal motivation. Certain motivational beliefs and propensities set the stage for self-regulated learning and self –efficacy. The self – regulated and self-efficacious learners who actively participate, have sustained attention, and focus on the learning process for them to become successful. They have the ability to modulate emotional responses, solve problems, cope with failures, and channel their effort in mastering the subject matter. The theories presented above are used in the design and development of IM in Research Methods.

Instructional Materials and Students' Performance

There have been several studies on the development of Instructional Materials (IMs) in various forms. There are modules, laboratory manuals, workbook, learning guides, resource books, computer aided instructions, textbooks, and others. Oladejo & Olosunde (2011) conducted a quasi-experimental study on the effect of using standardized and improvised instructional materials on the academic achievement of students in Physics. They found out that there was a significant difference in the achievement of students exposed to standard instructional materials, those exposed to improvise IMs, and those exposed in the conventional method. They concluded that the use of improvised instructional materials improve the teaching and learning process. They recommended to Physics teachers to use the material since it is effective to improve the performance of the students in Physics. IMs are really integral components of teaching-learning situations; it is not just to supplement learning but to complement its process. It then shows that, if there must be an effective teaching-learning activity, utilization of instructional materials will be necessary.

Instructional media today are very gradually finding their ways into the classrooms where modern and versatile teachers are exploring new ways of transferring learning to the younger generation such as the use of prints, visuals, and audios or various combinations of these trios make up all we have in

instructional media. Another study on the effects of instructional resources on students' performance in ten subjects was done. He concluded that the material resources have significant effect on students' achievement in each of the ten subjects (Isola, 2010 in Oladejo & Olosunde, 2011).

Adalikwu & Lorkpilgh (2013) conducted a study on the influence of IMs on the academic performance of Senior High School students in Chemistry. They used the Pre-test and Posttest quasi-experimental research design. They found out that students exposed to IMs achieved better than those students not exposed to IMs. The IMs help the students in understanding concepts in Chemistry. Hence, students' performance in Chemistry generally improved. Likewise, Tety (2016) stressed that many schools do not use appropriate IMs. Much worst is they do not have IMs nor do they improvise their own. Although teachers agree that the IMs are important in enhancing students' achievement, they don't exert effort to provide the IMs in their classrooms. No matter how teachers are knowledgeable about the importance of IMs, they don't have the initiative to develop one. They do not have the commitment and dedication to care for their students. From the management point of view, this behavior of teachers emanate from low morale and motivation towards teaching or the teachers wanted to be supervised by their school heads.

Students' Attitude toward Research Methods

Studies have shown the relational contributions of attitude to learning. Positive and negative attitudes vary their influences towards learning the subject. Prado (2003) noted that students in the state colleges and universities' secondary schools have more positive attitude towards Mathematics than those students in public national secondary schools. In another study of Prado et al. (2011) on the intellectual development, learning styles, and learning approaches of engineering students on their performance in College Algebra pointed that the lone predictor of performance in College Algebra is attitude. This implies that the more positive the attitudes of students toward College Algebra the better their performance regardless of teaching and learning styles.

Attitude is related to motivation (Vansteenkiste, Lens, & Deci, 2006). They emphasizes that when students have a high positive attitude level, they will be more motivated towards self-improvement. A positive attitude towards the subject greatly helps in motivating a student to do Research. Their beliefs and attitudes have the potential to either facilitate or inhibit learning. Without interest and personal effort in learning, students can hardly perform well in the subject (Yara, 2009).

Students' Self-Efficacy Beliefs

Students' orientation and exposure on Research Methods activities influence their beliefs in the subject. Students who are exposed to teaching that emphasizes mastery of skills, teamwork, and collaboration have better performance in the subject.

Nietes & Prado (2015) noted that students with highly positive epistemological beliefs, self-efficacy beliefs, and attitude towards Biology perform better than those students with negative beliefs and attitude.

According to Bandura (1997) in Prado, et. al. (2015) who is the original proponent of self-efficacy, defined "perceived self-efficacy as beliefs in one's capacities to organize and execute the courses of action required to manage prospective situations (tasks) and to produce desired outcomes" (p. 3). Self-efficacy is a belief that a person can do something to produce a specific outcome, and second, it is "a person's estimate that a given behavior will lead to certain outcomes". He explained that self-efficacy beliefs determine the goals individuals set for themselves, how much effort they will expend, how long they will persevere, and how resilient they will be in the face of failure and setbacks. Self-efficacy is concerned, not with the level of skill possessed by a person, but with the judgment about what can be done with whatever level of skill exists. Self-efficacy as a self-referent thought is a significant determinant of performance that operates partially independent of underlying skills (Bandura, 1986) in Prado et al. (2015).

The study of Dales & Mirasol (2018) on innovative classroom instructional material for enhancing creative teaching and learning Linear Programming concluded that teachers can innovate in terms of IM to simplify their teaching and improve the self-efficacy of the students. The IM in Linear Programming is

effective in enhancing the performance of the students. Likewise, Salvan (2013) cited that positive self-efficacy beliefs of Mathematics teachers exhibited high competencies.

