

Video Modeling Assistance for Autism (VIMAS)

by

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the requirements for the
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CERTIFICATION OF APPROVAL

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Business Information System Programme
Universiti Teknologi PETRONAS
in partial fulfilment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(BUSINESS INFORMATION SYSTEM)

Approved by,

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UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
September 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

NURUL ATIQAH BINTI AMRAN

ABSTRACT

This project is purposely to develop a mobile application prototype on Video Modeling Assistance for Autism (VIMAS) and to evaluate the usability of the prototype. Until today, there is no specific video modeling tools and application to help them to properly act at various categories of locations in the community. Hence, the mobile application on Android for VIMAS will provide an application for autism children aged between 7 until 18 in order for them to live a normal life like other typical children. VIMAS will provide a great Video Modeling (VM) tool that can show and highlight to the autism children on “what to do?” in certain categories of locations. At the moment, there will be only 4 categories of locations; Dentist, Playground, Hairdresser & School. VIMAS will also be integrated with GPS function so that wherever they go, they will know how to adapt with the current location situation. A normal child aged between 7 until 18 will be used as the role player or model in the video. Each location will contain a video of the normal child modeling an appropriate sequence of actions, so that the autism children can imitate the sequence of actions that have been modeled by the normal child in the video. In order to develop the prototype, ADDIE model has been adopted as the generic process flow for the whole project. In summary, we can say that VIMAS is reliable for autism children and with that, it can be used by the autism children for their future betterment in social and communication skills.

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Table of Contents

CERTIFICATION	i
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
LIST OF FIGURES AND TABLES.....	viii
CHAPTER 1 : INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives.....	3
1.4 Scope of Study and Limitations of Project	3
1.5 Benefits of the Project.....	3
1.6 Feasibility of the Project within the Scope and Time Frame	4
CHAPTER 2 : LITERATURE REVIEW	5
2.1 Benefits of Mobile Application on Android to Autistic Children	5
2.2 Autism Spectrum Disorders (ASD) and the Interventions.....	7
2.3 Video Modeling Treatment Approach	8
2.4 Imitation Ability among Autistic Children	10
2.5 Theories of Autism Spectrum Disorders (ASD)	11
2.5.1 Social Cognitive Theory of Bandura	11
2.5.2 Reinforcement Theory of Miller and Dollard.....	11
CHAPTER 3 : METHODOLOGY	13
3.1 ADDIE Model.....	13
3.1.1 Analyze	14
3.1.1.1 Data and Requirement Collection.....	14
3.1.1.2 Data and Requirement Analysis.....	15
3.1.2 Design	15
3.1.3 Develop	17

3.1.4 Implement	17
3.1.5 Evaluate.....	17
3.2 Tools and Software Involved	18
3.2.1 App Inventor	18
3.2.2 Sun Java SE Development Kit (JDK)	19
3.2.3 Android Software Development Kit (SDK).....	19
3.2.4 Android Devices 2.3 or above.....	19
3.3 Project Activities.....	19
3.4 Key Milestones	19
3.5 Gantt Chart	21
CHAPTER 4 : RESULTS AND DISCUSSIONS.....	23
4.1 Analyze – Result	23
4.1.1 Results of the Interview	23
4.2 Design – Result	30
4.2.1 System Architecture	30
4.2.2 System Design.....	31
4.2.2.1 Activity Diagram.....	31
4.2.2.2 Use Case Diagram.....	33
4.2.2.3 Prototype Interfaces Design	34
4.3 Develop – Result	36
4.3.1 Source Code	36
4.4 Implement – Result	37
4.4.1 Functionality Testing	37
4.5 Evaluate – Result.....	41
4.5.1 Usability Testing	41

CHAPTER 5 : CONCLUSION AND RECOMMENDATIONS	52
5.1 Conclusion	52
5.2 Suggested Recommendations for Further Improvements	53
REFERENCES.....	54
APPENDICES	I
Appendix A: Source Code	I
Appendix B: Official Letter	VIII
Appendix C: Interview Consent Form	IX
Appendix D: Interview Plan	X
Appendix E: Interview Transcript	XIII
Appendix F: Usability Testing Schedule & Details	LV
Appendix G: Usability Testing Consent Form.....	LVI
Appendix H: Usability Testing Post-Test Questionnaire.....	LVII
Appendix I: Technical Report.....	LVIII

List of Figures

Figure 1 Process Flow of Project Background.....	2
Figure 2 Expected Deliverables for Each Stage.....	4
Figure 3 Smart phone Sales during Q4 2011 (based on Operating Systems)	7
Figure 4 ADDIE Model	14
Figure 5 Key Milestones of the Project (FYP 1).....	20
Figure 6 Key Milestones of the Project (FYP 2).....	20
Figure 7 VIMAS System Architecture.....	31
Figure 8 Activity Diagram	32
Figure 9 Use Case Diagram	33

List of Tables

Table 1 Status of Treatment Approaches to Teaching Social Skills	10
Table 2 Common Behaviors of Autism Children in the School	23
Table 3 Ways to Attract Autism Children to Behave Properly.....	24
Table 4 The Most Worrisome Behavior among the Autism Children in the School	25
Table 5 Progress in Change of Behavior among the Autism Children	25
Table 6 The Best Approach to Teach Autism Children	26
Table 7 Ability to be Independent in Life.....	26
Table 8 Level of Acceptance among the Community.....	27
Table 9 Imitation Ability among Autism Children	28
Table 10 The Most Appropriate Model for Autism Children to Imitate.....	28
Table 11 Video Modeling Tools as a Treatment Approach.....	29
Table 12 Prototype Interfaces Design	34
Table 13 Front page-Functionality Testing and Results	37
Table 14 "Login as Administrator" page-Functionality Testing and Results	37
Table 15 "AddDelete" page-Functionality Testing and Results	38
Table 16 "Add New Location" page-Functionality Testing and Results	38
Table 17 "Delete Existing Location" page-Functionality Testing and Results.....	39
Table 18 "Categories of Location" page-Functionality Testing and Results.....	39
Table 19 "List of Locations Nearby" page-Functionality Testing and Results.....	40
Table 20 "Video Modeling" page-Functionality Testing and Results	40
Table 21 "Video Modeling-More Location" page-Functionality Testing and Results	41
Table 22 Usability Testing Test Script and Results (Autism Children).....	42
Table 23 Usability Testing Test Script and Results (Teacher)	46
Table 24 Summary of the Actual Usability Testing Results (Autism Children)	48
Table 25 Summary of the Actual Usability Testing (Teacher)	49
Table 26 Summary of post-test questionnaire results	50

CHAPTER 1

INTRODUCTION

1.0 Introduction

1.1 Background of Study

Mobile application is now become a popular trend worldwide. Whoever has smart phone, for sure they will have lots of application in their phone. The ease of use of mobile application is also one of the reasons why people chose mobile applications to assist in their daily life activities. They are simple, handy and easy to use. Android operating system has the biggest market share in smart phone sales. Android OS also have the most compatibility with almost all smart phones brand. That is why Android OS become developer's choice in order to develop a mobile application.

By using Android mobile application, many people can benefit from this for example autism children. Autism is a developmental disorder that appears in the first three years of life, and affects the brains normal development of social and communication skills. Autism is a spectrum disorder, which the symptoms and characteristics of an autism can be presented in a wide variety of combinations, from mild to severe. People with autism process and respond to information in unique ways, not like the other typical normal person.

This project is carried out to develop a prototype; an Android mobile application on Video Modeling Assistance for Autism (VIMAS), which provide Video Modeling (VM) in which the autism child will act as the appropriate model in the video. This prototype will also integrate with GPS function so that autism children can use it anywhere, anytime.

With this mobile application around, it will give a normal life to the autism children while they can learn on how to perform appropriate sequence of actions at various categories of locations in the community. They can also learn on how to be independent without the supervision of adults to carry out daily routines in their life.

Finally, from the perspective of normal person, VIMAS could greatly assist autism children to live a normal life, like us and in fact VIMAS will also make their life more meaningful.

Figure 1 shows the process on how I come out with this project:

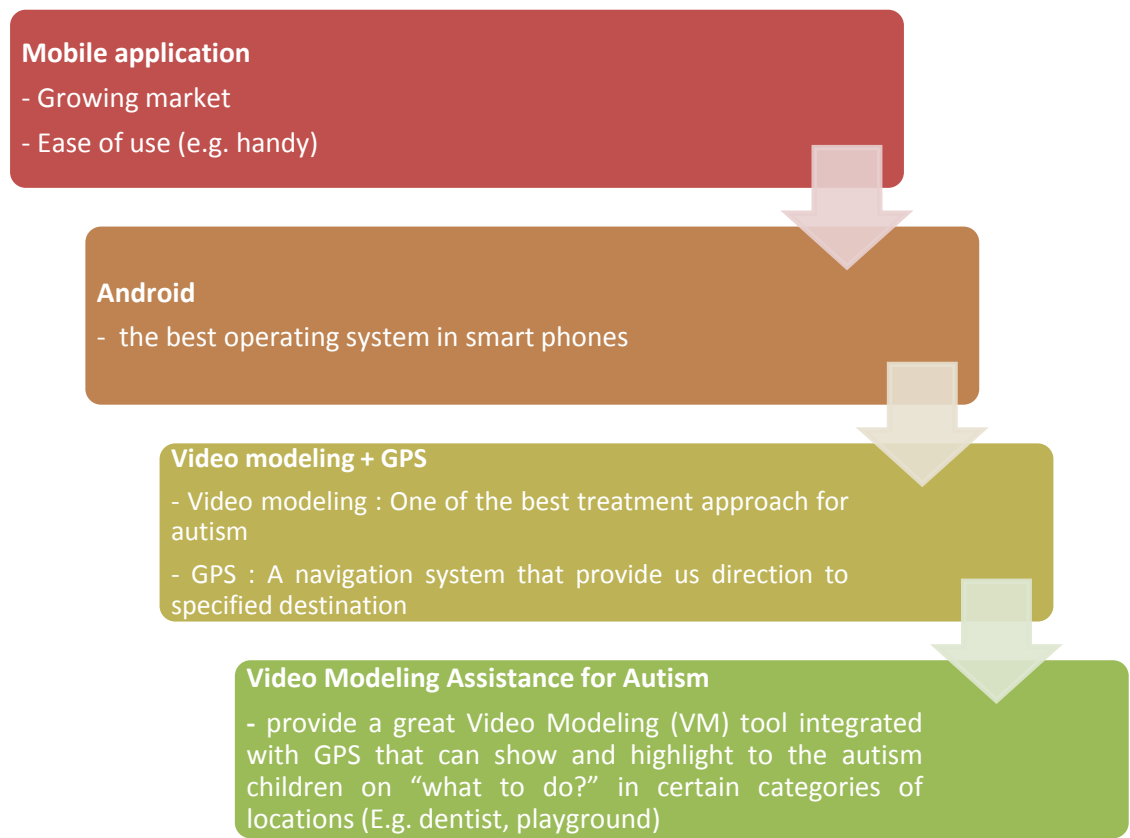


Figure 1 Process Flow of Project Background

1.2 Problem Statement

Children with autism have difficulties in understanding and processing what others say. The main goals when treating children with autism are to lessen associated deficits and family distress, and to increase quality of life and functional independence. Intensive, sustained special education programs and behavior therapy early in life can help autism children acquire self-care, social, communication and job skills. Video Modeling (VM) is one type of the effective treatment programs in which can help to increase social awareness and social skills among autism children. Until today, there is

no specific video modeling tools and application to help them to properly act at various categories of locations in the community. Hence, there should be a tool or application to help them to live a normal life like others anywhere, anytime based on their ability.

1.3 Objectives

- To carry out a research on the suitable techniques to produce a great Video Modeling (VM) tool for helping autism children learn on how to perform appropriate sequence of actions at various categories of locations in the community.
- To develop a mobile application prototype on Video Modeling Assistance for Autism (VIMAS), which focus on the autism children aged between 7 until 18.
- To evaluate the usability of the prototype.

1.4 Scope of Study and Limitations of Project

The scope of study of this project is to produce a prototype of mobile application for autism children in order to increase their social awareness, communication and social skills through Video Modeling (VM) treatment, as one of the effective intervention programs for autism.

The limitation of this project is that it will only focus on autism children user aged between 7 until 18. This project is limited to these range of ages due to the time constraint given to develop this project and the wide variety of autism children's behavior according to their ages. Besides, autism children likely to imitate their peer's action, hence on this project, a normal child aged between 7 until 18 will be used as the role player or model in the video. At the moment, there will be only 4 categories of locations; Dentist, Playground, Hairdresser & School. Due to the time constraint too, the prototype will be developed only for Android mobile application, as Android Operating System (OS) is the market leader among all smart phones operating system. Further benefits of Android will be discussed in literature review chapter.

1.5 Benefits of the Project

As mention in the problem statement, the prototype of this project will benefit autistic children by giving them a chance to live a normal life. This prototype will help

them to gain social awareness, communication and social skills so that they can live a meaningful life without fully depend on other normal persons. By increasing their quality of life, this prototype has been indirectly being one of the treatment approaches for autistic children. Video modeling concept that will be used in this project will help them to learn the appropriate sequence of actions they should imitate in order to adapt with the current locations' situations in the community.

1.6 Feasibility of the Project within the Scope and Time Frame

As this final year project will be conducted in two semesters, hence I will have about 8 until 9 months to conduct research and develop the mobile application. Figure 2 shows the expected deliverables for each stage during FYP1 and FYP2:

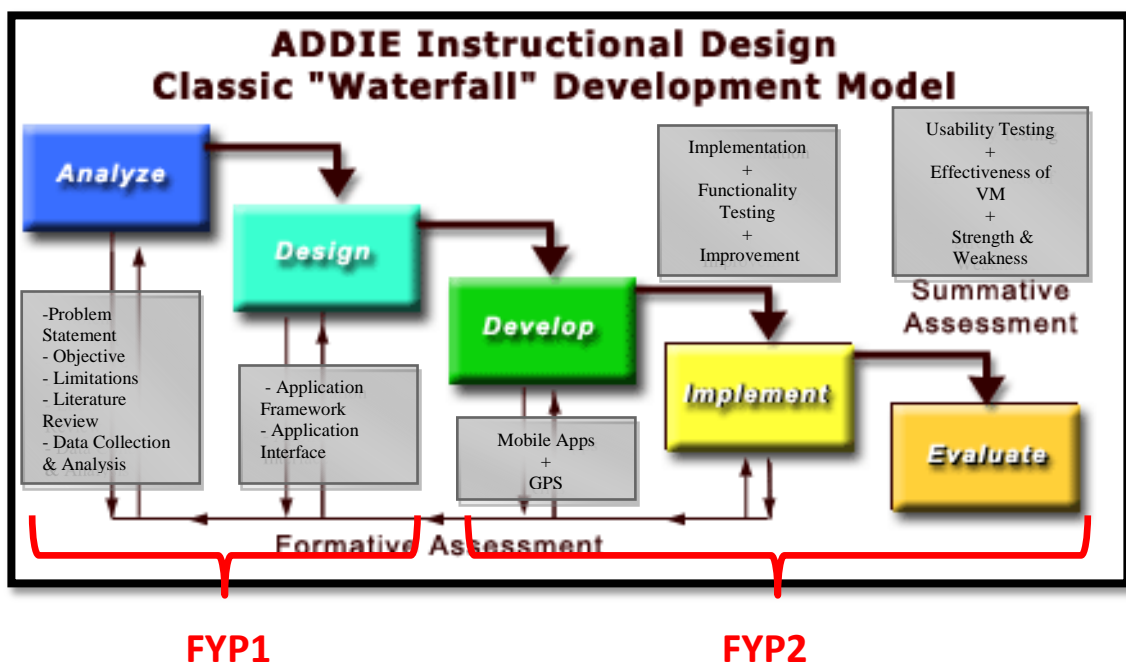


Figure 2 Expected Deliverables for Each Stage

CHAPTER 2

LITERATURE REVIEW

2.0 Literature Review

2.1 Benefits of Mobile Application on Android to Autistic Children

In this project, it has been decided that mobile application will be developed instead of web application. A research has been conducted to justify the benefits of mobile application towards autism children, other than they can be used anytime, anywhere. According to Joshi [1] in her article, teachers, parents and therapists describe the profound difference that apps for Apple and Android products have made in helping autistic children develop skills. Ipad programs have provided a means of communicating for some children with autism who cannot speak or have language delays [1]. Other apps help autistic children learn how to handle social situations that can be stressful, like crowds at malls [1]. And many programs can help develop fine-motor skills, which promote functions like writing or manipulating small objects [1]. Sami Rahman of Houston said that his son, Noah, 3, who has cerebral palsy, was woefully behind in fine-motor skills, speech and cognitive skills before he began therapies and intervention programs (personal communication, 2011) [2]. But in four months, the apps he used — along with sessions with therapists and teachers — have put him ahead of the curve in all these areas, Mr. Rahman said [2].

“The iPad has lowered the cognitive base you have to have to interface with a computer. You touch it, and something happens.”- Rahman, 2011[2].

There are few examples of mobile applications for Autism such as [3]:

- **Model Me Going Places™**
 - A great visual teaching tool for helping your child learn to navigate challenging locations in the community. Each location contains a photo slide show of

children modeling appropriate behavior. 6 locations: Hairdresser, Mall, Doctor, Playground, Grocery Store, and Restaurant.

- **ABA Therapy Images**

- The ABA Therapy Images app has photos in 3 categories meant to help autistic children learn by visual stimulation.

- **Life Skills Winner**

- Teaches social and life skills to autistic and special needs individuals. It does this interactively via a game format.

However, in this project, Android Operating System (OS) is used rather than iOS (Apple), Symbian, RIM, Bada and Microsoft. This is because Android is the first complete, open, and free mobile platform (Darcey & Conder, 2010) [4]. Developers will enjoy a comprehensive software development kit, with ample tools for developing powerful, feature-rich applications [4]. The platform is open source; relying on tried-and-true open standards developers will be familiar with [4]. And best of all, there are no costly barriers to entry for developers: no required fees [4]. And also, Android developers have numerous options for distributing and commercializing their applications [4]. In addition, Android application is compatible with almost all smart phones brand such as Samsung, Sony, Nokia, etc. rather than the other smart phones' application [4]. For instance, iOS can only be used for Apple products like iPad and iPhone.

Figure 3 below shows smart phones sales during Q4 2011:

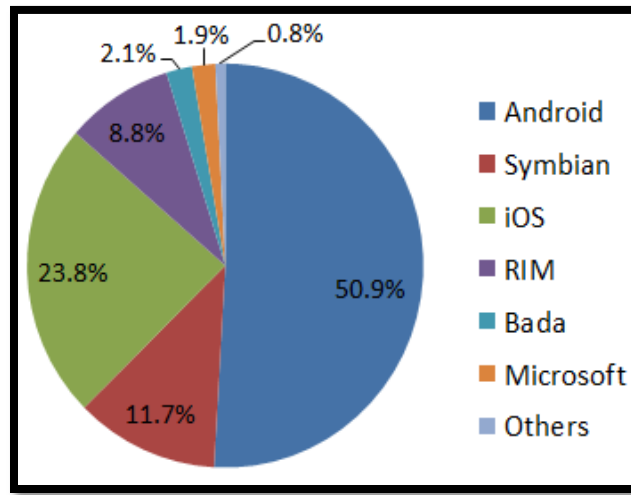


Figure 3 Smart phone Sales during Q4 2011 (based on Operating Systems)

According to Gartner's [5] analysis of global Q4 2011 smart phones sales shows the Android operating system dominating market share by more than 50% of the whole market share and iOS in 2nd place with only 23.8%. As a conclusion, it is proven that Android OS is a good choice to develop the prototype compared to other OS.

2.2 Autism Spectrum Disorders (ASD) and the Interventions

According to Rutherford [6], autism is a developmental disorder characterized by three clusters of symptoms: 1) specific impairments in social interactions, especially involving joint attention and shared experiences 2) delay or impairment in language development, and 3) stereotyped or ritualistic behavior, including attachment to routines or object placement as well as extreme interest in a peculiar topic and compulsive mannerisms. Based on the first cluster of symptom which is specific impairments in social interactions, autism children have difficulties in order to interact with other people and to adapt with the environment around them. Unfortunately, Wetherby [7] proposed that efforts to better understand and enhance social-communication skills of autism children hinge on our ability to accurately quantify social communication.

Instead of all the obstacles, we still have to give the autism children a normal life. Effective intervention programs could greatly improve their social and communication skills and have a substantial impact on long-term outcome and improve the quality of life of these children and their families [8]. Klim [9] states that the qualitative impairment of verbal and non-verbal communication is one of the parent's major concerns. According to the author there are a small number of children with diagnosis within the autistic spectrum that will never acquire speech but this number tends to decrease due to early intervention programs and improvements on therapeutic procedures [9]. Understanding the impaired features in autism children may allow a consistent comprehension about them and hence a more objective and evidence-supported intervention proposal can be carried out, based on individual profiles of abilities and inabilities [10]. According to Mesibov et al. [11], at an individual level, there are indications of approaches that can be of benefit: "A structured, organized daily programs based on each individual's skills, impairments and special interests continues to be the best available approach".

