The effectiveness of separating the lecture and laboratory instructors compared to a same laboratory and lecture instructor in the Information Technology subjects of SDCA BSIT Students

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Abstract - *This study examines the effectiveness of the teaching method wherein an Information Technology subject should have two separate instructors in delivering education to SDCA BSIT students. The proponent sought to address their own concerns about the quality of student learning in an environment that permits the separation of instructors in IT laboratory and lecture subjects, and the difficulties in soliciting answers and reactions from the students of these subjects. The prediction is that the students in the control group with the same lecture and laboratory instructor plus increased direct contact with the teaching faculty would learn the subject matter better than the students in the experimental group who have different lecture and laboratory instructors for the same subject courses. The students in both groups were compared by obtaining their final grades, and using the t-test paired data method to compute the relationship between these grades. The null hypothesis is that there is no significant difference between the grades of the BSIT students with the same laboratory and lecture instructor class and the grades of the BSIT students with different laboratory and lecture instructors. Since the t-statistic computed is higher than the t-critical two tail statistic, it means that there is a significant difference between the two data samples. The null hypothesis is rejected.*

Keywords – *Student, laboratory, lecture, Information Technology learning.*

Introduction

In higher education, teaching in a lab/lecture format is common (Perkins, 2005). A great majority of students in Information Technology subject courses find them a bit boring and difficult. Many researchers feel that this difficulty stems from the passive role the students play in a traditional class. A traditional class is a teaching class with a lecture instructor only. If this is the case, then we must clearly modify the way we teach in order to develop students who are enthused about science and really understand the subject matter. Even students headed for non-computer careers need to have an understanding and appreciation of the role computer and IT-related courses play in their lives. After all, how many people think about the importance of how software works and how computers are interconnected? The traditional classroom can sometimes resemble a one-person show, with a captive but largely uninvolved audience. Classes are usually dominated by lecture or direct instruction. Oftentimes, students are expected to blindly accept the information they are given without questioning the instructor. Then came about the idea of a laboratory class. In laboratory classes, the instructor can have an application of what is taught in class in a practical, real-world scenario. The teacher seeks to transfer thoughts and meanings to the passive student in a lecture class to an active student in a laboratory class. In laboratory sessions, students play an active role in carrying out experiments and reaching their own conclusions. Teachers assist the students in developing new insights and connecting them with previous knowledge, but leave the discovery and discussion to the student groups. The dilemma is, what if the lecture sessions do not coincide with the laboratory applications? This will become a hindrance to the effectiveness and

maximization of the learning of students in computer science and information technology courses. This is further complicated when the instructor in the lecture class and laboratory class handle the same subject matter differently. The proponent of this study is trying to address the effectiveness of separating the lecture and laboratory instructors in information technology and computer science subject courses.

Some students believed that they were more likely to review lectures when important details that were covered in the lectures were excluded from the hand-outs (Danielsona, 2014). It is important at this stage that Outcomes-Based Education (OBE) be implemented in such a way that both IT lecture and laboratory classes are in harmony. Information technology helps meet student needs by providing multiple curriculum delivery methods (Bridge, 2009). If the student does not give his interest to the subject, one of the factors that are neglected is attendance. However, attendance is enhanced if both lab and lecture subjects agree with each other, for if the lecture subject supplements the laboratory subject, it affects the attendance (Holbrook, 2011). Arguments may be made for employing copious numbers of lecture demonstrations as interest-grabbers, but a lecture demonstration that explains an important concept still is not very interesting if the concepts themselves are of no interest. If, on the other hand, students are left to discover concepts in the laboratory with little guidance initially, then they may be much more interested and motivated in the classroom discussion that follows concerning the experiment and the concepts that accompany it (McCauley, 2003).

Objectives of the Study

The general objective of the study is to assess if having a student enroll in a class with the same lecture and laboratory instructor would affect his grades more compared to having a student enroll in a class with different lecture and laboratory instructors. Specifically, the objectives of this study are:

1. Determine if there is a significant difference in grade performance between a control class group, where they have the same lecture and laboratory instructor, and an experimental class group with different lecture and laboratory instructors.
2. Determine whether or not the difference in lecture and laboratory instructors affects their grades.
3. Determine whether or not there is a positive or negative effect if a BSIT class should have different lecture and laboratory instructors.

Statement of the Problem

The study determines if having separate lecture and laboratory instructors have an effect on BSIT students. Specifically, the study seeks to answer the following questions:

1. Is there a significant difference between a control group with class of same lecture and laboratory instructor with an experimental group with different lecture and laboratory instructor with their learning in class which is measured in their grade performance?
2. Is the final grade of a BSIT student affected if their class has the same lecture and laboratory instructor compared to a class with different laboratory and lecture instructors?

