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**THE EFFECT OF A MOBILE-ASSISTED MIND
MAPPING TECHNIQUE TOWARD ESL
UNDERGRADUATE STUDENTS'
ARGUMENTATIVE WRITING
SKILLS PERFORMANCE**



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RAFIDAH BINTI ABD KARIM

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ABSTRACT

The purpose of this study was to determine the effect of a Mobile-Assisted Mind Mapping Technique (MAMMAT) towards ESL undergraduates' argumentative writing skills performance. The study employed a quasi-experimental design with pre and post-tests. The participants of this study were 45 diploma students. They were selected randomly from the two Diploma groups at a public university. The experimental group (n=23) was taught using the Mobile-Assisted Mind Mapping Technique (MAMMAT) whilst the control group (n=22) was taught using the conventional method. The research instruments used in this study were a set of writing tests, questionnaires and semi-structured interview. The development of MAMMAT was based on two theories – Flower and Hayes Writing Process Model and the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh. The intervention consisted of four sessions, with each session assessed on a weekly basis. The main result showed that there was a statistically significant difference between the post tests of the control and experimental groups at the level of 0.05. The analysis of covariance (ANCOVA) results showed that there were statistically significant differences between the experimental group and the control group for Writing Test 1 [$F(1, 42) = 40.57, p < 0.05$], Writing Test 2 [$F(1, 42) = 59.96, p < 0.05$], Writing Test 3 [$F(1, 42) = 139.27, p < 0.05$] and Writing Test 4 [$F(1, 42) = 27.72, p < 0.05$]. The findings of the questionnaire and the semi-structured interview revealed that the students have positive attitudes towards the use of Mobile-Assisted Mind Mapping Technique (MAMMAT) to improve their argumentative writing skills performance. In terms of the qualitative data, four themes emerged from the interview which are: (1) assistive technology, (2) fun learning, (3) innovation, and (4) novelty of MAMMAT. As a conclusion, the Mobile-Assisted Mind Mapping Technique (MAMMAT) has improved ESL undergraduates' argumentative writing skills performance. The study implicates that Mobile-Assisted Mind Mapping Technique (MAMMAT) could be used by ESL undergraduate students for improving argumentative writing skills performance.





KEBERKESANAN TEKNIK PETA MINDA BERBANTU MOBIL TERHADAP PENCAPAIAN PENULISAN ARGUMENTATIF PRASISWAZAH BAHASA INGGERIS SEBAGAI BAHASA KEDUA

ABSTRAK

Tujuan kajian ini adalah untuk menentukan kesan Teknik Peta Minda berbantu Mobil (MAMMAT-Mobile-Assisted Mind Mapping Technique) terhadap pencapaian penulisan argumentatif prasiswazah Bahasa Inggeris sebagai Bahasa Kedua. Kajian ini menggunakan reka bentuk kuasi eksperimen dengan ujian pra dan ujian pasca. Peserta kajian ini terdiri daripada 45 orang pelajar diploma. Mereka dipilih secara rawak dari dua kumpulan diploma di sebuah universiti awam. Kumpulan eksperimen ($n=23$) telah diajar dengan menggunakan Teknik Peta Minda berbantu Mobil (MAMMAT) manakala kumpulan kawalan ($n=22$) diajar dengan menggunakan kaedah konvensional. Instrumen kajian yang telah digunakan dalam kajian ini iaitu set ujian penulisan, soal selidik dan temu bual separa berstruktur. Pembangunan MAMMAT adalah berdasarkan dua teori—Model Proses Mengarang Flower dan Hayes dan Teori Penyatuan Penerimaan dan Penggunaan Teknologi (UTAUT) oleh Venkatesh. Intervensi mengandungi empat sesi, dengan setiap sesi dinilai secara mingguan. Dapatan utama menunjukkan bahawa terdapat perbezaan statistik secara signifikan di antara ujian pasca kumpulan kawalan dan kumpulan eksperimen pada aras 0.05. Hasil analisis kovarians (ANCOVA) menunjukkan terdapat perbezaan signifikan antara kumpulan eksperimen dengan kumpulan kawalan ketika Ujian Menulis 1 [$F(1,42) = 40.58, p < 0.05$], Ujian Menulis 2 [$F(1,42) = 59.96, p < 0.05$], Ujian Menulis 3 [$F(1,42) = 139.28, p < 0.05$] dan Ujian Menulis 4 [$F(1,42) = 27.72, p < 0.05$]. Dapatan kajian soal selidik dan temubual separa berstruktur menunjukkan bahawa pelajar-pelajar mempunyai sikap yang positif terhadap penggunaan Teknik Peta Minda berbantu Mobil (MAMMAT) untuk meningkatkan pencapaian penulisan argumentatif mereka. Dari segi data kualitatif, empat tema muncul dari temubual adalah: (1) teknologi bantuan, (2) pembelajaran yang menyeronokkan, (3) inovasi, dan (4) kebaruan MAMMAT. Sebagai kesimpulan, Teknik Peta Minda berbantu Mobil (MAMMAT) Mobile-Assisted Mind Mapping Technique (MAMMAT) telah meningkatkan pencapaian penulisan argumentatif pelajar prasiswazah Bahasa Inggeris sebagai Bahasa Kedua. Implikasi kajian menunjukkan Teknik Peta Minda berbantu Mobil (MAMMAT) Mobile-Assisted Mind Mapping Technique (MAMMAT) boleh digunakan oleh pelajar prasiswazah Bahasa Inggeris sebagai Bahasa Kedua untuk meningkatkan pencapaian penulisan argumentatif mereka.