2.3 Video Modeling Treatment Approach

Video Modeling is one of the treatment approaches for effective intervention programs for autism children. Ferraioli & Harris [12] summarized that Video Modeling (VM) involves a competent confederate performing a targeted skill on videotape; this video is shown repeatedly to a subject, who is then given the opportunity to perform the task in a real life setting. According to Bellini & Akullian [13], VM is an intervention technique often used for social skills training which involves participants watching a video of someone modeling a desired behavior and then imitating the behavior of the person in the video. While in Video Self Modeling (VSM), are videotaped successfully performing behaviors and then watch those videos as models [13]. A meta-analysis of VM & VSM suggested that it is an effective strategy to address social-communication skills and functional skills in children with autism [13]. Bellini et al. [14] explored the social validity of VM by measuring social outcomes directed toward peers in a preschool classroom, rather than adults in a clinical setting. VM was used to successfully teach

social engagement to two children with autism; these skills maintained after the removal of the intervention [14].

The evidence-based research suggests that video modeling can be effectively implemented with learners from early childhood through middle school [15]. This practice may prove useful with high school age learners as well, though no studies were identified to support its use at this age level [15]. In the evidence-based studies, the domains of communication, social, academic/cognition, and play were represented. It may be useful in the behavior domain as well; however, no studies were identified to support the use of video modeling in this domain. In the studies that serve as the foundation for the evidence base, video modeling was implemented in home and school settings. This practice, however, may be useful anywhere there is learner access to view equipment [15].

Applied behavior analysis (ABA) has a long history of over four decades of significant and successful strategy development, verification and generalization in the treatment of individuals with autism [16]. According to Nikopoulos & Keenan [16], one of the many effective behavioral strategies for dealing with autism is video modeling. Video is regarded as an expanding technological medium for bringing about behavior changes [16]. It has considerable potential as an effective and socially acceptable form of intervention, mainly because it is widely used by typically developing children and adults for leisure, educational and business activities [16]. Both authors also have stated that two main procedures have been identified when analyzing observational learning; modeling and imitation [16]. First, in modeling the observer watches a model engaging in some behavior [16]. Second, in imitation this observer performs a pattern of new behaviors similar to those executed by the model that previously had not been in his or her repertoire [16]. However, in the literature these two procedures are usually used as one integrated unit, and therefore the observation of a behavior and the subsequent imitation of it by a person are regarded as an example of modeling (e.g. Axelrod and Hall 1999) [16].

2.4 Imitation Ability among Autistic Children

According to Nadel et al. [17], the function of imitation changes around the age of three years from an act of communication to a tool for learning. Children will imitate the actions of others when they recognize the purpose for which an action or verbal expression is being used [17]. Nadel and colleagues found that children with autism also used imitation as a major communicative tool and as such it is a good predictor of the social capabilities of children with autism [17]. Furthermore, Libby et al. [18] stated that sometimes simple imitation tasks do not discriminate between children with and without autism, and older children with autism have been reported to imitate. The presence of imitation seems to be a positive signal in children with autism: A positive association has been found between imitation and subsequent language development [19]. Contingent imitation of the child with autism has also been used as a means to stimulate its social-interactive behavior [20]. An intervention based on imitation would benefit from a precise evaluation of what kind of imitation the child performs better and what kind of information the imitation conveys regarding object-action relationships, or the role of prompt in the child's performance, or the capacity to select means to achieve goals [21]. Despite of thousands of interventions programs that have been conducted for autism children and adolescents, new interventions proposal or enhance the existing intervention programs should be continued; especially on video modeling and imitation approaches. Table 1 below shows status of treatment approaches to teaching social skills:

Table 1 Status of Treatment Approaches to Teaching Social Skills

Treatment approach	Status
Joint attention	Established
Imitation	Established
Peer training	Promising
Social Stories	Promising
Social skills and cognition groups	Promising

2.5 Theories of Autism Spectrum Disorders (ASD)

2.5.1 Social Cognitive Theory of Bandura

Bandura [16] suggests that observational learning can be explained through four processes that occur during or shortly after observation of a model. First, attentional processes take place while a person observes the relevant aspects of the model's behavior and its consequences [16]. Second, once that person is attending to these aspects of the model's behavior, retentional processes follow [16]. These are actions that the observer performs in order to evoke the modeled behavior [16]. That is, he or she may verbally represent the modeled behavior or repeatedly perform that behavior in some covert way [16]. Third, the observer must have the motor reproductive processes necessary to perform the model's behavior (i.e. he or she must be physically able to engage in the behavior) [16]. Finally, motivational processes are essential, especially in determining whether a modeled behavior will be imitated [16]. According to Bandura, the observer must have an expectation that an imitated behavior will produce reinforcement; otherwise he or she will not display it. Hence, reinforcement could affect the performance of the behavior, but not the learning [16].

2.5.2 Reinforcement Theory of Miller and Dollard

As an alternative to Bandura's theory, it is possible to explain observational learning within the behavioral framework. According to this view, Miller and Dollard [16] argued that the changes in an observer's behavior were due to the consequences of the observer's behavior, not those of the model. They demonstrated, for example, that imitation in children was a function of reinforcement [16]. In one study, children could get candy from a machine if they manipulated the handle the right way, following a model's demonstration [16]. In one condition, whenever the child imitated the model's behavior, the machine provided candy [16]. In another condition, children had to perform the opposite behavior- not to imitate the model, in order for the machine to provide candy [16]. In that way, the children learned to imitate the model when imitating paid off, and they learned not to imitate the model when imitating did not pay off [16]. However, according to Nikopoulos & Keenan [16], problems exist with Miller and Dollard's theory, when you consider, for example, that if an observer receives

reinforcement for imitating a model's behavior, imitative performances occur even when the model is no longer present? For instance, one might see an advertisement for a film on one day and go to the cinema the next [16]. The advertisement is no longer present, yet it still affects behavior [16]. Thus, although it has been shown that stimuli have their most powerful effects immediately, it is clearly the case that they may continue to affect behavior long after they have disappeared [16]. Moreover, on some occasions it can happen that imitation occurs in the absence of reinforcement of the observer's behavior [16]. In the previous example of the children who learned to imitate a model to get candy from a machine, later they imitated other models under other situations even though they received no reinforcement for imitating these models [16]. If imitative behavior occurs as a product of specific reinforcement, then why did the children imitate these models? [16] An explanation of such behavior can be given in terms of the concept of generalized imitation [16]. Generalized imitation proposes that reinforcement of a number of imitative behaviors can result in a general tendency to imitate modeled behavior [16]. That is, people learn through reinforcement not only to imitate a particular model emitting a particular response, but also to imitate other models emitting other responses [16]. In everyday practice, autistic children learn, through reinforcement of their behavior, to observe and subsequently imitate the behavior of successful models and to avoid imitating the behavior of unsuccessful models [16]. They may even attend to models whose behavior produces neutral consequences if imitating such models produces intermittent reinforcement [16]. They may also observe and imitate modeled behavior that is not reinforced if the model has characteristics often found in successful models [16].

CHAPTER 3

METHODOLOGY

3.0 Methodology

A methodology is a formalized approach to implement the System Development Life Cycle (SDLC). There are several categories of methodologies and each of it has its own usage and uniqueness. The main objective of this project is to develop a prototype which is a mobile application on video modeling for autistic children to learn appropriate sequence of actions at challenging locations in the community. In order to come out with the prototype, the suitable tools and technique to produce the mobile application, needs to be identified. The ADDIE model has been adopted as the generic process flow in developing the prototype.

3.1 ADDIE Model

ADDIE model always being used in Instructional System Design (ISD). Instructional design is the systematic specification of instruction to include: presentation, activities, materials, guidance, feedback and evaluation. It applies learning principles to decisions about information content, instructional method, use of media and delivery system. The goal is to ensure instructional quality, effectiveness, efficiency and enjoyment. The main purpose of instructional design is to maximize the value of instruction for the learner- especially the learner's time. Instruction provides a concentration of life-experience into a shortened, optimized time frame and provides feedback to ensure that learning objectives are actually being achieved.

The most common model of ISD is ADDIE, which stands for Analyze, Design, Develop, Implement and Evaluate. Each element has its own purpose in fulfilling the requirements and accomplishing the objectives of the project that has been set prior.

Figure 4 shows the core elements of the ADDIE model.

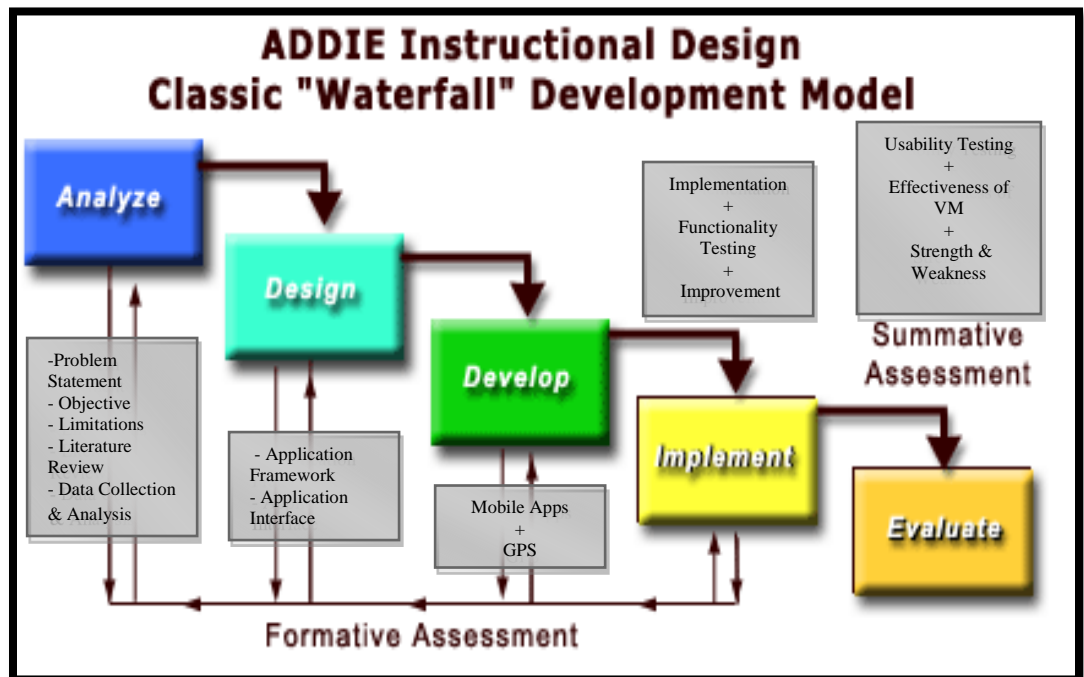


Figure 4 ADDIE Model

3.1.1 Analyze

It has been shown that Analyze is the first stage of all. In this stage, the focus was more on determining the correct problem statement to be solved, the right objective to be achieved, limitations on the project, analyzing the literature review done by other researchers and collecting and analyzing data to develop VIMAS app. Below are the details on how Analyze stage is conducted:

3.1.1.1 Data and Requirement Collection

There are two types of data; primary and secondary. Primary data is a term for data collected from a source. Primary data cannot be processed and manipulated as it did not give any meaning. Secondary data is data collected by someone other than the user. Common sources of secondary data include surveys and data collected through qualitative methodologies or qualitative research [22]. For this project, 2 types of data have been collected:

1. Research on journal, books, articles and papers available outside and the internet with regards to the related topics of the projects.

2. Qualitative analysis : Interview

- A semi-structured interview has been conducted to five teachers of National Autism Society of Malaysia (NASOM) at Ipoh branch. The interview took about 20 minutes for each teacher. There were 9 main questions being asked and few additional questions. Questions asked in the interview session were the key to the analysis phase where it is the qualitative data type. From these data, various analyses can be produced. Refer *Appendix B, C, D and E* for the official letter, consent form, interview plan and interview transcripts.

3.1.1.2 Data and Requirement Analysis

Data analysis for the qualitative data for this project is tabulation of results. The tables were generated from the results of the interview sessions that have been conducted previously. From there, results were analyzed and discussed. For the qualitative data, there a few methods can be implemented:

- ***Familiarization***- listening to tapes, writing transcripts, reading transcripts, and studying notes to list key ideas and recurrent themes.
- ***Identifying a thematic framework***—identifying all the key issues, concepts, and themes by which the data can be examined and referenced.

3.1.2 Design

In Design stage, the activities conducted were on identifying the system architecture, designing the application framework which includes designing the application process flow and use case diagram. Besides, proposed interface designs were also drafted during this stage. In order to design application's interface, there are some guidelines to be followed. Android's system User Interface (UI) provides the framework to build our application. Important aspects include the Home screen experience, global

device Modeling, and notifications. The application will play an important part in keeping the overall Android experience consistent and enjoyable to use. These are some of the basic design principles when designing the user interfaces [23]:

- ***Delight me in surprising ways*** – A beautiful surface, a carefully-placed animation, or a well-timed sound effect is a joy to experience. Subtle effects contribute to a feeling of effortlessness and a sense that a powerful force is at hand.
- ***Real objects are more fun than buttons and menus*** – Allow people to directly touch and manipulate objects in the app. It reduces the cognitive effort needed to perform a task while making it more emotionally satisfying.
- ***Let me make it mine*** – People love to add personal touches because it helps them feel at home and in control. Provide sensible, beautiful defaults, but also consider fun, optional customizations that don't hinder primary tasks.
- ***Get to know me*** – Learn people's preferences over time. Rather than asking them to make the choices over and over, provide previous choices within easy reach.
- ***Keep it brief*** – Use short phrases with simple words. People are likely to skip sentences if they're too long.
- ***Pictures are faster than words*** – Consider using pictures to explain ideas. They get people's attention and can be much more efficient than words.
- ***Only interrupt me if it's important*** – Like a good personal assistant, shield people from unimportant minutiae. People want to stay focused, and unless it's critical and time-sensitive, an interruption can be taxing and frustrating.
- ***It's not my fault*** – Be gentle in how you prompt people to make corrections. They want to feel smart when they use your app. If something goes wrong, give clear recovery

instructions but spare them the technical details. If can fix it behind the scene, even better.

- ***Sprinkle encouragement*** – Break complex tasks into smaller steps that can be easily accomplished. Give feedbacks on actions, even if it's just a subtle glow.
- ***Make important things fast*** – Not all actions are equal. Decide what's most important in your app and make it easy to find and fast to use, like the shutter button in a camera, or the pause button in a music player.

3.1.3 Develop

In Develop stage, VIMAS app was built by using App Inventor. This stage usually consumes more time as compared to other stages.

3.1.4 Implement

Meanwhile, in this Implement stage, VIMAS app was start to be implemented. Functionality testing was conducted by the developer in order to test potential interactions (test cases) by users on each of the page in VIMAS app. Besides, it is purposely to check all of the application functionalities whether they are usable and well-functioned or not. Improvements on the app were done from time to time in this stage.

3.1.5 Evaluate

Last but not least, for the final stage which is Evaluate, usability testing was conducted by the users who are the autism children in order to test whether VIMAS app can be understood by the autism children, user-friendly enough for them and also to ensure that VIMAS app achieved its objective which is to produce a great Video Modeling (VM) tool for helping autism children learn on how to perform appropriate sequence of actions at various categories of locations in the community. This testing was monitored by the developer as it is being done and observation technique was used to capture and analyze the results of the testing. There were 2 phases conducted in this

testing, which are training phase where the developer read the task instructions to the participants and they carry out the respective task based on the instruction given, meanwhile second phase was the actual usability testing, where the developer let the children and the teachers to use VIMAS on their own. From this testing, effectiveness of VIMAS app was identified and evaluated by the teachers based on their observation to the autism children and their own experiences in conducting the actual usability testing for the “Admin” part. The strengths and weaknesses of this app were also being determined in this stage. Three autism children and five teachers had been identified as the participants and the venue for the testing had been confirmed which was at National Autism Society of Malaysia (NASOM), Ipoh branch. Proper usability testing materials were provided such as test schedule, consent form, test scripts, test data and post-test questionnaire (*see Appendix F, G, and H*). This testing was conducted as soon as the completed VIMAS app has been successfully developed.

3.2 Tools and Software Involved

3.2.1 App Inventor

Most Android beginner developers use the popular, open-source App Inventor for Android, Google’s new powerful visual programming tool that lets anyone including those who do not have any experience in programming to build apps for Android-based devices. This App Inventor is simple but yet getting more powerful. Based on a visual “blocks” programming method that’s proven successful even with kids, App Inventor dramatically lowers the entrance barrier to programming and lets us build flashy, high-tech apps within hours for Android phones and devices. We just design the user interface (the visual appearance) of an app using a web-based graphical user interface (GUI) builder, then we specify the app’s behavior by piecing together “blocks” as if you were working on a puzzle. App Inventor also promotes exploration and discovery, and we can build an app exactly how we want it. App Inventor is not just a prototyping system or an interface designer – we can also build complete, general-purpose apps. The language provides all the fundamental programming building blocks like loops, conditionals, and other programming and logic constructs necessary to build apps with complex logic, but

in block form. These are all the reasons why I chose App Inventor compared to others Android's environment for development.

3.2.2 Sun Java SE Development Kit (JDK)

Java is a free flexible programming language developed by Sun Microsystems, now owned by Oracle. With Java, we can quickly build Web-enabled as well as full-featured stand-alone applications and games. Java programs are portable that can be run on many different kinds of computer without being re-written. Android applications can be developed using Sun's JDK 5 or JDK 6. Having App Inventor with JDK together is a great tool for the beginner and can really help with that learning-curve.

3.2.3 Android Software Development Kit (SDK)

Android SDK needs to be installed to develop Android applications. The Android SDK's includes the Android JAR file (Android application framework classes) as well as Android documentation, tools, and sample code.

3.2.4 Android Devices 2.3 or above

Android devices 2.3 or above are basically for the purpose of testing the prototype. The Android application's prototype built was downloaded into the devices to test whether the application is running smoothly or not.

3.3 Project Activities

Activities that have been carried out stage by stage in order to successfully complete this project consists of 5 parts; Analyze, Design, Develop, Implement and Evaluate. The methods on how each of the activity in every stage are done have been described in this chapter and the respective results later discussed in Chapter 4.

3.4 Key Milestones

During Final Year Project I, the main activities carried out were doing researches and also collecting all users' data to make sure that the application that will be built in Final Year Project II will be a success to the autistic children.

Figure 5 and 6 shows the highlights or milestones of the project for FYP 1 and FYP 2:

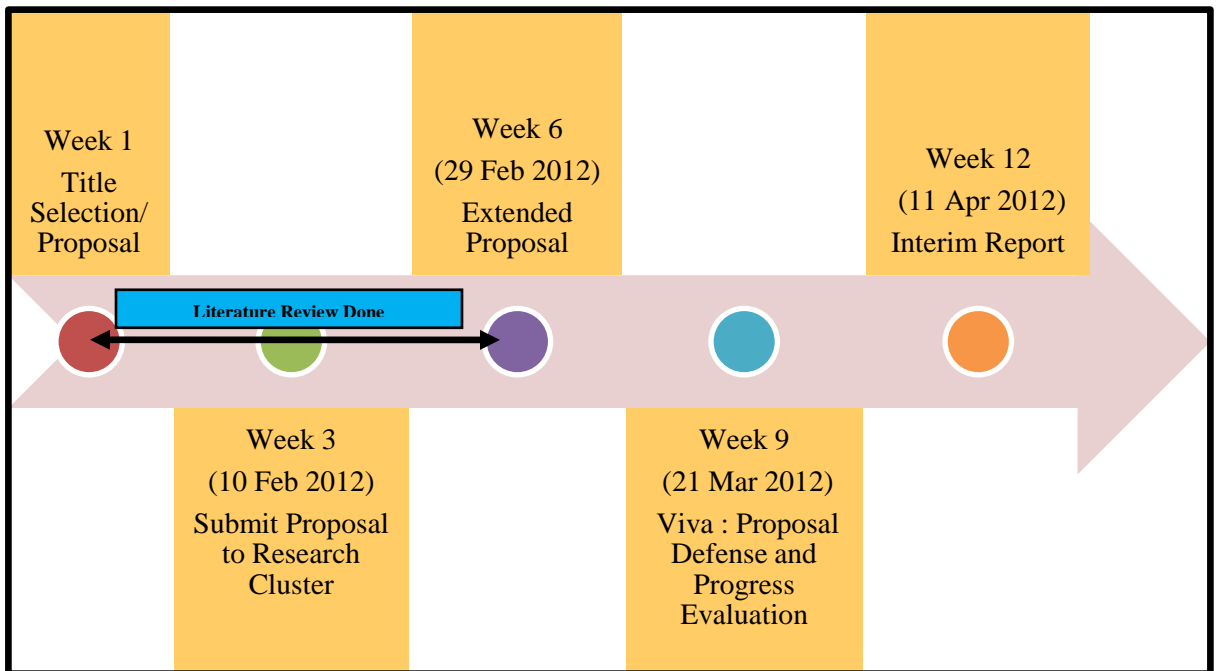


Figure 5 Key Milestones of the Project (FYP 1)

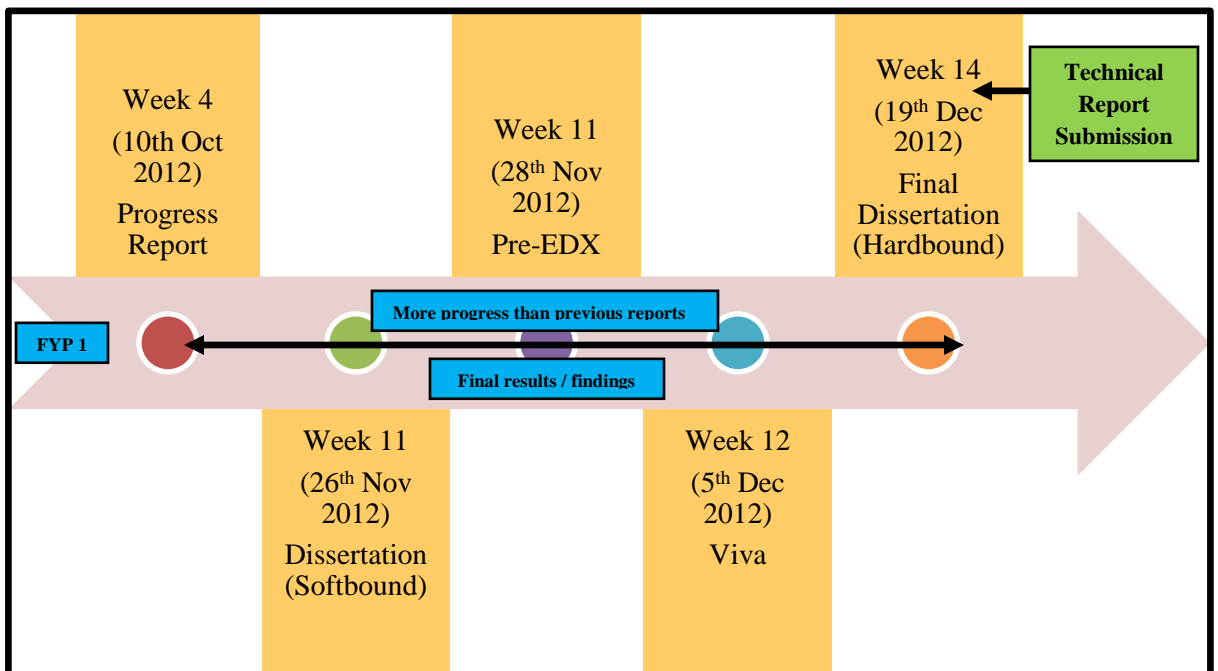


Figure 6 Key Milestones of the Project (FYP 2)

3.5 Gantt Chart

FYP 1



Deliveries	Week													
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Selection of Project Topic		*												
Preliminary Research Work														
Literature Reviews														
Research on Methodology														
Submission of Extended Proposal Defense						*								
Proposal Defense									*					
Project Development Work continues														
Submission of Interim Draft Report													*	
Submission of Interim Report														*

Process / Activities

* Milestones

FYP 2

Deliveries	Week													
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Submission of Progress Report				*										
Project Development Work (Develop Stage)														
Functionality Testing (Implement Stage)														
Usability Testing (Evaluate Stage)														
Pre-EDX														
Submission of Dissertation (Softbound)														
Oral Presentation (Viva)														
Submission of Final Dissertation (Hardbound)														
Submission of Technical Report														

 Process / Activities
 Milestones

CHAPTER 4

RESULTS AND DISCUSSIONS

4.0 Results and Discussions

This chapter presents the results from conducting each of the stages in methodology; Analyze, Design, Develop, Implement and Evaluate as have been described in Chapter 3.

