



**PROPOSED DEVICE FOR IMPROVING MEANINGFUL VERBAL  
COMMUNICATION FOR CHILDREN WITH AUTISM**

By

**HOSSEINIOUN ASIEHSADAT**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirements for the Degree of Master of Science**

**February 2022**

**FRSB 2022 23**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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**HOSSEINIOUN ASIEHSADAT**

**February 2022**

**Chairman : Associate Professor Mohd Shahrizal bin Dolah, PhD**  
**Faculty : Design and Architecture**

Education is one of the essential tools for all aspect of life. Every day, everybody uses their experience mixed with knowledge which comes from education and learning to leave better and have a wonderful life. How to speak, how to take someone attention, how show our work and etc are the first, small and easy communication method that everybody uses for daily life but imagine someone without any of this knowledge. It means that if someone does not know or doesn't learn how to start a small conversation and take the attention, probably will face some difficulty in life. Kids with autism can be one of these group people. The purpose of this study is to analyses the knowledge and implementation of a suitable approach for children with autism to improve their language delay and speech problem, which is related to communication and behaviour patterns. The aim of this study is to improve kids with autism who has speech difficulty by proposing the idea of a new device to increase their communication, social skills and behaviour pattern. The main function of improving communication and social skills is to enhance the ability or the skill of speaking includes language. The study identified a current method to practice speaking with kids to improve the ability to talk, and besides that, to increase the patterns of behaviour. The method used in this research is observation, interview and case study. The idea of this device is built for Kids with mild autism who might be non-verbal (speechless) because of a lack of communication or impairment in social skills. The researcher collected the data while she was working with special kids as an assistant teacher by using case study and observation methods to find the gaps in their speaking, communication, and behaviour patterns. This achievement can help by understanding better in theory of mind. Theory of mind shows that how a mind can control in specific subject and part. The result is the impaired a kid with mild autism's ability to communicate and social skills. Thus, it shows the advantage of talking to others and increases the ability of communication by user experience. The researcher hopes that the findings will propose the factor which helps to the stakeholder and establishing directions for supporting kids with autism spectrum disorder (ASD) in the future.

Keywords: Autism, communication, and social skills, behaviour patterns, the theory of mind, device.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

## **CADANGAN PERANTI UNTUK MENINGKATKAN KOMUNIKASI LISAN YANG BERMAKNA UNTUK KANAK-KANAK AUTISME**

Oleh

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Pendidikan adalah salah satu alat penting untuk semua aspek kehidupan. Setiap hari, setiap orang menggunakan pengalaman mereka yang dicampur dengan pengetahuan yang berasal dari pendidikan dan belajar untuk meninggalkan yang lebih baik dan menjalani kehidupan yang indah. Cara bercakap, cara menarik perhatian seseorang, cara menunjukkan karya kita dan lain-lain adalah kaedah komunikasi pertama, kecil dan mudah yang digunakan setiap orang untuk kehidupan seharian tetapi bayangkan seseorang tanpa pengetahuan ini. Ini bermaksud bahawa jika seseorang tidak tahu atau tidak belajar bagaimana memulakan percakapan kecil dan mengambil perhatian, mungkin akan menghadapi beberapa kesukaran dalam hidup. Kanak-kanak dengan autisme boleh menjadi salah satu kumpulan orang ini. Tujuan kajian ini adalah untuk menganalisis pengetahuan dan pelaksanaan pendekatan yang sesuai untuk kanak-kanak dengan autisme untuk memperbaiki masalah kelewatan dan pertuturan bahasa mereka, yang berkaitan dengan komunikasi dan corak tingkah laku. Tujuan kajian ini adalah untuk meningkatkan kanak-kanak autisme yang menghadapi masalah pertuturan dengan mencadangkan idea alat baru untuk meningkatkan komunikasi, kemahiran sosial dan corak tingkah laku mereka. Fungsi utama meningkatkan kemahiran komunikasi dan sosial adalah untuk meningkatkan kemampuan atau kemahiran bertutur merangkumi bahasa. Kajian itu mengenal pasti kaedah semasa untuk berlatih bercakap dengan anak-anak untuk meningkatkan kemampuan bercakap, dan selain itu, untuk meningkatkan corak tingkah laku. Kaedah yang digunakan dalam penyelidikan ini adalah pemerhatian, temu bual dan kajian kes. Idea peranti ini dibina untuk Kanak-kanak dengan autisme ringan yang mungkin tidak lisan (tidak bersuara) kerana kekurangan komunikasi atau gangguan dalam kemahiran sosial. Penyelidik mengumpulkan data semasa dia bekerja dengan anak-anak istimewa sebagai guru penolong dengan menggunakan kaedah kajian kes dan pemerhatian untuk mencari jurang dalam corak pertuturan, komunikasi, dan tingkah laku mereka. Pencapaian ini dapat membantu dengan memahami dengan lebih baik teori minda. Teori fikiran menunjukkan bahawa bagaimana minda dapat mengawal dalam subjek dan bahagian tertentu. Hasilnya adalah kanak-kanak cacat dengan kemampuan autisme ringan untuk berkomunikasi dan kemahiran sosial. Oleh itu, ini menunjukkan kelebihan bercakap dengan orang lain dan meningkatkan keupayaan untuk

