EFFECT OF PARTIAL POWERPOINT HANDOUTS ON ATTENTION, RECALL AND PERFORMANCE OF FIRST YEAR UNDERGRADUATES AT A MALAYSIAN PUBLIC UNIVERSITY

CELIA VERONICA AUGUSTIN

ASIA e UNIVERSITY
2020

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A Thesis Submitted to Asia e University in
Fulfilment of the Requirements for the
Degree of Doctor of Philosophy

November 2020

ABSTRACT

This study was conducted in order to identify whether there is a significant effect of partial PowerPoint handouts on student attention, recall and performance. This study is important as PowerPoint is the most common method of instruction in all universities in Malaysia. Some of the problems of the traditional lecture method is the lack of student attention which then influences recall and performance. The quasi-experimental method succeeded in identifying the effectiveness of the partial handouts compared to the current practice of full handouts effect on students' attention, recall and performance. The research was conducted based on the Solomon Four group design. A total of 301 participants were used in this study. The participants were mainly female undergraduates of a public institution of higher learning in Malaysia. The first group which is the experimental pre-test and post-test group consisted of 81 students. The second group which is the experimental post-test group consisted of 72 students. The third group which is the control pretest & post-test group consisted of 34 students and the fourth group which is the control post-test group consisted of 70 students.

The results were analysed using MANOVA. The most significant effect of the experimental method was on the attention with significant effect in all four experimental and control groups. The effect on recall was mixed and the effect on Performance was minimally significant. This study has established the effectiveness of partial PowerPoint handouts on undergraduate students' attention. Further studies can be done to investigate the effect of partial PowerPoint handouts on student recall and performance. As a conclusion, this study has fulfilled the intended objectives of identifying the effective use of PowerPoint handouts as a mode of instruction in higher education.

APPROVAL

I certify that I have supervised / read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, as a thesis for the fulfilment of the requirements for the degree of Degree of Doctor of Philosophy

Professor Dr. Ismail Hussein Amzat
Supervisor

Examination Committee:

Professor Dr. Nor Aziah Alias
Universiti Teknologi MARA
Examiner

Associate Professor Dr Soon Seng Thah
HELP University
Examiner

Associate Prof Dr Siew Nyet Moi
@ Sopiah Abdullah
Universiti Malaysia Sabah
Examiner

Professor Dr. Siow Heng Loke
Asia e University
Chairman, Examination Committee

This thesis was submitted to Asia e University and is accepted as fulfilment of the requirements for the degree of Doctor of Philosophy.

Professor Dr. John Arul Philips
Dean, School of Education
Asia e University

Professor Dr. Siow Heng Loke
Dean, School of Graduate Studies
Asia e University

DECLARATION

I hereby declare that the thesis submitted in fulfilment of the PhD degree is my own work and that all contributions from any other persons or sources are properly and duly cited. I further declare that the material has not been submitted either in whole or in part, for a degree at this or any other university. In making this declaration, I understand and acknowledge any breaches in this declaration constitute academic misconduct, which may result in my expulsion from the programme and/or exclusion from the award of the degree.

Name: Celia Veronica Augustin

Signature of Candidate: **Date**: 25 November 2020

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ACKNOWLEDGEMENTS

Firstly, to the Almighty creator, Yahweh, for granting me the grace to complete another milestone in my life mission for the Glory of His Name. Second to my beloved, Oz for his everlasting love and greatest perennial support. Third to Habsah Maneh, my loving guide to goodness. To my family for their prayers and loving support especially aunt Parupathy. To my father for the inheritance of my cottage abode of tranquility and fruitful orchard which has sustained me tremendously economically. To my great ancestors: their guidance in living a God fearing life and; to my paternal grandparent James Frederic Augustin for setting a strong foundation in education and inheritance of his invaluable mini-library. To my mother, Deeliamah d/o Tan Ah Chee for ensuring me a good education and showing me how to be a great teacher. Maternal grandmother, Tan Ah Chee for being a great role model woman of substance –greatest education.

To Dr Wan Kamarul, Prof Tarmizi, UPM, my raters, University Malaya Citra team lecturers, and students for their excellent cooperation. The IBM team especially in Malaysia. Microsoft software development team. Mr Su, Eversun Printing Sungai Petani Kedah for super efficient technical support.