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LIST OF ABBREVIATIONS

ADDIE	Analyze, Design, Develop, Implement and Evaluate
ANOVA	Analysis of Variance
ANCOVA	Analysis of Covariance
AGO	Argumentative Graphic Organiser
ASAW	Analytic Scale of Argumentative Writing
BAM	Branching Association Machine
BI	Behavioural Intention
CALL	Computer Assisted Language Learning
CAAM	Computer-aided argument mapping
CMC	Computer-mediated communication
EE	Effort Expectancy (EE)
EFL	English as a Foreign Language
ELC	English Language Course
ELT	English Language Teaching
ESL	English as a Second Language
eReMAP	Emoticon Reasoning Map
FC	Facilitating Conditions
GIF	Graphics Interchange Format



HEIs	Higher Education Institutions
ICT	Information and Communication Technology
IT	Information technology
L1	First language
L2	Second language
MALL	Mobile Assisted Language Learning
MAMMAT	Mobile-Assisted Mind Mapping Technique
M.Ed	Master of Education
MIA	Malaysia Innovation Agency
MMMTM	Mobile-Assisted Mind Mapping Technique Model
MOE	Ministry of Education Malaysia
MUET	Malaysian University English Test
PDA	Personal Digital Assistants
PCs	Personal Computers
PE	Performance Expectancy
PEU	Perceived Ease of Use
PU	Perceived Usefulness
SI	Social Influence (SI)
SPSS	Statistical Package For Social Science
SPM	<i>Sijil Pelajaran Malaysia</i> (Malaysia Certificate Examination)
SRSD	Self-Regulated Strategy Development
TAP	Toulmin's Argument Pattern
TESL	Teaching English as a Second Language





UiTM	<i>Universiti Teknologi MARA</i> (University of Technology MARA)
UTAUT	Unified Theory of Acceptance and Use of Technology
WAP	Wireless Application Protocol





CHAPTER 1

INTRODUCTION



1.1 Introduction



This thesis presents research on Malaysian ESL undergraduates, which uses a mobile-based learning technology tool known as Mobile-Assisted Mind Mapping Technique (MAMMAT). This tool helps to improve undergraduates' argumentative writing skills performance. In this introductory chapter, the background of the study is used to contextualize the research problems. Then, it proceeds to explain the research objectives, research questions, research hypotheses, the theoretical framework, significance, and the limitations of the study. Finally, the key terms used in this thesis are also defined.





1.2 Background of the Study

Writing is a challenging development skill which includes various cognitive and metacognitive activities. Some examples of the writing activities are brainstorming, planning, outlining, drafting and revising. Flower and Hayes (1981) stated that composing is a mind perplexing and imaginative process that is considered as a fundamental aptitude for powerful correspondence. It incorporates the refining of thoughts and their appearances, combined with introduction and alternation. Writers move forward and backward between these parts of creating, as their essays advance. Additionally, they claimed that the cognitive parts of composing have received particular attention, as examiners have attempted to understand the thought processes underlying the composition of the students (Flower & Hayes, 1981). Charles Bazerman as cited in Prior (2009) recommended the following idea of difficulty in

writing:



Writing is a constant struggle, as we project a text by considering multiple resources memories and experiences, conversations with colleagues and mentors; perceived restrictions imposed by genre, audience, and occasion, our attitudes and desires; and a thousand other considerations that bear on the moment of articulating our thought.(p.vii)