berkomunikasi dengan pengalaman pengguna. Penyelidik berharap penemuan ini dapat mencadangkan faktor yang membantu pihak berkepentingan dan menentukan arah untuk menyokong kanak-kanak dengan gangguan spektrum autisme (ASD) di masa depan.

Kata kunci: Autisme, komunikasi, dan kemahiran sosial, corak tingkah laku, teori minda, peranti.



## ACKNOWLEDGEMENTS

This success of being able to complete this project within the long duration is due to the contribution and advice of innumerable people that had always assisted me. Therefore, I believed that without their help and support, this investigation report of this multimedia design would never be possible to complete in time.

First, I would like to state my excellent appreciation to my advisor Dr. Mohd Shahrizal Dolah, for his supervision and guidance during my master's journey. Dr. Mohd Shahrizal Dolah has always been helpful and supportive and advises me with his helpful comments. Also, I would like to thank Dr. Saiful Hasley Ramly, PM. Dr. Raja Ahmad Azmeer Raja Ahmad Effendi, and PM. Dr. Jusang Bolong for their willingness to be the committee members, further their support and helpful suggestion in all stages of my thesis process. I am very grateful to my colleague at Einstein Education House for their helpful comments and contribution during the writing process. Last but not least, I wish to express my sincere gratitude to all those who have not mentioned here that have helped me to ensure the completion of my study.



This thesis was submitted to Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of Supervisory Committee were as follow:

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# CHAPTER 1

## INTRODUCTION

### 1.1 Research Background

Autism is a life-long developmental disability. Recent trends in autism shows that children with autism spectrum showing setbacks in the development of this capability , with a knock at the implications for cognitive empathy throughout the lifespan (Ellawadi & Weismer, 2015; Robertson & Baron-Cohen, 2017). Autistics people show up differences in their social communication, social interactions, sensory sensitivities, with limited and repetitive concerns and behaviours (Levin & Rosenquest, 2001; Liu et al., 2017; Milteer et al., 2012).

Comprehensive or understandable communication assessment and intervention as a useful educational program can be helpful not only for children with autism but to other developmental disorders and who has lack of speaking and social interaction. This issue can be the lack of speaking with (Bottema-Beutel et al., 2021c; Milteer et al., 2012) . It seems like they understand what the structures are, but they usually forget the steps, and as a result, they cannot finish the task. Typically involves assessment by a speech and language pathologist as well as informal observation and classroom-based evaluation (Bottema-Beutel et al., 2021b).

The assessment system as a basic method to identify and evaluate the strategies to help and development of children with autism in language skills and other social interaction such as strategies to facilitating of language development (K Dickinson, 2014; Wiggins et al., 2020). Education programs also should concentrate on the attention, repeated and, understanding that how language can be useful in playing and social interactions (Fox et al., 2021; Wilson et al., 2014).

Communication skill must focus on practical usage of the language in the social interaction and in the different environments. Teaching kids with autism is not simple. Usually, they have other disabilities or difficulties besides that. Even if they are only kids with autism, it is still not easy to work with them (Golan et al., 2015; Hadwin et al., 1997; Thompson et al., 2017). They usually refuse to follow the methods or structure of tasks, or it is better to say because they have an issue to understand and memorize how to follow the job; they refuse to implement them. How a kid can follow something to do when she/he cannot talk and ask a question about it and how to solve the issues. (Fombonne, 2018; Wing, 1993).



Autism Spectrum Disorder or ASD is explaining to important and essential standard and criteria. The first one is deficit in social communication and interaction in a way that led the person to isolate from the different areas, and the second one is repeated some patterns of behaviour and activities such as repeating the same sentences over and over or moving hands in the same patterns and figures. To identify someone as ASD, these two criteria must be present in him (Ellawadi & Weismer, 2015; Wing, 1993).