4.1 Analyze - Result

4.1.1 Results of the Interview

As has been described in Section 3.1.1 Analyze, a semi-structured interview has been conducted on five teachers of National Autism Society of Malaysia (NASOM) at Ipoh branch. After listening to the audio records, writing transcripts, reading transcripts and studying notes, all the keys issues, concepts and themes have been identified. Below are the list of the key issues, concepts and themes:

Common Behaviors of Autism Children in the School

Table 2 Common Behaviors of Autism Children in the School

Respondent	Response
1	Most of them have ADHD, hyperactive. Hence, the common characteristics are lack of eye contacts and tend not to hear what people say to them. They can understand better by showing picture to them. They also can read and memorize about one to two words, the things that really attract them.
2	They cannot sit still. Every time must have something to do. They are also hyperactive, because it is inside already. Their concentration is also very low. They only can concentrate doing thing in which they are really like.
3	At the beginning, they do not know how to speak anything. You must tell them with the action so they can understand better. They can recognize the common places they usually go, but need to be trained and take long time.
4	They loss of control. Some of them are very active. They also do not know how to focus. When their routines changes, they will become

	very aggressive.
5	They have different behaviors. Some always keep shaking, some like always self-stimulation and so on. They will become more aggressive when they cannot get what they want. They also like to touch their bodies such as private parts.

Table 2 shows the common behaviors among autism children in the school. Based on the response, we can conclude that they are hyperactive and aggressive especially when their routines changed and when they cannot get what they want. They are also lack of eye contact and concentration. They can understand better by pictures and repetitive instructions that are followed by action.

Ways to Attract Autism Children to Behave Properly

Table 3 Ways to Attract Autism Children to Behave Properly

Respondent	Response
1	By giving them some rewards. It really works on most of the students especially the one with critical behavior. Rewards should be something they very like. It depends on the students whether to give the rewards before or after doing a task.
2	By giving them some rewards. We must also don't force them to do the task.
3	For younger children, usually they like toys like cars. Just show their favorite toys, then they will give positive response.
4	Sometimes we will give them their favorite food like bread. It depends on the students whether to give the rewards before or after doing a task, but usually, after they complete their tasks.
5	Sometimes we should use some reinforcements. We also give them some rewards before they do the task, or after they complete their tasks.

Table 3 above shows some of the ways to attract the autism children to behave properly or to do a task. In general, most of them are most likely want rewards such as their favorite food or favorite toy after they complete their tasks. This is kind of motivation to them to do the task.

The Most Worrisome Behavior among the Autism Children in the School

Table 4 The Most Worrisome Behavior among the Autism Children in the School

Respondent	Response
1	Self-injury. These children seldom attack people unpurposely. Sometimes if they can't get something, their routines changed or they can't express their feelings, they tend to bite themselves until injured to satisfy themselves and to stimulate their anger.
2	Self- injury. There are also few homosexual cases happened here among boys. One more thing is they seldom get chances to go outside, once they get it, they will become more hyperactive.
3	For pre-school class, most of them are hardly to talk and respond.
4	Self-injury and hygiene. Most of them still do not know how to control the hygiene.
5	Sometimes they are out of control. Worry if they might hurt others.

Table 4 shows the most bothering behavior among the children in NASOM. Most of the teachers said that they are very worry on the self-injury behavior among the children. The children tend to hurt themselves if they cannot get something or their routines changed.

Progress in Change of Behavior among the Autism Children

Table 5 Progress in Change of Behavior among the Autism Children

Respondent	Response
1	They did change. When they just entering here, 1 year plan will be created for them. Based on the plan, then they will be evaluated. Most of them change year by year.
2	In 3 months' time, they're not really change. A long period of time needed for them to improve themselves.
3	The behavior of the younger autism children is easy to mold. They will just follow what the teacher told them and there is no protest at all. However, the older children may protest a bit. Besides, younger children are easier to teach. In 3 months' time, they can memorize all the alphabets and sing in front of their parents at home.
4	It depends on the children. Some of them will improve in just 3 months' time especially the younger ones.
5	In 3 months' time, only small children can improve and mold easily.

Table 5 shows the progress in change of behavior among the autism children. It can be concluded that within three months' time, improvements on younger autism kids can already be seen instead of older children who will take longer time to change.

The Best Approach to Teach Autism Children

Table 6 The Best Approach to Teach Autism Children

Respondent	Response
1	Picture and video but video is more interesting. They are likely to imitate what they have seen on the video and never forget. If want to use picture, shows the real pictures first to teach then slowly adjust that with different colors in order for them to generalize.
2	Video. It can be shown to the children through television and computer. Repetitive instructions also have to be implemented so that they can remember.
3	For pre-school class, the best approach is by using flash cards and by showing the video that related to the subject. For example, they will learn the alphabets by singing along with the video shown. If want to use picture, show them the real picture.
4	It depends on the children but pictures and videos work best. If want to use picture, show to them the real picture instead of draw it or spell it so that they can recognize it better.
5	The best method is repetition of instructions. Pictures of real things also work.

Table 6 shows the best approach to teach autism children. Most of the teachers agreed that picture and video is one of the best approaches to teach the children. However, it also depends on the children.

Ability to be Independent in Life

Table 7 Ability to be Independent in Life

Respondent	Response
1	Yes, especially the mild or moderate level autism children. But it takes time and teachers have to monitor them first for few months.
2	They may be independent but maybe should put them in group. Teachers may start teach on how to be independent to the children above 12 years old. But sometimes, it depends on the process and training. This can be a long term training.
3	Yes, they can but the parents have to cooperate with the teachers.

	Some of the parents just don't know how to take care of their children and here can drag times to teach them from the beginning.
4	Yes, the mild one can. It depends on the children on how fast they can be independent. There should be someone also to guide them for first few months.
5	Yes, maybe after long term training. It depends on the children on how fast they can be independent.

Table 7 shows the ability to be independent in life among autism children. All teachers agreed that the children can be independent in life but it will take long times to train them and there must be someone at the side to monitor them for first few months.

Level of Acceptance among the Community

Table 8 Level of Acceptance among the Community

Respondent	Response
1	Yes they can be accepted. But we have to create awareness first among the public so that they aware of this.
2	They can be accepted but have to create awareness first because not many people know how to treat them right. It also depends on the behavior of the children. If the behavior is too worst, then it will be difficult for them to be accepted among the community.
3	Depends on the community. The children also should have always tried to talk or greet the public.
4	Depends on the community. By hook or by crook, they are still different with the children. Sometimes the behavior of the children also makes them uncomfortable.
5	Some of the public are fine with them. It depends on the awareness they have about autism children.

Table 8 shows the level of acceptance of autism children among the community. In general, autism children can be accepted among the community but it depends on the type of community and the awareness they have about autism children.

Imitation Ability among Autism Children

Table 9 Imitation Ability among Autism Children

Respondent	Response
1	Autism children can imitate whether themselves or others. But this maybe a long term plan for living skills. The period until they are able to imitate the action without looking at that is depends on the children and the creativeness of the teacher to guide them at the beginning.
2	Yes, they do imitate.
3	Yes, but it takes time for them to imitate. For small children, they must understand the action first by demonstration before they can imitate themselves.
4	Yes, can.
5	Yes, they can.

Table 9 shows the imitation ability among autism children. All teachers agreed that autism children can imitate others actions that they have seen but it takes time and they need to be guided first.

The Most Appropriate Model for Autism Children to Imitate

Table 10 The Most Appropriate Model for Autism Children to Imitate

Respondent	Response
1	The parents. Normal kids would also work best. Teachers won't stay permanently so it is not suitable. Cartoon character would work also because some of them love cartoons. Maybe should put various models so that they can choose.
2	It is best if there are combination of teacher, parents and cartoon together. If cartoon, they like to imitate their favorites cartoon.
3	For the younger kids, cartoon and buddies are not the best choices. They cannot recognize their own buddies yet. Teacher is the best model for them at these ages.
4	Normal kids work best. But teachers need to demonstrate the action first for few times and guide them, then after that they will be able to imitate the actions slowly.
5	Normal kids or their peers work best. Teachers and parents not really influence them and for cartoon, some of them don't like to watch cartoons.

Table 10 shows the responses of the teachers on the most appropriate model for autism children to imitate. For older autism kids, normal child works best as a model for them. Meanwhile, for the younger kids, cartoon and buddies are not the best choices. Teacher is the best model for them.

Video Modeling Tools as a Treatment Approach

Table 11 Video Modeling Tools as a Treatment Approach

Respondent	Response
1	Video modeling can be one of the best treatment approaches to improve self-care and social skills of autism children. But maybe should include some manuals so that the teachers could understand clearly before teach it to the autism children.
2	Yes video modeling can be the appropriate way to teach autism on their social skills but maybe takes time to become familiar with the system.
3	Yes, it is the best method but we need to train them every day so that they will learn it slowly. The teachers should also monitor them first.
4	Yes, video modeling can be one of the best treatment approaches because this one seems like they can imitate something to do. But it will also take time for them to concentrate and understand it.
5	Yes, it can be the best treatment approach. Maybe this treatment approach should be implemented from small so that they can imitate it when they grow older.

Table 11 shows the opinions of the teachers whether video modeling tools can be one of the best treatment approaches for autism children. All teachers agreed with that and they also suggest that this treatment approach should be implemented since pre-school class.

As a conclusion from the results of the interview conducted, it can be summarized that:

- ✓ Most interviewees said that the best approach to teach autism is through picture or video.
- ✓ Autism children can be independent in their life, but they need to be monitored first at the beginning.

- ✓ Autism children like to imitate others action i.e. parents, teachers, buddies, themselves.
- ✓ All interviewees agreed that video modeling can be one of the best treatment approaches to improve self-care and social skills of autism children.

There are also some recommendations from the teachers in order to improve this project such as:

- Add audio function to the application.
- Add some background music during the video plays.
- Put more attractive pictures on the interface.
- Use real-life scenario videos instead of cartoon animations.
- Use strong materials for the hardware.

4.2 Design – Result

As have been described in Section 3.1.2 Design, system architecture, activity diagram, use case diagram and prototype interfaces have been designed in this stage. The results can be seen as below.

4.2.1 System Architecture

Figure 7 shows the system architecture for VIMAS.

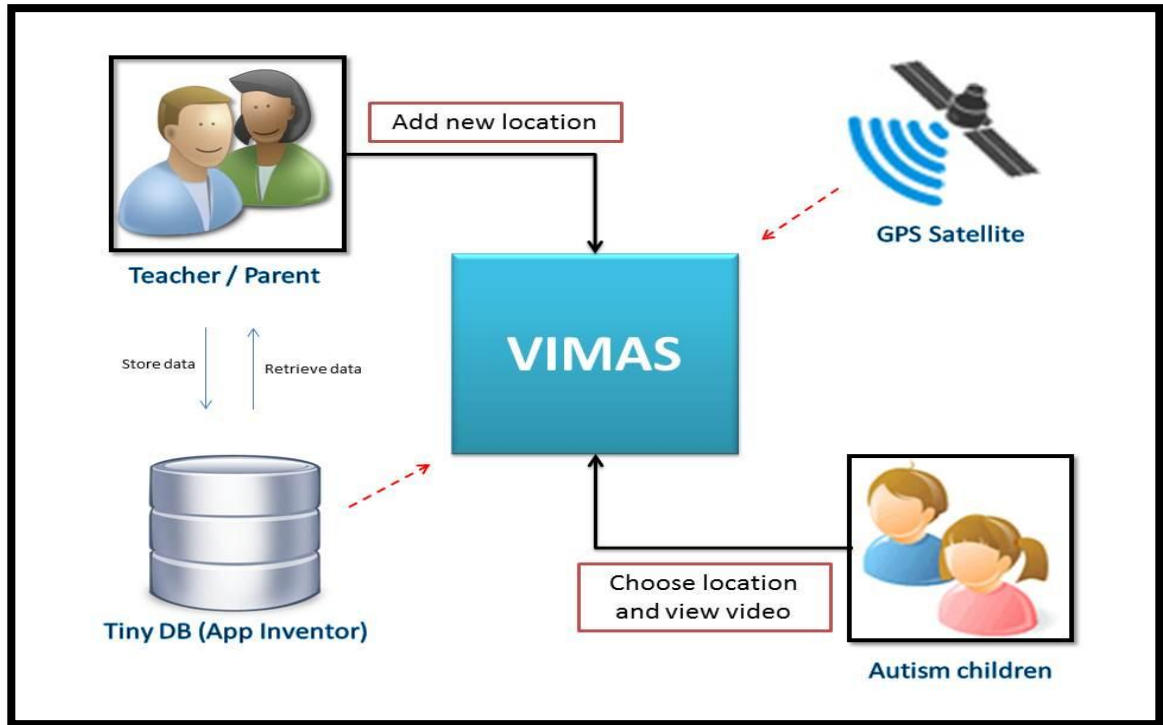


Figure 7 VIMAS System Architecture

VIMAS's system architecture is not complicated at all. All of the data for new locations will be stored in Tiny DB, which is a persistent data store for the app, that is, the data stored there will be available each time the app is run. Meanwhile, the autism children will directly use VIMAS to choose their preferred location and view the respective video. In addition, GPS satellite will communicate with VIMAS in order to give walking directions for the autism children to go to their preferred location.

4.2.2 System Design

4.2.2.1 Activity Diagram

For this mobile application, the activity starts when user clicks on the front page and ends when user has no other destination to go and quit the application. Figure 8 shows the activity diagram for this mobile application:

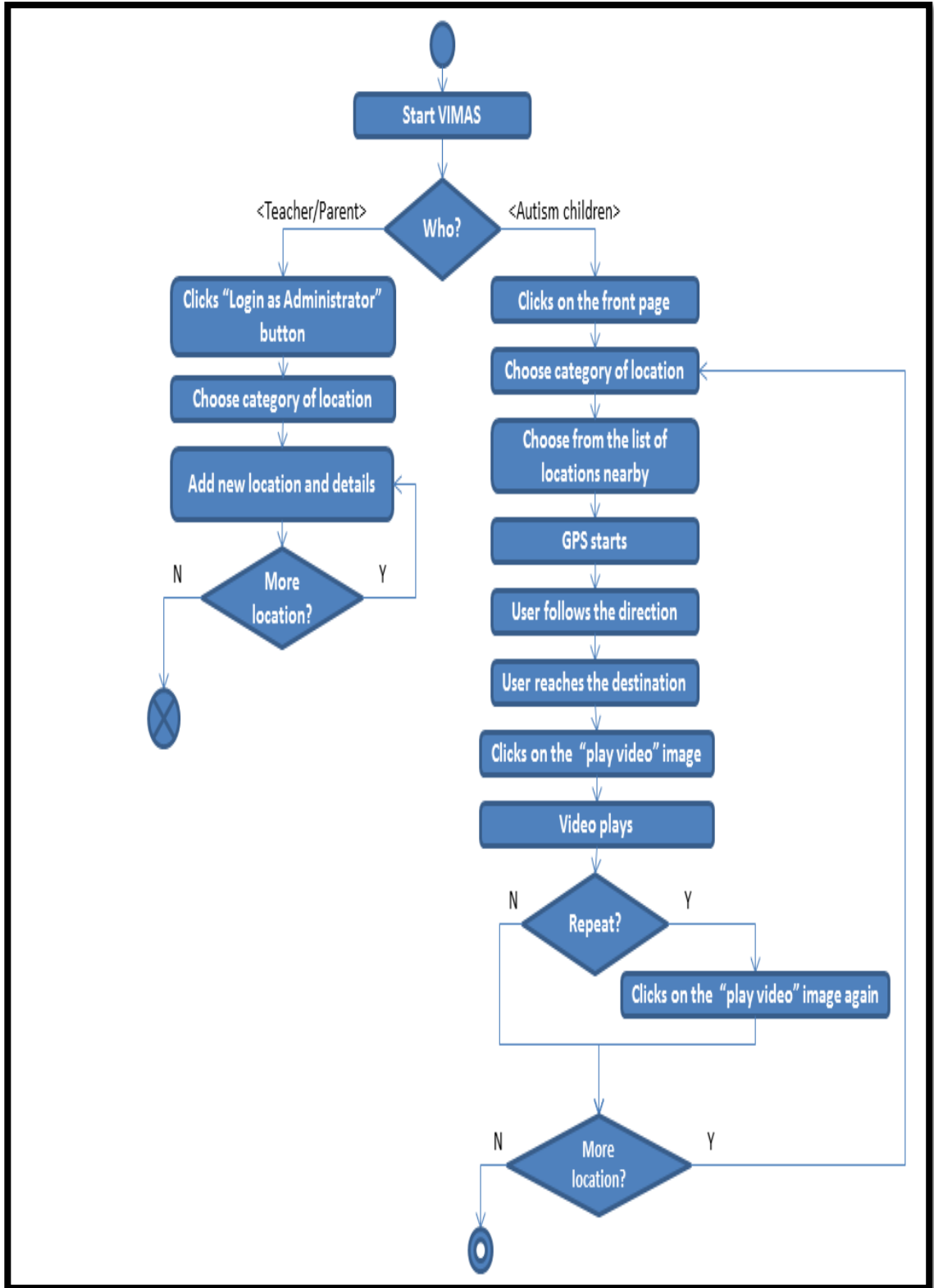


Figure 8 Activity Diagram

4.2.2.2 Use Case Diagram

This system is a personal application. Hence, it has only two actors; the user which is the autism children and administrator which is the parent or teacher. Figure 9 below shows the overall function and the respective actors:

