The Measurement of Validity, Stability and Consistency in Essay Writing Structuring Techniques Based on Interactive Multimedia Graphic: A Case-Study in Malaysia

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In this modern era, the essay writing techniques are required to be aligned with the sustainability in acquiring information through digital and virtual materials. In getting research results, which are innovative, creative, and critical, this research was conducted to measure the validity, stability, and consistency of essay writing structuring techniques by using the interactive multimedia graphic materials. A quasi-experimental method is used based on the quantitative research design. The sample consists of 30 secondary school students in Shah Alam, Selangor. The data were analyzed descriptively through mean and standard deviation. The data were also tested by inference using ANCOVA statistics. The results showed a significant difference, that is, F=13.3, at the level of <0.05. The implication of this research is that the knowledge of the interactive multimedia graphic material is essential to the technical structure in essay writing especially when involving the writing skills element, namely in the Learning and Facilitation (PdPc) of Malay language.

Keywords: essay writing, validity, stability, consistency, interactive multimedia graphic

INTRODUCTION

The advancement of information and communication technology (ICT) is parallel along with the development of the global education world, which transforms into the digital and virtual elements. Digital and virtual graphics technology-based teaching, especially in the Malay language is becoming more global, exciting, dynamic, meaningful, and productive in the context of higher-order thinking (Ayob, 2011; 2012; 2014). In this case, the interactive multimedia graphics can convey certain information quickly and accurately as well as is able to create an active and fun learning environment (Abbas, 2012). The implementation for students with problems in writing skills will have a more positive impact in terms of knowledge and technology content because information technology materials are already incorporated into the essential elements of various graphics to create a new environment (Ayob, 2018a; 2019b; 2020) and also rich in knowledge content (Ayob, 2018b). In this regard, teachers and students need to be skilled in applying interactive multimedia as a vehicle in mastering writing skills more flexibly and independently in accessing knowledge. Hence, computers as interactive multimedia graphics medium can assist in improving writing achievement through student-centred systematic graphic material (Ayob, 2019a; 2019b).

In particular, the most critical skill from the aspect of writing is language achievement. This skill refers to the ability of students to write meaningful words and sentences in expressing ideas through various creative and critical writing (Ayob, 2019a). Writing is related to knowledge and personal experience which can be portrayed through the correct usage of grammatical sentences, punctuation, correct spelling, clear and neat writing (Hajimia et al., 2019a; 2019b; 2020; Hajimia, 2020). Besides that, writing is closely related to the formation of writing symbols in a language.

The formation of symbols aims to convey and connect messages, information, or ideas to the reader (Ayob, 2019b). In addition, graphic symbols in writing represents the use of meaningful symbols. From the perspective of importance in the writing skills, in terms of essay writing, it is prone to these symbols especially when it involves developing knowledge-based on high-order thinking. On another note, from the aspect of curriculum research, the importance of writing skills is not only to answer exam questions, write reports and assignments but also to meet the needs in daily life and professionalism in the workplace (Hajimia, 2020).

Skilled human resources are essential in the development of current educational knowledge in the classroom. The usage of professional human resources is not only in the context of technology but also involves language skills, especially the writing skills (Ansburg, 2000). Therefore, students should be given training that allows them to learn and use those skills from an early stage. Thus, teaching based on technological graphic materials forged with appropriate high-order thinking skills needs to be oriented and practised by teachers through a technique so that it can be taught to students more effectively.

PROBLEM STATEMENT

This study focuses on two connected variables. The first dependent variable is the student's achievement in the essay. Meanwhile, the second variable is the independent variable which is the interactive multimedia graphics material. Strictly speaking, the issue manipulated in this study is the results and achievement in the opinion essays.

Writing factual essay is one of the components evaluated in the Malay language in secondary schools. In the research of Ayob (2014), students' achievement in writing Malay language is still weak even though many of the techniques and materials are based on information and communication technology used in the Learning and Facilitation (PdPc). Students' weaknesses are detected in all aspects of writing involving the content, language, and processing of the essay. Bikowski & Vithanage (2016) have proven traditional techniques and materials to be less effective in improving students' achievement in content, language, and processing. In 2016, statistics from the Malaysian Examinations Council (MPM) report indicated that students' achievement experienced a significant decline in related aspects (Ayob, 2014). According to Hasnah (2016), the use of conventional PdPc techniques and materials are found to be less effective in improving students' achievement in essay writing.

The appropriateness of the use and application of techniques should focus on high innovation (Hasnudin, et.al., 2015), such as the result of writing which can be the measurement of achievement. From the sustainability of the ICT world, creative techniques need to be based on something digital and virtual. In this era, techniques and materials are usually appropriate to focus on interactive multimedia graphic elements (Mat Nashir, et.al., 2022). Techniques and materials like these have proven to be a dependency in PdPc languages in this modern century (Mueller & Jacobsen, 2016), particularly those related to writing.

