The Effect of Kod Tangan Bahasa Malaysia and Bahasa Isyarat Malaysia on Student Achievement in Bahasa Malaysia among Deaf Children

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Introduction

Previously in Malaysian curriculum, only Bahasa Melayu Kod Tangan (BMKT) is allowed in the curriculum as this is the formal language used in the Ministry of Education Malaysia. Bahasa Isyarat Malaysia (BIM) is the language developed by the Malaysian Federation of the Deaf, for the deaf people, where it is used by the deaf association in Malaysia. Bahasa Malaysia Kod Tangan or BMKT is the code used by teachers to construct sentences using formal Malay language, whereas Bahasa Isyarat Malaysia is the informal way of communication between teachers and students mainly to explain what certain words or hand signals mean (Yusoff & Mohamed, 2004). In order to fully utilize this code, teachers need to have a good understanding of the topics and subjects.

BIM is widely known and used in Malaysia. BMKT is not widely used, but it is associated and used to translate from oral or visual into formal Bahasa Malaysia. When used, a lot of people from the deaf communities would get confused with the hand signals (http://sirkarami.tripod.com/bahasaisyarat.htm, n.d). Now, in the *Akta Orang Kurang Upaya 2008 Akta 685*, BIM has been recognised as the official language for the deaf, which shows that BIM could be implemented in schools, though schools have yet to use BIM in their teaching curriculum (http://www.jkm.gov.my/images/stories/pdf/oku2008scan.pdf, 2008).

In Malaysia, the Bahasa Malaysia subject in the education system is extremely important. Hearing impaired/deaf children in Malaysia would also need to master the Bahasa Melayu on top of other subjects. Linguistically, deaf children have a harder time grasping Bahasa Malaysia as they are used to the informal way of communicating, using BIM (Yusoff & Mohamed, 2004). As a result of this, deaf children in Malaysia do not perform as well in their subjects due to not fully understanding the uses of nouns and pronouns. The purpose of this study is to examine student achievement in their Bahasa

Melayu subject using BMKT and BIM as a support language. This research delves into looking at the ability of students in mastering the Bahasa Melayu subject.

Problem Statement

Previously in Malaysian curriculum, only BMKT is allowed in the curriculum. BIM is the original language for the deaf people, where it is used by the deaf association in Malaysia. BIM is widely known and used in Malaysia. BMKT is not widely used, but it is associated and used to translate from oral or visual into formal Bahasa Malaysia. When used, a lot of people from the deaf communities would get confused with the hand signals (http://sirkarami.tripod.com/bahasaisyarat.htm, n.d). Now, in the *Akta Orang Kurang Upaya 2008 Akta 685*, BIM has been recognised as the official language for the deaf, which shows that BIM could be implemented in schools, though schools have yet to use BIM in their teaching curriculum (http://www.jkm.gov.my/images/stories/pdf/oku2008scan.pdf, 2008).

In Malaysia, the Bahasa Malaysia subject in the education system is extremely important. Deaf children in Malaysia would also need to master the Bahasa Malaysia on top of other subjects. Linguistically, deaf children have a harder time grasping Bahasa Malaysia as they are used to the informal way of communicating, using BIM (Yusoff & Mohamed, 2004). As a result of this, deaf children in Malaysia do not perform as well in their subjects due to not fully understanding the uses of nouns and pronouns.

Purpose

The purpose of this study is to see the significant difference in the deaf children's exam results when using both the BMKT and BIM in Bahasa Malaysia, rather than just using BMKT. The significance of this study is that by using both BIM and BMKT, deaf children

would be able to adapt better to the classes, making them feel more comfortable and confident in what they are doing.

Research Question

RQ1. Is there a difference in achievement for classes only utilizing the BMKT compared to the classes implementing both the BMKT and the BIM at the different time points?

RQ2a. Is there a positive significant relationship between BMKT in the academic performance?

RQ2b. Is there a positive significant relationship between BMKT and BIM in the academic performance?

RQ3. How do teachers feel about implementing both BMKT and BIM?

RQ4. How do students feel about the implementation of both BMKT and BIM?

Hypothesis

H1: There is a positive significant difference between Group A and Group B at the different time points.

H1: There is a positive significant relationship between BMKT and BIM in the academic performance.

LITERATURE REVIEW

Special Education

Special education is a specially designed education for those who need more, special or extraordinary attention. In addition to this, special education is also to teach and train children to be good and useful to themselves and to society. The importance of special education began in the 1920s among volunteers involved in the opening of visually impaired and hearing schools. According to the Ministry of Education Malaysia (2012) the Cabinet Committee Report on the implementation of education policy through Certificate 169 is a turning point that leads to greater emphasis and focus on the development of special education in Malaysia.

Additionally, Certificate 169 also emphasised on the awareness where the government aims to establish and streamline a special education system that focuses fully on the education of differently abled children. Hallahan, Kauffman and Pullen (2011) explained that Special Education means a specially designed lesson to meet the needs of an extraordinary child. Among these needs are special materials, teaching techniques, or equipment and facilities. Werts, Culatta and Tompkins (2006) agrees with the statement and added that special education is an individualized teaching designed to meet the needs of educational needs and in connection with differently abled students. Special education provides learning opportunities not provided in the usual curriculum or regular school services.

Tee (1970) identified that hearing-impaired students in Malaysia learned to follow the usual curriculum modified according to their needs and achievements. For compulsory school-age students, it is six years old in primary and 5 years in high school but for students with hearing problems they are given an extra two years. This has changed in recent years where students who are hearing impaired are all in the same grades as the normal hearing students.

Hearing Impairment

Hearing impairment is one disability contributing to the difficulty of learning in school, which could result in these students being left behind, which could also lead to societal problems later on. Understanding the hand signals or codes is extremely important as this is the main way of communication in class. Not understanding of the sign language could lead to problems for the students as all the teachings would be conducted in sign language (Wilbur, 2013). Manual signing has been one of the most widely used form of communication to both children and adult, not only for those who are hearing impaired but also to those who have intellectual or developmental disabilities which could affect their communication skills (Grove & Woll, 2017). Deaf children have previously and continue to be at risk for maltreatment, with linguistic deprivation, sometime known as language deprivation being on top of the list, where these children have not been exposed to language, or have limited access to language (Humpries, et al., 2016).

To the hearing impaired, sign language is one way of communicating with others that are used within their community. Signing has been said is the most effective form of communication for the hearing impaired, compared to other modes of communication. Signing could be used by people who have hearing problems, those who cannot talk, and those who have problems with talking (Wilbur, 2013). Sign language used by deaf people have their own grammatical structures unlike those to the spoken ones (Grove & Woll, 2017), which shows why students have a harder time processing the formal sign language in class, which utilizes Bahasa Malaysia Kod Tangan or BMKT, as they are used to Bahasa Isyarat Malaysia. Bahasa Isyarat Orang Pekak (BIOP) or Bahasa Isyarat Malaysia is the informal way of communication between teachers and students. Bahasa Malaysia Kod Tangan or BMKT is the code used by teachers to construct sentences using formal Malay language (Yusoff & Mohamed, 2004). In order to fully utilize this code, teachers and students need to have a good understanding of the topics and subjects. BMKT is the formal language of use in school because it conforms to the nouns and pronouns found in regular sentence structure, which also conforms to reading text.