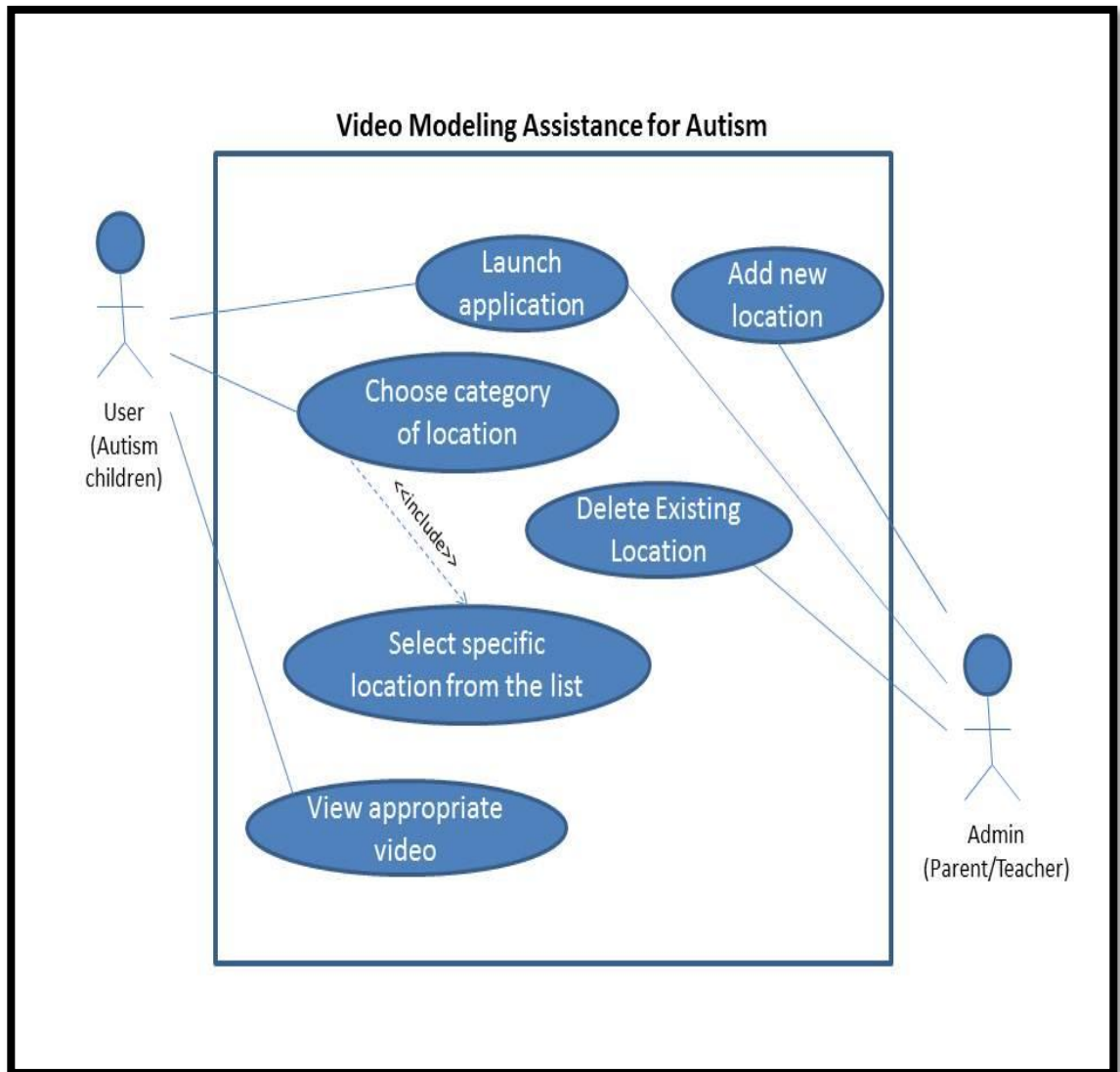

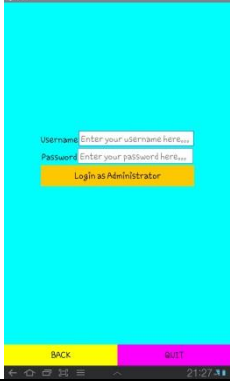
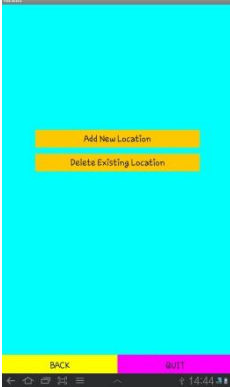


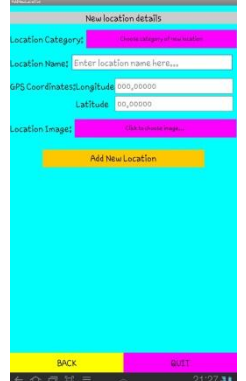
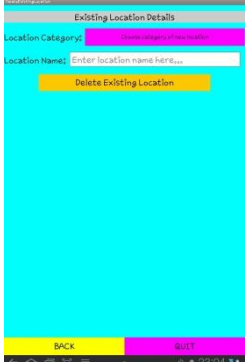


Figure 9 Use Case Diagram




4.2.2.3 Prototype Interfaces Design

Table 12 shows the prototype interfaces design for VIMAS mobile application and its description:

Table 12 Prototype Interfaces Design

	Screen	Description
Front page		In this front page, user will see a welcoming image and “Login as Administrator” button. User has to click on this welcoming image to proceed to the next page. While for the administrator, who are the teachers and parent, there is also a button for them to login as an administrator who has the access to add new location for any category of location.
“Login as Admin” page		In this “Login as Administrator” page, teachers or parent need to enter username which is “admin” and password which is also “admin” in the spaces provided. After that, they have to click on the “Login as Administrator” button. If login successful, then they will proceed to the next page.
“AddDelete” page		In this page, Admin will choose either to add new location or to delete existing location. If admin clicks on “Add New Location” button, then admin navigates to “Add New Location” page. Meanwhile, if admin clicks on “Delete Existing Location” button then he/she navigates to “Delete Existing Location” page.

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“Add New Location” page</p>		<p>In this “Add New Location” page, teachers or parent needs to fill up all of the details for the new location to be added; location category, location name, GPS coordinates and location image. After all of the details have been filled, then they have to click on the “Add New Location” button. If successful, then the new location will appear on the respective page, based on the category chosen before.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“Delete Existing Location” page</p>		<p>In this “Delete Existing Location” page, teachers or parent needs to fill up all of the details for the existing location to be deleted; location category and location name. After all of the details have been filled, then they have to click on the “Delete Existing Location” button. If successful, then the respective location will be deleted on the respective page, based on the category chosen before.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“Categories of Location” page</p>		<p>In this page, image of several categories of locations will be displayed. There are Playground, Dentist, Hairdresser and School. User will have to click on one of these images to go to the next respective page. For example, if user clicks on “Dentist” image, then “List of Dentists Nearby” page will be displayed next. There is also speech function where when user holds on one of the images for about 3 seconds, there will be voice speaks out “Dentist”.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“List of Locations Nearby” page</p>		<p>In this page, list of few dentists nearby will be displayed. In this case, dentists near to NASOM school are Karthi Dental Clinic and Lokga Dental Clinic. User needs to click on one of these dentists’ image or label to navigate to the next process. For example, if user clicks “Karthi Dental Clinic” label, then the activity starter in VIMAS will be triggered and GPS will be activated and direct the user to “Karthi Dental Clinic”.</p>

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“GPS Starts” page</p>		<p>As described above, GPS will be activated and give directions to the user until he reached the specified destination (in this case, “Karthi Dental Clinic”).</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“Video Modeling ” page</p>		<p>When the user has reached his destination, then he will be automatically navigated to the “Video modeling” page. In order to play the appropriate video related to the category of location (in this case, “Dentist”), user need to click on the image. This video will show the appropriate actions should be done by the user, who is the autism children. In this case, the user had chosen “Dentist”, hence a video showing “what to do?” in the dentist clinic will be played. User will tend to imitate the model in the video, and day by day, he can do it himself without looking at the video</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">“Video Modeling-More Location” page</p>		<p>After the user done watched the respective video, he will be provided with the option either to go to another location or quit the application. If he chose to go to another location, he will then navigate to “Categories of Location” page meanwhile if he chose to quit the application, then the application will close.</p>

4.3 Develop – Result

4.3.1 Source Code

As has been described in Section 3.1.3 Develop, VIMAS has been developed by using App Inventor, hence the source codes are in the form of visual “blocks”. The completed source code has been attached in **APPENDICES** section, named *Appendix A*.

4.4 Implement – Result

4.4.1 Functionality Testing

After completion of the system development, then testing should be conducted. As has been described on Section 3.1.4 Implement, Functionality Testing was conducted in this stage. Following are the results of the functionality testing:

Front page

Table 13 Front page-Functionality Testing and Results

#	Test Case	Result
1	User clicks on the welcoming image.	User proceeds to the “Categories of Location” page.
2	Admin (teacher/parent) clicks on the “Login as Administrator” button.	Admin proceeds to the “Login as Admin” page.

“Login as Admin” page

Table 14 “Login as Administrator” page-Functionality Testing and Results

#	Test Case	Result
1	Admin fills in the correct combination of username and password. Then, clicks “Login as Administrator” button.	Login successful. Admin then be navigated to “AddDelete” page.
2	Admin fills in the wrong combination of username and password. Then, clicks “Login as Administrator” button.	Login failed. There is a text string popped out which says “The username and password you entered does not match!” Admin then be prompted to enter the username and password again until login successful.
3	Admin clicks BACK button.	Admin navigates back to Front page.
4	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
5	Admin clicks CANCEL.	User remains in the same page.
6	Admin clicks YES.	User quits VIMAS application.

“AddDelete” page

Table 15 "AddDelete" page-Functionality Testing and Results

#	Test Case	Result
1	Admin clicks “Add New Location” button.	Admin navigates to “Add New Location” page.
2	Admin clicks “Delete Existing Location” button.	Admin navigates to “Delete Existing Location” page.
3	Admin clicks BACK button.	Admin navigates back to Front page.
4	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
5	Admin clicks CANCEL.	User remains in the same page.
6	Admin clicks YES.	User quits VIMAS application.

“Add New Location” page

Table 16 "Add New Location" page-Functionality Testing and Results

#	Test Case	Result
1	Admin chooses the location category, fills in the location name, GPS coordinates and choose location image. Then, admin clicks “Add New Location” button.	Admin navigates to the “List Of Locations Nearby” page. New location with the details has been successfully added in the page.
2	Admin forget to fill up one or more details. Then, admin clicks “Add New Location” button.	New location failed to be added. There is a text string popped out which says “You must fill up all of the details in the space provided!” Admin then be prompted to enter all of the details again until the new location successfully added.
3	Admin clicks BACK button.	Admin navigates back to AddDelete page.
4	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
5	Admin clicks CANCEL.	User remains in the same page.
6	Admin clicks YES.	User quits VIMAS application.

“Delete Existing Location” page

Table 17 "Delete Existing Location" page-Functionality Testing and Results

#	Test Case	Result
1	Admin chooses the location category and fills in the location name. Then, admin clicks “Delete Existing Location” button.	Admin navigates to the “List Of Locations Nearby” page. Respective location has been successfully deleted from the page.
2	Admin forget to fill up one or more details. Then, admin clicks “Delete Existing Location” button.	Existing location failed to be deleted. There is a text string popped out which says “You must fill up all of the details in the space provided!” Admin then be prompted to enter all of the details again until the existing location successfully deleted.
3	Admin clicks BACK button.	Admin navigates back to AddDelete page.
4	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
5	Admin clicks CANCEL.	User remains in the same page.
6	Admin clicks YES.	User quits VIMAS application.

“Categories of Location” page

Table 18 “Categories of Location” page-Functionality Testing and Results

#	Test Case	Result
1	User clicks on the speaker image.	User hears a female voice speaks out the instruction in English.
2	User clicks on the “Playground” image for about 3 seconds.	User hears a female voice speaks out “Playground”.
3	User clicks on the “Playground” image.	User navigates to “List of Playground Nearby” page.
4	User clicks on the “School” image for about 3 seconds.	User hears a female voice speaks out “School”.
5	User clicks on the “School” image.	User navigates to “List of School Nearby” page.
6	User clicks on the “Hairdresser” image for about 3 seconds.	User hears a female voice speaks out “Hairdresser”.
7	User clicks on the “Hairdresser” image.	User navigates to “List of Hairdresser Nearby” page.
8	User clicks on the	User hears a female voice speaks out “Dentist”.

	“Dentist” image for about 3 seconds.	
9	User clicks on the “Dentist” image.	User navigates to “List of Dentist Nearby” page.
10	Admin clicks BACK button.	Admin navigates back to Front page.
11	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
12	Admin clicks CANCEL.	User remains in the same page.
13	Admin clicks YES.	User quits VIMAS application.

“List of Locations Nearby” page (E.g. Playground)

Table 19 "List of Locations Nearby" page-Functionality Testing and Results

#	Test Case	Result
1	User clicks on the speaker image.	User hears a female voice speaks out the instruction in English.
2	User clicks on the “Padang Polo” image for about 3 seconds.	User hears a female voice speaks out “Padang Polo”.
3	User clicks on the “Padang Polo” label for about 3 seconds.	User hears a female voice speaks out “Padang Polo”.
4	User clicks on the “Padang Polo” image or label.	GPS starts automatically with the directions on the chosen destination to go. (In this case, “Padang Polo”). When user has reached the destination, it will automatically go to the “Video Modeling” page.
5	Admin clicks BACK button.	Admin navigates back to “Categories of Location” page.
6	Admin clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
7	Admin clicks CANCEL.	User remains in the same page.
8	Admin clicks YES.	User quits VIMAS application.

“Video Modeling” page (E.g. Playground)

Table 20 "Video Modeling" page-Functionality Testing and Results

#	Test Case	Result
1	User clicks on the speaker image.	User hears a female voice speaks out the instruction in English.
2	User clicks on the video modeling image.	A video on the video modeling at playground starts to play.

3	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “Video Modeling” page again.
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“Video Modeling-More Location” page (E.g. Playground)

Table 21 "Video Modeling-More Location" page-Functionality Testing and Results

#	Test Case	Result
1	User clicks on the speaker image.	User hears a female voice speaks out the instruction in English.
2	User clicks on the video modeling image.	The video on the video modeling at playground plays again.
3	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “Video Modeling” page again.
4	User clicks YES button on “More location?”	User navigates back to the “Categories of Location” page.
5	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.
6	User clicks CANCEL.	User remains in the same page.
7	User clicks YES.	User quits VIMAS application.

4.5 Evaluate – Result

4.5.1 Usability Testing

Meanwhile, in this evaluate stage, Usability Testing was conducted. As have been described in Section 3.1.5 Evaluate, this testing was conducted in order to ensure that VIMAS can be understood by the autism children and it achieved its objective which is to produce a great Video Modeling (VM) tool for helping autism children learn on how to perform appropriate sequence of actions at various categories of locations in the community. During the first phase of the testing which is training phase, the developer guides the participants steps by steps on how to use VIMAS. Table 22 shows the steps followed by the participants:

Table 22 Usability Testing Test Script and Results (Autism Children)

Test ID	Test Case	Result	Success?
Participant No: 3			
Task 1(Playground)			
1.1	User starts VIMAS while hearing on a headphone.	NA	/
1.2	User clicks on any area on the welcoming image.	User proceeds to the “Categories of Location” page.	/
1.3	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
1.4	User clicks on the “Playground” image for about 3 seconds.	User will hear a female voice speaks out “Playground”.	/
1.5	User clicks on the “Playground” image.	User will be navigated to “List of Playground Nearby” page.	/
1.6	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
1.7	User clicks on the “Padang Polo” image for about 3 seconds.	User will hear a female voice speaks out “Padang Polo”.	/
1.8	User clicks on the “Padang Polo” label for about 3 seconds.	User will hear a female voice speaks out “Padang Polo”.	/
1.9	User clicks on the “Padang Polo” image or label.	GPS will start automatically with the directions on the chosen destination to go. (In this case, “Padang Polo”). When user has reached the destination, it will automatically go to the “PlaygroundVM” page.	/
2.0	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
2.1	User clicks on the video modeling image.	A video on the video modeling at playground will start to play.	/
2.2	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “PlaygroundVM” page again.	/
2.3	User clicks YES button on “More location?”	User navigates back to the “Categories of Location” page.	/
2.4	Choose another category of location and repeat steps 1.6 until 2.2	NA	/
2.5	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/

2.6	User clicks CANCEL.	User remains in the same page.	/
2.7	User clicks YES.	User quits VIMAS application.	/
Participant No: 1			
Task 2(School)			
2.8	User starts VIMAS while hearing on a headphone.	NA	/
2.9	User clicks on any area on the welcoming image.	User proceeds to the “Categories of Location” page.	/
3.0	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
3.1	User clicks on the “School” image for about 3 seconds.	User will hear a female voice speaks out “School”.	/
3.2	User clicks on the “School” image.	User will be navigated to “List of School Nearby” page.	/
3.3	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
3.4	User clicks on the “SK Coronation Park” image for about 3 seconds.	User will hear a female voice speaks out “SK Coronation Park”.	/
3.5	User clicks on the “SK Coronation Park” label for about 3 seconds.	User will hear a female voice speaks out “SK Coronation Park”.	/
3.6	User clicks on the “SK Coronation Park” image or label.	GPS will start automatically with the directions on the chosen destination to go. (In this case, “SK Coronation Park”). When user has reached the destination, it will automatically go to the “SchoolVM” page.	/
3.7	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
3.8	User clicks on the video modeling image.	A video on the video modeling at playground will start to play.	/
3.9	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “SchoolVM” page again.	/
4.0	User clicks YES button on “More location?”	User navigates back to the “Categories of Location” page.	/
4.1	Choose another category of location and repeat steps 3.2 until 3.8	NA	/
4.2	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/

4.3	User clicks CANCEL.	User remains in the same page.	/
4.4	User clicks YES.	User quits VIMAS application.	/
Participant No: 2			
Task 3(Hairdresser)			
4.5	User starts VIMAS while hearing on a headphone.	NA	/
4.6	User clicks on any area on the welcoming image.	User proceeds to the “Categories of Location” page.	/
4.7	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
4.8	User clicks on the “Hairdresser” image for about 3 seconds.	User will hear a female voice speaks out “Hairdresser”.	/
4.9	User clicks on the “Hairdresser” image.	User will be navigated to “List of Hairdresser Nearby” page.	/
5.0	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
5.1	User clicks on the “Soho Saloon” image for about 3 seconds.	User will hear a female voice speaks out “Soho Saloon”.	/
5.2	User clicks on the “Soho Saloon” label for about 3 seconds.	User will hear a female voice speaks out “Soho Saloon”.	/
5.3	User clicks on the “Soho Saloon” image or label.	GPS will start automatically with the directions on the chosen destination to go. (In this case, “Soho Saloon”). When user has reached the destination, it will automatically go to the “HairdresserVM” page.	/
5.4	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
5.5	User clicks on the video modeling image.	A video on the video modeling at playground will start to play.	/
5.6	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “HairdresserVM” page again.	/
5.7	User clicks YES button on “More location?”	User navigates back to the “Categories of Location” page.	/
5.8	Choose another category of location and repeat steps 4.8 until 5.4	NA	/
5.9	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/
6.0	User clicks CANCEL.	User remains in the same page.	/

6.1	User clicks YES.	User quits VIMAS application.	/
Participant No: 1			
Task 4(Dentist)			
6.2	User starts VIMAS while hearing on a headphone.	NA	/
6.3	User clicks on any area on the welcoming image.	User proceeds to the “Categories of Location” page.	/
6.4	User clicks on the “Dentist” image for about 3 seconds.	User will hear a female voice speaks out “Dentist”.	/
6.5	User clicks on the “Dentist” image.	User will be navigated to “List of Dentist Nearby” page.	/
6.6	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
6.7	User clicks on the “Karthi Dental Clinic” image for about 3 seconds.	User will hear a female voice speaks out “Karthi Dental Clinic”.	/
6.8	User clicks on the “Karthi Dental Clinic” label for about 3 seconds.	User will hear a female voice speaks out “Karthi Dental Clinic”.	/
6.9	User clicks on the “Karthi Dental Clinic” image or label.	GPS will start automatically with the directions on the chosen destination to go. (In this case, “Karthi Dental Clinic”). When user has reached the destination, it will automatically go to the “DentistVM” page.	/
7.0	User clicks on the speaker image.	User will hear a female voice speaks out the instruction in English.	/
7.1	User clicks on the video modeling image.	A video on the video modeling at playground will start to play.	/
7.2	User watches the video.	User follows the steps-by-steps described in the video on what-to-do at playground. When user finished watching the video, it will automatically go to the “DentistVM” page again.	/
7.3	User clicks YES button on “More location?”	User navigates back to the “Categories of Location” page.	/
7.4	Choose another category of location and repeat steps 6.4 until 7.0	NA	/
7.5	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/
7.6	User clicks CANCEL.	User remains in the same page.	/
7.7	User clicks YES.	User quits VIMAS application.	/

For the “Login as Admin” page, this requires the teachers to be the participant. Hence, the teachers are asked to follow the steps as have been described in the test script. Table 23 shows the steps followed by the teachers:

Table 23 Usability Testing Test Script and Results (Teacher)

Test ID	Test Case	Result	Success?
Participant No:			
Successful login & New Location Added			
1.1	Admin starts VIMAS and clicks on “Login as Administrator” button.	Admin navigates to “Login As Admin” page	/
1.2	Admin fills in the correct combination of username and password. Then, clicks “Login as Administrator” button. *Username: admin Password: admin	Login successful. Admin then be navigated to “AddDelete” page.	/
1.3	Admin clicks on “Add New Location” button	Admin navigates to “Add New Location” page	/
1.4	Admin chooses the location category, fills in the location name, GPS coordinates and choose location image. Then, admin clicks “Add New Location” button. *Location Category: Playground Location Name: Taman Dr. Seenivasagam Longitude: 101.08496 Latitude: 04.60344 Location Image: Choose from the image provided	Admin navigates to the “List Of Playground Nearby” page. New location with the details has been successfully added in the page.	/
1.5	Admin clicks BACK button.	Admin navigates back to Front page.	/
1.6	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/
1.7	User clicks CANCEL.	User remains in the same page.	/
1.8	User clicks YES.	User quits VIMAS application.	/
Successful Login & Existing Location Deleted			
1.9	Admin starts VIMAS and clicks on “Login as Administrator” button.	Admin navigates to “Login As Admin” page	/
2.0	Admin fills in the correct combination of username and password. Then, clicks “Login as	Login successful. Admin then be navigated to “AddDelete” page.	/