In addition, Omaggio Hadley (1993) also mentioned that writing requires composing as in expository or argumentative writing which is best viewed as a range of writing activities that consists of the correct aspects of writing, and the complex acts of writing. Several studies suggested that language learners need to be trained by using language learning strategies to help them improve their language proficiency. Naiman, Frohlich, Stern and Todesco (1996) proposed several great learning approaches for second language or foreign language learning for students. Recently, mind mapping has been used as a tool for learning and language teaching. Mind maps are tools that make ideas appear visually. A mind map is a graphic





organizer in which the major groups give out ideas from a central image. Furthermore, less important groups are represented as subgroups of a topic (Budd, 2004). The mind map can be used to generate ideas and take notes. Besides that, this technique can also improve concepts and ideas and develop memory (Buzan, 2000). In fact, the teachers can use this mind map technique as a powerful tool to improve learning among learners. In addition, this technique is helpful for visual learners. It is because they use this tool to organize ideas, guide learning and make links (Stephens & Hermes, 2007). Some research studies also show that mind map has some effectiveness in numerous fields of learning such as in science, psychology, social studies, and research methods.

In Malaysia, the Ministry of Education Malaysia (MOE) and the Malaysia Innovation Agency (MIA) have collaborated and implemented the i-Think programme. This module consists of eight thinking maps namely the Circle Map, Flow Map, Bubble Map, Double Bubble Map, Tree Map, Brace Map, Multi-flow Map and Bridge Map. For this study, the thinking map type is referred to The Circle Map. Hyerle and Yeager (2007) indicated that The Circle Map is used for brainstorming ideas about a particular topic. Students will draw without any connections. After producing ideas, students begin to see connections within the map. These eight thinking maps can be used in the classroom by the teachers for teaching and learning processes. Thus, this module helps to enhance critical, analytical and creative thinking among students in Malaysia.

Recently, many researchers have given support for the use of mobile technology in an academic setting. The Computer Assisted Language Learning (CALL) was adapted and advanced to Mobile-Assisted Language Learning (MALL) technology in language learning. Therefore, this study will examine the fundamental issues related to the mobile technology-





mediated language learning and the learners' attitude. These technologies have been explored and used for language learning due to their acceptance. Stockwell (2008) projected mobile learning in the future generation. As of today, the prevalent use of mobile devices among learners is excessive. Therefore, it is a great value for the learners if the use of mobile device becomes widespread especially for the potential use of mobile applications in language learning.

Combining MALL with mind mapping has good potential in teaching and learning. This kind of learning will create a progressive learning strategy. By learning to generate mind map using mobile devices, the students will develop creative and critical thinking skills, and attain positive effects in learning. Besides that, using computerized mind mapping helps students to create mind map quickly and much easier than using pen and paper.



Liu et al. (2010) also confirmed that if CALL and concept mapping are combined as a learning technique, positive results will be achieved by the learners. Learners can find various online mind mapping software, such as *Mindmeister*, *Freemind*, *Mindomo*, *Bubbl.us*, *MindMup* and *Edraw* which can be downloaded from computers and mobile phones. According to Holland, Holland and Davies (2003), students used the *Mind Manager* mind mapping for their assignments in the subsequent modules. Another study conducted by Chan (2004) found that mind mapping was beneficial in writing planning which helped students develop their writing skills and improve their writing quality.





1.3 Problem Statements

In Malaysia, having undergone through at least eleven years of formal ESL instruction in schools, many undergraduates are still found to have problems in writing due to several reasons (Adzmi, Bidin, Ibrahim et al., 2009, Osman & Bakar, 2009; Ting & Tee, 2008). Sometimes students have a lot of ideas flowing and enduring in their mind when they begin to think of a topic. However, their lack of skills in organizing these ideas resulted in thinking too long for certain ideas. Thus, this will stray them away from the intended topic, and ended up write something off topic. In addition, students tend to forget their planned main ideas, whereby those ideas will only resurface later once they have finished writing, due to poor organisation of ideas. The students will not have enough time and space to elaborate on the newfound ideas. Hence, this shows that the students have problems in brainstorming skills in pre-writing stage.



Brainstorming is one of the techniques to help students brainstorm more ideas for their essay writing in the classroom. Through this technique, students are allowed to talk and produce any logical ideas that cross their minds, openly. Nevertheless, students need to write down their ideas using pen and paper in the brainstorming group. Then, the members of the group will decide the most relevant ideas after the ideas are thoroughly discussed. However, this technique needs students to practice their brainstorming using pen and paper, and it needs some time for them to discuss the best ideas in their own groups.