Nowadays understanding of written text is extremely important and crucial ability that children would need to acquire. This is because deficits in reading comprehensension would have negative consequences in their future (Potocki, Sanchez, Ecalle, & Magnan, 2015). Studies by Potocki et al. (2015) have also found that one of the main reasons why students have a hard time understanding written text is because they are unable to decode those texts.

Researchers have found that there is a huge difference in the way hearing impaired/deaf and hearing students process information (Marschark, Leigh, Sapere, Burnham, Stinson, Knoors, Vervloed & Noble, 2006). It is important for teachers to know what type of method is suitable to teach students with hearing impairment or deaf children as this affects their future, but there little known on the best method to use in teaching these students (Marschark et al., 2006). Being able to communicate through reading and writing is challenging, especially to those with sensory impairment (Abdullah & Eng, 2012). It is not easy for hearing impaired students to read as these require certain skills along with them, such as being able to recode certain written symbols into correct sounds or the proper signing (Holmer et al., 2016). These skills are especially crucial when it comes to employment (Abdullah & Eng, 2012). Not being able to effectively communicate is one of the main reason why employment continues to be an elusive goal for people with disabilities. A study conducted by Abdullah and Eng, 2012 also found that there is a higher number of unemployed compared to the employed, where the unemployed have rated their reading skills as very weak. This could be due to the fact that there are different hand signal that they need to master, such as the American Sign Language, Bahasa Malaysia Kod Tangan, and Bahasa Isyarat Malaysia (Abdullah & Eng, 2012). Deaf/ hearing impaired students also have a harder time grasping abstract concepts, and have limited cognitive ability to understand what was taught (Zainuddin, Zaman & Ahmad, 2010).

Abdullah and Eng's (2012) study found that those who were employed had a higher rate in reading, writing and communicating. This is due to the fact that people with hearing impairment depends on their other skills as there are no or very little auditory information that

could be processed. When people with hearing impaired have better writing skills, they are better equipt at communicating with others such as through social network. The study also found that better communication skills would benefit the hearing impaired by connecting them to other successful people with the same condition and learn to better themselves (Abdullah & Eng, 2012).

Sign language were found to be an extremely important communication tool for people with hearing impairment, as they prefer to sign over writing. In Malaysia the main signing used in schools is the Bahasa Malaysia Kod Tangan (BMKT), which is similar to Sign Exact English when it comes to learning the English language (Zainuddin et al., 2010). Outside of the classroom though, students with hearing impaired very rarely use BMKT, as there are a lot of nouns and pronounces. These students prefer using the Bahasa Isyarat Malaysia (BIM), where everything is simplified (Zainuddin et al., 2010). This creates a conflict in understanding for these children, as nouns and pronouns are not present in BIM.

Studies have found that deaf students learn significantly less than those of hearing children. This is because deaf students do not comprehend as much from lectures (Marschark et al., 2006). Marschark et al., 2006 argued that lectures and class structure are more in tuned with hearing children compared to deaf children, as the learning styles of deaf children are quite different to those of hearing children. Trussel and Easterbrooks (2017) also mentioned that deaf students constantly need to struggle to attain grade equivalent grades and that interventions are almost always needed to help these students. Now, more and more technology has emerged to help deaf children in learning, as more deaf children has been integrated into the mainstream classrooms. Students have reported that there is more understanding in real time captioning compared to interpretations. Students have also reported that it is quite hard for them to process things that are quite fast, compared to if they were able to control it themselves (Marschark et al., 2006). A study by Francisco, Groen and McQueen (2017) found that there is a relationship in audiovisual processing to reading in an intervention program, showing that an application

utilizing visual could help improve deaf student's understanding and help with their reading abilities.

Current Classroom Management in Special Education

According to a study conducted by Elliot and Thurlow (2006) the attention given to the appraisal of different assessments for the differently abled students has increased and this is no longer surprising, although in the Malaysian setting, examinations for the hearing impaired content are similar to the hearing students. Various actions have been made to assist these groups such as conducting tests that are compatible with their ability. People with disabilities cannot be excluded from the general education system on the basis of their inability. in such a way, to enable those with disabilities to pursue education, adapting to the conditions and in accordance with the needs of disabled persons in terms of infrastructure, equipment and teaching materials, teaching methods, curriculum and other forms of support that meet their various needs need to be provided. These groups are entitled to equal treatment with fairly normal groups without any element of discrimination against their inability (Zainudin Mohd, 2009).

Mohd Salleh, Serajul, Mohd Ali and Bari (2001) explained that teaching and learning process depends on the competence and skills of special education instructors. This is especially important for hearing impaired students as they need a standardized language and teaching method to maintain the class in order for students to understand the mode of instruction. With the teaching that is appropriate with the level of ability and skill of the problematic learners, students can demonstrate the success of the teaching and learning process. The basic principles of teaching are determined by the change in behaviour because the learning process is a process of change and takes place all the time. It can be concluded that behaviour management and classroom management need to be mutually required, explains that effective classroom

management can create conducive learning environment as room routines can run more smoothly and discipline can be controlled (Hashim, Razali & Jantan, 2007).

Hearing Defects in Malaysia

In Malaysia there are 283,512 people with disabilities (OKU) and 37,729 are registered individuals who have hearing disabilities (Social Welfare Department, 2009). The Social Welfare Department in 2009 according to statistical studies has shown that the disability level of the disabled is divided into six categories namely visual impairment, hearing, physical, learning problems, cerebral palsy and others. We know that hearing problems are the most common neurological disorders in human populations.

As indicated by (Che Lah, 2008), identifying the World Health Organization (WHO) in 1999 has estimated that nearly 250 million people have suffered hearing loss. Meanwhile, (Chua & Koh, 1992) concluded that hearing impaired children were those who suffered hearing loss in various situations and could not respond to the surrounding sound levels.

Malaysian Sign Language

In Malaysia, education for people with hearing disabilities has begun in 1954 and is lagging behind compared to other countries, such as the United States, Japan, France and Spain. In 1978 the Ministry of Education has established the entire National Communication Committee responsible for planning education for the deaf in the next approach. The success achieved by the United States was made a reference to the Whole Communications National Committee to adopt a new approach known as the whole communication approach. To realize that dream, the entire Communications Working Committee was formed in 1978. The Committee is responsible for forming an acceptable language of sign language as the standard language for the country. As a result, the committee compiled sign language and later in 1980 became Bahasa Malaysia of the Hand Code for school-level deaf children or Bahasa Melayu Kod Tangan (BMKT).