In general, several studies shows that the techniques and learning materials based on graphics, is useful in improving the writing of the opinion or factual types of essays (Truong & Zanzucchi, 2012). It is because the material is global and easy to access. Graphic access is profound, namely, it does not restrict the acquisition of knowledge access. This indicates that the interactive multimedia graphics can complement the process of stimulation, response, and students' thinking creatively and critically. Ayob (2014) stated that students should be given space to think laterally if interactive multimedia graphics techniques and materials are used in PdPc writing.

The above discussion shows that the interactive multimedia graphics found in PdPc techniques and materials are beneficial in achieving student's essays. For the purpose of this study, a specific graphic known as the bitmap graphic material is used to show student's achievement of opinion essays. This study involved 30 form four students in the context of an existing group or intact group. The quasi-experimental method used in this research is based on pre-test and post-test. In this case, the pre-test is varied. The data were analyzed using descriptive and inferences.

Research Objective
1. To identify the mean scores of pre-test and post-test of students' opinion writing essays based on bitmap graphic material.
2. To analyze the difference in mean scores between pre-test and post-test essay-type essay writing based on bitmap graphic material.

Research Questions
1. What is the mean score of pre and post-test of students' opinion writing essays based on bitmap graphic material?
2. Is there a significant difference in mean score between pre-test and post-test essay writing based on bitmap graphic material?
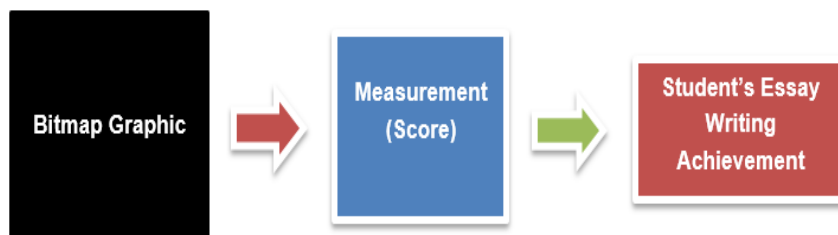
Research Theoretical Framework

FIGURE 1
MODEL OF BITMAP GRAPHIC BASED ON MAYER (2001)
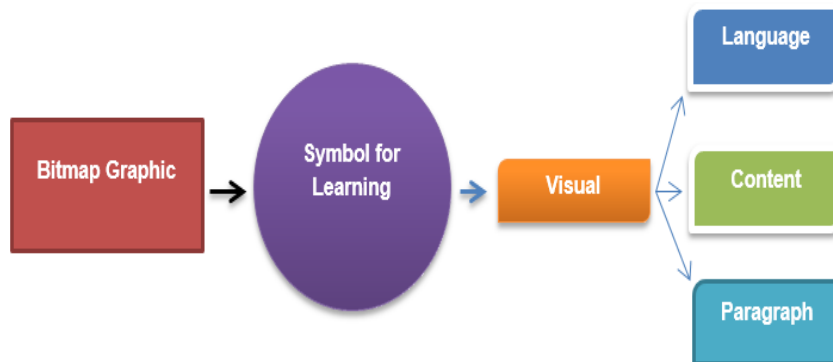
Research Conceptual Framework

FIGURE 2
CONCEPTUAL FRAMEWORK

Operational Definition

Bitmap Graphic

Bitmap graphics means (existing) graphics that can be accessed directly from Internet sources (Abbas, 2012). Bitmap graphic operations are accessible by adapting to the title of the essay.

Achievement of Essay Writing

Essay writing achievement is assessed through pre-test and post-test. Each test has instructions, shape, structure, time, marks, and quantity of items. Test operations are in the form of scores.

LITERATURE REVIEW

Application of Information Technology in Essay Teaching Curriculum

The main policy of MOE in (PIPP 2006-2010) namely the Core 2, which is to develop ICT-literate human capital can be considered as a means to direct the role and function of language education (Ayob, 2018a). Any subject can be implemented in PdPc to cultivate and form the credibility of students to be good at writing essays, in addition to equipping themselves with various types of language and technology skills (Ayob, 2019b). The Curriculum Policy of MOE is also an aspiration to apply ICT in the Malay language (Ayob, 2019b). 21st-century teachers are not only implementing the application but are also providing opportunities for students to gain experience in the application of ICT in and outside of the classroom through techniques and use of interactive multimedia materials. According to Hasnah (2016), interactive multimedia graphic materials are still in the early stages of language education because they are fundamentally able to contribute to the change in the application of traditional learning techniques to new techniques that are more practical-based. According to Iqbal & Muhammad (2015), in the past, within the PdPc process, among the new techniques that can be utilized in the essay writing techniques by teachers and students involved the basic usage of ICT in the digital and virtual classrooms.