	Administrator” button. *Username: admin Password: admin		
2.1	Admin clicks on “Delete Existing Location” button	Admin navigates to “Delete Existing Location” page	/
2.2	Admin chooses the location category and fills in the location name. Then, admin clicks “Delete Existing Location” button. *Location Category: Playground Location Name: Taman Dr. Seenivasagam	Admin navigates to the “List Of Playground Nearby” page. Respective location has been successfully deleted from the page.	/
2.3	Admin clicks BACK button.	Admin navigates back to AddDelete page.	/
2.4	User clicks QUIT button.	A notifier pops up and asks for user’s confirmation.	/
2.5	User clicks CANCEL.	User remains in the same page.	/
2.6	User clicks YES.	User quits VIMAS application.	/
Fail login			
2.7	Admin starts VIMAS and clicks on “Login as Administrator” button.	Admin navigates to “Login as Admin” page	/
2.8	Admin fills in the wrong combination of username and password. Then, clicks “Login as Administrator” button.	Login failed. There will be a text string popped out which says “The username and password you entered does not match!”	/
2.9	Admin clicks OK.	Admin then be prompted to enter the username and password again until login successful.	/
New location failed to be added			
3.0	Admin starts VIMAS and clicks on “Login as Administrator” button.	Admin navigates to “Login as Admin” page	/
3.1	Admin fills in the correct combination of username and password. Then, clicks “Login as Administrator” button. *Username: admin Password: admin	Login successful. Admin then be navigated to “AddDelete” page.	/
3.2	Admin clicks on “Add New Location” button	Admin navigates to “Add New Location” page	/
3.3	Admin forget to fill up one or more details. Then, admin clicks “Add New Location” button.	New location failed to be added. There is a text string popped out which says “You must fill up all of the details in the space provided!” Admin then be prompted to enter all of the details again until the new location	/

		successfully added.	
Existing location failed to be deleted			
3.4	Admin starts VIMAS and clicks on “Login as Administrator” button.	Admin navigates to “Login as Admin” page	/
3.5	Admin fills in the correct combination of username and password. Then, clicks “Login as Administrator” button. *Username: admin Password: admin	Login successful. Admin then be navigated to “AddDelete” page.	/
3.6	Admin clicks on “Delete Existing Location” button	Admin navigates to “Delete Existing Location” page	/
3.7	Admin forget to fill up one or more details. Then, admin clicks “Delete Existing Location” button.	Existing location failed to be deleted. There is a text string popped out which says “You must fill up all of the details in the space provided!” Admin then be prompted to enter all of the details again until the existing location successfully deleted.	/

Meanwhile for the second phase, which is the actual usability testing, the developer let the autism children to use VIMAS on his own. The teachers are also being asked to do the same for the “Admin” part. By using observation technique, the developer takes notes on the behavior as well as the tasks done by the participants. Table 24 and 25 shows the results of the actual usability testing for autism children and teacher:

Table 24 Summary of the Actual Usability Testing Results (Autism Children)

Participant	Task/Activity	Response/Observable Behavior
1	User was asked to start VIMAS and repeat the steps as have been guided before. Category of location= School & Dentist	User can follow the steps smoothly until finished watching the video and he seems excited when playing with VIMAS. He focused in doing his task and showing his interests.
2	User was asked to start VIMAS and repeat the steps as have been guided before. Category of location=Hairdresser	For first try, the attendant has to tell him some few steps on what to click. However, when conducting for the second try, he seems already know on what to click and follow the steps until

		finished watching the video. His interests and focuses can be seen clearly after few tries.
3	User was asked to start VIMAS and repeat the steps as have been guided before. Category of location=Playground	At first, user does not show any interest in trying VIMAS. But, after she playing with VIMAS for few times, she can easily follow the steps smoothly until finished watching the video. She can also imitated the first few steps on what the model is doing in the video. Her interests can be seen when she kept smiling while playing with VIMAS.

Table 25 Summary of the Actual Usability Testing (Teacher)

Participant	Task/Activity	Response/Observable Behavior
1	Teacher was asked to start VIMAS and repeat the steps as have been guided before for “Admin” part.	Teacher done the tasks smoothly for login, add and delete locations.
2	Teacher was asked to start VIMAS and repeat the steps as have been guided before for “Admin” part.	Teacher done the tasks smoothly for login, add and delete locations.
3	Teacher was asked to start VIMAS and repeat the steps as have been guided before for “Admin” part.	Teacher done the tasks smoothly for login, add and delete locations.
4	Teacher was asked to start VIMAS and repeat the steps as have been guided before for “Admin” part.	Teacher done the tasks smoothly for login, add and delete locations.
5	Teacher was asked to start VIMAS and repeat the steps as have been guided before for “Admin” part.	Teacher done the tasks smoothly for login, add and delete locations.

During conducting the testing, there was an attendant, who is the teacher with each of the autism children. While the children playing with VIMAS, the teachers evaluated on the effectiveness, efficiency, user satisfaction and learning ability of VIMAS app based on the observation to the autism children and their own experiences while conducting the usability testing for the “Admin” part. They were asked to fill in a post-test questionnaire in order to express their evaluation on VIMAS. Table 26 shows the summary of post-test questionnaire results:

Table 26 Summary of post-test questionnaire results

No	Question	R1	R2	R3	R4	R5
EFFICIENCY						
1	VIMAS would be easy to understand by the autism children	Agree	Agree	Neutral	Neutral	Agree
2	VIMAS would be easy to carry everywhere	Agree	Agree	Strongly Agree	Agree	Agree
3	The pictures in the VIMAS were easy to see	Strongly Agree	Neutral	Neutral	Agree	Agree
4	The pictures in the VIMAS is appropriate in size	Strongly Agree	Neutral	Agree	Agree	Agree
5	The pictures in VIMAS are colorful enough to attract autism children	Strongly Agree	Agree	Agree	Agree	Agree
6	It took too long to understand the message	Disagree	Disagree	Agree	Disagree	Neutral
EFFECTIVENESS						
7	It was easy to understand what each picture represented	Agree	Strongly Agree	Agree	Agree	Agree
8	It was easy to understand the voice that spoke out the instructions	Neutral	Agree	Neutral	Neutral	Agree
9	It was easy to understand the video played in VIMAS as the video modeling treatment approach for autism children	Agree	Agree	Agree	Agree	Neutral
10	GPS function in VIMAS is reliable for autism children	Agree	Agree	Agree	Disagree	Agree
USER SATISFACTION						
11	I liked VIMAS	Agree	Agree	Agree	Agree	Agree
12	I would recommend autism children to use VIMAS	Agree	Agree	Agree	Agree	Agree
13	VIMAS is an appropriate means of treatment approach for autism children to enhance their social and communication skills	Neutral	Strongly Agree	Agree	Neutral	Neutral
LEARNING ABILITY						
14	VIMAS provides the opportunity and mobility for autism children to learn social and communication skills	Neutral	Agree	Agree	Agree	Neutral
15	VIMAS provides video modeling treatment approach in a more interactive way	Agree	Strongly Agree	Strongly Agree	Agree	Agree

In summary, from Table 25 we can conclude that the teachers are satisfied with the overall performance of VIMAS. The design, size of the pictures and colors used in the interfaces really help autism children to understand better about VIMAS and make it easy for them to remember how to use VIMAS. All of the teachers also have agreed to recommend VIMAS to other autism children in order for them to enhance their social and communication skills. They also have agreed that VIMAS provides video modeling treatment approach in a more interactive way.

Besides the above results, the teachers also give a few suggestions for prototype improvement such as:

- ✓ Instead of only playing the video, let the children have another option to choose what to view. For example, provides also visual aids instead of only video.
- ✓ Add more categories of location. E.g.: Grocery

However, due to time constraint, the above suggestions will be considered in the future enhancement.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.0 Conclusion and Recommendations

5.1 Conclusion

As a conclusion, it has been clearly proven that this project has achieved its objectives that have been set at the early stage which are:

- To carry out a research on the suitable techniques to produce a great Video Modeling (VM) tool for helping autism children learn on how to perform appropriate sequence of actions at various categories of locations in the community.
- To develop a mobile application prototype on Video Modeling Assistance for Autism (VIMAS), which focus on the autism children aged between 7 until 18.
- To evaluate the usability of the prototype.

By conducting interview sessions with the teachers and also doing some research on journal, books, articles and papers available outside and the internet with regards to the related topics of the projects during the Analyze stage, suitable technique to produce a great Video Modeling (VM) tool has been found which is by combining technology nowadays (mobile application) and video modeling treatment approach itself.

Besides, a mobile application prototype on Video Modeling Assistance for Autism (VIMAS), which focus on the autism children aged between 7 until 18 has been successfully developed during the Develop stage.

Last but not least, the usability of the prototype has also been evaluated by the autism children as well as their teachers. The usability testing has been conducted in the Evaluate stage.

Based on the successfully achieved objectives above, we can say that VIMAS is reliable for autism children and with that, it can be used by the autism children for their future betterment.

5.2 Suggested Recommendations for Further Improvements

There are some suggested recommendations to further improve this project with greater functionalities which are:

- Develop the similar application for other operating system such as iOS, Bada or Symbian.
- Add more functions to the application such as upload new video function and add more categories of location.
- Instead of using common GPS navigation, use Augmented Reality (AR) in order for the autism children to navigate from one location to the other locations.
- Instead of using only a normal child model in a video for each location, use different models such as teachers, parents or maybe themselves for different videos so that a location will have few videos to choose from instead of only one.

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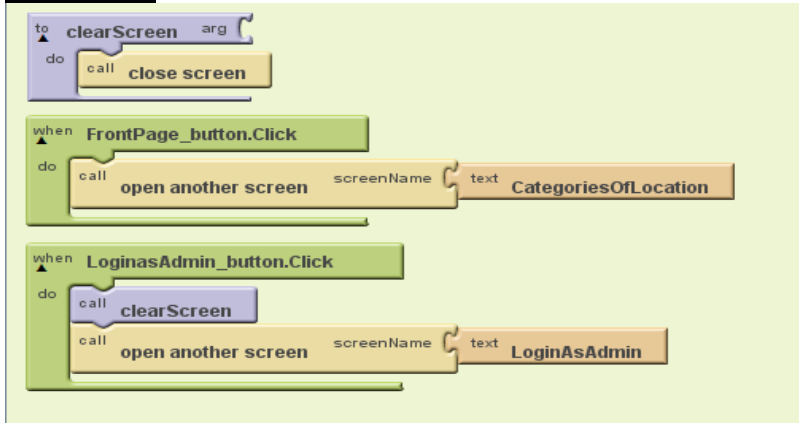
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- [23] *Android Design*. Retrieved April 13, 2012, from <http://developer.android.com/design/get-started/principles.html>

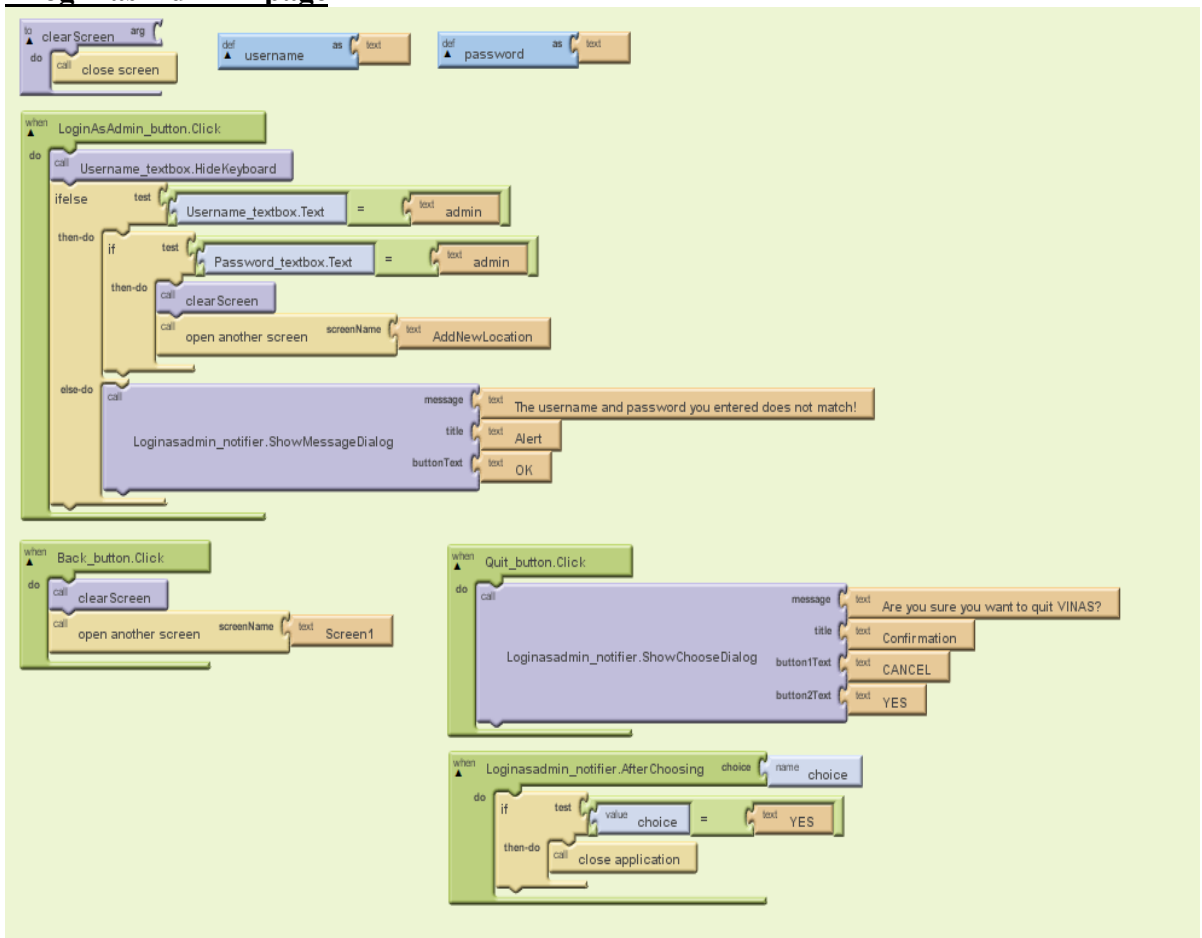
APPENDICES

Appendix A – Source Code

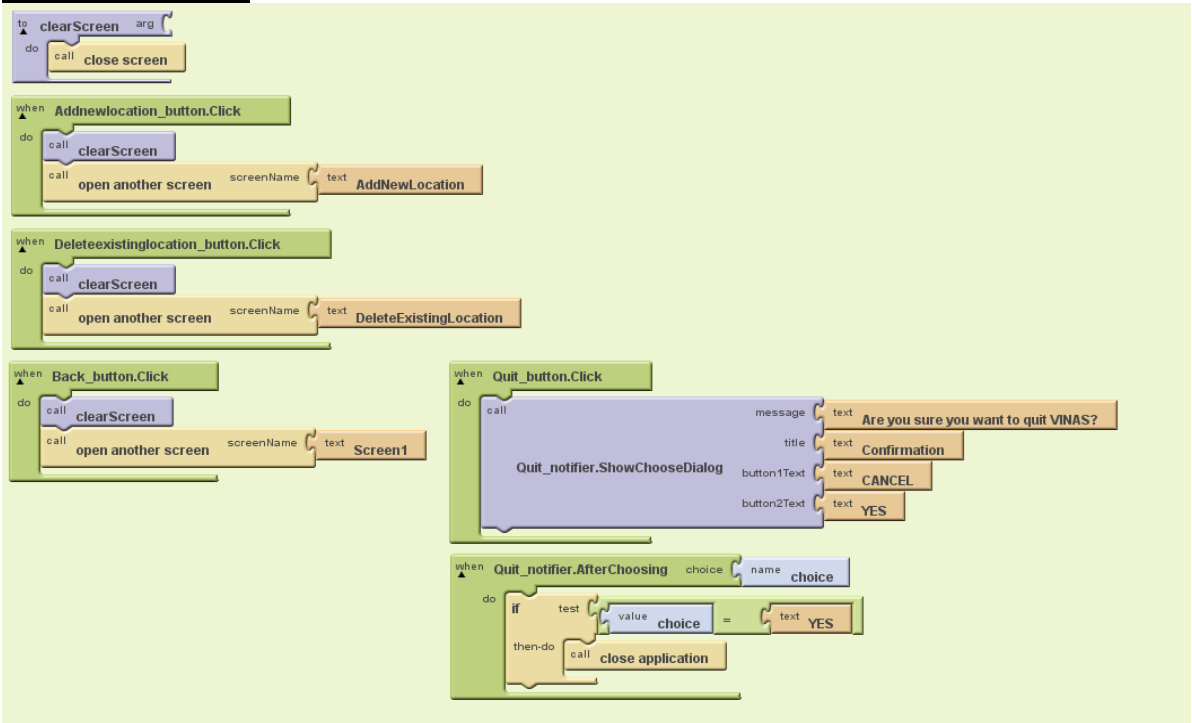
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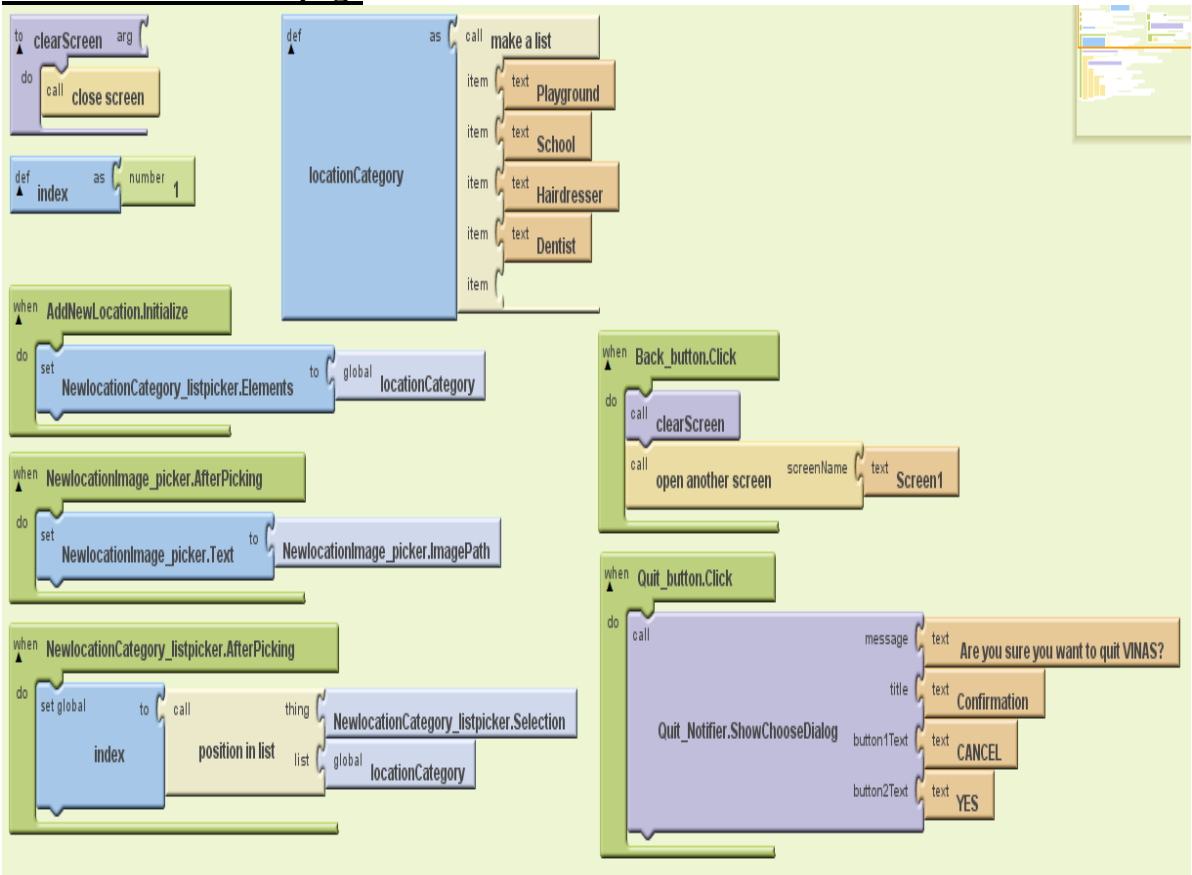
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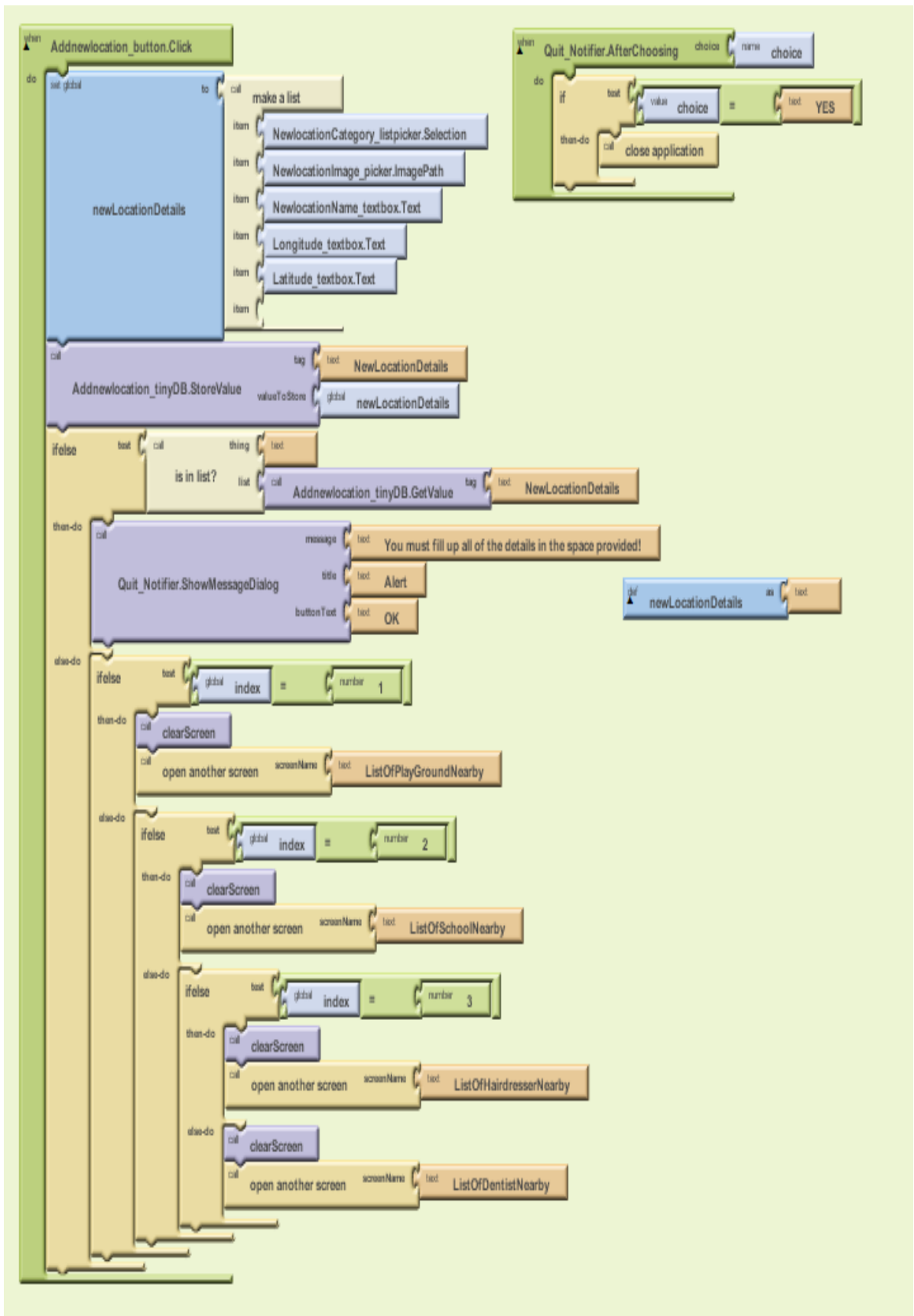