To improve the quality of education, various ways and efforts by the government to complete the deaf children education system. In addition, apart from the BMKT produced by the

Ministry of Education, the Federation of Deaf People (POPM, 2000) is also actively working on producing a version of their sign language called Sign Language Malaysia or Bahasa Isyarat Malaysia (BIM), POPM has produced 1000 sign language forms. BIM is the first book containing the signals used by the deaf community. The language of Malaysia is the language used by the deaf in Malaysia. This language is rich in identity that symbolizes the various races, religions and cultures of the country. According to Dato 'Dr. Hajah Siti Zaharah bt, Haji Sulaiman, the Minister of Unity and Community Development, (2003) states Malaysia Sign Language is an important tool in community integration and as a link to non-deaf community.

Historically, the education system and philosophy in Malaysia has emphasized the major problems of education in special education for visually impaired, hearing impaired and mute individuals who emphasize Language and communication problems. The communication problem faced by hearing impaired students was harder because they could not hear whatever the teachers wanted in communicating information and relying entirely on sign language (Ministry, 2012)

According to (Che Omar, 2009), states that sign language is the language the deaf used to communicate visually to one another. While (Stokoe, 2005) interpreted that sign language is a natural language consisting of complex structures and grammar itself. As we know, sign language is the language that makes deaf people easier to communicate and express opinions, feelings, problems, and so on. The uniqueness in terms of hand, body and face movements distinguishes every message you want to convey (Che Omar, 2009).

In Malaysia, Sign Language Malaysia or better known as BIM is the official language of the deaf community as cited in (Lim & Chong, 2006). History of the beginning of the sign language in Malaysia in 1954 (Che Omar, 2009). According to (Shaari, 2004) BIM is a language people with hearing impairments used in their daily communication and represent the symbol of identity-disabled hearing in multicultural Malaysia. BIM is considered to be the emblem of the hearing impairment because their signals are based on their way of life and culture and are not

affected by other external elements (Shaari, 2004). Hence, it is clear that BIM is the primary medium to communicate among the hearing impaired and to give them a better understanding, since it is used in their community. In addition, according to (Loughran, 2013) to communicate something or lesson to the deaf community it is necessary to use sign language as the main form of communication. If there is no use of the sign language in this lesson will cause the deaf community to be less interested in learning something because they do not understand the lessons taught (Cooper & Cripps, 2013).

According to (Wilbur, 2013) stated that the use of sign language can also be used by those who have problems in speaking, those who cannot learn the language through speech, and those who cannot hear. This is because the use of sign language facilitates the communication of hearing impaired people and gives them the opportunity to express their feelings, opinions, ideas, feelings and so on. Furthermore, body language and facial expressions are attraction and intonation in the use of sign language (Wilbur, 2013).

The approach of using sign language as a way of teaching language to deaf people means that deaf people are trained either formally or otherwise in order to communicate using sign language. Sign language involves the whole movement of human limbs such as hands, feet, body of mouth, face and so forth. According to (Cooper & Cripps, 2013) states that the use of this sign language is said to be among the oldest methods used by the deaf in the process of interacting with members in society as it is more of a nature. The rational use of this approach is to recognize (Deaf Sign Language) as a language of ownership of the deaf community (Sharan, 1998)

There are various types of sign language used by the deaf. This diversity is due to the background of the deaf and the cultural environment that surrounds their lives. According to (Yusoff & Mohammad, 2009) states that due to such circumstances, the signals produced differ between a speaker and another speaker.

According to Kramer (2013), the deafening language sign language approach is an approach that uses the true signals of the deaf in teaching and learning the language to the deaf.

Studies by linguistic masters of deaf language signals show that the Deaf sign language has the same status as the spoken language spoken by a society, such as the Stoke study (Mohd Rashid, Alias, & Ismail, 2017) on American Sign Language, and (Jefwa, 2014) on the British sign language. Sign Language Indo Pakistan by (Lieberman, Borovsky, Hatrak, & Mayberry, 2014) While research on the language of Malaysian sign language with His first attempt was to publish the 'Malaysian Sign Language' (Federation of Deaf Persons) Malaysia, 2000).

In relation to language teaching and learning, it is clear that deaf children are easy to understand the verbal, verbal and verbal words as opposed to short conversations, stories, poems and acting. They are easy to understand sign language and fast to master it compared to lip reading but difficult to follow oral lessons in the classroom. The findings show that deaf students can understand some of the Malay verses submitted to them (Sabdan, 2014). Therefore, a study should be conducted to identify those areas so that they can be used as guides to teachers in the language teaching and learning process to them.

For people with hearing impairment, sign language is one of the methods or alternative communication used by a community of serious hearing impairment. According to (Wilbur, 2013) states that sign language can be used by communities with problems in speaking, communities who cannot learn language through speech, and non-listening communities. While other studies (Hussin, 1996) explain that sign language users, cued speech and spelling are also the main communication channels for people with impairment and communication methods that use sign language are said to be more effective than other methods.

Native signal language

The native sign language is the sign language that is used by most people deaf. The signals formed are based on self-creation or based on deaf family members, deaf and non-deaf partners as well as members of the community who surround their lives (Steven, 2013). These signals are shaped local area and its distribution is not extensive.

Normally native language is the first language and is very important for the deaf. According to (Sharan, 1998) states the native sign language is the first language acquired by deaf children. Children acquire these sign language from the closest person to them as parents, family members to meet the need to communicate.

What we know, there are different types of sign language based on culture, religion and national borders. It can be said that each country has its own native signal language. For example, American country with American Sign Language (ASL), Japanese with language Japanese and Indian gestures with Indian-English Sign Language. These native sign languages are recorded as Japanese and American Sign Language. According to (Sharan, 1998), this bookkeeping facilitates the spread of a sign language in an effort to standardize its use.

Even some new signals are created to refer to something new. It can be stated that this occurs between teachers and their students. Based on the shape of the object, the signal created and used as a standard signal in its use environment. According to (Krammer, 2013) explains that his creation is restricted to things seen around because it is very difficult to make a signal to refer to the abstract thing.

Technology Usage

Information and communication technology or ICT is very important today. This technology has mastered the world fast. According to a study from (Ahmad, 2011) states that almost every time people use this technology and with this technology it also causes us to control and control almost every point of the finger. Furthermore, he also noted that ICT advancement has contributed to improving the management and administration of the country in a more systematic and orderly manner.

