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The Impact of PowerPoint on Undergraduates' Technical Communication Achievement

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Abstract

PowerPoint, one of the most well known ICT tools, plays a vital role in our society nowadays as it has been utilized widely and actively in facilitating the process of teaching and learning, especially in the educational domain. The study examined the effect of PowerPoint lecturing on undergraduates' Technical Communication final examination grade. The experimental group was taught in a PowerPoint lecture format while the control group in a traditional whiteboard lecture format. The results revealed that the experimental group grades were significantly higher than the control group at $p = 0.00$.

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1. Introduction

The importance of ICTs in the education changes has been recognized by the Government of Malaysia by inaugurating Multimedia Super Corridor (MSC) status to higher learning institutions that use ICTs to produce and enhance their teaching and learning experiences. This award symbolizes "world-class service and achievement" (Multimedia Development Corporation, 1996-2012). In this context, the use of applications, such as PowerPoint, enriches the teaching and learning processes. PowerPoint application enriches teaching and learning experiences in a number of ways. First, it enables lectures to be delivered through a neat and organized presentation which eventually gets the students' attention (Holzl, 1997; Hashemi et al., 2012). Second, the uses of multimedia in the application enable the lectures to cater for different learning styles (Hashemi et al., 2012). In addition, the file

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format of PowerPoint is generally compatible to most systems, and thus, students can easily download the presentation slides and add more relevant information after or during lecture. Finally, PowerPoint presentation revolves around the most important points of the topic lectured.

Many studies have been carried out to examine the impacts of ICTs on teaching and learning but there are limited empirical studies of the effect of PowerPoint in learning. The European Higher Education Area (EHEA) is evolving their teaching and learning processes to provide better education experience. Valentín et al. (2013) reported that universities are transforming from a traditional controlled and directed instruction to autonomous learning, and hence, it is essential to focus on developing diverse competencies based instructions. ICTs play important roles in restructuring the educational setting, transforming it from teacher centered to students centered. In their study, Valentín et al (2013) proved that there were significant associations between the uses of different ICTs and 543 undergraduates' improved performance and satisfaction.

Gürbüz et al. (2010) explored the effect of PowerPoint as a learning tool. The sample for the study was a group of 109 freshman undergraduates taking a biology education program. They were assigned to two different groups: experimental group (n = 56) preparing and presenting with PowerPoint, and control group (n = 53) learning through traditional approach. To inquire the effect on academic achievement and attitude, two different tests were administered as pre- and post-tests, namely the Biology Achievement Test (BAT) and the Biology Attitude Scale (BAS). The results supported that using PowerPoint as learning tool may improve academic achievement and attitudes among undergraduates enrolling biology education program. This is due to the PowerPoint presentation itself promotes auditory and visual information representations, reflecting the cognitive benefit of multimedia learning.

Szabo and Hastings (2000) conducted three studies to investigate the efficacy of PowerPoint lecturing on undergraduates' academic achievement and attitudes in different modules: Motor Learning, Strength, Power and Endurance in Sport and Exercise, Research Methods in Sports and Exercise, and Social Psychology of Sport and Exercise. In the first study, comparisons were made between (i) the students' attitudes towards PowerPoint lectures and traditional overhead or blackboard assisted lectures, and (ii) the effect of the lecture styles on students' test result. The students were found to have positive attitudes toward PowerPoint lectures because they felt that PowerPoint lectures were interesting, able to get their attention, and help them to have better understanding. However, this did not reflect their achievement; both lecture styles had no significant differences on the students' test result. In the second study, a series of mock tests was conducted on the three groups of students receiving three different lecture styles respectively (i) overhead or blackboard lectures, (ii) PowerPoint lectures, and (iii) PowerPoint lectures with distribution of lecture notes. The results indicated that students performed better with PowerPoint lecturing. In the third study, two groups of students were compared for their performance in two mock tests using counterbalanced research design (PowerPoint and overhead). Both groups obtained higher grades for Test 1 compared to Test 2 despite different lecture styles.

Susskind (2005) provides the latest account on PowerPoint lecturing. In this study, the effects of PowerPoint assisted instruction were examined on two sections of students in Introduction to Psychology college classes. Lectures for section one and section two were conducted by the same instructor using whiteboard and PowerPoint presentation software in two blocks of time. Lectures were conducted in counterbalanced order for the two sections. After each block of the two different lecture methods, a test was carried out. In total there were two tests. Both sections obtained higher grades for test one compared to test two despite the two different lecture methods.

Although these four studies in the last decade provide some emerging evidences on the benefits of PowerPoint lecturing, there has been no attempt to undertake an inquiry on language and communication classes to our knowledge. In order to address this, the aim of the present paper is to report a preliminary study on the efficacy of PowerPoint lecturing on undergraduates' academic achievement in Technical Communication classes.