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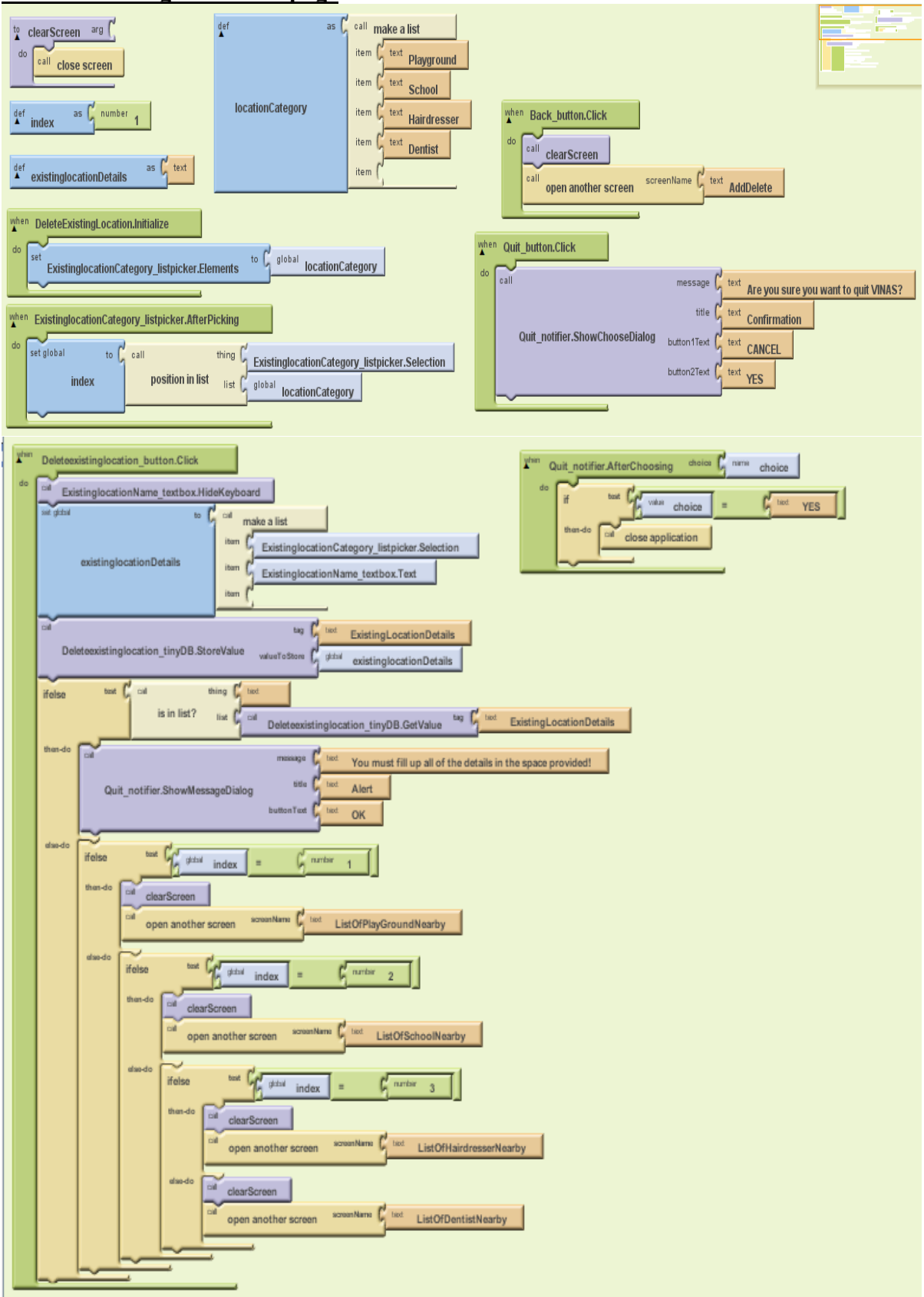


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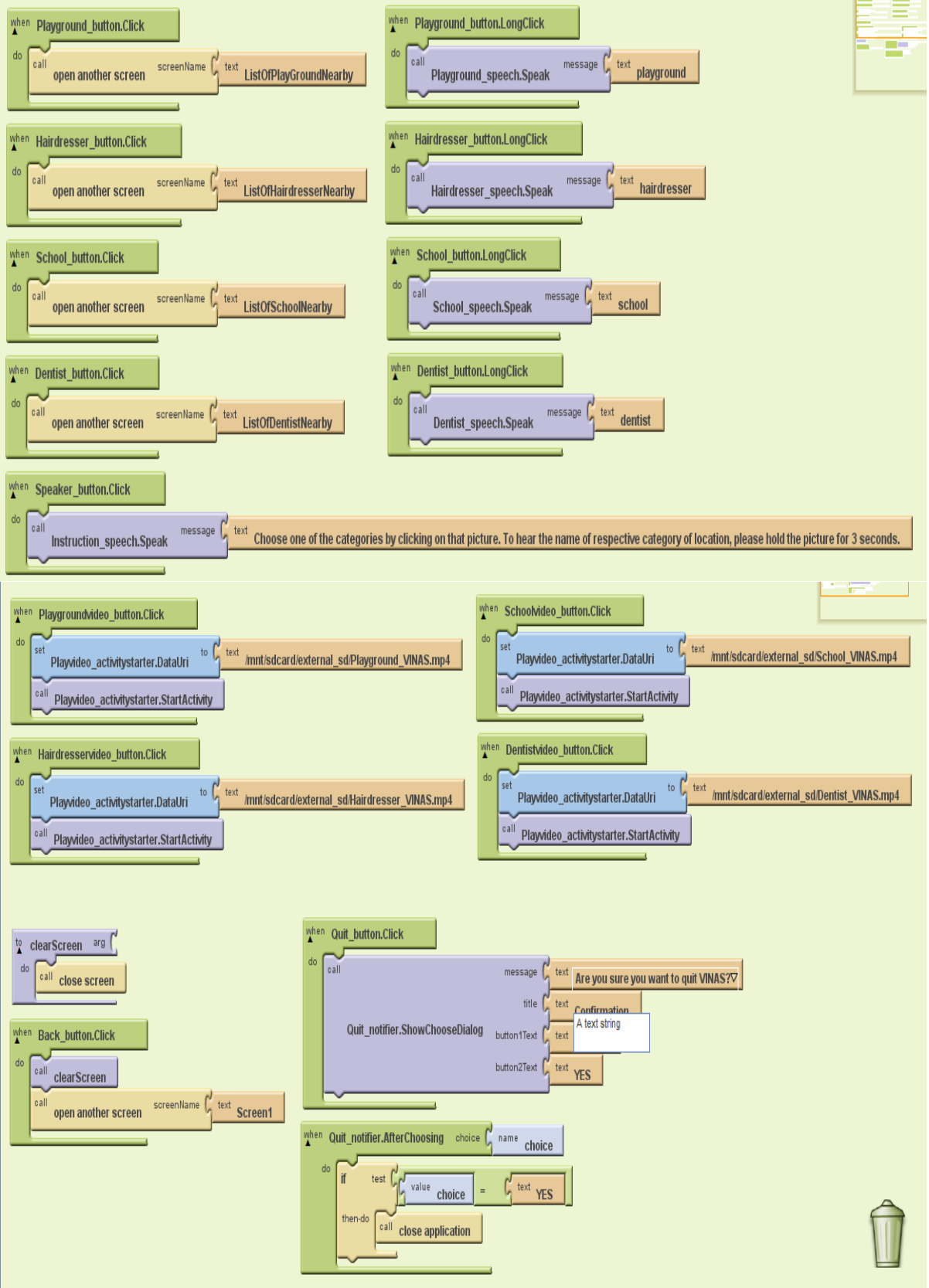




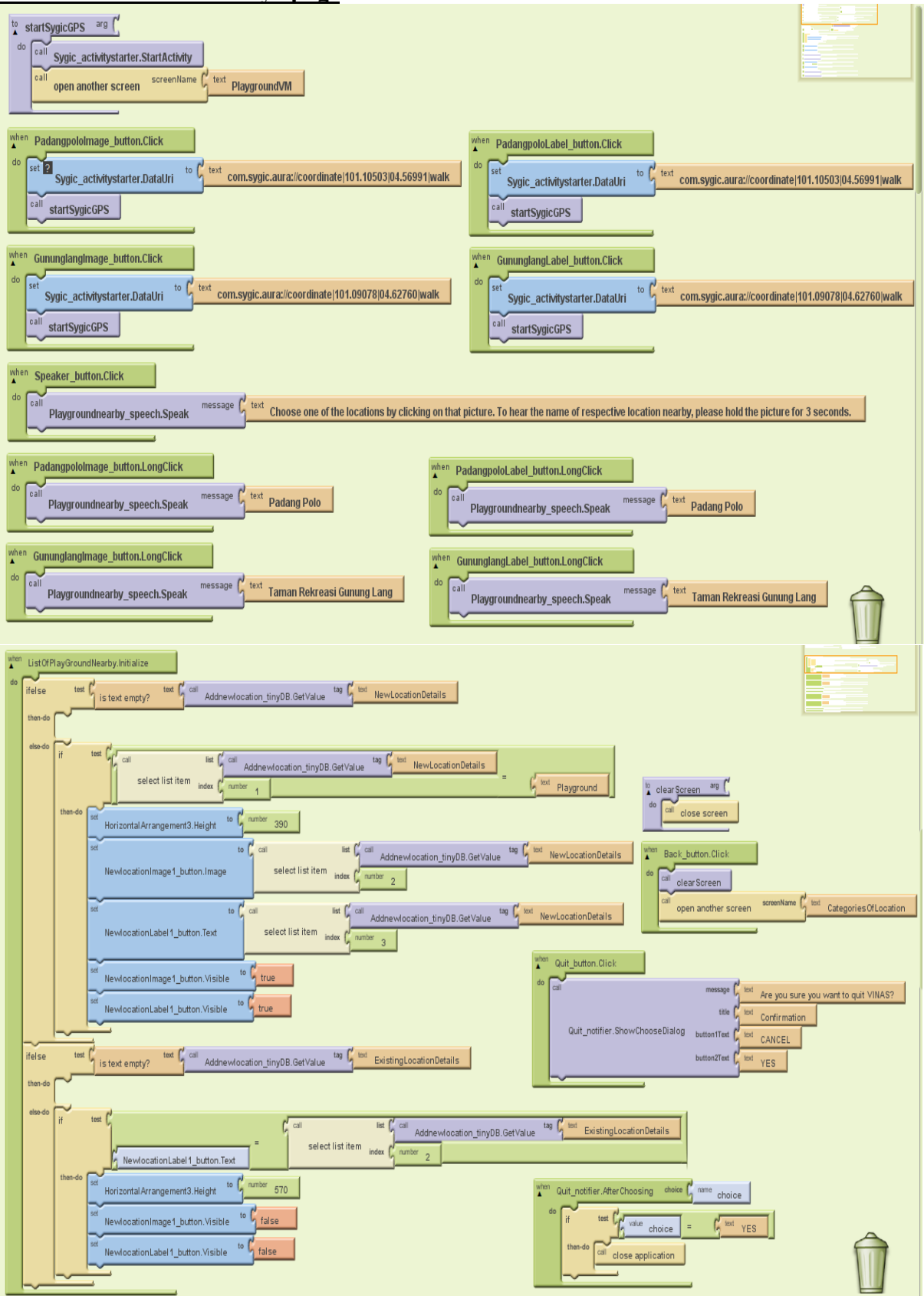
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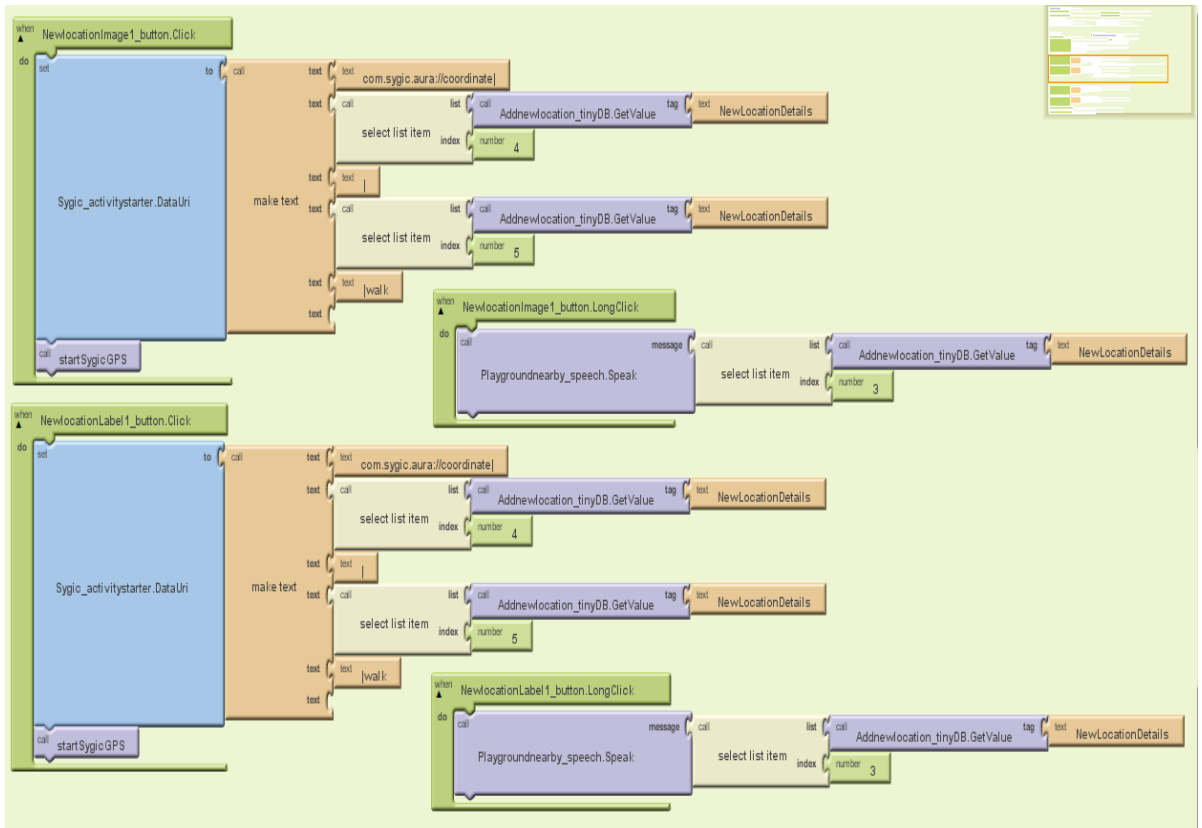


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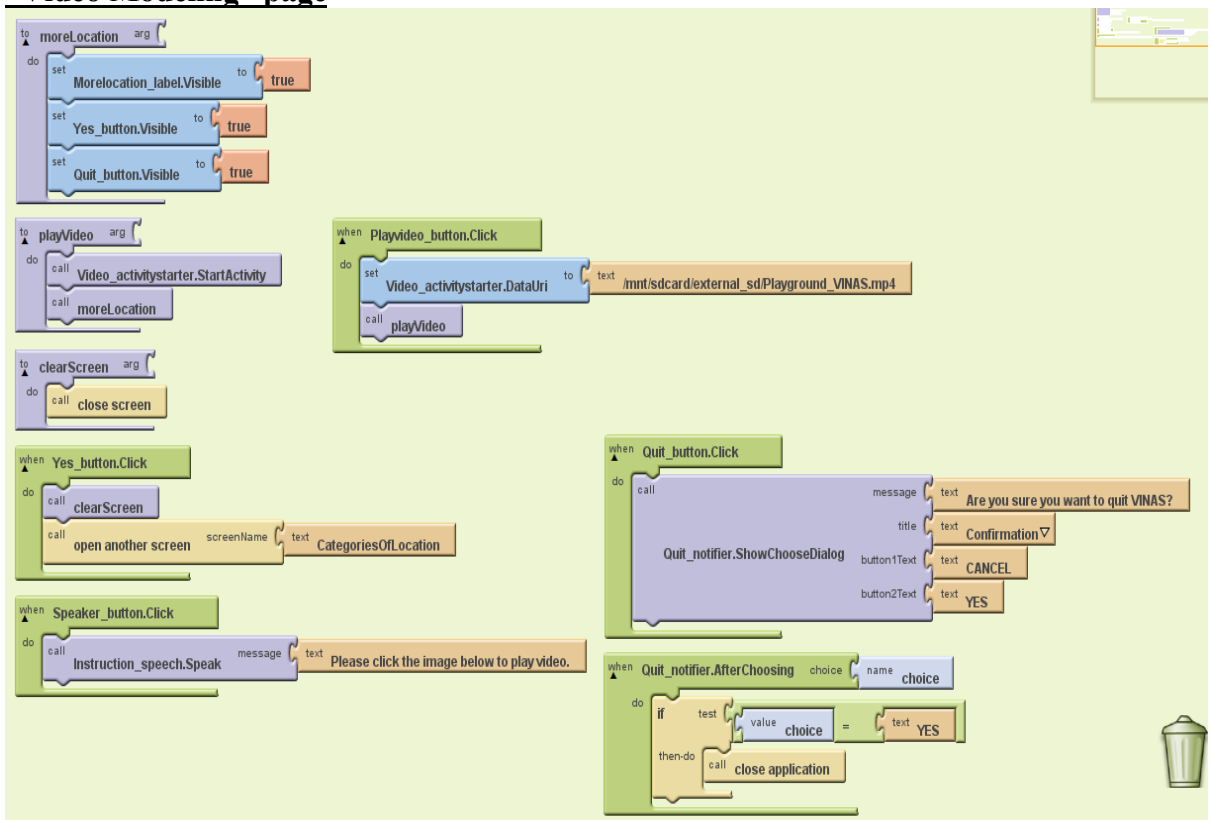


“List of Locations Nearby” page





“Video Modeling” page



Appendix B – Official Letter to NASOM

Nurul Atiqah binti Amran,
Village 5,
Universiti Teknologi PETRONAS,
Bandar Seri Iskandar,
31750 Tronoh,
Perak.



Coordinator,
The National Autism Society of Malaysia (Ipoh),
No. 6 & 8, Taman Tingkat Ipoh Satu,
Ipoh Garden South,
31400 Ipoh,
Perak Darul Ridzuan.

