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Effects of Instructional Objectives on Mathematics Learning among Selected College Students in LSU-Ozamis

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Abstract
This study attempted to answer the effect of instructional objectives on mathematics when presented along with the study text or when not presented along the study text among selected college students in La Salle University (LSU)- Ozamiz. Specifically it sought to answer whether the presence of instructional objectives produces increased intentional learning or its absence will decrease intentional learning and increase the latter learning as an effect. The findings of the study are: the effect of instructional objectives on the performance of the experimental group produces intentional learning; however, there is no significant increasing in their performance level. The effect of not presenting instructional objectives on the performance of the control group produces incidental learning; however there is no significant increase or decrease in their performance level. Based on the foresighted findings, the following conclusions are drawn: the effect of presenting mathematics instructional objectives increases the performances while the effect in the absence of mathematics instructional objectives would ensure decreasing score. The treatment is thought to elicit inspection behaviors, thus focuses the person's attention on the important aspects of the content and producing intentional learning on the other hand the absence of any specific objectives minimizes the attention of the learner in learning some relevant aspects in the study text, thus, producing incidental learning. Intentional learning increases when the teacher enhances students learning by letting them experience instructional objectives in the teaching-learning processes.

Keywords: mathematics learning, incidental learning, intentional learning, instructional objectives.

Introduction

Instructional Objectives are printed information about how to do, make, assemble, use, or operate something (Encarta 2003). Orienting stimuli that are thought to elicit inspection behaviors which in turn determine what is learned. These are the learning goals presented along with/before the study text or not presented along with/before the study text. An instructional program should be designed in response to the challenging situations that frequently reinforced the success of learning and teaching outcomes (Psychology, 1990). An objective sets the direction for the entire instructional processes. An instructional objective plays an important rule not only in mathematics field of learning but also into other studies. Instructional objectives on mathematics will help the learners recognize that that teaching is an art. Instructional objective is

also a powerful foundation in teaching with limitless applications. It will help the learners demonstrate their competency in modeling mathematical competency both in complex phenomena, problem solving, and decision making. Knowing the effects of instructional objectives into mathematics learners help us know how to utilize the learning process in order to further our progress in learning effectively. Instructional objectives refer to the objectives given to the experimental group that serve as a hint in this study which are used to measure its effect on intentional and incidental learning, thus, incidental learning and intentional learning are the terms frequently mention since it is basically refer to the effect of the learning objectives.

Furthermore, instructional objectives as used in the study refers to the aims formulated by the experimenters/researchers which are expected to be achieved at the end of the given time, however, other consequences, that is, absence of instructional objectives may result to incidental learning which is expected to be one of the effects in the absence of instructional objectives. Intentional learning environment provide a self –directed purpose in which goals and objectives on what and how to learn were emphasized. On the other hand, incidental learning occurs when the learners acquired knowledge and understanding in the learning environment. Effects of instructional objectives on the two learning processes are the main purposes of the study in which the researcher had attempted to find out for the conclusions.

Statement of the Problem

This study aimed to find out the effect of instructional objectives on mathematics learning of selected college students in LSU-Ozamiz. It sought to answer the effect of using the instructional objectives on the performance of experimental group; the effect of not using instructional objectives on the performance of control group. The study also determines the relationship of the respondents performance in math in which the experimental group were exposed to the intentional learning and the control group is on incidental learning environment.

Research Design of the Study

This research paper made use of experimental methods with analysis which initiated cause and effect relationship. To determine if one variable actually causes another, researchers conducted an experiments. Those who experienced the treatment compose the experimental group and those who do not make up or without treatment is the control group. Analysis and interpretation of data involved the total number of observed respondents from experimental and control group; with all the available data on hand, analysis and interpretation followed. This study employed the separate groups design consisting of two groups: the experimental and the control groups.

Significance of Study

The significance and importance of instructional objectives on mathematics in relation to learning should never be under emphasizing. In this study, an attempt was made to seek the effects of instructional objectives whether it's presence along with/before the study text produces increased intentional learning or its absence will decrease incidental learning and increase the latter learning as an effect.