Students' Performance

Teaching is effective when the students are taught with the use of instructional materials. Likewise, there is a significant relationship between the use of instructional material and students' performance. Okendu (2012) asserted that an instructional material does not only facilitate teaching and learning but also gives concern to the individual and group of students. He added that regular monitoring and supervising of the instructional processes on the use of instructional material closely have a significant effect on the academic performance of students. This was confirmed by Onasanya & Omosewu (2011) that standard and improvised instructional materials have equal bearing and positive effects on students' performance.

There are many factors that contribute to low performance of students. Adalikwu & Iorkpil (2013) noted that those students taught with instructional material performed significantly better than those students taught without the instructional material. Moreover, the use of the IM increased the academic achievement of the students. Specifically, IMs generally improve the conceptual understanding of the students.

Olayinka (2016) conducted a quasi-experimental study on the effects of instructional materials on secondary school students' academic achievement in Social Studies in Ekiti State, Nigeria. The results of the study revealed that students exposed to instructional materials performed better than those students not exposed to instructional material.

All of the above-cited related literature and studies are similar to the present study in terms of methodology and processes. Generally, the previous and present studies point on the positive effect of instructional material on the academic performance of the students. The only difference is that some of the cited studies involved secondary students as participants of the study.

Knowing the influence of IMs in the classroom and the need to better understand the selection process, the researcher is in the midst of a study investigating curricular decision-making, with particular attention to the development of instructional material in Research Methods. The IM in Research Methods was developed to be used in the classroom. This study determined its effectiveness in improving student performance.

OBJECTIVES OF THE STUDY

To determine the effects of the instructional material in Research Methods on the performance of the students is the main objective of the study. Specifically, this study intended to: 1) assess the level of performance of students in Research Methods before and after the use of the IM; 2) determine the attitudes, motivation, and self-efficacy beliefs of students in Research Methods; 3) compare the students' attitude, motivation, and self-efficacy beliefs in Research Methods before and after the use of IM; and 4) find a significant difference of the performance of students when exposed to the use of IM and those who were not exposed to IM.

METHODS

Research Design

The study utilized the pretest-posttest quasi-experimental research design. The students took the pretest at the beginning of the semester of the school year. College students took the pretest before using the IM. Before the semester ends, the completion or posttest was given to determine the performance of the students after the use of the IM.

A descriptive survey was also used in collecting data to test the hypothesis or to answer questions concerning the current status of the participants of the study. This follows a logical process from data collection, quantification, statistical treatment, analysis, and interpretation. This study gathered both quantitative and qualitative data. The qualitative part of this study was on the development of instructional material, which is purely descriptive.

Participants and Sampling Procedure

The study was conducted at the College of Education in the Professional Education Department of Central Mindanao University, Musuan, Maramag, Bukidnon, Philippines. Purposive sampling of two intact classes of students enrolled in Methods of Research in the College of Education served as participants of the study.

There were 60 college students comprising the participants of the study. The developed IM in Research Methods was used to gather pertinent data. Pretest and posttest were developed. The tests were content validated by three experts in Research Methods. These were pilot tested to students in Research Methods who were not included as participants of the study. It has a reliability coefficient of 0.90. Valid and reliable questionnaires on attitude and self-efficacy beliefs were adapted from the study of Prado et al. (2015), which was pilot tested before the conduct of the study. These questionnaires are reliable with Cronbach's alpha of 0.87.

Participants of the study were informed that they were selected to take part in this undertaking before they answered the questionnaires. Enough time was given to answer the pretest for performance, attitude, and the self-efficacy beliefs scales. The pretest and posttest before and after the treatment periods were administered before and after the use of IM.

Statistical Techniques

Descriptive statistics such as mean and standard deviation were used to establish the parameters of the study. Student's t-test for correlated samples was utilized to determine if there are significant differences in the performance, attitudes, motivation, and self-efficacy beliefs of the participants after the implementation of the intervention.

RESULTS AND DISCUSSION

Students' Performance

Table 1

Performance of the Students Before and After Using IMs

Subject	Pre test	SD	Post test	SD	Gain Score
With Research Methods	54.61	9.374	69.93	7.59	15.32
Without Research Methods	49.50	8.245	55.71	5.50	6.21

Table 1 presents the performance of students before and after using the instructional materials. As shown in the table, the mean score of the students using the IM in the pretest is M=54.61 is lower compared to their posttest mean score of 69.93. These indicate that there is a high increase of 15.32 in the pretest mean score, which is considered as the gain score. On the contrary, the mean score of the students without the IM in the pretest is 49.50 is also lower compared to the posttest mean score of 55.71. It has a gain score of 6.21.