To Prof Ansary, AeU team, Kamariah for her par excellence academic and administrative support. Library staff especially Liyana, and to all my friends for their professional and moral support.

Last definitely, the most critical gratitude to my par excellence supervisor, Dr. Ismail Hussein Amzat for his great patience and supervision throughout the long journey.

To all Malaysians and guests for maintaining a peaceful nation.

May Allah Yahweh bless you all.

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LIST OF ABBREVIATIONS

App.	Appendix
CPO	Control Post-test group
CPP	Control Pre-test Post -test group
Ed./eds.	edition/editions; editor, edited by
e.g.	(exempligratia); for example
Et al	(et alia):and others
Etc.	(et cetera): and so forth
i.e.	for instance
n.d.	no date
MANOVA	Multivariate Analysis of Variance
XPO	Experimental Post -test group
XPP	Experimental Pre-test Post -test group

CHAPTER 1.0 INTRODUCTION

1.1 Background of the Study

Education has developed profoundly from its initial beginnings. From a solely verbal transfer of knowledge prior to the invention of writing, to a combined written and verbal mode of instruction, which requires students to take notes. Subsequently, to the current advancement of technology in the classroom. The question to every serious educator is which is the optimum approach for the transfer of knowledge? In terms of efficiency and more importantly, in respect to the effectiveness of the transfer of knowledge to students. Therefore, it is critical that the medium of information transfer is planned concisely, according to the purpose of that passing of knowledge. Otherwise, there will be obvious detrimental effect upon time and resources, regardless of the caliber of the instructor or the level of advanced technology tools utilized for that transfer of knowledge.

With the advancement, as well as, accessibility of technology in education since late 20th century, various studies have been done in order to discover the functionality of information technology, specifically the PowerPoint software as an instructional tool in education settings. These included various context, such as seminars and conferences within a medical setting (Abutiheen, 2017 p.33); and especially within the lecture classroom (Kmalvand, 2015). Upon the establishment of technology as a valuable and functional tool for the transfer of knowledge in education, the focus of studies in the current 21st century has been redirected towards the effective and efficient use of this advanced and convenient tool.

This serious concern on the effectiveness of information technology application in education has gotten many dedicated educators and researchers worldwide onto the subject of technology in education. Whereby, though most

academicians acknowledge its importance, they acknowledge the pressure as well as difficulty in keeping up with the advances of technology for educational function. This includes within the United States whereby the incorporation of information technology is not fully optimized in educational settings (Merritt, 2017, p.23). This is an especially critical concern in the current generation of undergraduate students labeled as the millennials, who were born after the 1990's and who are advanced in technological tools as compared to the previous generations of students (Robinson, 2017).

On the same note, this study seeks to identify the effectiveness of a common information technology software of the Microsoft Corporation company, in their Microsoft Office application, namely the PowerPoint software. The PowerPoint software was initially called Presenter. It was developed by Robert Gaskins and Dennis Austin in 1987 for Forethought –a software company. Later that year it became the intellectual property of Microsoft Corporation (Encyclopedia Britannica, 2019). Initially developed for business function (Szabo & Hastings, 2000); the PowerPoint software progressed into a popular presentation tool which was used not only in education institutions but the corporate world as well (Chun, 2018; Oommen, 2012).

With the advent of modern technology, among all the various presentation gadgets used for the transfer of information, PowerPoint has become popular in seminars, colleges and as well as at the university level, being used at conferences throughout different countries (Adams, 2006 p.389; Hallewell & Crook, 2020). Therefore, it is important to study the usage of this instrument as an educational tool. The problem, however, is not only in terms of its usefulness as an instruction tool in the transfer of knowledge, but more importantly, what would be the optimal method

of incorporating this educational software into the teaching and learning environment, as an effective instructional tool.

One issue with the usage of the PowerPoint software in the classroom is whether it would depreciate the necessity of note-taking and eventually make note-taking obsolete. This is due to the conveniently available PowerPoint handout template available in this software. In reviewing the historical development of handout usage, generally, it has been shown that the incorporation of handouts within the classroom, progressed from the traditional setting (prior to the development of computers). Whereby, it was necessary for students to take notes otherwise, resulting in a risk of loss of important/critical information and subsequently affecting performance (Stacy & Cain, 2015, p.1). Subsequently, instructors distributed handouts; which was not a copy of the lecture/presentation. In fact, these handouts were rarely a direct copy of the lecture slides rather they were additional resources that supplemented the lecture. While, lecture slides were a hundred percent copy of the visual presentation, whereas, on the other hand, handouts consisted of supplementary reading material such as newspapers, magazine articles or textbooks chapters. These additional material which were given in lectures, were perceived as adding value to the students learning as it resulted in higher achievement (Stacy and Cain, 2015, p.2).