Method of Procedure

A sheet of paper containing questions to be answered by both experimental and control group was made out of the given context to be read by both experimental and control group. The test contains twenty-five (25) mathematics questions answerable by multiples choice; however, the experimenters included some evaluation for the possible critic of the respondents regarding the context. The test which they will be taking is directly referenced to the mathematics instructional objectives that will be given to the experimental group as a treatment. The

experimenter/researchers took three (3) action words in formulating objectives (knowledge, comprehension, application) out of six (6) of the Bloom's Taxonomy in making mathematics instructional objectives (IO).

Collection of Data

Research sample was forty (n=40) taken from the pool of the college students admitted during the year 2015-2016 in La Salle University-Ozamiz City. The sample was obtained by selection and randomization procedure. This was equally divided into experimental and control groups. The original pool of the population is from the selected college population in La Salle University-Ozamiz City. The experiment is projected into two (2) trials. The classroom number is divided into two (2), one half will be again divided into two groups which will be the experimental and control group so as to the other half classroom number. To control the intellectual level of the subjects, randomization was done. Only one (1) room was used. The medium and the kind of instruction used was the same for the two groups (experimental and control) both are exposed to same study text, materials, the test, and has the same time limit for reading the study text and for answering the questions. However, the two groups were exposed to different instructions since only the experimental group learners received the treatment (instructional objectives). In the experiment, only 10 students were selected and assigned to two (2) groups. There are ten (10) students per group in each trial. Medium of instruction will be the same for the two groups as well as the subject matter or the topic to be used including the materials and the test questions. Sequence relevant variable is where the subject participants of groups experimental and control will be subject to different conditions. The experimental group is given the instructional objectives (treatment) and the control group is not given any treatment at all.

Treatment of Data

To determine the difference in mean scores between experimental and control Groups, the t-test formula was used. a. Paired sample t-test. This was used to determine the significant difference between the experimental & control group scores at 0.05 level of significance. b. Frequency and Percentage. This was used to describe the profile of the respondents, c. Transmutation of scores by standard deviation. This was used to show compute the equivalent grades of the specific score for each respondents.

Findings

This study made use of experimental method. Although age and gender in this study are said to be beyond the control of the experimenter, for the sake of considering factors that might affect the gathered data, the experimenters tabulated the frequency distribution of the respondents' ages and gender as presented in table 1 and table 2.

Table 1 Frequency and Percentage Distribution of Respondent's Age

Experimental Group			Control Group		
Age	Frequency	Percent	Age	Frequency	Percent
15	1	5%	15	2	10%
16	5	25%	16	3	15%
17	13	65%	17	14	70%
18	1	5%	18	1	5%
Total	20	100%		20	100%

Table 1 shows the ages of the respondents belonging to the two groups. The tables illustrate the findings that; Of the 20 respondents, experimental group has 1 or 5% is a 15 year old, 5 or 25%

are 16 years of age, aged 17 has 13 or 65% while aged 18 has 1 or 5% of the total population on EG. Of the 20 respondents, control group has 1 or 5% was a 18 years of age, 2 or 10% were aged 15, while 3 or 15% were 16, 14 or 70% belongs to age 17.

Table 2 Frequency Distribution of Respondent's Gender

Experimental Group			Control Group		
Gender	f	Percent	Gender	f	Percent
F	17	85%	F	16	80%
M	3	15%	M	4	20%
Total	20	100		20	100

Table 2 shows the sexes of the respondents belonging to the two groups. The table illustrates the findings that; of the 40 respondents, 82.5% of the population comprises female, while there were only 17.5% belongs to male.

Table 3 Frequency and Percentage Distribution of Respondents Score in Math Test

Scores	Experimental Group			
	M		Percent	Description
22-20	17		45	Very Good
19-17	16		35	Good
16-14	15		20	Satisfactory

The table above shows the class interval of the experimental group. The number of students who got scores ranging from 16-14 are 4 or 20% which is describe as a satisfactory, 7 or 35% for the scores 17-19 with a description of good, and 9 or 45% for the scores 20-22 is said to be in very good condition. Experimental group has a high frequency than the control group, thus, experimental group is better than the control group.