Moreover, students using Research Methods have the highest gain score than those students who did not use the IM. Though other participants got a little bit higher gain score, it does not imply mastery. The high mean scores of students do not necessarily mean that the majority of the respondents do not learn anything. Due to the high dispersion of scores as reflected by the standard deviation of 7.59, high scores of students are pulled down by those with extremely low scores.

Students' Motivation, Self-Efficacy Beliefs, and Attitudes of Students in Research Methods

Table 2

Level of Students' Attitude, Motivation, and Self-Efficacy Beliefs

Variables	Rating			
	Pretest	Descriptive Rating	Posttest	Descriptive Rating
Attitude towards Research Methods	3.51	Positive	3.79	Positive
Motivation	3.37	Moderately Positive	3.79	Positive
Self-Efficacy Beliefs	3.36	Moderately Positive	3.14	Moderately Positive

Legend:

4.50-5.00 – Highly Positive (HP)
3.50-4.49 - Positive (P)
2.50-3.49 - Moderately Positive (MP)
1.50-2.49 – Negative (N)
0.00-1.49 – Very Negative (VN)

As can be gleaned from Table 2, the students' mean scores in attitude, motivation, and self-efficacy beliefs in Research Methods increased except for self-efficacy beliefs. In terms of students' attitude, it is reflected that students have pretest and posttest mean scores of 3.51 and 3.79, respectively. These indicate that the increase in the posttest mean score of students' attitude is evident. The finding revealed that the participants of the study have a positive attitude towards Research Methods indeed.

College students' mean scores in motivation for pretest and posttest were 3.37 and 3.79, respectively. Students have a moderately positive to positive motivation to do research. In terms of self-efficacy beliefs, students' pretest and posttest mean scores were 3.36 and 3.14, respectively. There was a slight decrease in the overall mean score of the participants. This decrease is attributed to the increasing degree of difficulty of topics. During an informal interview, students claim that they found topics in the early part of the semester easier compared to the later part. The former is just a review of the lessons they had, while the latter is something new.

Table 3

t-test for Significant Difference of Performance of Students Before and After the Use of IM in Research Methods

Variables	Grade/Level	Mean	SD	t	p-value
Pretest	College	54.61	9.374	***-10.975****	***0.000***
Posttest		69.93	7.59		

*α =0.01 level of significance

Table 3 reveals the statistical test for a significant difference in the performance of students before and after the use of instructional material in Research Methods.

The mean score in the pretest is 54.61 while in the posttest the mean score is 69.93. This shows that learning took place in the classroom when these students used the IM in Research Methods. Moreover, there was a significant increase in the performance of the students as reflected by its t-value of -10.975 with a p-value of 0.000. This implies that there is a significant difference in the performance of students after the use of IM in Research Methods.

The significant increase in students' performance from pretest to posttest reveals the effectiveness of the IM used in enhancing learning among students. Students

claimed during the informal interviews, that they found IM to be useful, especially that topics in the course syllabi are already well-arranged and presented unlike using some textbooks where teachers tend to skip from one topic to another since the presentation of topics does not follow the rules on pre-requisites. These findings are supported by the studies of Dales & Mirasol (2018); Olayinka (2016); Adalikwu & Iorkpil (2013), Onasanya & Omosewu (2011); Oladejo & Olosunde (2011) when they espoused that research-based IM foster success in any subject for that matter.

During a casual conversation with high performing participants, they claimed that IM is very useful, especially in the preparation for examinations. The results of the study find support in the studies of Adalikwu and Iorkpil (2013), Arop et al. (2015), and Olayinka (2016) when they found that engagement and avoidance of activities can be measured by the students' beliefs.

CONCLUSIONS

The following conclusions are drawn based on the findings of the study. The participants of the study have low performance in Research Methods, low motivation, and self-efficacy beliefs and have a moderately positive attitude towards Research Methods before the use of the IM. Their attitude ranges from moderately positive to positive. Significant increases in the performance of students before and after the use of IM are evident. There are significant differences in the students' attitudes, motivation, and self-efficacy beliefs and performance of students before and after the use of IM in Research Methods. The IM in Research Methods is highly effective in improving the performance of the students.

RECOMMENDATIONS

In the light of the foregoing findings and conclusions, the following recommendations are suggested:

1. Faculty members are encouraged to develop their own instructional materials and utilize varied instructional aids to enhance student learning;

2. Authors of IMs are reminded to continually revise their developed IMs to suit the learning styles and preferences of the students;

3. Teachers are invigorated to utilize different methods, strategies, and techniques of teaching including the use of IMs, equipment, technology, and others to facilitate effective teaching and develop a positive attitude towards the subject among the students;

4. Teachers' initiatives and the promotion of successful experiences among students be provided to strengthen self-efficacy beliefs. Varied learning activities be prepared by teachers to help students with a negative attitude and low self-efficacy beliefs be able to revert them to a more favorable attitude and beliefs that would lead to better academic performance; and

5. Finally, teachers in research both in the graduate and graduate levels are encouraged to use the IM in Research Methods since it has a positive effect on students' performance.

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