Thus, it can be summarized that the conventional method of teaching writing is not too effective in improving the undergraduates' writing skills. Therefore, the effective techniques and approaches need to be implemented to build undergraduates' critical thinking





so that it will enhance their writing skills. Razhiyah (2006) proposed that teaching aids help students to understand the teaching and learning process presented by the teachers. Additionally, Scanlan (2003) asserted that an instructor might use conventional tools such as chalkboards, handouts, charts, slides, overheads, real objects, and videotape or film in their teaching and help students' achieve their learning objectives. These conventional methods that are commonly trained for students do not give any effect on teaching writing. In reality, the intelligibility in writing is the most problematic among the four language skills for all language learners (Nunan, 2005).

In academic contexts of writing skill, the learners must have writing skills to produce a satisfactory piece of work. Additionally, the students must also be tested with writing skills in every language examination in Malaysia. Yunus and Chien (2016) suggested that writing is rather difficult because it consists of other language skills as the students need to have a broad grammar knowledge and suitable choice of words or phrases. Besides, writing skills also involve writing mechanics, organizational skills and writing styles. This is also supported by Firmansyah (2015) who stated that the students have some problems in producing ideas at their first stage of writing. Thus, they are not sure what to write first for their writing tasks. Students might also have problems in writing paragraphs for their essays. Another problem is the students have very limited vocabulary. Thus, they had difficulties in choosing the appropriate words when writing their essays. Thus, the researcher considers that this could be due to several reasons like the teaching approaches used by the instructors and the types of writing activities students received from them. It could also be due to the types of written feedbacks that the students received from their instructors. All that are mentioned above could be the reasons why instructors find writing to be the toughest language skill to be taught to students (Akinwamide, 2012).





In Malaysia, issues concerning writing skills among English as Second Language (ESL) students are commonly faced by the educators. Besides, many ESL teachers have some problems in teaching writing in their second language classrooms. This is because writing skill is regarded to be the most challenging skill to teach. This issue is noticeable among Form Six students taking the Malaysian University English Test (MUET) and students of higher institutions who are lacking in argumentative writing skills, causing them not being able to perform well in the exam. The Malaysian Examination Council (MPM Report, 2010) reported that out of 98,662 candidates from schools and institutions, 66.77% obtained below Band 3 (out of six bands) showing many students had problems in writing argumentative essays in MUET writing paper. Similarly, many students in this selected public university also had difficulties in writing argumentative essays. This was obvious among the Semester 3 diploma students.



Today, mobile devices are getting more ubiquitous and portable tools. For example, Personal Digital Assistants (PDA), tablets and mobile phones are becoming more significant in our daily life. Evidently, these devices have delivered various benefits in the e-learning environment. By using these devices, they helps to avoid problems in the learning process which include learning time and place. Due to these factors, it is apparent that mobile phones are much cheaper, flexible and greater to be used for language learning. Besides, students will have different learning opportunities when they learn using mobile phones. Even though there are not many research studies being carried out about the use of mobile phones in language learning recently, some of the findings determined that they had positive results on teaching and learning process.





For this study, the undergraduates' writing activity focused on brainstorming ideas at a pre-writing stage for writing skills. Therefore, this study aims at examining the effects of the MAMMAT as an innovative way to improve writing skills' performance. In other words, the researcher hypothesized that Malaysian tertiary students are weak writers in English because of the following three hypotheses:

1. Malaysian tertiary students lack the techniques in writing activity (Yunus and Chien (2016).
2. Malaysian tertiary students are not exposed to technology in generating ideas about writing (Chow et al., 2007).
3. Malaysian tertiary students are unable to produce coherent utterances or written text in English (Chong, Tan & Mardziah, 2011).



McKillip (1987) suggested that needs analysis concerning documentation and assessment of needs are required in making a decision. It can also be in various forms such as resource provision and planning. The systematic collection and analysis of all information necessary for define a defensible curriculum (Brown, 2009). Nunan (1988) claimed that information needs to be collected for a needs analysis. It is not only on why learners want to learn the target language, but also about public expectations and restrictions and resources available to implement the syllabus. Tarone and Yule (2000) state that needs analysis refers to examining the language learner's needs as it gathers data about present practices. Then, the practices are compared to the anticipated way of teaching and learning. In other words, this analysis includes all the activities used to collect data such as the students' learning needs and the students' learning desires.