The use of the internet in teaching and learning can increase student interest, performance and skills. In a study conducted by the US National Foundation by (Sander & Rosenberg, 2001) to 601 students and 1735 parents in the United States found that 48% of students and 53% of

parents said the main use of the internet was to complete schoolwork. In addition, 43% of survey respondents stated that internet and multimedia use improved their performance in school. According to a study conducted by MCI (1998), in the United States related to the use of internet in education, 91% of teachers are interested in using the internet during teaching. The study also shows that over 48% of teachers have used the internet in their teaching. Through (Scrbid, 2012), identifying most teachers and communities in America believe the internet can improve education standards as 90% give the view that the internet can improve student achievement, 97% of students think the internet can provide students with success in the future and 87% give the insight that the internet can reduce the costs that need to be used in activities in the classroom. This suggests that information technology can help in the field of education to produce excellent students.

Reading Culture in Malaysia

The National Libraries of Malaysia statistics show that the number of books read by Malaysia increases every year. However, the selected reading is said to have no scientific value. According to a newspaper article written by (Yusof, 2017) based on the Malaysian People's Reading Interim Review 2014, it is found that Malaysian people's reading materials are 62.8 percent magazine, 61.2 percent newspapers, 54.8 percent scientific books, novel and fictional 47 percent, online materials 46.4 percent, 29.9 percent of non-fiction books, comics 25.3 percent and 19.9 percent journal.

According to (Ezwan, 2018) the lazy reading scenario among Malaysians should be taken seriously and the major factors that cause Malaysians away from the reading culture is the unpleasant and boring feeling to begin reading steps. Thereby generating various reasons for avoiding reading including daily workloads and time constraints. For that reason, the lack of awareness among Malaysians becomes a source of lazy culture of reading.

Meanwhile, Chief Executive Officer and Managing Director of the Malaysian Institute of Translation & Book (ITBM), Mohd Khair Ngadiron in an article written by (Nor, 2018) stated

that reading practices outside the academic context among Malaysians nowadays is still far-reaching and he also stated that the government should return the 1Malaysia Book Voucher (BB1M) to student to encourage reading so that the facility was used only to buy books and not included in the granting of 1Malaysia Student Card (KADS1M).

According to (Abas, 2018) confirmed that the Ministry of Education took the initiative to bring the program of reading movement that has been taking place over the last two decades as the campaign has yet to reach a satisfactory level. With the effort towards making Malaysia a Reading State by 2030 and aims to create a world-class knowledge community with a focus on reading for knowledge, adding knowledge and reading practice culture (Online, 2018).

Reading Habits

According to (Hasan, 2017) in his note on the book industry and the reading worlds states that the Malaysian Reading Habit Review was conducted in 2005 that Malaysians only read two books a year. Even in his records also noted that the volume of two books was higher than in another study of Malaysian Reading Habit conducted in1984 led by Professor Atan Long to identifying that Malaysians only read two pages for a year.

The lack of reading habits among Malaysians it's really worrying. The youth and adults are now more heading towards hedonism and digital-based entertainment as cited in (Faizli, 2016). The no longer find pleasure in reading as a hobby in the free time as well as an entertainment source. In this regard, in (Bernama, 2017), according to National Library Director-General (PNM) speech, Datuk Nafisah Ahmad stated that PNM is currently working to improve reading habits among Malaysians who are still at a lesser level.

However, according to President of Open University PTS shows that Malaysians are increasingly keen to read and buy books. According to a page written by (Zain, 2019) stated that the National Library of Malaysia reports that for 2007 the number of books published in Malaysia has increased to 14,000 titles, so in 2003 the number was only 6,000 titles. This means that there is a significant surge of numbers, which is over 100 percent in four years.

Nathasia (2017) identified that 46 percent of respondents said they also considered new media such as Blog, Facebook, Instagram and Twitter as their reading material. This means that the latest trends in media readings should be studied in depth to get a more detailed statement on reading habits of Malaysians.

Reading and Communication Skills

A study by Sharilfuddin (2018) indicated that the mastery of reading skills at the early stage of life is much better and more important to enable a child to easily learn the knowledge and technology, also improve their skills and self-confidence. Raja Muda Perlis, Tuanku Syed Faizuddin Putra Jamalullail in the Delivery Council Program Smart Reader Kids-One Child One Hope (OCOH) said that "As parents should ensure that these reading skills are nurtured in children since their early age to pave the way for them to acquire knowledge in the field of their choice someday" (Online, 2018).

In a study written by (Abdul Rahman, Hairun, & Azizan, 2016), recognizes that reading ability is a valuable skill and it is a very dynamic process, which requires an active communication process between the reader and the author.

According to (Azizan & Hussin, 2017) explains that reading comprehension can be categorized into several levels, at simple, medium to higher levels. Additionally, they also recognize that reading skills are very important in a person because reading skills are closely related to the mastery of language. This means someone will acquire other skills during the learning process if they master and understand the language better.

Basically, most of the local studies use a variety of ways Information and Communication (ICT) to cultivate reading skills. Among them, the use of e-books by (Mohamed, 2014) in Malaysia. The principles of learning applied in this study such as Behaviourist, Cognitive and Constructivist, and Gagne and ASSURE design model principles as well as interactive balances are also included as a reading model. In the discussion of the findings, the researcher found that the e-book has seven multimedia elements that make this software strong and have high

interactivity and multimedia values. This means that Information and Communication Technology (ICT) is an initiative that will help everyone learn to receive and inform the public and also acquire new knowledge.

According to the study of (Abdul Hamid, 2005) has identified that reading skills using the pictures and syllabus cards have risen based on his findings. Then with the improvement it show a good results. While another study, (Abdul Hamid, 2005) Conducts studied in the state of Pahang on the first year of ten students where it can be explained that failure to master reading skills will cause the pupils to read and write smoothly.

According to (Yusof, 2000) stated that good communication skills are the basis of each relationship and it is the key to success. In addition, according to (Abdul, 2000), identifying that 80 percent of people fail in their success due to one factor that fails in connecting with others. This is because through one's communication it will express felling, ideas, thoughts, in some way. In this way, is capable of forming a quality of communication in society.

(Haron, 2018) mentioned that communication skills are required in various sectors and organizations, and not just in schools. In addition, it also stated that efforts to strengthen the image of the organization, communication should be more effective in everyday life. Furthermore, we are aware that communication skills should be learned by all parties and not for those involved in public relations only. This is said by the President of the Malaysian Institute of Public Relations (IPRM), Datuk Ibrahim Abdul Rahman who was written in Sinar Harian by (Othman, 2019) who explained that "communication is important nowadays in the face of the challenge of the 4.0 industrial revolution".

Based on the modernity of live today, communication skills have become an important aspect that is very important to be applied by every individual. According to (Mohd, 2014) findings show that the confidence level of communication skills of student education is at a good level. However, in Malaysia the ability to communicate in the English is still moderated

simultaneously. Therefore, all parties should play a role in encouraging students to master communication skills especially in the second language of English.