3. Is there a negative or positive effect if a BSIT class has different lecture and laboratory instructors?

Null Hypothesis

There is no significant difference between the grades of the BSIT students with the same laboratory and lecture instructor with the grades of BSIT students with different laboratory and lecture instructors.

$$H_0: \mu_0 = 0$$
$$H_A: \mu_0 \neq 0$$

Review of Related Studies and Literature

The case for a cooperative studio classroom: teaching Petrology in a different way. To improve their Petrology course, Perkins had changed it from a lab-lecture format to one that emphasizes studio and cooperative learning. The goals of the changes were to: (1) improve student learning by covering (a smaller number of) topics in greater depth, (2) deemphasize knowledge-based learning and emphasize development of higher order thinking skills (comprehension, application, analysis, synthesis, evaluation), and (3) help our students develop good habits of the mind and fundamental skills useful for lifelong learning.

The reformatted course requires that students take more responsibility for their learning. Perkins and the teaching assistant acted as mentors, guiding students as they carry out the learning process. Lab and lecture sessions were seamlessly combined. Formal lectures were short and rare. Instead, students did many group projects, studying complex problems in depth. The content covered in the semester was less than in a more traditional class, but the learning was greater (Dexter Perkins, 2005).

Improving student knowledge through experiential learning - hands-on statics lab at Virginia Tech. It has been well-documented that humans learn better through a combination of hearing, seeing, and hands-on experience than through hearing and seeing alone. Despite these findings, the majority of college instruction is through lecture. This research seeks to improve the quality of structural education for students in Building Construction, Architecture, and Engineering by allowing them to test theoretical structural concepts in a hands-on lab environment that parallels their static lecture class. The paper provides a background on the experiential learning approach, presents examples of others engaged in similar research, discusses the details of developing the experience-based lab class, describes the labs and their structure, and summarizes the outcome of this model class. Lessons learned, including which type of student might benefit most from the experiential learning format and shortcomings of applying the experiential learning model are discussed along with recommendations for future work. (Alcorn, 2003)

Is the effectiveness of lecture capture related to teaching approach or content type? The purpose of two related studies was to explore the relationships between course characteristics (teaching approach, content type, and level of curricular coordination), lecture-capture implementation, and learning in a veterinary medical education environment. Two hundred and twenty-two students (222) and thirty-five (35) faculty members participated in the first study, which surveyed respondents regarding their perception of lecture-capture use and impact on learning. Four hundred and ninety-one (491) students participated in the second study, which

compared scores on a standardized test of basic science knowledge among groups experiencing various levels of lecture-capture implementation. Students were most likely to view captured lectures in courses that moved quickly, relied heavily on lecture, were perceived as highly relevant to their future success, and contained information not available in other formats. A greater percentage of students than faculty-perceived lecture capture as beneficial to learning. Higher views of captured lectures were associated with higher test scores in disciplines that relied most heavily on a straight-lecture teaching approach and had a basic science-research teaching context. The number of lecture-capture views was not significantly related to test scores in disciplines that relied less heavily on straight lecture for instruction and had a basic science-applied teaching context. (Danielson, 2013)

The benefits of combining computer technology and traditional teaching Methodism in large enrolment geoscience classes. The use of computers and the internet to convey content to students is popular, but the amount of research relating the effectiveness of the technology to learning the information is relatively sparse. Data on exam performances and attitudes toward the use of technology were collected from large enrolment, entry-level Geoscience courses over a span of seven semesters. The data were examined to determine if the use of computers as a presentation tool and the incorporation of the internet as a means to give students increased exposure to course content, (notes) exam scores, and knowledge of Earth Sciences (Durbin, 2002).

Methodology

Design. Quasi-experimental research designs are used for this study, like experimental designs, test causal hypotheses (White & Sabarwal 2014). In this case, the grades of students in classes with the same lecture and laboratory lecturers, and classes with separate lecture and laboratory lectures.

Sample. The data are taken from twenty-seven (27) BSIT students of 2016-2017. The control group is composed of BSIT students in the E-Commerce subject under Prof. Angelito Buan, who acted as both the subject's lecture and laboratory class instructor. The experimental group is composed of BSIT students in the Web Development subject under lecture class instructor Prof. Harish Cerdiña and laboratory class instructor Prof. Angelo Arguson. The final grades of the students from both classes were obtained.

Procedures. In cooperation with members of the SBCS faculty, the proponent obtained the final grades of both classes in the experimental and control groups. The grades of BSIT students from the E-commerce subject were obtained and grouped as "Control Group A" with the single lecture and laboratory instructor (Angelito Buan), while the grades of BSIT students from the Web Development subject were obtained and grouped as "Experimental Group B" with the different lecture and laboratory instructors (Angelo Arguson and Harish Cerdiña). A null hypothesis was made where there is no significant difference between the grades of BSIT students with the same class laboratory and lecture instructor, and the grades of BSIT students with different laboratory and lecture instructors. A paired sample t-test was used to test the null hypothesis, and was computed in Microsoft Excel. The result of the computed values will be interpreted with the alpha value assumed at 0.05, and the hypothesized mean difference at 0.