2. Methodology

2.1. Participants

Participants were engineering undergraduates of College of Engineering at Universiti Tenaga Nasional (UNITEN). All participants were enrolled in two of 11 Technical Communication sections. Each section met two times a week for 60 minutes and 120 minutes each session. The first section was composed of 60 students and the second section was composed of 60 students also.

2.2. Research Design

Experiments were carried out on two different groups of participants. They were identified as sections one and two. Section one students received PowerPoint-assisted lectures in contrast to section two receiving traditional lectures. PowerPoint lectures were referred as “Lectures delivered with the aid of PowerPoint presentation software and with minimum uses of whiteboard.” On the other hand, traditional lectures were referred as “Lectures delivered with the aid of whiteboard and with occasional uses of PowerPoint presentation software.” Each class was conducted by different lecturer. The participants were tested after 14 weeks of classes.

2.3. Instrument

The only instrument used was the final examination questions developed by the Department of Languages and Communication in the university. This exam paper contained 20 multiple choice and two long answer questions. The multiple choice questions were about theories in writing experimental research report, business proposal, and information gathering processes. Each of the multiple choice questions was worth two marks. Meanwhile, the students were tested on the ability to review previous research studies and present research results on the other two long answer questions. This section was worth 60 marks. The total marks for the exam paper were 100 marks.

2.4. Procedure

The experiments were conducted for 14 weeks during the second semester of 2012-2013 academic year. All of the 120 students and two lecturers were given the same course outline which contained the scheme of work to be covered for the semester. The same lecturer provided the same lectures and notes to the same section of students.

All classes for section one students were lectured via PowerPoint slides prepared by the lecturer herself. The slides were displayed to the students on a screen in a lecture hall. After every main concept presented by the lecturer, students were given opportunity to ask questions and/or discuss short task assigned in groups. When needed occasionally, whiteboard was used by the lecturer to write down explanations for certain questions asked by the students. In contrast, all classes for section two were conducted by a different lecturer throughout the semester via traditional method by using mainly whiteboard, with PowerPoint presentation occasionally. The students were given in-class writing assignments to complete. Nevertheless, class discussions were encouraged as well in this section. After 14 weeks of lectures, all students took the final examination in week 15 in an exam hall at the same time.

2.5. Statistical Analysis

The final examination marks were analyzed using IBM SPSS Statistics Version 20. An independent-samples t-test was carried out to compare means, standard deviations and the level of significant differences at $p < 0.05$

between the experimental group and control group. The experimental group received PowerPoint lectures, but the control group received traditional lectures. Table 1 clarifies the data labeling used to key in data into the software.

Final examination marks	Grade awarded for the marks obtained	Value used to represent the grade
85 – 100	A	1
80 – 84	A-	2
75 – 79	B+	3
70 – 74	B	4
65 – 69	B-	5
60 – 64	C+	6
55 – 59	C	7
50 – 54	C-	8
45 – 49	D+	9
40 – 44	D	10
0 – 39	E	11

Table 1. Data labeling used in the study

3. Results and Discussion

The results of the analysis (Table 2) revealed that there was significant difference between section one and section two students' grades ($p=0.00$). Students in section one had better and higher grades ($M = 3.95$) for their final examination than students in section two ($M = 6.28$). The average grade obtained by section one students was $B+$, and section two scored $C+$ at average.

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Experimental group (section one)	60	3.95	1.44	-7.54	0.00
Control group (section two)	60	6.28	1.91		

Table 2. Means (*M*), standard deviation (*SD*), and *t* test scores of students' final examination marks or grades

These findings reinforce partially those of Szabo and Hastings (2000), who conducted a study on the effects of blackboard or overhead projector lecturing, PowerPoint lecturing and PowerPoint with lecture notes lecturing on students' academic achievement. It was found out that students performed better with PowerPoint lecturing. The current results imply that lecturing with PowerPoint has significant effect on students' academic achievement. As described by Susskind (2005) and Szabo and Hastings (2000), lecture delivered with PowerPoint presentation is more organized and systematic which might assist students to understand the content better. In other way, students might be more attracted by the design of the slides, and hence, they would pay more attention during the lecture. Paying attention to lectures is important in the sense that this facilitates effective teaching and learning to take place. In fact, interesting and well-design slides with animation and variation of color could capture the students' attention better, leading to establishing of interaction between lecturer and students. Lecturers would have more control over the teaching and learning processes.

4. Conclusion

The current findings show that the uses of PowerPoint in lecturing could help technical communication undergraduates to perform better academically compared to traditional lecturing where whiteboard is used mainly

in lecturing. Lectures for both control and experimental groups were conducted by two different instructors; this was seen as a limitation for the current study. Distinct teaching notes or experience could have played significant role in affecting the students' understanding and academic performance in addition to using PowerPoint slides and whiteboard as teaching aids. Researchers should examine the uses of PowerPoint slides and whiteboard as teaching aids by the same instructors to determine whether the PowerPoint-assisted lecturing establishes differences in students' academic achievement or not. This would also allow improvement in result reliability.

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