Linkage between Reading to Language Proficiency and Other Subjects

Ministry of Education Malaysia (K.P.M, 2000), confirms that in KBSM Learning Syllabus there are four basic skills that students need to have like listening, reading, speaking and writing skills. According to (Mahamod, Gani, & Wan, 2016), recognizing that learning and possessing Bahasa Melayu is not only intended to sit for exams, but as a means of communication and unity of different social backgrounds in a class, as well as enhancing the spirt of patriotism among the younger generation.

The mastery of language skills requires a variety of situations and content that affects various thinking skills that can be presented in the form of graphic and visual thinking cited by (Ramakrishnan, 2014). According to (Rahman & Mahamod, 2016) stated that students who make the second language of Bahasa Melayu to develop high-level thinking skills in the classroom and eventually help the students to master the Malay language.

According to a study conducted by (Ali, Rabnawaz, & Waseem, 2015) identifying that the teacher need to master the English language will be able to communicate well through the presentation. While research carried out by (Nisreen, Baker, & Yaser, 2016) stated that poor English domination will lead to a boundary in the development of an academic staff at the university in communication skills and interpret information especially to understand, translate and provide information, in the process of learning and teaching.

Integrating Literacy with STEM

Malaysia is currently experiencing a touch of the Fourth Industrial Revolution (4.0) or known as the (4^{th} IR) which leads to a change in the way people think and work. It is a condition where the use of technology is open and increasing. According to (Frank & Nigel, 2017), the Industry Revolution found several new technologies namely Internet of Thing (IoT), automation,

big data and analysis, system integration, more popular robotic applications and digital technology and cyber security and Cloud.

While according to (Hasim, 2016) in the book The Fourth Industrial Revolution written by Klaus Schwab stated that the emergence of this Industrial Revolution can be seen by the appeared of robots, supercomputers, neuro-technical developments and so forth. With that, the existence of the Science, Technology, Engineering and Mathematics (STEM) education that can assist in the generation of the fourth generation industry by integrating and applying these four areas in a world as cited by (Abdul Rasib & Maat, 2018).

According to the word Deputy Education Minister Datuk P.Kamalanathan P. Panchanathan stated that STEM is important in the development of future generations of the nation in enhancing development and competitiveness in the development of today's technology and high career opportunities in these areas compared to other areas (Harun, 2017). Therefore the STEM approach is seen as capable to bring about the aspiration of Malaysia to become a high-income developed nation through the achievement of quality and competitive human labour (Bunyamin, 2017).According to (Utusan, 2016) stated that the ability and compatibility of computational thinking in problem-based learning led to the element being included in the STEM subject at school.

With the implementation of teaching and learning STEM will be able to integrate knowledge, skills and value in the subject in depth through inquiry, project-based learning and problem-based learning in real-world contexts (Mohd, 2018).

Past studies also indicated that that the presence of STEM in early childhood education can help in the development of critical thinking and skills, building the foundation of learning and future mind development, children's science and mathematics lessons, and interest in STEM-related careers, further expanding curiosity, asking questions and researching and ultimately giving children a natural experience of the natural world (National, 2010).

Culture and Skills of Reading in Turkey

According to a view written by (Farihin, 2017) in a conference that she followed in Turkey states that the culture of reading in the turkey is very encouraging and has compatibility with reading culture in turkey. Additionally, in her paper also explains awareness of the importance of education can be felt in the city of Ankara as well it can be noted that there are many small alleys reserved for book sellers in the city of Ankara despite books that are not copyrighted.

According to a study conducted by the European Statistical Institute (Eurostat), most Turkish people spend more time reading books from most European countries such as Spain and the Netherlands (Hidayahullah, 2018). According to (Mazhar, 2018) confirmed that it has been studying the involvement of junior high school students in Turkey in writing. This study was conducted after experiencing some of the issues such as the reading culture of primary school students was less satisfactory as well as writing. But it also found that students prefer to work and read on watt pad apps becau6se it is more freely expressive and creative thinking. While the system also helps motivate students to continue to produce good ideas.

According to (Ahmet, 2017) studied 92 teachers in turkey. The study was conducted to identify the reading habits of teachers in turkey. As a result of the study finds that turkey teachers read regular books because they have limited time and prefer to read literary books to read more often than magazines. This shows that turkey teachers play an important role in acquiring reading habits. Every prospective Turkish teacher should be aware of that the importance of reading a book before serving and will make it a daily routine (Akin, 2015). Reading habits should be maintained throughout life (Batur, Gülveren, & Bek, 2010).

According to a study conducted by (İlyas, Coşku, & Toklucu, 2017) in a report titled "Teachers Training Model in Turkey" monitoring and evaluation stated that the percentage of book readings for prospective teachers in Turkey determined by the Ministry of National Education is very poor. Erdogan stated in an event in Istanbul's Zeytinburnu District that "We are working to encourage Turkish generation to read books", and make Istanbul a major public library in Turkey (Yenaagustin, 2018).

Socioeconomic Status to Reading

According to (Bradley & Corwyn, 2002) explain that socioeconomic status is based on family income, parental education status and parental employment. Indirectly, the development of children is due to socioeconomic status (SES) as it is a very common condition in children. According to (Bergen, Zuijen, Bishop, & Jong, 2017) stated that in children's development it is preferable to make material and interpersonal investments, this is because parents have a good socioeconomic status (SES) compared to parents who have low SES according to the family investment model as cited by (Conger & Donnellan, 2007).

In addition, the studies of (Bradley & Corwyn, 2002) and (Kieffer, 2010) found that early childhood development of reading was positively associated with socioeconomic status (SES). However, according to (Kieffer, 2012), stated that students who have poor SES in their background make children very difficult and have difficulty reading and also understanding reading. Thus, according to (Bowey, 1995) it was found that the association of socioeconomic status (SES) with reading ability has increased in research.

While for the study (Hart, Soden, Johnson, Schatschneider, & Taylor, 2013) indicated that socioeconomic status (SES) is positively related to reading comprehension in previous studies. In addition, a study conducted by (Rowe & Goldin-Meadow, 2009) found that the association between early vocabulary and socioeconomic status (SES) by children was found to have many research outcomes. Meanwhile, according to (Lepola, Lynch, Kiuru, Laakkonen, & Niemi, 2016) show that the mediating between reading comprehension and socioeconomic status (SES) is children's vocabulary knowledge.

A study by (Hadley, Dickinson, Hirsh-Pasek, Golinkoff, & Nesbitt, 2016) stated in several studies recognizes that vocabulary directly influences reading acquisition. Moreover, vocabulary knowledge in the early stages of knowledge explain that it can be create morphological awareness as cited by (Cheng, Li, & Wu, 2015). In addition, according to (Carlson, Jenkins, Li, & Brownell, 2013) there are studies that have mediated the reading comprehension with code-related skills

such as morphological awareness, phonology and even naming in letters have indirect relation to vocabulary. Meanwhile, according to (McBride, 2016) explain that homophonic character morphemes in children's learning can be helped with homophone awareness.