With the advancement of technology and more relevantly the creation of the PowerPoint software, the promotion of this software as an education tool and its popularity in lecture presentations and schools (Samsonov, 2008, p.55; Uzun and Eğmir, 2018, p.68), the PowerPoint became the trend within lectures of institutions of higher learning, including in Malaysia (Wai, Seng & Kok, 2015, p.434). According to Lindstrom (1998) cited in Rankin and Hoaas 2001) the PowerPoint software *'controlled ninety three percent of the presentation market'*. (p.356) this was prior to

the 21st century. This has indirectly led to the use of the PowerPoint handout template as a common blueprint of student handouts.

Prior to the use of advanced information technology gadgets in the education sector, writing and talking was the main method used by instructors. Whereby, they would write on the blackboard or whiteboard, while students were required to efficiently take notes (Klemm, 2007, p.122). With the increasing use of technology as an instructional tool in education, the availability of the standard PowerPoint templates facilitated lectures and students alike. Facility for lecturers, as there is no longer a necessity of preparing a separate set of handouts for students; a positive development in terms of time efficiency. Also, facility for students, especially those who had poor note-taking skills (Adams, 2000, p404).

The standard PowerPoint template for handouts also facilitated students obtaining a hundred percent exact copy of the lecture notes which greatly reduced students making errors through the process of taking notes, especially the copying of important information (Naik, 2017). Also, the value of handouts in the classroom is also stressed by Shimazaki, et al (2018, p.51) who state that it is an important academic writing skill whereby guidelines for developing good handouts are necessary in order to establish its effectiveness.

In order to identify and enable optimum methods of instruction, it is critical to be clear on what constitutes learning. Generally, learning initially occurs when there is a transfer of knowledge from one individual, the sender of the message; to another- the recipient of the message. For instance, in childhood education, the parent may tell the child not to play with a hot fire as it may cause pain. Hence, the child learns that fire is dangerous.

According to some educationists, in order for learning to occur, several cognitive processes are necessary such as Attention and Recall. The absence of attention would result in either weak, in-accurate or zero recall (Klemm, 2004 cited in Klemm, 2007, p122). Subsequently, Recall is a necessary ingredient of academic performance, which is usually assessed; mainly by written tests (Lavy, 2011).

Thus, the problem is in identifying instructional approaches that facilitate and maximize attention. With the current overload of information to students in institutions of higher learning, especially, with the development and advancement of the international network (internet) of computers; the attention span of students has drastically dropped from an average of thirty minutes to *'ten to eighteen minutes'* (Johnstone & Frederick, 1976 cited in Mandello, Andrew, Todd, & Mahony, 2008, p.101) or less than ten minutes (Wilson and Korn, 2007, p.85). This is an approximately thirty three percent reduction in students' ability to focus on a given stimuli.

With such a retardation in attention span, it is no longer feasible to apply old methods of instructional design to capture students' attention. New, improved and innovative approaches to the transfer of knowledge is vital for optimum student knowledge and learning. In addition, the traditional lecture utilizing the PowerPoint software, whereby full/complete handouts of the presentation are provided; commonly results in high absenteeism and zero note-taking (Adams, 2006, p401; Young, 2004). This could be due to the students perception that the handouts are sufficient material for their exam preparation. Another problem is the issue of how much of the handout content is comprehended, digested and recalled sufficiently for optimum academic performance without the traditional taking of notes of the lecture presentation.