Data analysis. The data samples were ordered, arranged, and coded for investigation. The mean, the variance, the t-statistic (one tail and two tail), and the other data analysis computations in t-test will be computed and presented as per the Microsoft Excel results.

Results and Discussion

Table 1. Summary of the final grades of the classes which have same and different instructors

Names		Different	Same
ABDURAHMAN	N	76.85	72.44
BABAS	H	69.74	72.11
BANTULAN	G	58.67	68.15
BARCELONA	T	72.93	74.75
BAYATAN	L	57.91	64.85
BAYRON JR.	R	52.25	71.78
CAJIGAL	S	90.02	92.04
CONCHE	C	71.08	75.74
DOMINGUEZ	S	82.06	89.34
FUNTANAR	O	84.82	92.67
GOZON	B	88.34	89.33
GUHIT	T	53.93	64.85
IMPERIAL	C	68.00	74.75
LAURETA	P	85.35	82.97
MENDOZA	P	69.22	72.77
NARCISO	L	88.26	89.67
NOBELA	C	71.84	73.76
PURIFICACION	O	87.18	68.15
QUITAIN	B	84.32	96.34
RABOY	V	89.79	90
RAMIREZ	T	75.52	90
ROA	T	60.13	78.05
SORIANO III	O	80.95	86.7
SY	C	72.87	76.07
VILLARIN	V	70.27	71.45
VILLEGAS	M	89.05	88.01
ZAPANTA	L	78.47	90
N=		27	27
Average=		75.18	79.88
Standard Deviation=		11.50736	9.690308
Mean difference =		4.7	

Table 1 shows the summary of grades obtained from the control group and experimental group, and represents the raw data which will be computed later on. The table also shows the mean average of both groups and their computed standard deviations.

Confidence interval:
The mean of Group One minus Group Two equals 4.7007
95% confidence interval of this difference:
From 1.6985 to 7.7030

Table 2. Paired two sample for means of the group A control group and group B experimental group.

	Same (Grp A)	*Different (Grp B)*
Mean	79.879259	75.179136
Variance	93.902076	132.419441
Observations	27	27
Hypothesized Mean Difference	0	
Degree of Freedom	26	
t Stat	3.217654	
P(T<=t) one-tail	0.001724	
t Critical one-tail	1.705618	
P(T<=t) two-tail	0.003448	
t Critical two-tail	2.055529	

Table 2 shows the summary of the data analyzed using inferential statistics with t-test. A mean of 79.879 is obtained for group A, and a mean of 75.179 for group B. This shows that there is only a small difference between the two means. The degree of freedom is computed as 26, which is one point lower than the total observations for each sample. The hypothesized mean difference is 0 because in the conducted t-test analysis, there is no mean difference between the samples as per null hypothesis. The t-test one tail was also computed, but will not be used in this study because there is no assumed direction on the correlation between the data samples. Since the t-statistic is higher than the t-critical two tail statistic, it means that there is a significant difference between the two data samples. By conventional criteria, this difference is considered to be very statistically significant. Therefore, the null hypothesis is rejected.

Conclusion and Recommendations

Conclusion. The results of the statistical treatment t-test indicate that there is a difference in the grades of IT students if the instructor in the lecture and laboratory classes were the same. The proponent concludes that there is no effectiveness in separating the laboratory and lecture instructors in IT subjects, and it would be more effective if the instructors were the same instead. This is based upon the rejection of the null hypothesis that there is no significant difference between the grades of the BSIT students with the same laboratory and lecture instructor class and the grades of the BSIT students with different laboratory and lecture instructor. This is proven by the result where the computed t-statistic 3.217654 is higher than the computed t-critical two tail statistic 2.055529, meaning that there is a significant difference between the two data samples as shown in Table 2. Since the values of the data (grades) and the calculated data are higher in Control Group A than Experimental Group B, the proponent concludes that there is a negative effect in a BSIT student's final grades if the laboratory and lecture instructors are different.

Recommendations. This course's instructors suggested that the lab/lecture instructor division be abolished. In its place will be a course structure that is divided into groups of students.

The three current instructors (two lab and one lecture) will each teach three lab lectures, and will also be responsible for the same students' online lecture instruction. This set-up was also inferred by the students. Furthermore, the proponent recommends that having the same lecture and laboratory instructor will benefit the student because it increases their attitude and learning while boosting interests in the subject that they are currently enrolled.

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