Deficits or insufficient non-verbal social behaviours, as well as lack of eye contact or eye gaze at the other objects during the conversations which shows lack of attention, are the first noticeable disorders particularly in ASD (Baron-Cohen, 1992; Bottema-Beutel et al., 2021a; Brodhead et al., 2018). Thus, in the different social functions eye contact may serve and evolving this necessary behaviour may have significant implications for children with autism.

The best option or equipment can use for kids with autism, or any language and speech delay is Speech Generating Devices (*Voice Output Communication Aids (VOCA) / Speech Generating Device (SGD)* – *Mada Accessibility & AT Glossary*, n.d.; Wiles Higdon & Hill, 2015). Speech Generating Devices or SGD are portable electronic devices used to teach learners communication skills and provide a means of communication. SGDs can produce either synthetic or digital speech for the user. SGDs may be used with graphic symbols as well as with alphabet keys (L. M. S. R. M. O. G. L. T. D. DM Kagohara, 2013; Kander, 2013; Strasberger & Ferreri, 2013). SGDs can be used effectively from early childhood through high school with children and adolescents with autism spectrum disorders who have limited or no verbal speech. SGDs are portable devices that allow a parent, teachers, or caregiver to program custom vocabularies for the child with an autism spectrum disorder (De Giacomo et al., 2016; Harris, 2015a; Meer & Rispoli, 2010). There are different types of available devices to choose from, but the devices must fit the child's age and communication level. After the child had taught to touch one of the pictures, the synthetic devices voice says the name or phrase that expresses what the child wants to say. The goal areas are demonstrating positive outcomes in communication and social (L. M. D. A. V. G. M. O. A. M. DM Kagohara, 2010; N Trottier, 2011) The picture below shows a different kind of speech generation devices which help kids with the disability of talking to connection with others (N Trottier, 2011).



**Figure 1.1 : (Voice Output Communication Aids (VOCA) / Speech Generating Device (SGD) – Mada Accessibility & AT Glossary, n.d.)**

As was before, ASD has been defining by two critical criteria, persistent social communication and interaction deficit in multiple contexts and restricted, repetitive patterns of behaviour, interests, or activities. These criteria can be mild, moderate, or severe (Kamaralzaman et al., 2018; Parisi et al., n.d.).

Working with kids with autism help the researcher to find out some gaps and lack of devices for some situations. For example, all the devices which provide for kids who cannot talk or cannot communicate is a touch screen. Imagine the three years old kids who cannot speak, how this kid can understand the symbols on the device, and how this kid can learn communication through these kinds of equipment (MO Mazurek, 2013). The problem is early years old kids need a device that is suitable for their age as teenagers have a different need (Jasmin et al., 2009; M Freeth, 2010).

Eye contact occurs very early in development and serves many functions for the young child. It has been implicating in the development of social, cognitive, and language skills. A substantial number of children with autism fail to develop this critical skill and therefore, experimenters with both developmental and behaviour analytic perspectives have researched methods to teach eye contact (Arnold et al., n.d.; V. J. Carbone et al., 2013).

However, only a few researchers have recently attempted to condition the response of the communication partner as a reinforcer for social behaviour and thereby arrange the conditions under which typical children develop social responses (P. S. Carbone et al., 2012; H Akechi, 2011).

## 1.2 Research Problem

Speaking ability is a power that help the person to talk, to express the thoughts and emotions by words, sounds and body gesture (body language) (Liu et al., 2017; Yogman et al., 2018). Speak ability doesn't mean how to speak English or other languages, it means in the way to be understood by the audience. Autistic children have a mix of context-related strengths and weaknesses in language, communication, and social interaction. Some children with autism do not speak at all, or do not use speech to communicate (Healey et al., 2019; Loucas et al., 2008; Thompson et al., 2017).

Autistic children who use speech may experience intermittent, unreliable, and/or insufficient speech. A person with intermittent speech can speak sometimes, but not always, and a person with unreliable speech may say things that do not match their preferences or intended meaning (E Anagnostou, 2014; Milteer et al., 2012). Hence, communication in the level that it is comfortable for the audience to listen and understand the meaning of conversation, but not using the meaningless words and phrases during social connection with audience which is very often in children with autism (Hassani et al., 2020; Salter et al., 2014).

Speaking too quickly, short, and not complete words or phrases or sentences, which sometime is a lack of speaking ability, won't give time to listener to understand what they need and help them. Also, speaking too slow and with delay between the words and sentences which usually is the problem of children with autism take too much time and listener may lost interest to continue listening (Canault et al., 2015; Morreale et al., 2019).