According to (Lawson & Mohd, 2017) recognizing that family background is a factor that contributes to the academic achievement of students in particular causes and has great responsibility in schools. According to (Ren & Xin, 2013) noted that consistent academic achievement from early childhood to adulthood was positively associated with socioeconomic status (SES). According (Bradley & Corwyn, 2002) identified that there are three dimensions of socioeconomic status (SES) which is the family income, educational level and parent job translated by the Michigan State Department of Education that has been used in several studies until now.

Methodology

Design

This would be a mixed method research, utilizing a quasi experimental design with repeated measures comparing two separate groups (Group A and Group B), and qualitative method to explore how teachers and students feel about the implementation of the BMKT and BIM. Quasi experimental design was chosen because the groups are already set in place, and it would be disruptive to the teachers and students to separate them and having to randomly assign them to different groups.

Subjects

There would be two different subjects for this research. The first group would be deaf students undertaking the Bahasa Melayu classes in the schools, and the second would be the teachers. The sampling method that would be undertaken for this study would be cluster sampling as all the deaf students in the schools would be recruited for the study. There would be a total of 4 schools, with two schools implementing both the BMKT and BIM, whereas the other two schools only implementing the BMKT. The inclusionary criteria for the first group is that the students are deaf, and are in the deaf program, implementing either both the BMKT and BIM or just the BMKT. The second group of subjects are the teachers of the deaf programs. The teachers would be purposefully sampled. The inclusionary criteria for the teachers are that they would have to be teachers of the deaf program, and are actually teaching either both the BMKT and BIM or just the BMKT.

Measures

The independent variables for this study for be the implementation of language (BMKT and BIM or just BMKT), with the dependent variable being the Bahasa Malaysia

examination results. Group A (BMKT and BIM) and Group B (BMKT only) are two separate groups, but every student in both groups would be testing at the same time points. Qualitative analysis would also be taking place, where the dependent variable is the perceptions of teachers towards the implementation of both BIM and BMKT.

Reliability and Validity

To minimize the error variance, as there would be four different schools in the study, with two schools in each group, the groups might not be homogeneous. To have adequate psychometric properties for reliability and validity, a pre-test would be conducted to test the level of students at the beginning of the program. The pre-test would minimize the confound history of the students. A significant of difference test would also be conducted on the pre and post-tests.

Table 1.0 represents the result of the reliability test for each variable tested in this study i.e. Time (Time 1, Time 2 and Time 3) and Group (Group A and Group B). The Cronbach's Alpha for all variables was more than 0.6 which is considered as good according to Nunally (1978). Therefore, all the factors fulfilled the minimum requirement level of reliability.

Table 1.0 Reliability Analysis of all variables

Variables	***Cronbach's Alpha***
Time 1 (Comprehension and Writing) marks	.649
Time 2 (Comprehension and Writing) marks	.810
Time 3 (Comprehension and Writing) marks	.693
Schools (Group A and Group B)	.907

Analysis

Demographic Information

Using the dataset, the researcher assessed the distribution of data across some demographic characteristics of respondents from Group A (uses mainly BMKT) and Group B (uses both BMKT and BIM). Group A refer to schools SPK Seremban and SPK KG. Baharu; Group B refer to schools SPK Miri and SPK Kota Samarahan and Time (Time 1, Time 2 and Time 3). Time refer to comprehension and writing mark of students at different time points. The table shows that the majority of respondent from Group B (58.7 percent) followed by Group A (41.3 percent). In terms of Time 1 (comprehension marks) the below table shows 45.3 percent have marks (21-40), followed 37.3 percent have marks (0-20), 16.0 percent student have marks in range (41-60) and only 1.3 percent student have mark (61-80). Meanwhile, for writing mark, majority students get 86.7 percent in range of (0-20) folowed by 9.3 percent students mark (21-40), 2.7 percent get (41-60) and 1.3 percent (61-80). For Time 2 and Time 3 mostly student get range marks from 0-20 for comprehension and writing.

Table 1.0

Group (Schools)	**Frequencies**	**Percentage (%)**
Group A	31	41.3
Group B	44	58.7

Table 1.1

Time 1	Mark (0-20) frequency	%	Mark (21-40) frequency	%	Mark (41-60) frequency	%	Mark (61-80) frequency	%
Comprehension	*28*	*37.3*	*34*	*45.3*	*12*	*16.0*	*1*	*1.3*
Writing	*65*	*86.7*	*7*	*9.3*	*2*	*2.7*	*1*	*1.3*
Time 2	Mark (0-20) frequency	%	Mark (21-40) frequency	%	Mark (41-60) frequency	%	Mark (61-80) frequency	%
Comprehension	*30*	*40.0*	*28*	*37.3*	*15*	*20.0*	*2*	*2.7*
Writing	*53*	*70.7*	*13*	*17.3*	*6*	*8.0*	*3*	*4.0*

Time 3	Mark (0-20) frequency	%	Mark (21-40) frequency	%	Mark (41-60) frequency	%	Mark (61-80) frequency	%
Comprehension	*38*	*50.7*	*29*	*38.7*	*6*	*8.0*	*2*	*8.0*
Writing	*67*	*89.3*	*2*	*2.7*	*6*	*8.0*	*0*	*0*

Reliability test for the variables in the study

Table 1.2 represents the result of the realibility test for each variable tested in this study i.e. Time (Time 1, Time 2, and Time 3) and Group (Group A and Group B). The Cronbach's Alpha for variables was more than 0.6 which is considered as good according to Nunally (1978). Therefore, the factors fulfilled the minimum requirement level of reliability.

Table 1.2 Reliability analysis of all variables.

Variables	***Cronbach's Alpha***
Time (Time 1, Time 2 and Time 3)	0.699
Group (Group A and Group B)	0.928

Descriptive analysis

Due to the nature of the obtained data and considering the scales used for measuring, the results were analysed in statistical data analysis, mean, standard analysis and-t-tests were used. The research findings were reviewed analysed the data and analytical hypotheses were examined.

Table 1.3 Descriptive Analysis of Time

Time	**Mean**	**Standard Deviation**
Time 1	1.5000	0.5198
Time 2	1.6533	0.7622
Time 3	1.4067	0.5795

Table 1.3 showed the mean and SD of Time 1, Time 2 and Time 3. According to this table, the schools were ranked according to the mostly answered to the least answered. The first Time are

Time 2 (μ=1.6533, SD = 0.7622); Time 2 (μ=1.5000, SD = 0.5198); Time 3 (μ=1.4067, SD = 0.5795). In the descriptive statistics of principal construct, the mean was applied as a measure of central tendency, which indicated that all variables were above their midpoint level (Sekaran, 2003).

RQ 1a: Is there a statistically significant difference in achievement for Group A and Group B?