In view of this issue, there is a need to again investigate the function of note-taking in education and its value as an important element of the instructional design process in academia. In addition, also, there has been evidence that the bodily/kinesthetic act of taking notes contributes positively to student attention (Klemm, 2007, p.123) in the classroom; whereby the deterioration of attention in the classroom has become a major issue in current educational institutions. A common phrase applicable in this context is *action speaks louder than words*. Hence, note-taking possesses added value to student attention compared to passive listening (Urbanová & Čtrnáctová, 2009, p203). Therefore, studies on common trends of instructional design that have been in practice until the current twenty first century, such as on note-taking and PowerPoint, become more important. This is especially when institutions of higher learning throughout the world, are being pushed forward into the era of borderless education (Zakaria, 2001, p.2). This includes Malaysia, whereby *'information technology has influenced the educational system in Malaysia'*. (Abu Ziden & Abdul Rahman, 2013, p.211). Such studies as these are critical to prevent educators throughout the world from making a possible false conclusion i.e. that note-taking is obsolete and redundant.

Within the Malaysian context, research on technology in education has extended from the identification of perceptions of PowerPoint usage in class, mobile use by students (Ali et al, 2010), student-centered learning (Kassim & Ali, 2007); as well as Learning Management Systems (Raman, 2013) and its value and relevance in blended learning (Wai, Seng & Kok, 2015). Whereby, in these studies, students are active learners in the transfer of knowledge.

More recently, researchers have shown renewed interest in cognitive theories such as the Cognitive Theory of Multimedia Learning (CTML) (Kmalvand, 2015) as well as the Cognitive Load Theory. Such a study is that of Saw Kim Guan (2017, p145) who investigated *'the use of worked examples as an instructional strategy in physics for distance learners that omits some elements'* which found that such an approach *'can reduce intrinsic cognitive load and therefore facilitate learning.'* However, there is much formal research that is necessary. This view is supported by Hoque, Razak & Zohora (2012) in their study which found that Information and Cognitive Technology (ICT) usage in Malaysia was administrative, in spite of having complete facilities for functional educational use.

The view of the retarded advancement of technology usage in education is also lamented by Aaijaz et al. (2013). In addition, the importance of technology as an efficient instructional tool is highly supported by various studies such as by Chew (2010), who found that the use of information technology in education is positively perceived by students and academicians alike.

Technology was also found to possess benefits in language education (Hashim, Kassim. & Mohd. Radzuan 2006, p.2). In addition to this, as mentioned by DeWitt, Alias & Siraj (2014, p.2), it possesses the function of facilitating time efficiency. This is critical for academicians in higher education, as usually lecturers lack time to cover the syllabus (DeWit et al.) or *'shortage of time'* (Saban et al, 2011, p.919). This is especially critical in a Malaysian higher education institution setting, in order to optimize facilities and time.

In addition to this, due to students' graduation requirement of the standard norm of a minimum of a hundred and twenty credit hours, academic efficiency is critical; especially for students who do not want to delay their graduation. This standard is determined by the Malaysian Qualification and Accreditation (MQA) body, the independent audit organisation that monitors, assesses and grants approval for institutions of higher learning to operate as a credible educational institution in Malaysia (Laws of Malaysia, 2007, p.11; Malaysian Qualification Agency. 2019); with legal rights under the Malaysian Qualification Agency Act 2007 (Laws of Malaysia, 2007, p.11).

In addition, this study will also extend the body of knowledge on effective instructional methods in institutions of higher education. Specifically, in relation to the use of the PowerPoint software in lectures. As, the use of the PowerPoint lecture is one of the most common methods used in lecture halls of universities throughout the world (Hallewell & Crook, 2020), familiar in United States higher education (Merrit, 2017) and is still prevalent albeit there is much criticism to this popular multimedia software (Uzun & Eğmir, 2018, p.68). The popularity of this software in higher education includes Malaysia whereby in most public and private universities, PowerPoint is the most popular or common mode of instruction (Islam et al, 2005). This includes university Malaysia Pahang (Kassim & Ali, 2007, p16). It is also an indispensable instructional tool in the current century (Inoue, 2016).

In fact, the need to rethink the use of technology in education is not a new concern. Such related questions on the necessity of more relevant methods were raised at the end of the twentieth century (Mohd. Ishak et al, 2002, p.19), who highlighted the need for new techniques of teaching. Another Malaysian based research conducted more recently in 2017, that supports this view, is that of Ridwan et.al (p. 2115) who

recommend the need to *'rethink teaching and learning.'* with the increased use of the *'disruptive'* technology in education.