The Concept of Interactive Multimedia Graphics

Interactive multimedia graphics based on pedagogical elements can make a meaningful contribution to language education. Under the framework of behavioural and cognitive learning models, the primary role of teachers is to convey information and as a facilitator of an active and dynamic learning environment (Jones & Estes, 2015; Rahmadani, et.al., 2019). Teachers need to ensure that students' existing knowledge or skills in writing are based on learning objectives. Next, teachers need to provide steps and activities to achieve the proposed goals. After the teaching session, teachers will evaluate student's essays based on the tests to ensure PdPc is successful or needs rehabilitation (Ayob, 2018b). The role of a student is as a recipient of information, starting from the acquisition of knowledge and responding to learning problems. Interactions between teachers and students are supplemented with processed activities to help obtain detailed learning information.

Previous Studies

Computer applications covers various aspects, including administrative matters as well as teaching and learning. The development of technology helps teachers to improve new teaching techniques digitally and virtually (Ayob, 2014). Teaching essay writing based on highly innovative techniques is critical for students to think creatively and critically (Ayob, 2018a). Whereas the philosophy of linguistic thinking is related to the formation of lexical according to the needs of users of a language based on their race or nation (Hanafi & Tang, 2014; Zaini, et.al., 2020).

Past studies also shows that the application of lexical in writing needs to be multiplied from specific meanings based on semantic prosody theory (Sarudin, et.al., 2019). Writing enables students to generate ideas based on an essay title. Focus is given to the mastery of language and communication skills in various fields. The provision is that at the end of the learning of writing, students can integrate content, language, and processing effectively based on structuring techniques.

The use of interactive multimedia graphic materials requires teachers who have the expertise and knowledge to use computers so that PdPc can be implemented effectively (Puspit, et.al., 2020). Teachers play an essential role in generating students' thinking skills especially with their imagination or reasoning ability (Bikowski & Vithanage, 2016). Generating review can also be adapted to specific thinking techniques (Wong, 2019).

Ayob (2014) argues that interactive multimedia graphic materials can create a dynamic and active environment so that the contents of the lesson are easily accessible to students. Multimedia graphics can be obtained through learning applications, training, computer games, and others (Hasnah, 2016). Besides that, interactive multimedia graphics are also website-based variations used for learning and presentations that is easily accessible from the Internet (Mueller & Jacobsen, 2016). Interactive multimedia graphics tools are used to apply techniques and present material featuring highly meaningful writing language symbols (Ayob, 2018a). Among the multimedia graphic tools needed for the development and presentation of the application are, computers, multimedia transmitters, digital camera scanners, and digital video (Hui & Wei, 2013).

Language learning that is conducted interactively and collaboratively can produce students who are willing to critically analyze information (Hasnudin, et.al., 2015). Therefore, changes in language teaching techniques are, of course, based on learning aggression (Hasnudin, et.al., 2015). For example, graphic-based learning techniques began around the 1970s with various terms such as online, virtual, or web-based learning. It refers to the use of computers in education and accessing different information from Internet sources. The benefits of using computers also exist in corpus-based databases (Karim, 2014).

With the exposure of new techniques in essay writing based on interactive multimedia graphics, students can deepen their knowledge of writing and master their ability to write essays more effectively (Hasnah, 2016). According to Ayob (2018a), learning to use multimedia graphic materials in highly innovative techniques is more effective and suitable for a language subject because its output can mature the essay processing.

METHODOLOGY

Research Design

A quantitative study design was used in this research. This design is based on the view of Creswell (2018), which emphasizes on objective measurement and numerical analysis by manipulating data through essay structuring techniques. This design also focuses on the collection of generalized statistical data to cross the group of students.

Research Method

The quasi-experimental method was used in this study. This method is used to measure the numerical data of the group of students tested before and after treatment. This method is used based on the following design diagram:

FIGURE 3
QUASI-EXPERIMENTAL DESIGN FOR THIS RESEARCH

X1 .... Y X2
.

Legend:
X1:   Pre Test
Y: Treatment
X2:   Post Test

Sample and Location of Study

The sample of this study is 30 upper secondary students who are in form four in a school at Shah Alam, Selangor. The selection of this sample is made according to the view of Creswell (2018), that is, each student meets the three characteristics of respondents for the quasi-experiment: (i) The same age range; (ii) In one stream; and (iii) Identical achievement. They are also of the view that if all samples have been identified to meet the three criteria, the sample should not be randomized.