This is a preliminary study and the first part of development in mobile learning application for this present study. Aldoobie (2015) stated that the ADDIE model is one of the most common models used in the instructional design field as a guide to generate an effective design. For development of the mobile learning application, the researcher used ADDIE model as shown in Figure 1.1 which includes five processes which are (1) review the analysis of mobile phone use among students, (2) the process of designing mobile learning application, (3) process of mobile learning application development, (4) the implementation of mobile learning modules, (5) the evaluation process of mobile learning application.



Figure 1.1. Phase Analysis of ADDIE Model. Adapted from Aldoobie, 2015

The needs analysis from this study is important because the findings will be used to help the following review of the mobile learning application development for the students. The purpose of this needs analysis was to identify the perspectives and practices of mobile learning among undergraduates from the components of the usage of mobile devices for learning, types of mobile devices used for learning and the time spent on using mobile



devices for learning. Thus, the researcher carried out a small-scale survey method for the needs analysis. This survey aims to answer the designated research questions below:

- Do the respondents use their mobile device for learning?
- What types of mobile device do the respondents usually use for learning?
- How much time do the respondents spend on mobile devices for learning?

The survey involved 45 diploma students who studied in a selected public university. The respondents were believed to be accustomed to simple mobile technology devices for their learning. The small scale survey research was administered to the respondents during the teaching conducted in the classrooms. Thus, the findings can deliver positive outcomes into the study on the perspectives and practices using mobile phone technologies among students. Of all respondents, 38 were females (84%) and 7 (16%) were males. Generally, there were two different age groups of respondents, with 42 respondents (93%) (ranged from 19-20 years) and only 3 respondents (0.7%) (ranged from 20-22 years). All of the respondents were Malay students. Hence, the students' need was the preliminary step to be analysed first. This step was a crucial step in the whole process of the present study.

1.4 Research Objectives

There are three objectives of this study:

1. To explore the feasibility of using the Mobile-Assisted Mind Mapping Technique (MAMMAT) to improve ESL undergraduates' argumentative writing skills performance.





2. To investigate the ESL undergraduates' attitudes towards writing and mind mapping activities by using the Mobile-Assisted Mind Mapping Technique (MAMMAT).
3. To identify the features of the Mobile-Assisted Mind Mapping Technique (MAMMAT) that appeal to ESL undergraduates.

1.5 Research Questions

Specifically, the study investigated the use of the MAMMAT in improving ESL undergraduates' writing skills performance. The study addressed the following questions:

1. Does Mobile-assisted Mind Mapping Technique (MAMMAT) improve ESL undergraduates' argumentative writing skills performance?
2. How do ESL undergraduates perceive the use of Mobile-Assisted Mind Mapping Technique (MAMMAT) in improving their writing skills performance?
3. What features of the Mobile-Assisted Mind Mapping Technique (MAMMAT) appeal to ESL undergraduates?





1.6 Research Hypotheses

The following are the research hypotheses of this study:

Null Hypothesis 1 (H_{01})

There is no statistically significant difference in the mean scores of ESL undergraduates' argumentative writing skills performance due to the differences in teaching technique applied (the Mobile-Assisted Mind Mapping Technique vs. conventional method).

Alternative Hypothesis 1 (H_{a1})

There is a statistically significant difference in the mean scores of ESL undergraduates' argumentative writing skills performance due to the differences in teaching technique applied (the Mobile-Assisted Mind Mapping Technique vs. conventional method).



Null Hypothesis 2a (H_{02a})

The ESL undergraduates do not have positive attitudes toward the use of Mobile-Assisted Mind Mapping Technique (MAMMAT) in improving their writing skills performance.

Alternative Hypothesis 2a (H_{a2a})

The ESL undergraduates have positive attitudes toward the use of Mobile-Assisted Mind Mapping Technique (MAMMAT) in improving their writing skills performance.

Null Hypothesis 3 (H_{03})

The features of the Mobile-Assisted Mind Mapping Technique (MAMMAT) do not appeal to ESL undergraduates.



Alternative Hypothesis 3 (H₀₃)

The features of the Mobile-Assisted Mind Mapping Technique (MAMMAT) appeal to ESL undergraduates.

1.7 Theoretical Framework of the Study

The theoretical framework for this study is illustrated in Figure 1.2. The framework was adapted from the theory of L2 (second language) writing, Flower and Hayes Writing Process Model (1981) and the Unified Theory of Acceptance and Use of Technology (UTAUT) Model (2003).