13 March 2012

Dear Sir/Madam,

CONDUCTING A RESEARCH ON AUTISM CHILDREN BEHAVIOUR

With reference to the above matter, I, Nurul Atiqah binti Amran, final year student from Universiti Teknologi PETRONAS (UTP) would like to conduct a research on autism children behaviour at the NASOM (Ipoh branch).

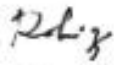
2. For your information, this research is conducted due to the final year project requirement of my university. Basically, I am building a mobile application for autism children which is called Video Navigation Assistance for Autism (VINAS). VINAS will provide a great Video Modeling (VM) tool in order for them to learn "what to do?" in certain locations such as playground, grocery store, mall, restaurant, cinema, etc. VINAS will also be integrated with GPS function so that wherever they go, they will know how to adapt with the current location situation.

3. Due to this matter, I would like to schedule an appointment so that I can conduct an interview session with you and all of the teachers and also carry out observation on the autism children.

Your cooperations are very much appreciated. Thank you.

Yours Sincerely,


.....
(NURUL ATIQA H BINTI AMRAN)


Dr Rohiza bt Ahmad (supervisor)
Senior Lecturer
Computer & Information Sciences Dept.
Universiti Teknologi PETRONAS
31750 Tronoh, Perak.

13/3/12

Appendix C – Interview Consent Form

Mobile Application on Video Modelling Assistance for Autism (VIMAS)
Nurul Atiqah binti Amran
Final Year Student
Universiti Teknologi Petronas



CONSENT FORM

Project:
Mobile Application on Video Modeling Assistance for Autism (VIMAS)

Project context:
VIMAS will provide a great Video Modeling (VM) tool in order for them to learn "what to do?" in certain locations such as playground, grocery store, mall, restaurant, cinema, etc. VIMAS will also be integrated with GPS function so that wherever they go, they will know how to adapt with the current location situation.

I agree to participate in this project, whose conditions are as follows:

- The project is aimed at making a mobile application for autism children. For this purpose, semi-structured interviews will be conducted with key informants from the National Autism Society of Malaysia (Ipoh branch).
- Interviews will last for about one hour and questions will deal with autism children behaviour towards self-care and social interaction skills within the community, imitation ability among autism children and video modelling tools as a treatment approach for autism.
- The interview I give and the information it contains will be used solely for the purposes defined by the project.
- At any time, I can refuse to answer certain questions, discuss certain topics or even put an end to the interview without prejudice to myself.
- To facilitate the interviewer's job, the interview will be recorded. However, the recording will be destroyed as soon as it has been transcribed.
- All interview data will be handled so as to protect their confidentiality. Therefore, no names will be mentioned and the information will be coded.
- Any reference will be made in general.
- For any information about the project, I can contact Nurul Atiqah at 017-7996582 or nurulatiqahamran90@gmail.com

Respondent's signature: _____

Date: _____

Interviewer's signature: _____

Date: _____

Appendix D – Interview Plan

Mobile Application on Video Modeling Assistance for Autism (VIMAS)
 Nurul Atiqah binti Amran
 Final Year Student
 Universiti Teknologi Petronas



INTERVIEW PLAN

INTRODUCTION OF INTERVIEWER

Hello, my name is _____, and I am here to conduct an interview due to my final year project which is to develop a mobile application for autism children. This mobile application which is called "Video Modeling Assistance for Autism (VIMAS)" will provide a great Video Modeling (VM) tool in order for them to learn "what to do?" in certain locations such as playground, grocery store, mall, restaurant, cinema, etc. VIMAS will also be integrated with GPS function so that wherever they go, they will know how to adapt with the current location situation. Each location will contain a video of a normal child modeling an appropriate sequence of actions, so that the autism children can imitate the sequence of actions that have been modeled by the normal child in the video.

During the interview, I would like to discuss on the following topics: Autism children common behaviour, self-care skills and social skills they can acquired, imitation ability among autism children, and video modelling tools as a treatment approach. With these topics in mind...

AUTISM CHILDREN COMMON BEHAVIOUR

Main questions	Additional questions	Clarifying questions
<p>1) Can you tell me about the common behaviour of autism children in this school? OR How do autism children in this school behave?</p> <p>2) In your experience, which behaviour bothers you the most? OR In your opinion, what is the most worrisome behaviour among the autism children in your school?</p> <p>3) What is the best approach to teach them?</p>	<p>☞ How did you learn the right way to teach/motivate them?</p> <p>☞ Under what circumstances do they eager to learn?</p> <p>☞ What attract them to behave properly?</p> <p>☞ When would they become aggressive /calm and who are the main victims?</p> <p>☞ Have you noticed any changes of behaviour in themselves over the past few years as a result of intervention programmes?</p> <p>☞ Which behaviour do you think the most difficult to change/improve?</p> <p>☞ What task their need help the most?</p> <p>☞ Can they recognize common places or location they usually go? By what?</p> <p>☞ Can they learn through picture or visual? Would they recognize something by just looking at the picture?</p>	<p>☞ Can you expand a little on this?</p> <p>☞ Can you tell me anything else?</p> <p>☞ Can you give me some examples?</p>

SELF-CARE AND SOCIAL SKILLS		
Main questions	Additional questions	Clarifying questions
3) Do you think they can be independent in their life, without the supervision of adults/parents?	<ul style="list-style-type: none"> <input type="checkbox"/> If yes, what is the reason you think like that? <input type="checkbox"/> If not, why do you think they can't? 	<ul style="list-style-type: none"> <input type="checkbox"/> Can you expand a little on this? <input type="checkbox"/> Can you tell me anything else? <input type="checkbox"/> Can you give me some examples?
4) In your opinion, how they can live a normal life like others? OR What are the best methods/ways to give them a chance to live a normal life like us?	<ul style="list-style-type: none"> <input type="checkbox"/> What is your suggestion in order to improve their interactions with the community? <input type="checkbox"/> How can they be accepted among the community? <input type="checkbox"/> Do they find difficulty in locating places? 	
IMITATION ABILITY AMONG AUTISM CHILDREN		
Main questions	Additional questions	
5) Based on your experiences, do you think autism children has the ability to imitate others action?	<ul style="list-style-type: none"> <input type="checkbox"/> Who do you think is the most appropriate model for autism children to imitate? <input type="checkbox"/> How frequent they will see the model perform that action before they will imitate it continuously? <input type="checkbox"/> Why do you think they can/can't imitate others? 	
VIDEO MODELLING TOOLS AS A TREATMENT APPROACH		
Main questions	Additional questions	
6) Have you ever heard about video modelling tools as a treatment approach for autism children?	<ul style="list-style-type: none"> <input type="checkbox"/> Have you ever applied video modelling tools as a treatment approach for autism children? If yes, how do you apply it? What is the method and what medium are you using? (e.g. laptop). If no, do you want to try to apply it? 	
7) In your opinion, do you think video modelling is one of the best treatment approach to improve self-care and social skills of autism children?	<ul style="list-style-type: none"> <input type="checkbox"/> Why do you think so? <input type="checkbox"/> Is there any suggestion to improve this tools/approach? 	

Mobile Application on Video Modeling Assistance for Autism (VIMAS)

Nurul Atiqah binti Amran

Final Year Student

Universiti Teknologi Petronas



CONCLUSION OF INTERVIEW		
Are there any other matters that we have not discussed and that you find worrisome? OR Do you want to add anything in order to improve this project?		

Appendix E – Interview Transcript

Transcript 1

Interviewer: Nurul Atiqah Amran

Interviewee: Pn. Siti Nordiana, Coordinator of NASOM Ipoh and Autism Teacher

Interview Setting: Interview conducted at National Autism Society of Malaysia (NASOM) Ipoh branch, No.6 & 8, Tingkat Taman Ipoh 1, Taman Ipoh Selatan, 31400 Ipoh, Perak

Affiliation with interviewee: Coordinator is the first point of contact for the society. I have had no previous relationship with Pn.Siti.

(Start of Interview)

Atiqah: Ok, for the introduction as I mentioned before this the purpose to develop this system. So for today I would like to ask you certain topics such as their common behaviors, how they take care of themselves, social skills, whether they can imitate others or not and whether you've heard about video modeling treatment.

Pn.Siti: Umm... (positive response)

Atiqah: So firstly, can you explain a little bit about the common behavior of the autism children in this school?

Pn. Siti: The characteristics here is most of them have ADHD, hyperactive. Then, the characteristics are more on they are lack of eye contacts, tend not to hear people say what to them. Actually we believe that the process lah. What they got cannot be processed so that there is no output come. But then, there is no prove to say that, just if we look at the posters it said that hearing impact.

Atiqah: So that's mean what they hear they cannot process?

Pn. Siti: That's what we assume because why, if we use picture with them, often picture what we want them to do. The first two months we talk to them they don't understand what we are telling them and then they are looking at other places because they have lack of eye contacts. They don't like to face-to-face people. So, when we start showing pictures to them, ok "I want you to go toilet", the next time "I want you to go toilet". After few periods, we found that a student, we don't have to show the picture, we just say "toilet", they understand already.

Atiqah: But basically first is based on the picture?

Pn. Siti: Aa first we must start with a picture. But before we assess first la whether they need the picture or not. Picture is to exchange our communication to them, besides than telling them verbally we used picture to guide them. At the beginning we told them “go toilet, go toilet”, 2-3 months maybe still not understand, then we take out the picture. Take out the picture and start teaching them with the picture. “Ok boy, toilet. Boy, toilet”. But the words should be very simple. Either 2 or 3 words only. We can't like “Boy, now you go toilet, after toilet you wash hands then you close the tap”, they can't process that. It's too long for them.

Atiqah: So one by one right?

Pn. Siti: Yes, one by one at one time. Then if we had started with the picture, gradually we fade the picture, then they will understand what are we telling them to do.

Atiqah: So basically, compare to picture or video, what do you think the most appropriate for the children?

Pn. Siti: Ok so we did try the video but video is more interesting. And then you can put it for more than one or two people. It depends how you want to use the approach. You can use more than one or two people. This is my next project for the school. Now my children are learning how to cook. With the guide, with the guide of teacher. We are recording everything. So at one day, we're going to cook all these individually, and then ask them to see what they did and to imitate from the video.

Atiqah: Aa that one is video modeling right?

Pn. Siti: Aa video modeling. Our future plan.

Atiqah: But it is video self-modeling?

Pn. Siti: Um mmm, it's on themselves. What are they doing? What things they used to cook? So there is no more verbal, there is no more instruction from teacher. There is video. Self video so just need to label Monday to Friday. So Monday what are they going to cook, Tuesday and until Friday, what are the menus? So they have to select the video themselves, they have to see and then they have to follow. So that's our long term plan. So that they don't depend on people anymore. So next time, whatever they see with themselves, what they have done, they can adapt. They also can adapt with television shows. They see people cook spaghetti, channel 80,

maybe one day they can follow that. That's what we want, so that they not dependent and at the same time they have innovative and creative idea.

Atiqah: So that's mean they can imitate themselves modeling and also others?

Pn. Siti: That is our --, our long term. This is long term in our living skills. But we just start to adapt on cooking. We are not prepared yet to adapt others skills because other skills we are not seriously doing yet. But cooking is basic, every human being have to eat right. So this is very basic, very important to the children.

Atiqah: So, they are more attracted to picture, video and other interesting things right. If we spell the words P-E-N-C-I-L either than we show them pencil picture, they will be attracted to picture.

Pn. Siti: Yes, they will attract to picture. But then, we do encourage both. If at school, we encourage both. But, we are not stressing them to spell; we are not stressing them on that. It's fine if they can memorize the things. So usually you can see our country, we are not really "OKU friendly". If you can see at the bus stands, the picture is not big enough to give them instruction and so on. Mostly are for normal people. So, that's why we have to do both. We can't against the culture, we must follow the culture also. If our culture likes to do something on certain way, so we must to do like that.

Atiqah: So can they read? For example, at the station I put restaurant picture and the word "Restaurant". Can they read the word "Restaurant"?

Pn. Siti: Aa most of them can.

Atiqah: Can lah..Most of them can read just one word, two words can lah..

Pn. Siti: Yes, I tell you some of child – some of these children they are not verbal, but when see KFC they said "KFC". They won't say "Mummy", but when they see the Domino's Pizza, they will say "Domino". Things like that, things that really attract them. Colors really play their roles, color. If we make it black and white, they're not really interested. If something are really attractive, you see KFC red and white, really attractive right. Mc Donald's also, red and yellow. Really attractive. Children can see that and easy to memorize.

Atiqah: They are interested with attractive colors.

Pn. Siti: Yes, apparently it is easy to memorize.

Atiqah: Is there any color blind among the children?

Pn. Siti: So far I didn't hear that. Their parents also did not reach that level for their research on the children.

Atiqah: So based on this intervention program at NASOM, so you have observed and identify the progress. Did they changed?

Pn. Siti: Yes, yes.

Atiqah: how are they when they just enter this school and how are they now?

Pn. Siti: When they just enter, sometimes the doctor gives the assessment. Basic assessment from the hospital, sometimes we don't get that. So when we didn't get that we create observation from here, we create assessment for them then we have 1 year plan. We start with 1 year plan. In 1 year plan, we have 3 breaks. In these 3 breaks, we evaluate again. Is that plan valued with these children or not. If not, if it is too far, we have to simplify. If too simple, we have to add more.

Atiqah: So for each children different programs right?

Pn. Siti: Yes, different IP. Individual education plan is really different. Each student is different, not the same. But basic needs we standardized. Because some children they can't sit, some can sit but don't like to sleep, another can sit but will crying. So you can't create one for all. We need to customize but the basic needs for example when sitting, table activity – when sitting, table activity, that one we standardized it. So that teacher can teach easily.

Atiqah: So, based on your experience, what attract them to behave properly? Maybe you do some rewards or they will get something when they can do something

Pn. Siti: Um mmm, will give them rewards. Most of the students especially the critical behavior lah, very challenging, yes we work with every task there is reward for you.

Atiqah: Rewards like?

Pn. Siti: Usually we will interview the parents. We have evaluation form also with the parents. What is the more interesting if they show tantrum, what they most like, so the thing that they like the most, the parent have to sent here. 101% confirmed that they like it. If they see the thing, for

sure they want it. If not, they will be unconscious. So we will use that as our weapon to encourage positive behavior. Example like –

Atiqah: So if they like KFC, they will get KFC?

Pn. Siti: Um mmm, but we seldom get thing like that. Usually we get biscuits, ice cream, toys more on light behavior that is not very challenging. Toys work with them. Some children even say “Good boy” they happy already. But some children, you say anything it won’t give any effect. Just a particular thing is work with them. Mamee, M&M, things like that, you know, that they very like. U gave that automatic their “button” will turn on and they can do work. If they see it, but you didn’t give it, you didn’t encourage them, they also can’t work.

Atiqah: So you give the reward before they do a task or after to motivate them?

Pn. Siti: It depends on the students. Some students they understand. We tell them, “if you finish your task, at the end of the activity, I will give you this”. They have patient and they can wait, they can wait. Some children we have to give them little bit first. This is what you’ll get to motivate. It depends on the student. We can’t predict it. Some children we just say to them “Ok you finish” and then they just finish their work without ask any reward.

Atiqah: Emm, so, which behavior you worry the most?

Pn. Siti: Is self injury. The most difficult behavior to change. Because I have faced a children. My experience here is 40 years. I met the children already 14 years. Already big enough. From the age of 5 until now, teen. What I can see is the most difficult behavior to stop is self injury. Because these children seldom attack people except unpurposely. But self injury is the most worrisome. Sometimes if they can’t get something, or they can’t express their feelings, they tend to bite until injured.

Atiqah: Bite others?

Pn. Siti: Bite their own hands. Self injury. It’s like their own face, you know, and kick their leg on the wall, throw themselves on the floor. I’ve seen all that. This is the more difficult to stop. When they have self injury, slowly it will become enjoy for them you know. To satisfy themselves. To stimulate their anger. Until they feel numb or what then they stop. Relax. But until they feel that, they will keep going like that.

Atiqah: Are they will do like that when angry?

Pn. Siti: Usually when they can't get something. So that to express their feelings. There are few cases happened at home or weekend. Things like for example their parent promise for shopping or what, they didn't get. So happened on Monday they know every Monday, teacher will take them to Tesco. But on one Monday, food still there, so don't take them to Tesco, then they start act.

Atiqah: They remember that?

Pn. Siti: Yes, because it is their routine. Their process is routine so that is why schedule is very important for them. We are doing here all the things like that, like the schedule. Morning what to do, so that's what we adapt. At one moment time, we break the routine. Like this morning we have a bit hand walk, because why normally morning they go up study. But because of short teacher, I say ok this morning today we do other activity then later we have another activity. There is no class today. I say like that because we have look each other. Some students don't want to go outside in the morning, some crying, some want to go eat. You know they don't understand what teachers want them to do because their routine already changed. But have to do more often. But if new staff comes in, it's difficult to convince the children. If the old staffs, they knew already.

Atiqah: How can them recognized the new staffs? How long it will take?

Pn. Siti: Aa some of them yes. Some of them get used to it already. We already have intern about 3 years. Still one or two children still can't recognize them. When their favorite teacher already not here, their behavior will like pensive, isolate themselves from others, they really miss the teacher lah. What to do I also can't hold my staffs[laugh].

Atiqah: So are they ever hurt others?

Pn. Siti: Actually I've been beaten also, but this children, he's ADHD but he's Asperger. He understand people angry with him, if others make him sad, you know things like that he will understand. So happened on that day, he got this habit to watch people in the toilet. So that thing we have to stop. So we are stopping him to go toilet, or you see that particular toilet lah. You cannot use this toilet, you have to use outside toilet. So when he goes to the toilet, at this time teacher can send another student to go to another toilet. By the time he goes out, another student has settled. Things like that. If not he wants to break the door also. So at one day, he knows about this. He already knows the teachers lied to him and he starts to break the door. And then when we disciplined him, he will start beat. I have gone through that. My teacher also.

Then at the end of the day, I have to tell the parents that I really cannot handle him. This case seldom happens, and actually that is my first case. I've never seen autism like this. Yes it is really my first case throughout 14 years experiences. But if compared to student here, he is very intelligent. He is from normal school actually, then after end school at 18 years old, he can't go anywhere so he has to come here. Special education at normal school is only offered until 18 years old only. This OKU children can be 2 years late, 9 years old can still enter Standard 1 class. 18 years old can still at Form 5 class. So when the school age already ended, he don't know where to go. So usually all the NGOs at Ipoh, they seldom take autism which is already matured enough. Only NASOM offers long life. So I give him opportunity. He can do works fine. But then one or two times la he did beat teachers, so I have to tell his father that we really cannot handle that.

Atiqah: So he never comes anymore?

Pn. Siti: Yes. But before that I told his father that he have to give medicine and all. But since her father not agreed, I can't do anything. We don't have any man here. If there is man, we have no authority to tie them or to beat them. We don't have the authority. If we really like nursing home, it's different. We just a society who conduct a program. So the violent thing shouldn't happen here. From staff or students. So I cannot please my teacher, I cannot please him. So I have decide to remove him from school.

Atiqah: So what do you think the best approach to teach them? Picture? Video?

Pn. Siti: Um yes. Because for me that things, they never forget you know. You'll never forget once you see the pictures. Even though you don't remember the story, but the next time you see that picture, you will remember. We normal also we can remember, the children also the same. Last time, when I newly work here, we don't use picture you know. We point them then we drag them to come, we show this, show that, show the same thing. If that thing can go mobile, easy. Toilet how can it be mobile? So they have to go to toilet and see, this is toilet. Really ridiculous. Then slowly we modified. At that time, we have no training or course. We start with a picture, with a chart. This thing should be put where, that thing should be put where. So that picture does work. They will remember. So slowly from there we adapt.

Atiqah: Then, if in the picture, the color is different from the real one, do they will be disturbed with that?

Pn. Siti: Because of that firstly we teach the similar thing. If we want to use picture as a mean of communication, firstly we must snap the toilet that we want to teach. The real toilet. The

particular one. Then, slowly we adjust that. With different colors. Slowly we adjust the toilet, because they have to generalize with the public toilet also. They can't expect to find the red color toilet there. They can't expect to find the blue color table at the cafeteria, shopping complex right? They can't expect all that. So then slowly we have to adjust it. But for the beginning, yes. To make them to understand the concept, we have to use the same model.

Atiqah: So, for my system, the pictures need to be real right?

Pn. Siti: Yes, yes. Like us, we teach them to go to Tesco. We don't snap the picture of Tesco Extra, download from the internet, no. we snap the real picture of Tesco. We got the permission, snap the picture, the exact location. So they will know each entrance. Every entrance is not the same. So they will not took the entrance they not familiar with. Normally when they enter the respective entrance, they will keep enter the same entrance. Slowly, we will park them under the roof. But for the time being, still outside. So we will take view from each angle, and then we will teach them. They have to learn. Sometimes, we have to teach whatever we plan to do. We have to think of 15 years later. What will happen to them? So now we bring them out, but 15 years later, this will not happen anymore. We will fade from them. They have to do these themselves. So if they can adapt now, the picture will be useful to them. If from this angle, they have to enter this entrance. If from that angle, they have to enter that entrance. At least this will help them.

Atiqah: So next question, on their self-care and social skills. So you think they will be independent without the parents, without the teachers?