Research Instrument

The instrument of this study is suitable for the use of quasi-experimental methods, which are before and after treatment through pre-test and post-test, which is in line with Creswell's opinion (2018). Pre-tests were used to measure student achievement in essay writing before being exposed to interactive multimedia graphic-based essay structuring techniques. Post-tests were used to measure student achievement after being exposed to the technique. Both tests have coherence in terms of answering instructions, type, shape, structure, quantity, time, theme, and marks.

Validity, Stability, and Consistency of Measurement

The pre-test and post-test used in this study are standard and standard. The instrument standard is in line with the requirements of the Malaysian Examinations Council (MPM), which was tested in the Malaysian Certificate of Education (SPM) examination in 2016. The standard means that the scoring obtained is highly valid, consistent, and stable, as stated by Creswell (2018).

Data Collection Procedures

The data that has been collected begins with the appointment of the invigilator teacher and the presentation of the examinations' supervision briefing. The appointed teacher is an assistant teacher explicitly assigned for this study. Another assistant teacher was also appointed to check the students' answer script. Each data collection activity is coordinated with the appropriate and suitable timing to meet the required data collection process based on the views of Iqbal & Muhammad (2015).

Data Analysis

The data of this study were analyzed based on Research Questions (i) and Research Questions (ii). For Research Question (i), the data is analyzed descriptively; mean statistics and standard deviation. For Study Question ii, the data were analyzed by inference (mean difference); ANCOVA statistics. It means that pre-test data are varied.

FINDINGS

Respondent Demography

The respondents of this study are 30 students. Table 1 shows the number and percentage of students.

TABLE 1
RESPONDENT DEMOGRAPHY

n=30				
Gender	**Malay**	**Chinese**	**Indian**	**Number/ Percentage**
Male	7%	4%	2%	13%
Female	8%	6%	3%	17%
Total	**15%**	**10%**	**5%**	**30 (100)**

Research Question I

What is the mean score of pre and post-test of students' opinion writing essays based on bitmap graphic material?

TABLE 2
MEAN AND STANDARD DEVIATION

Test	**Mean**	**Standard Deviation**
Pre	65.3	11.1
Post	83.7	7.5

Research Question II

Is there a significant difference in mean scores between pre-test and post-test essay-type essay-based test material based on bitmap graphic material?

TABLE 3
MEAN DIFFERENCES USING ANCOVA STATISTICS

Test	**Mean**	**Standard Deviation**	**F**	**Significant**
Pre	65.3	11.1	13.3	0.002
Post	83.7	7.5		

Level of significant < 0.05

DISCUSSION AND IMPLICATION

The findings indicates that the multimedia graphic-based essay structuring technique shows an impressive test score achievement based on the inference tests. Graphic-based symbols are meant for students to creatively compose the contents of an essay, which is similar to the perspective of Jones & Estes (2015). Therefore, the creativity of essay writing can support students to explore the application of material techniques globally and accurately with the requirements of essay questions. Ayob (2018a) added that the content, language, and processing of essays could be generated virtually, easily accessed, and varied to boost students' thinking. According to Ayob (2018a), graphic symbols in addition, can guide students to identify the contents of the essay by relating it through an issue.

Ayob (2018a; 2019b; 2020) also found that students who are exposed to ICT-based innovative techniques enables students to think at a high level, based on the domain of analysis, evaluation, and their creation. Graphic material serves to show the intertwined affective and cognitive elements (Ansburg, 2000). Graphic symbols are material that stimulates students to write essays in an organized and systematic manner (Bikowski & Vithanage, 2016). From the affective stimulus, students' creative thinking can be generated

through the reasoning of content, language appearance, and acquisition that is very interesting and motivating (Hasnah, 2016).

In addition, students motivation level also increases by using the new techniques and materials on interactive multimedia graphics as proven by the study of Iqbal & Muhammad (2015). Easy-to-access teaching makes it easy for students to explore new writing discoveries in content, language, and essay processing through interactive multimedia graphic materials (Ayob, 2018b).

CONCLUSION

Interactive multimedia graphics material has a bright potential in the future as it is in line with the requirements of the information and communication technology curriculum in the country, which emphasizes on high-level thinking skills. Diversity in interactive multimedia-based structuring techniques needs to be considered so that the students are stimulated to think proactively and are willing to explore broad content based on other interactive multimedia elements to write essays. Therefore, teachers and students need to be prepared to preserve specialized interactive multimedia techniques and materials by intergrating symbols through graphic, text, audio, and animation elements in the essay writing learning.

ACKNOWLEDGEMENT

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