Table 1.4 T-test for equality of means between two groups of schools

Schools	**Correlation**	**SD**	**T**	**Sig**
GROUP A (Spk Seremban, And Spk Kg Baharu) & GROUP B (Spk Miri, and Spk Kota Samarahan)	0.871	0.19054	3.939	0.000

To investigate difference between Group A (Spk Seremban, and Spk Kg Baharu) and Group B (Spk Miri, and Spk Kota Samarahan), T-test for independent means was performed. Since, the p-value is lower than 0.05, the study manages to reject the null hypothesis. Hence, the above hypothesis is supported. Thus conclude there is significant different between Group A and Group B.

RQ 1b: Is there a significant different in Group A compared to Group B at different time point?

Table 1.6: ANOVA Analysis

Group A	***Sum of square***	***Mean square***	***F***	***Significant***
Time 1 (Comprehension Time 1, Writing Time 1)	5.342	2.671	13.120	0.000
Time 2 (Comprehension Time 2, Writing Time 2)	10.083	5.041	11.031	0.000
Time 3 (Comprehension Time 3, Writing Time 3)	2.670	1.335	4.334	0.000
Group B	***Sum of square***	***Mean square***	***F***	***Significant***
Time 1 (Comprehension Time 1, Writing Time 1)	5.249	2.625	12.810	0.000
Time 2 (Comprehension Time 2, Writing Time 2)	10.847	5.423	12.150	0.000
Time 3 (Comprehension Time 3, Writing Time 3)	2.554	1.277	4.125	0.000

From table 1.6 to investigate difference between Groups A (SPK Seremban and SPK Kg Baharu) compared to Group B (SPK Miri, and SPK Kota Samarahan) at different time point. Since, the P-value is lower than 0.05, the study manages to reject the null hypothesis. Hence, the hypothesis is supported. There is significant different in Group A and Group B of the schools when student are classified according to their three different Time (Comprehension Time 1, Writing Time 1, Comprehension Time 2, Writing Time 2, Comprehension Time 3, Writing Time 3) (Marks).

Parametric Statistical Analysis

Table 1.7 The T-Test for Equality of Means Group A and Group B at Time 1, Time 2 and Time 3.

Time 1 (marks)	**Mean**	**Standard Deviation**	**T**	**Significant**
Group A	1.2933	0.4799	23.337	0.000
Group B	1.2067	0.5458	19.145	0.000
Time 2 (marks)	**Mean**	**Standard Deviation**	**T**	**Significant**
Group A	1.4466	0.6757	18.541	0.000
Group B	1.3600	0.7239	16.270	0.000
Time 3 (marks)	**Mean**	**Standard Deviation**	**T**	**Significant**
Group A	1.2000	0.6524	15.928	0.000
Group B	1.1133	0.7098	13.583	0.000

To analyze difference in level of Time between Group A and Group B of schools. The table 1.6 shows the p-value for Group A and Group B on the level of Time 1, Time 2, and Time 3 is lower than p-value less than 0.05; the study manages to reject the null hypothesis. So, the hypothesis is supported. Thus conclude there are significant difference in level of Time on the schools when students are classified according to their Group A and Group B. Since the number of participants for each group was not similar, a T test for equality of means (Table 1.6) between the groups were analysed. Based on the finding, it was found that Group A did significantly better compared to group B at all the different time points.

RQ2: Is there a positive significant relationship between BMKT and BIM in the academic performance?

Group A compared to Group B at different time point.

Table 1.7 the T-Test for equality of means between Group A and Group B in level of Time.

Group A	**Correlation**	**Significant**
Time 1	0.446	0.000
Time 2	0.463	0.000
Time 3	0.080	0.496
Group B	**Correlation**	**Significant**
Time 1	0.303	0.008
Time 2	0.350	0.002
Time 3	-0.042	0.720

Correlation analysis was conducted to investigate the inter-correlation among variables. Based on Table 1.7, it shows that a significant positive correlation between Group A and Time 1; Group A and Time 2. A significant positive correlation also found between the Group B and Time 1; Group B and Time 2. Researcher found no significant correlation between Group A and Time 3 and also Group B and Time 3. According to Cohen (1988), the correlation value of 0.5 and above is large, 0.30-0.49 is moderate, and 0.10-0.29 is small. The magnitude of the correlation for all the variable measure from (r) = -0.042 to (r) = 0.463.

Overall time 1, time 2 and time 3 at different group

Table 1.8 The T-Test for Equality of Means Group A and Group B at Total Time 1, Time 2 and Time 3.

***Total Time** (marks)*	***Mean***	***Standard Deviation***	***T***	***Significant***
Group A	1.3133	0.4714	24.129	0.000
Group B	1.2267	0.5416	19.616	0.000

To analyze difference in total of time 1, time 2 and time 3 between groups. Based on table 1.8, it shows that all variables are lower than p-value 0.05. The study conclude there are significant

different in total time when students are classified according to their Group A and Group B. Descriptive statistics as stipulated in table 1.8 indicate the higher mean value of 1.3133 for between Group A and total time followed by Group B and total time (μ=1.2267).

Group A compared to Group B at total time.

Table 1.7 the T-Test for equality of means between Group A and Group B in level of Time.

Variables	**Correlation**	**Significant**
Group A & Total time	0.423	0.000
Group B & Total time	0.268	0.020

Table above shows the Pearson Correlation of the variables. The value of correlation between Group A and Total time is 0.423. This indicates that there is moderate positive linear relationship. The value correlation between Group B and Total time is 0.268. So researcher can conclude that there is low positive linear relationship.

RQ3. How do teachers feel about implementing both BMKT and BIM?

Two themes were derived when asking teachers about the implementation of BMKT and BIM into the Bahasa Melayu subject which are *BMKT needs to be given priority* and *students have very poor command of the language*. When interviewing the teachers, there were a mixture of inputs from them. Although teachers do mention that implementing BIM as a supplemental language to help with student's understanding is helpful, BMKT needs to be given priority over BIM as students with a better grasp of BMKT is able to read, write and signal more proficiently. They are also able to perform better academically compared to those not having a good grasp of the BMKT. This is due to the fact that BMKT consists of nouns, and pronouns as well as complete sentence structure compared to the BIM. This is extremely important when it comes to the Bahasa Melayu subject as it's examinees are required to read and write with proper structure. The teachers also stressed that students who learn solely on BMKT usually perform

better compared to students who learn a mixture of BMKT and BIM or just BIM on it's own, which seems to be in line with the findings in RQ1 and RQ2.

The teachers also mentioned that students have a very poor command of the language, where they are unable to understand what the teachers are signing. The teachers even had to act out somethings in order for students to understand what they are trying to say. By having schools not implementing proper language into the curriculum would have a detrimental effect to the students later on, as they will not stay in one place forever. The teachers feel that in order to have a better command of the language, more learning platforms should be provided, and that students should learn the formal language more compared to the supplemental language.