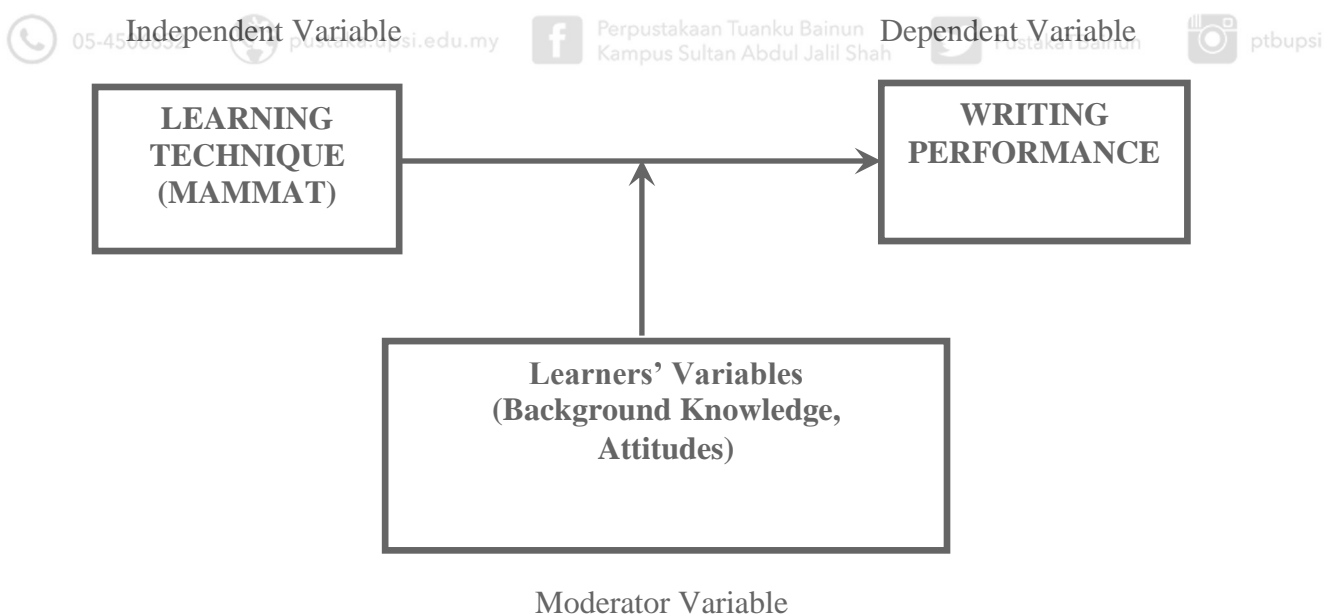


Figure 1.2. Theoretical Framework of the Study. Adapted from Flower and Hayes Writing Process Model, 1981 and UTAUT Model, 2003



The framework shows the relationship between the MAMMAT, learners' variables (background knowledge and attitudes) and writing performance. This framework is divided into three main variables; the learning technique (MAMMAT), the learners' variables (background knowledge and attitudes) and writing performance. The learners' background knowledge consists of the knowledge of writing, the knowledge of mobile learning, the knowledge of mind mapping while the learners' attitudes comprise of the attitudes towards using the MAMMAT for writing skills. The two variables of this model are highly interactive as the learning technique of MAMMAT operates based on the two resources. For example, during the writing process using the learning technique of MAMMAT, particularly at the planning stage, the writer comes out with ideas and sets a writing plan by drawing information from the background knowledge. Another resource, learners' attitude is also seen as an element which can influence the learners' orientation towards writing performance.



The adapted framework is designed and to be conducted for the purpose of looking at whether a specifically designed and innovated technique used in writing skills can improve the ESL undergraduates' argumentative writing performance. Thus, Figure 1.2 shows the relationship between the three variables of the study. The learning technique of MAMMAT act as the independent variable that is to be manipulated to see whether it affects the dependent variable which is the writing performance. However, the moderator variables which are the learners' background knowledge and learners' attitudes give an indirect effect to the results of the writing performance.