Table 4 Frequency and Percentage Distribution of Respondents Score in Math Test

Scores	Control Group			
	M		Percent	Description
22-20	17		40	Very Good
19-17	16		35	Good
16-14	15		25	Satisfactory

Table 4 shows the description of control group according to their score. As depicted in the table many (40%) of the respondents were having a very good performance in math as measured by the test in math.

Table 5 Weighted Mean Scores of Experimental and Control Group

Group	Mean	n	Standard Deviation	Standard Error Mean
Experimental	18.8	20	2.28	0.511
Control	18.4	20	2.33	0.520

The table above shows that the mean for experimental group is 18.8 which is higher compare to the mean of control group who got 18.4. The mean difference of experimental and control group are 0.4. It shown in the table that 18.80 is good based on the items 25 for the experimental group and 18.40 is satisfactory for the control group. The result implies that there is just a little difference between experimental and control group since the population number is small to compare.

Table 6 T-test Showing Significant Difference of Performance
Between Experimental and Control Group

T-test		p-value	Decision	Significance
36.79	38	0.05	Reject H_0	Highly Significant

T-test formula was used in the study instead of the z-test formula since the population number of respondents is small. The gathered data revealed that experimental group performed better than control group when an instructional objective is present in the stimulus. The t-value of the experimental group is 36.795 while the t-value of the control group is 35.376. A computed t-test value of 36.795 was obtained which is greater than the critical value of 1.645; since it is in the critical region, the null hypothesis was then rejected at 0.05 level of significance. This result revealed that despite of minimal difference of the means between the groups, its difference is not negligible and shown to have significant difference. Thus, it implied that there is a significant difference between the performances of the experimental group and control group when instructional objectives is present along with the study text and it implies that the respondents in the experimental group are better than the respondents in the control group.

Conclusion of the Study

The effect of presenting instructional objectives on mathematics increases performances while the effect in the absence of instructional objectives would ensure decreasing scores. The treatment (presence of instructional objectives) is thought to elicit inspection behaviors, thus, focuses the person's attention on important aspects of the content and producing intentional learning. On the other hand, the absence of any specific objectives minimizes the attention of any person in learning some relevant aspects in the learning material, which then produces incidental learning.

Students learn faster and retain most of the lesson longer when they actually see what they are expected to learn. Based on the result, the null hypothesis was rejected which pointed out that there is a significant difference on intentional learning (experimental group) when instructional objectives are presented along with/ before the study text and with incidental learning (control group) when instructional objectives are not presented along with/ before the study text. With the t-values, it can be inferred that the variables cited in this study are highly significant. The respondents in the experimental group are quiet better than the control group based on their average means score. The generality of conclusion is only limited to forty (40) college students in LSU, Ozamiz City during the year 2015-2016. The findings of this study bear significant implication to the instructors/teachers and administration responsible for curriculum making.

Furthermore, instructional objectives have significant difference in experimental and control group. Experimental group is better than control group when instructional objectives are presented along with/before the study text. There are possible reasons to consider for the superiority of the former group; one is it could be expected that subjects instructed to go over the given instructional objectives would induce rehearsal. Another is experimental group would have a greater tendency to categorize material, to try to find devices that would facilitate remembering and; it is expected that experimental group pay closer attention on relevant items referenced to mathematics instructional objectives and not on non-relevant items, furthermore, perhaps the mathematics instructional objectives given to the experimental group helped them to understand the concepts they need to know and made them improve their performance in the test. In general, overall retention tend to be greater when instruction or objectives are located after than before the study text materials due to some factors such as review, repetition of relevant material and practicing test-like events (Frase, 1968).

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Mark Premacio Laurente is an educator, researcher, mathematician and statistician. He graduated his Bachelor of Science in Mathematics from the Mindanao State University, Marawi City, Philippines. He also finished his Master of Science in Mathematics and Certificate in Statistics from the same institution. He is also a passer of August 2007 Licensure Examination for Teachers (LET) and April 2010 Civil Service Examination. He is currently pursuing his Doctor of Philosophy in Mathematics in Iligan Institute of Technology of the Mindanao State University, Iligan City, Philippines. His research interests include mathematics, education, graph theory, statistics, topology and algebra.