Communication needs to participate in the act of connection, pay attention, and also show to the speaker by mirroring, rephrasing, taking turn, answering the questions and sometimes finishing the sentence (Bishop et al., 2016). Lack of looking at the audience and speaker into eye and appropriate and importance in the length of time make an issue for the connection and communication with others (V. J. Carbone et al., 2013).

Plays, toys, and games have an essential value and place in every child's life, and play is an important job for all children (Cló & Dounavi, 2020; Johnson et al., 2007). Children with autism can understand the real world better by playing. They can try different social and communication roles during playing the games . They can learn how to have eye contact while they have a conversation with others, how to take a turn, and how to contribute in different communications (Ellawadi & Weismer, 2015; Önder, 2018).

Suitable and significant games can help parents or caregivers to give them ideas to engage with children, evaluate social interaction, and challenge the critical development of brain at the early age. Lack of appropriate games can cause difficulty in this evaluation especially for children with autism who need more these types of activities (Healey et al., 2019; Liu et al., 2017).

Here researcher address the problem of effectively designing and building a device fit for this purpose. The device that researcher has been suggested uses a simple method that teach autism kids who are unable to speak smoothly and frequently. In general, playing with different games and toys is powerful, simple, safe, and provides a wide range of pictures, sound and touch interaction capabilities to encourage the child to learn and play (Christakis et al., 2007; Wiles Higdon & Hill, 2015).

### **1.3 Research Question**

This research focuses on investigating the issue of autism children that have a need to improve their communication and social skills and finding a suitable device to help them accomplish this. This study is going to answer to the following questions:

- i. What are lack of speaking abilities among children with Autism?
- ii. What are factors to improve communication and social skills in children with Autism?
- iii. How to propose a suitable device in terms of language ability?

### **1.4 Research Objective**

- i. To understand the lack of speaking ability in kids with Autism.
- ii. To identify communication and social skills in kids with Autism.
- iii. To propose a suitable device to help kids with Autism in terms of language ability.

### **1.5 Scope of research**

Although Autism Spectrum, Disorder has very large area and rarely happened, people can compare one autism kids to other kids in this spectrum, however, this study is cover only small part of this spectrum and focus on kids who has lack of speaking not kids with language barrier and disability. This research also can help other type of kids who has delay in speaking and they are not in this spectrum. Besides that, this research explains about the signs of autism and symptoms that children with autism have and how they effect on communication and social skills and how lack of social interaction can make problem in life these children. There is lots of games and toys that can played by all children but most of them are not suitable equipment for children with autism. This research focusses on how an electronic device separate of smart devices that can help to improve the disabilities and difficulties of children with autism and lack of this gadget can have negative effects on their life.

## **1.6 Significance of study**

### **1.6.1 Contribution to the current body of knowledge**

The result of the study will be useful for the organizations such as Ministry of Education (MOE), and The National Autism Society of Malaysia (NASOM). They will use the results of the present study for their further policy and decision making in education issues.

### **1.6.2 Contribution to the policy**

The results of this study have been positively added to the literature and attempts were made to fill the research gap generally and particularly in Malaysia as a foundation for the research community to proceed with further research on verbal ability and communication skill of Autism children by proposing a suitable device.

### **1.6.3 Contribution to practice**

The findings of the research will be useful for the teachers, parents, care givers. They will be able to use these results for a better understanding of autism kids, predict their future behaviours and provide them better education facility.

The outcomes of this study have been positively added to the literature and attempts were made to fill the research gap generally and particularly in Malaysia.

## **1.7 Thesis structure**

This thesis contains five stages as objectives. It provides the reader with a view of what this thesis is and how it can help different kinds of kids who have difficulty in speaking.

Chapter 1 has information based on the problem statement, objectives and questioning of the problem.

Chapter two presents an overview of the documented literature and related knowledge. It helps the reader to find sources of this study as well as, how to use these sources to build a new device.

In the following chapter, chapter three describes the research method and sampling strategy. In this chapter, the researcher explains the technique used to find out how to develop the idea of research, which leads to a new device for the early years.

Chapter four shows the analysis output and the obtained data explanations. All information and knowledge learned in chapter two and then estimated in chapter three will analyse in chapter four.

Chapter five discusses the implications of the study. In this chapter, the researcher discusses what kind of devices can be useful for this kind of kids and what kind of elements they must follow. Conclusion, recommendations, and direction for future studies which study covered framework, that means only the idea of the device.