1.8 Significance of the Study

This study is needed because it will contribute towards the educational theory and practice in three domains: the educators, the students, and language learning studies. This study will help all the educators in the higher education institutions in Malaysia to plan the programmes towards achieving the improvement in argumentative writing skills performance. This study uses a Toulmin Model for argumentative writing. The study of incorporating mobile-assisted technologies in the ESL classroom is expected to provide an alternative approach to improve undergraduates' argumentative writing performance in the ESL classroom. Besides, this study will offer positive outcomes for the theory and practice of integrating the mobile technologies and mind mapping in writing instruction for improving ESL undergraduates' argumentative writing skills performance.



In addition, this study will be a significant effort in improving the ESL undergraduates' argumentative writing skills performance by using the MAMMAT as an innovative technique. This technique can help the students to develop critical thinking skills and brainstorm their ideas effectively. It also enhances their technique of argumentative writing skills in an online environment be it in or outside of the ESL classroom. The results from the survey and the interviews also provided an overview of the MAMMAT which contribute to the development of the theoretical knowledge. MAMMAT as the technique to support students with course contents and innovative technique provide a rich learning environment for the students. In fact, it can be said that it is still possible for students to generate ideas without the presence of a book and another individual. Thus, this will ensure that the students will not be too independent on books in finding ideas as there will be no books to refer to when they were to compose an essay in the classroom. Students will be





more independent and creative in producing ideas for their essays using the mobile device in the future. Thus, the educators themselves are to be encouraged to use Mobile-Assisted Language Learning as an innovative teaching and learning in their suite of strategies to quality teaching and learning in higher education. Hence, the result of this study will give a positive impact on Teaching English as a Second Language (TESL) in the 21st century specifically for undergraduates' writing skills.

1.9 Scope and Limitation of the Study

Similar to other studies, this particular study has limitations and delimitations. Firstly, this study was carried out with the participation of diploma level students at the Faculty of Accountancy of a selected public university. Thus, the result is only be generalizable to the above population. This study is limited to a randomly selected sample of 45 male and female diploma students of this selected university. The study was also limited to the Semester 3 diploma students who were taking a writing course. This was only conducted over a certain period of time for a quasi-experimental design of the study. Due to time constraint, the duration of the intervention using the MAMMAT was limited to 7 weeks only. If these participants were given extra time to accomplish the writing tasks, the results would be better. In addition, the study also only involved English as a Second Language (ESL) students in the selected university as the study's respondents. The study, furthermore, limits itself by investigating the effect of the MAMMAT as an innovative tool for the undergraduates' learning technique and only enhances their argumentative writing skills. Therefore, the contents of the mobile application were limited to the pre-writing stage for writing skills and it is also only provided the mind mapping technique to brainstorm ideas. Finally, the mobile





application used was only prototype-based, and only limited to be used by android mobile phones users.

1.10 Operational Definition

Mobile-Assisted Language Learning (MALL)

Mobile-Assisted Language Learning (MALL) is defined as a method to help and enhance language learning with the use of a mobile device (Kulkuska-Hulme, 2013). MALL is a subgroup of both Mobile Learning (m-learning) and Computer-assisted language learning (CALL). This method uses mobile devices such as *iPhone*, *iPad*, *iPods*, and *Blackberry* for language learning (Kukulska-Hulme & Shield, 2007). In this study, MALL refers to the method the researcher implements to assist and enhance argumentative writing skills using the mobile device among ESL undergraduates.

Mind Mapping

Mind mapping is a great explicit technique which offers learners to expose the potential of their brain. This technique connects the full range of mentally stimulating activities such as cortical skills-word, logic, colour, and image. Thus, this technique provides the learners with their self-determination to use the potential of their brain. The technique can also be applied to every aspect of life. It will help to improve our knowledge and vibrant thinking in way of life. Thus, it will help to improve the learners' performance. Mind mapping uses both sides of the brain and so processing productivity will be improved which translates into greater





retention (Buzan, 1989; Buzan, 1996). In this study, the researcher uses an adapted argument map as the mind mapping technique for improving the argumentative writing skills performance.

Conventional Method

Conventional method or traditional method refers to a teaching method involving instructors and the students interacting and discussing in a face-to-face manner in the classroom. The instructors commonly use textbooks and notes for their teaching materials (McCarthy & Anderson, 2000). In this study, the researcher uses pen and paper as a conventional teaching method for teaching argumentative writing in the classroom.



Mobile-Assisted Mind Mapping Technique (MAMMAT)

In this study, MAMMAT is also known as Mobile-Assisted Mind Mapping Technique. It is designed with Mobile-Assisted Language Learning (MALL) to employ students in learning, and increase their motivation and performance in argumentative writing. MAMMAT is a supportive learning platform which contains some essential components of learning course contents and innovative technique in improving argumentative writing skill performance for ESL undergraduates. In this study, the MAMMAT was designed and developed from the *Appy Pie* application maker for android which is one of the free mobile applications builders without coding.