RQ4. How do students feel about the implementation of both BMKT and BIM?

Students are more used to BIM and cannot relate to BMKT as well. This is because BIM is used daily, and is a shorter way of communicating. Although, students from East Malaysia (Sabah and Sarawak) are more comfortable with BMKT and is able to converse well in BMKT compared to BIM.

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Appendix

GROUP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	31	41.3	41.3	41.3
	B	44	58.7	58.7	100.0
	Total	75	100.0	100.0	

COMPREHENTION 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	28	37.3	37.3	37.3
	21-40	34	45.3	45.3	82.7
	41-60	12	16.0	16.0	98.7
	61-80	1	1.3	1.3	100.0
	Total	75	100.0	100.0	

WRITING 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	65	86.7	86.7	86.7
	21-40	7	9.3	9.3	96.0
	41-60	2	2.7	2.7	98.7
	61-80	1	1.3	1.3	100.0
	Total	75	100.0	100.0	

COMPREHENSION TIME 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	30	40.0	40.0	40.0
	21-40	28	37.3	37.3	77.3
	41-60	15	20.0	20.0	97.3
	61-80	2	2.7	2.7	100.0
	Total	75	100.0	100.0	

WRITING 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	53	70.7	70.7	70.7
	21-40	13	17.3	17.3	88.0
	41-60	6	8.0	8.0	96.0
	61-80	3	4.0	4.0	100.0
	Total	75	100.0	100.0	

COMPREHENSION TIME 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	38	50.7	50.7	50.7
	21-40	29	38.7	38.7	89.3
	41-60	6	8.0	8.0	97.3
	61-80	2	2.7	2.7	100.0
	Total	75	100.0	100.0	

WRITING TIME 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	67	89.3	89.3	89.3
	21-40	2	2.7	2.7	92.0
	41-60	6	8.0	8.0	100.0
	Total	75	100.0	100.0	

Case Processing Summary

		N	%
Cases	Valid	75	100.0
	Excluded[a]	0	.0
	Total	75	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.699	3

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TIME1	75	1.00	3.50	1.5000	.51988
TIME2	75	1.00	4.00	1.6533	.76217
TIME3	75	1.00	3.50	1.4067	.57945
Valid N (listwise)	75				

Case Processing Summary

		N	%
Cases	Valid	75	100.0
	Excluded[a]	0	.0
	Total	75	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.928	2

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GROUP_A	.2067	75	.34965	.04037
	GROUP_B	.2933	75	.38637	.04461

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	GROUP_A & GROUP_B	75	.871	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	GROUP_A - GROUP_B	-.08667	.19054	.02200	-.13051	-.04283	-3.939	74	.000

Oneway

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TIME1	Between Groups	5.342	2	2.671	13.120	.000
	Within Groups	14.658	72	.204		
	Total	20.000	74			
TIME2	Between Groups	10.083	2	5.041	11.031	.000
	Within Groups	32.904	72	.457		
	Total	42.987	74			
TIME3	Between Groups	2.670	2	1.335	4.334	.017
	Within Groups	22.177	72	.308		
	Total	24.847	74			

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TIME1	Between Groups	5.249	2	2.625	12.810	.000
	Within Groups	14.751	72	.205		
	Total	20.000	74			
TIME2	Between Groups	10.847	2	5.423	12.150	.000
	Within Groups	32.140	72	.446		
	Total	42.987	74			
TIME3	Between Groups	2.554	2	1.277	4.125	.020
	Within Groups	22.292	72	.310		
	Total	24.847	74			

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME1	1.5000	75	.51988	.06003
	GROUP_A	.2067	75	.34965	.04037

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME1 & GROUP_A	75	.446	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME1 - GROUP_A	1.29333	.47996	.05542	1.18290	1.40376	23.337	74	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME2	1.6533	75	.76217	.08801
	GROUP_A	.2067	75	.34965	.04037

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME2 & GROUP_A	75	.463	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME2 - GROUP_A	1.44667	.67570	.07802	1.29120	1.60213	18.541	74	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME3	1.4067	75	.57945	.06691
	GROUP_A	.2067	75	.34965	.04037

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME3 & GROUP_A	75	.080	.496

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME3 - GROUP_A	1.20000	.65244	.07534	1.04989	1.35011	15.928	74	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME1	1.5000	75	.51988	.06003
	GROUP_B	.2933	75	.38637	.04461

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME1 & GROUP_B	75	.303	.008

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME1 - GROUP_B	1.20667	.54583	.06303	1.08108	1.33225	19.145	74	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME2	1.6533	75	.76217	.08801
	GROUP_B	.2933	75	.38637	.04461

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME2 & GROUP_B	75	.350	.002

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME2 - GROUP_B	1.36000	.72392	.08359	1.19344	1.52656	16.270	74	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME3	1.4067	75	.57945	.06691
	GROUP_B	.2933	75	.38637	.04461

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME3 & GROUP_B	75	-.042	.720

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME3 - GROUP_B	1.11333	.70984	.08197	.95001	1.27665	13.583	74	.000

Correlations

		GROUP_A	GROUP_B	TIME1	TIME2	TIME3
GROUP_A	Pearson Correlation	1	.871**	.446**	.463**	.080
	Sig. (2-tailed)		.000	.000	.000	.496
	N	75	75	75	75	75
GROUP_B	Pearson Correlation	.871**	1	.303**	.350**	-.042
	Sig. (2-tailed)	.000		.008	.002	.720
	N	75	75	75	75	75
TIME1	Pearson Correlation	.446**	.303**	1	.469**	.168
	Sig. (2-tailed)	.000	.008		.000	.149
	N	75	75	75	75	75
TIME2	Pearson Correlation	.463**	.350**	.469**	1	.637**
	Sig. (2-tailed)	.000	.002	.000		.000
	N	75	75	75	75	75
TIME3	Pearson Correlation	.080	-.042	.168	.637**	1
	Sig. (2-tailed)	.496	.720	.149	.000	
	N	75	75	75	75	75

**. Correlation is significant at the 0.01 level (2-tailed).

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TIME_OVERALL	1.5200	75	.49696	.05738
	GROUP_A	.2067	75	.34965	.04037
Pair 2	TIME_OVERALL	1.5200	75	.49696	.05738
	GROUP_B	.2933	75	.38637	.04461

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	TIME_OVERALL & GROUP_A	75	.423	.000
Pair 2	TIME_OVERALL & GROUP_B	75	.268	.020

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TIME_OVERALL - GROUP_A	1.31333	.47137	.05443	1.20488	1.42179	24.129	74	.000
Pair 2	TIME_OVERALL - GROUP_B	1.22667	.54155	.06253	1.10207	1.35127	19.616	74	.000