1.8 Research framework

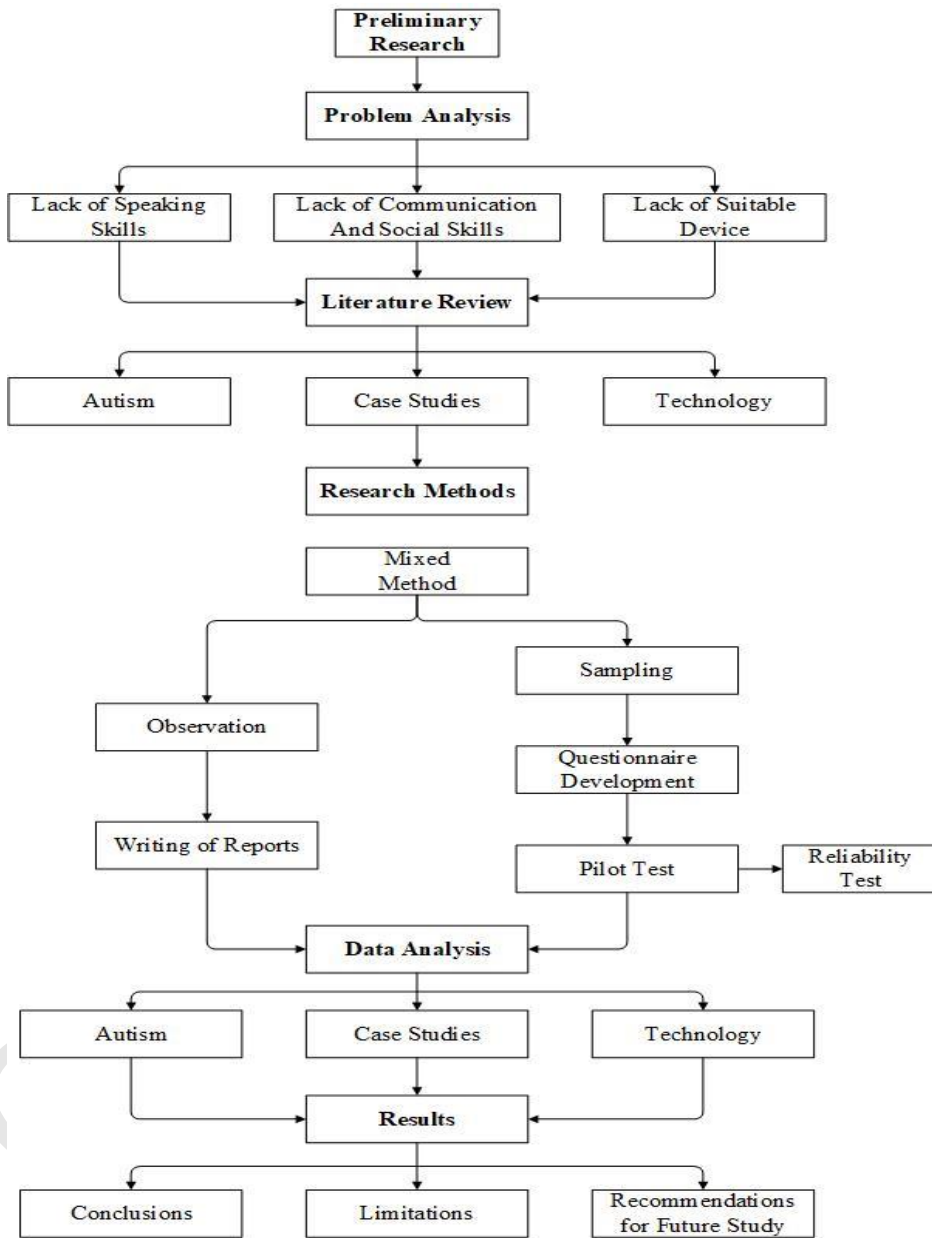


Figure 1.2 : Framework Chart

## 1.9 Conclusion

As a conclusion of chapter one, researcher must answer to the research questions and find the solutions for research problems and because of them this study must support the research objectives. The reason why this study is important is that this is technology century, and everybody is using smart gadget in the daily life. All communication changes via online; online self-education (YouTube), online meeting (zoom or other applications), online exams (google form), online news or information (Facebook or Twitter), online letter (Email or text), and so on. As a result of that communication and social skills have weakened during this time. The children with special need disorder like Autism or other people with communication disorders have developed different and hard situation and this process has not only helped to improve them but has also led to a harder environment. Nowadays kids having difficulty to find friends because they don't know how to start the conversation, how to continue it, how to end it, even they don't know how to ask their needs for help. The research objective of this study will help them to increase the lack of this ability.



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