Emoticon Reasoning Map (eReMAP)

Lionel (1973) mentioned that people have an incredible ability to remember particular images in long-term memory, even those defining everyday scenes, and events, or the shapes of arbitrary forms. In this study, the Emoticon Reasoning Map (eReMAP) is an innovative technique which will be introduced to improve undergraduates' argumentative writing skills performance. In this study, this technique was designed by integrating the argument map and emoticons functions to be used in the writing course for brainstorming. This is an adapted argument map which uses a metacommunicative pictorial symbol of facial expression. For this technique, only four emoji symbols were selected and used. Instead of using words as an inferential connection for the argument map, this technique uses the emoji as the symbols for students to represent their ideas in a coherent visual structure. The eReMAP technique is embedded within the MAMMAT as part of the latter's learning contents. Combined, both are employed to brainstorm their ideas for argumentative writing.

Technique

Ware (1989) described technique as a teaching method, skill, style, procedure which a teacher has selected to expedite the teaching/learning process. A technique is a variety of method for carrying out a particular task. It includes the teaching style of teachers while teaching in the classroom. In this study, technique refers to the way the researcher improves and implements the method of teaching in the classroom.





Writing Skills

Writing is one of the difficult language skills to be learned by language learners. It is essential for learners to grasp grammar forms in writing. Furthermore, learners also need to know the rules for writing good essays. They need to know how to develop good ideas and information and choose the appropriate vocabularies. The most important thing is the learners also must know how to construct correct sentence structure which is suitable to the topic (Jim, 2010).

Argumentative Writing

Argumentative writing is a difficult task in which the writer takes a position on a controversial issue and suggests reasons and supporting ideas to influence the audience to accept his or her point (Anker, 2005). This type of writing includes arguments, facts, evidence, reasons description or explanation. This writing supports the side being argued and uses a reference to expert authority and the writer needs to make an irrefutable stand (Smalley & Hank, 1982). Based on this selected university syllabus, argumentative writing is a writing type which stresses arguing an issue or a situation. This genre of writing requires the writers to persuade readers to rely on their claims. In order to support the claims, every rebuttal and points of information argued are crucial. Then, students will provide examples and quotes retrieved from reliable resources to produce an effective argument.





Writing Performance

In this study, writing performance is a variable measured using the Analysis of covariance (ANCOVA) of the post-test and post-test scores attained. The pre-test and post-test were evaluated using the selected university marking guidelines rubric for preparing students in the final examination. For this marking rubrics, content and language criteria are given score of 10 marks and 15 marks. For organisation criteria, the score is 5 marks. The pre-test and post-test for each student's writing score are also compared to find out the mean gain score for each student by using the descriptive statistic.

ESL Learner

According to Nesamalar, Saratha & Teh (2001), a second language is not a native language of the country but is a language used for a certain purpose and by a certain people within the country. English as a second language (ESL) is frequently used for non-native English speakers. The speakers are learning English as a second language in their country. Therefore, an ESL learner is a student whose main language or languages of the native is not English. Thus, they would need further English language aid to develop language skills.

Attitude

Attitude is a state of readiness, a tendency to act or react in a certain manner when confronted with certain stimuli (Oppenheim, 1996). For this study, the attitude refers to the ESL undergraduates' attitudes towards the use of the MAMMAT in improving writing skill performance.





Quasi-Experimental

Quasi-experimental research designs test causal relationships, much like true experimental designs but it lacks the random assignment that is a requirement of true experimental research. Similar to the experimental research design, this research design also involves both the control group and experimental group in the research. However, the participants of quasi-experimental design are not randomly assigned to both groups (Creswell, 2009).

1.11 Summary

In conclusion, this chapter discussed the background of the study, and also presented the problem statement of the study. Commonly, the instructors commonly use pen and paper to teach argumentative writing in their classrooms, which is proven to be less effective. This study used a mixed method research design. In this study, the researcher used a quantitative method to explore the effectiveness of the developed MAMMAT. It was used to improve undergraduates' argumentative writing performance in ESL classrooms. Furthermore, the researcher also investigated the undergraduates' perceptions whether the developed MAMMAT promoted effective learning by using mobile technology. Therefore, the researcher will further discuss the mobile technology integration and writing in the classrooms in the next chapter.