A study in support of the focus of the current study on the Microsoft Office PowerPoint, is the study by Ong et al (2009, pp.15-17), whereby in their qualitative study of blended learning in a Malaysian education institution, the *'PowerPoint was identified as most effective and efficient compared to other methods'.* Another Malaysian study by Anuwar Ali (2008, p.4) concluded that PowerPoint is still relevant for visual learners in addition to the fact that *'students still possess positive perception of face to face knowledge transfer.'* Apart from that, at the international level, the issue of the lack of studies on PowerPoint usage in terms of basics to its effective use; as an instructional tool especially for the *'net generation'* is also lamented by Berk (2012a, p.141).

On the question of the relevance of studying handouts in the current digital era, is the study by Sim, et al. (2014) who stressed the importance of the focus on handouts. In their study conducted few years ago, they discovered that more than seventy six percent (76.3 %) of medical teachers, who were target participants in an assessment workshop, identified handouts as useful. Apart from that, Kassim (2013, p.230) also concluded that students in Malaysia preferred *'paper-based instruction tools'*, whereby she stressed the importance of re-evaluating the learning tools in order to manage cognitive load in working memory so that mental processing capacity can be increased, which in turn enhances knowledge construction. As shown above, multiple studies in Malaysia support the rationale for the current study about the effect of the PowerPoint partial handouts on undergraduate students' attention, recall and performance.

1.2 Problem statement

There is a severe lack of research being done on the effectiveness of technology in education especially the PowerPoint software (Moulton et al., 2017). This deficiency extends to varied formal settings in which the transfer of knowledge occurs, such as seminars, workshops, conferences, meetings; and more relevantly, classroom teaching such as lectures. This problem pertains especially to student attention which may be adversely affected by passivity (Klemm, 2007; Urbanová & Čtrnáctová, 2009). Thus it is vital that researchers focus on improving the attention of students which influences recall and subsequent performance (Lai et al., 2011a). Therefore, this research seeks to discover the effect of a less-practiced instructional approach i.e. the use of the PowerPoint partial handouts as a superior method of instruction as compared to the more common approach used in higher education i.e. providing complete handouts.

Therefore, the problem or critical question is whether to terminate the use of PowerPoint as an instructional tool especially within the higher education setting. In other words, is PowerPoint obsolete compared to the fast developing trend of technology gadgets in the classroom? is PowerPoint less effective compared to other modes of the transfer of knowledge or electronic communication such as clickers as well as Learning Management Systems (LMS)? or does PowerPoint still have its place as an effective method of instruction for the transfer of knowledge at the higher education level? This question replicates the similar debate that occurred previously with the advancement of technological tools such as the computer, which replaced overhead projectors, transparencies, and the *talk and board* modes of instruction.

In order to answer this question, it is necessary to study the effective use of PowerPoint as a method of instruction in higher education. Some research has been done to demonstrate the superiority of PowerPoint compared to the traditional mode

of lectures which encompass writing on boards combined with verbal instruction. Similar concern was raised by local researchers who agreed that the problem currently is whether PowerPoint is still an effective tool for higher education use or should it be made obsolete. Such as that of a Malaysian study by Kassim (2013, p.229) who states that: *'The usefulness of ICT in education is no longer doubted, however, its value and contribution to the development of meaningful learning is yet to be verified due to the lack of sufficient research.'*

Hence, as recommended by these Malaysian researchers, more studies on a variety of information technology techniques in education is highly needed such as the analyses of methods used in the classroom (Hallewell & Crook, 2020; Nawi et al, 2012). Also, in the Malaysian context, there is a lack of sufficient research on technology as an instructional methodology, especially in relation to the novel generation called the millennials. This was stressed by Cheng and Siow (2015, p.83) in their study of the *'impact of mobile technology on learning…'* This view is also supported by Hashim, et al. (2017, p.1150) who re-iterated the need for further investigation into technology use within the teaching and learning industry; due to the fact that the *'millenials expect to be engaged in learning and do not perform well being passive learners.'*

Another more related problem is the use of the PowerPoint handouts, also known as lecture notes. With the use of the PowerPoint software as the main tool in lectures throughout the world, the ready-made template of the presentation slides in handout format, has facilitated the students' reference for lectures. This is especially during student absenteeism, as well as for those students who are not speedy or, in other words, lacking in their note-taking skills. In addition, most undergraduate students nowadays consider handouts or lecture notes as part of their rights as a student