Pn. Siti: Aaa if here I can talk about the teachers lah. But parents long time since I carried out a survey on them. If sometimes I followed my teacher to go to Tesco, what I can see is, at least when they see people, especially in Tesco, blue color uniform, they don't knock them [laugh]. They will not crush on the people because they know people with blue color uniform are the staffs of Tesco after few times go to Tesco. And they know already, if at the counter, they have to queue and pay. But for now, we don't use large cash note for them, still using small money to buy one or two items only and then calculate the balance. And then yes, slowly they can say thank you because this is what teacher modeled them. What the teacher doing they will observe and then when the teacher fade, they have to do exactly like what they see from the teachers.

Atiqah: Then after that, can they imitate without the presence of the teachers?

Pn. Siti: That is our future long term plan. But yes, there is a successful story about this children which is going to the shopping complex alone, buying things.

Atiqah: Range of ages that can be leave alone to be independent? Approximately?

Pn. Siti: Usually I heard, not Asperger cases, autism which is on mild or moderate level, is at range 20's plus. That mean really have an effective intervention, the correct way of teaching, yes they can even use the public transport. I have seen this case before. Even we are hiring autism kids in Kuala Lumpur to be like office boy. First few months we can see they had a few problems to adjust with the situation, but gradually by routine, they are fine already.

Atiqah: So for 15 years old autism kids, you'll never leave them alone?

Pn. Siti: Yes, not ever. If we want to try, its one-to-one situation. That's mean if teacher, they should be two or three feet behind. We have to check first for example, if we bring out this one boy, would they understand they have to take a taxi, before that have to wait for a taxi, we have to see that first. If they don't know about, we will never try it. Accident can happen anytime, especially loss. You know escalator also dangerous. At the beginning, there will a great challenge. In fact from the Tesco itself, they get annoyed that we bring our children, because they will disturb other customers. Yes its true while at the beginning they will act weird. But after 3 years, ok already. People also know them already.

Atiqah: But if they use my system, then you have to follow them from behind to observe them?

Pn. Siti: That one is for us to monitor them first. If they can use the system, we may fade. In fact, now my school is doing main stream. Means that my student is going to normal school with a teacher as her buddy. Now is her 3rd month, and my teacher already fade from class. They have to do things independent. But then my teacher is peeping him to make sure she not stole things, not screaming, not beat others because she is sitting in a normal class, she cannot have that behavior in the class that can disturb others. Teacher has to be nearby. But then this week, starting from Monday, my teacher is already in the canteen. Not followed her, just waiting for her at the canteen. But then, I have to tell the class teacher, if she showing something already, then the teacher has to call her because it's too early for me to fade the teacher. But it can happen. No problem with that.

Atiqah: But for the few times we have to monitor right?

Pn. Siti: Yes, we have to be nearby, you know, to ask them, to correct them. If they know already how to do that thing, like in your system, the GPS right? If they already know about the concept, for example if they want to go to Mc Donald, they have to click Mc Donald, so it will show the directions. You have to turn left, you have to turn right. The sound is there. If they already

understand the concept, did they have to hear this and that, and look here, it will be fine for them. If they don't understand the concept, to understand the concept they need someone to be near. To teach first. For example, "this is how you press the button, this is how you change the direction, once you press the button you don't press other button. After that it will change your direction." You see. Somebody have to take them first lah on how to use. For the children normally the manual is their buddy, teacher or the supervisor. Teach them first, after few times you see they can do it, then its fine.

Atiqah: So you think at what ages they can use my system?

Pn. Siti: We prefer as early as possible because why –small kids can understand faster. I have games here, where they have to see the video, and then start the match. You know, small kids really can understand fast. Big kids are little bit slow.

Atiqah: The exact ages?

Pn. Siti: Below 10 can understand faster. But kids below 10 are more to play. They are not serious learner. Sitting also have to-- have to timing them, at least 10 minutes you have to sit, at least two minutes you have to look at the paper there, at least 3 minutes you have to this, that. When the bell ring, then only you get up from there. So we have to timing them for the small kids. But in terms of knowledge, observing the knowledge, small kids are easier.

Atiqah: So at the age of 8 they already can understand la?

Pn. Siti: Yes, quite understand also. But it depends on their seriousness.

Atiqah: So you think at the age of 8 they already can understand my system?

Pn. Siti: Usually if you have start—even if you realized this thing, our autism kids now more familiar with iPad you know. So small kids now start affected.

[Interview stopped for a while. Pn. Siti has to handle an autism kid named William]

[Interview continued]

Atiqah: So do you think they will be accepted among the community? For example, if they go outside, do public people help them?

Pn. Siti: That's why we have to create awareness. As I told you, when we first bring out the kids to Tesco, even though we already do black and white with the manager, still the challenges are there. The security guard is not really happy. If the kids took items, they will come. You know. And then now, fine already. In fact, the people know them. And then start to help them. And say like "this is not fresh. You take this one" Even usually in the morning, the same kid will go to the wet market at the Tesco. So the staffs already know them and start helping them. We take them to Polo field often and even the Sultan recognized them. He will give way to the kids because they know that autism kids have no "handbrake". They are very fast at walking. Even the Sultan understood and will give us ways. You know when we often go to create awareness, people will gradually understand. At the beginning it will look weird, but then it's ok. Like before this, the teacher will be a bit shy. Like me when starts working, feel little bit shy taking them out because sometimes they behave very oddly and really embarrassing. But then when they behave odd, people see then we have to tell them that this is autism kids. At this moment then comes the interest. They will ask "what is autism? Never heard before this". Some will know and said, "Ohh, this is the autism kids. They are so healthy". They thought of autism will look like very weird or what you know. So when they see this kid, then they understand. The only center pure of autism is NASOM. Some centers they have autism but mix.

Atiqah: Do they have difficulty in locating places? For example, when you bring them out to Tesco, did they find it difficult to locate which shop to go?

Pn. Siti: At the beginning, we have to teach them. But Tesco is perfect sample because each time we go, the department will change.

Atiqah: Is it the location where the items are placed?

Pn. Siti: Yes, the location. After how many weeks if you noticed, the location of the item will change. So it's just nice with our program. The kids have to generalize with the things. They have to adjust their routine according to the environment.

Atiqah: So do they search for the items at other locations?

Pn. Siti: Yes, yes, they will do that. But only at the beginning, they find it difficult to find the items. But gradually, they will ask the teacher, "tomato, tomato". So teacher will lead them to find the item. But then after few times, they already understand. If "wet" then the thing should be at the back, they will not search for it in front. But if like tom yam paste, yes they have to find it in front because the department of the items will change. But it really works with our program. Because we also like that, for example today we put the spoon there, after few weeks we will put it at

other places so that they can be generalized with it. It can be here, it can be there. People's house you don't expect this right? You don't expect this bowl to keep the spoon all. So that you have to adjust that thing. They will know like this can and like that also can.

Atiqah: So for the imitation ability, who do you think the most appropriate model? Is it parent? Teachers? Or buddies?

Pn Siti: Aaa, I would say the parents. Because teachers won't stay permanently, even though you do that, imitation has already been done at the beginning when they come. First thing is attending an imitation. Because without imitation, it is very difficult for us to prompt them, to model them. But we usually imitate on gross motor. But parents will not do more than that. That's why it is very important for us to educate the parents. Like what I said before, ICI has three breaks. The three breaks are with the parents. We will discuss together with the parents so they have to do it in the house.

Atiqah: If I create video by using cartoon character, is it difficult to imitate?

Pn. Siti: Cannot see... They love cartoon. It depends. Like us also, I use the finest student like this. The first time I'm using this model of telephone, it's a bit difficult for me. But by the time I keep on using it, I used to it. I have tried with one student to use this, Siti. The other side. I teach her to snap picture using this. Because sometimes I got activity, less teachers, so I ask her to take photo lah. One two times is a bit difficult for her. But later on, she will take this from my bag and take her own photo. You see when they get used to it. Actually it's not good because I feel like take advantage on her but then is good for me, I can work with her. That's mean like your idea, for me looks like very interesting lah.

Atiqah: The cartoon part?

Pn. Siti: Yes, cartoon.

Atiqah: How about parents you mentioned just now? But different kids, different parents, right? So looks like complicated.

Pn. Siti: Maybe you can apply two things lah. One is in cartoon, and the other one is real. So they can choose. Just like us, in the phone, we also can choose which language we prefer [laugh]. So maybe you put your model like that.

Atiqah: What if I put buddies? Their peers?

Pn. Siti: If autism, it will be very difficult I tell you. Because both are same. That's why our pilot project is to take them with the normal kids.

Atiqah: Err..what I mean is, my model will be a normal kid, then from your opinion, do the autism kids will imitate the normal kid?

Pn. Siti: Can. Yes. When they can imitate the teachers. I'm normal you know [laugh]. When they can imitate me, sure they can imitate the children. My boy who is going for the main stream can running, riding bicycle, singing "Negaraku" song already. From there he learned.

Atiqah: So, if from the real person, the parents or buddies would be ok right? Cartoon also ok right?

Pn. Siti: Yes, maybe you can change the application. Maybe can do two choices, either the real one or the cartoon. But I think if there are general symbols there, for example like toilet, the common sign we used for toilet. Anytime they see the same things, they will understand. But the picture I will change because not all toilets use this sign anymore. Now we are currently teaching them about hotel symbol. So they will know, when there are in a hotel, these are the common symbol which will be used. But previously at the PLUS toll, we get them another symbol. If at school, we get them other symbols. If all these things have been teach --it's good to have a manual, colorful manual for them. So they can see.

Atiqah: So how long usually do they take to imitate others action? Like what you mentioned before, there is a teacher who follows the kid to the school. So how long for the teacher to follow until they can be independent themselves?

Pn. Siti: Aaa this teacher is quite fast lah. Only two months and then she fade already. But she -- one thing she is good, she's very creative. She has initiatives herself to start. If follows my target at least 6 months. But she fades early. She's the one who always face the child so she's the one who is better than me. I'm from here monitoring her progress only from her reports. So when she said, "ok fine, I already sit at the canteen. The class teacher did not complain anything about her. But when she wants to go to toilet, I have to observe her from far". So at least we know already, the children has excited enough if they can see the teacher from far. But the teacher not pulling him you know. Just show off her face a little bit and she will fade.

Atiqah: If strangers, would the kids imitate them?

Pn. Siti: It would be difficult if stranger. Even some of them don't like to see the stranger also.

Atiqah: If like today, I come, so are they happy with it?

Pn. Siti: They will be a little bit weird but not all. Some. Not all. Some of them have difficulty to adjust with the change. But half of them have no problem with it.

Atiqah: Have you used video modeling treatment approach before this?

Pn. Siti: Err..our future plan. But for the younger group, we still used it for the purpose of imitation their dance movements, you know. Sound we always used so that they know how to process that things. Then we also used educational video to imitate good behavior.

Atiqah: So what do you used? Laptop, television or else?

Pn. Siti: We used television. We will download that thing first, burn in into DVD, then we will open it by television. We will watch it in group but at the same time we are teaching them. This is what you should do, this is --. But then we have to suit that thing with their living skills. If we not adapt that, then it will become useless if teach only the theory but there is no practical.

Atiqah: So do you think video modeling treatment approach is one of the best treatment approaches for autism kids? What are your suggestions to improve this approach? Like to improve this approach compared to the common one?

Pn. Siti: What I see now is we seldom see all this things in manual type. You know, manual. Before you used a thing, there must be an instruction first. The instruction usually is hardcopy, paper-based type. Like what we have for hand phones, but usually if we buy DVD, for example to play game, they rarely provide manual. The steps are not provided. It will direct to start play the games. You will learn how to adjust after few trials. But I did come across with this one called "lingua franca", that is one program you know. Is actually to upgrade IQ for normal kids but I bought that program for autism kids here. Their model form in video is very clear. They give video and then they give trial. "Now, you press" then see what happens. They already taught before like if you press this, this will happen. If you do this, this will happen. Then you can try. You do it yourselves. So it's really systematic, we can understand and so the kids.

Atiqah: Is it game or...

Pn. Siti: It's not game, it's an educational program. They will show the video first then will prompt how to use it. Then they will give us one trial on how to use it. Then after that only we go to step

2. Step 2 we can start implement that video. If we not really understand, then we start again. It's very good. I bought the program but not reached yet, it will be two to three months lah. It comes from U.S.

Atiqah: So is there any other matters you want to add or maybe to inform about the kids in order to improve this project?

Pn. Siti: Emm ok, your hardware should be made from strong material. Autism kids tend to not really take care of their belongings. Only that I realized because previously I gave Siti my hand phone to play, but suddenly if her mom come, she will just throw away the phone. They don't ever keep it back at the correct place.

Atiqah: So your phone is touch screen right? Is it ok with them?

Pn. Siti: Yes, yes. Siti can do it, but other kids I never try before.

Atiqah: Will they touch the screen slowly?

Pn. Siti: Siti is quite rough at the beginning. But then when she knows that just touch lightly also can, and then she starts touch it slowly. In fact my handy cam is also touch screen, Siti also get used to it. With her I have different projects. I aimed her to become our photographer because she can really do that work quite well. In fact her drawings also so good. She has artistic talents with her. That's why I make herself familiar with all these things. So once she used to it, we are going the get the grant and buy for her a nice camera.

Atiqah: How old is Siti?

Pn. Siti: 17. She is my first student when I work here. Long time already because her mom works permanently here so her mom just place her here because all the teachers are all girls. We don't have any boy here. So her mom feels safe to send her here. That's why she continues here. But usually when girl kids stay longer at NASOM, this is the reason. Most of the teachers at NASOM are women, so they feel more confident to keep their OKU kids here.

Atiqah: So I think that's all for now. Actually for my final year project, this semester I just carried out a research, not into development yet. So next semester I will not taking any project. Later in my 3rd semester, on September, I will take FYP2. During FYP2 I will develop this system.

Pn. Siti: So later you will develop this system?

Atiqah: Yes, I will build the application during FYP2. So I will meet you again lah.

Pn. Siti: Sure, sure you can. If I still here lah. But you can use the children as the research also. It's very a good idea. Actually I really like that idea. Even though I'm not going through this thing, but I see this project is very interesting. Even GPS also help us in our daily life.

Atiqah: so for this one year I will always contact you. But next semester actually is not official lah. From September until December, then during that period I will officially develop and test the system.

Pn. Siti: Later you just email me that you're coming because as you know, my schedule is very pack. At least if there is no interview session, I don't have to be here. I can pass the message to my teacher. So at least somebody know that you're coming. Err maybe for your system, for trial, you can try in this building first. Usually from building, we will bring them to porch. From porch only we will take them outside. In fact, usually before we bring them to Tesco, they have to walk with us in this park. One teacher with one student. Until we confident they won't run from us, with one sound they will come back, then we start taking them to the shop. We will teach them how to cross the roads, the color of the traffic light. Then after that going back. It takes more than 2 years since we try this. Then after we move here, only then we confident to bring them by taxi to go to Tesco. Just buy a cup of water at the food court and then go back. We don't enter. Few times trial until they show a good respond, then after that only with start with down area first. To adjust the environment into themselves will take time lah.

Atiqah: You said that I should start in the building first right? Like from downstairs to upstairs or what?

Pn. Siti: Yes. Usually when we say "toilet", they will go to the nearest toilet. So maybe in your application, go to the toilet 1.

Atiqah: But if using GPS, can the GPS read indoor location?

Pn. Siti: If I'm not mistaken, this is only my idea lah, maybe you can tagging first. Maybe at the beginning, this is toilet 1, this is toilet 2 or maybe give name to the toilet. But you have to be very brave to attend them, not scared of them. If you scare, this thing will not happen. I see most of the new teachers will feel a bit scared. When the kids start screaming, the teacher will run first. They won't harm. They look like very aggressive, but actually they're very sweet. If you're kind to them, they will be really nice to you.

Atiqah: Are they kind of spoiled?

Pn. Siti: Majority of them like to be pampered. Their parents never scold them.

Atiqah: So I think that's it. Thank you Pn. Siti for your cooperation.

Transcript 2

Interviewer: Nurul Atiqah Amran

Interviewee: Victor Choo Jiunn Chyuan, Autism Teacher (Intern)

Interview Setting: Interview conducted at National Autism Society of Malaysia (NASOM) Ipoh branch, No.6 & 8, Tingkat Taman Ipoh 1, Taman Ipoh Selatan, 31400 Ipoh, Perak

Affiliation with interviewee: Teachers are the suitable respondents for this project. I have had no previous relationship with Victor.

(Start of Interview)

Atiqah: Ok so I start, basically I want to develop the system, a mobile app for autism to actually to improve their social skill, for example if they go outside, then OK for example, click Enter to enter the program then there are categories of location, for example they choose restaurant then, will be pop out of list of restaurant nearby so, after that they click restaurant nearby, GPS will start. They reach at the destination then a video will pop out.. An appropriate video will pop out to that contain a normal child, modeling appropriate behavior for them to imitate.

Victor: They can --.

Atiqah: they can imitate normal child in the video. So basically to make them know what to do in each location, the GPS is just the additional one.

Victor: Then they will be –

Atiqah: have to monitored by teachers then after few times, I think they can but because I just use the simple interface. You are from what course in UTAR?

Victor: physiology

Atiqah: Ouhh, that why you enter here. The girls also—

Victor: the girls are classmate.

Atiqah: Ouhhh, OK. How many here?

Victor: including me is 8.

Atiqah: Ouhh, so every day you come here?

Victor: Haa aa, everyday, Monday to Friday. Start work from 8 to 1 but this centre is until 5 o'clock.

Atiqah: So OK, throughout your internship period here, what do you think about the common behavior of autism children here.

Victor: Common behavior hah?

Atiqah: yaaa, which you are realize since 4 months you undergo internship here.

Victor: cannot sit still. They must have something to do.

Atiqah: Ouhh, they don't like to sit still eh. Ouhhh. So, how do you learn the right way to teach them here?

Victor: learn the right way?

Atiqah: just like Puan Siti said just now, she has the right guide on how treat the autism on the right way.

Victor: Don't force them—

Atiqah: Just follow—

Victor: if the negative behavior, they don't want to do something – they want to protest. If, giving them warning for 2 times, we can try to not—like give some punishment but still minor one. So that they know that is not right thing to do.

Atiqah: So, since you being here for 4 months ago, did you notice change of behavior of the autism or instead?

Victor: it is same. I think a long period of time can change their behavior to more normal.

Atiqah: So, what task or action they need your help the most? For example, going to toilet must be accompanied by you; going to take bath must be accompanied by you.

Victor: Some of them need still need a company. Some only but majority of them do know how to use the toilet.

Atiqah: what do you think the most difficult behavior to be changed?

Victor: Hyperactive, because it is – inside already. And their concentration is very low.

Atiqah: How long they can concentrate?

Victor: Cannot say how long they can concentrate but they can concentrate doing thing which they are really like and don't concentrate doing thing which they are really don't like.

Atiqah: So. What of the behavior that you feel most worry? Just like Puan Siti said just now was self injury. In your opinion, what is the most worried behavior and do you feel it too difficult to change that behavior?

Victor: Puan siti said also right –

Atiqah: Did you find another behavior that you feel most worry since you intern here?

Victor: ouhh, here, got girls, this happens to the boys. There are few homosexual cases happen here.

Atiqah: So, since 4 months you already intern here, what is the best approach to teach them? Using picture o using video? Did you ever use the picture to teach them?

Victor: have not.

Atiqah: ouhh, never eh. How about usage of video? Like Tutor TV.

Victor: TV then the computer. Just TV and computer.

Atiqah: did they get specific session for them to watch TV or video through the computer?

Victor: there are no specific session.

Atiqah: But she want to let them watch a video—

Victor: if like that the activities here-- let them go watch TV or computer

Atiqah: in your opinion, what the usual method you use every day in teaching them in order to make they feel easy with you?

Victor: everyday eh? Just use the repetition method in order to remind them every day.

Atiqah: do you think they can be independence without the teachers and parents? Just like for the more older autism.

Victor: I think can but must be in group.

Atiqah:they needed to be monitored first?

Victor: Haa a, that class is very good already. The older children they—Some of them came here since small around 5 years old. So, trained well already.

Atiqah: So, in your opinion, at what age they could be independence? 8 or 9 years old are considered can be independence?

Victor: 12 years old.

Atiqah: 12?

Victor: But really cannot tell. Depend on their process, training.

Atiqah: Can but must be in long term before they can be independence eh?

Victor: Haa a.

Atiqah: Did you have any suggestion regarding to improve their interaction to community? Either in aspect of community for instance we must create awareness among community or in aspect of autism children so they can improve their social skill?

Victor: I think the awareness should be better because now not many people not know what is autistic.

Atiqah: hurmm. Not many people know how to treat them right?

Victor: yes, they real just think autism is just like tanjung rambutan—

Atiqah: Ouhh I see. But do you think the autism children can be accepted in the community?

Victor: depend on the behavior actually. If the behavior is worst so they cannot accept autism.

Atiqah: Does the autism children has ability to locate place? For example, you ask them to go somewhere which is not familiar, does they need to be accompanied?

Victor: the place must have toilet just because they frequently go to toilet.

Atiqah: So, can they locate the familiar place easily? Or depend on children?

Victor: They need to be accompanied because they like to run and run.

Atiqah: So, do you think that autism children has the ability to imitate others action?

Victor: yaaa, they do imitate.

Atiqah: Does they imitate you?

Victor: yaaaa, once only.

Atiqah: what do you did?

Victor: I just open the mouth and say “AAAAAAA”. They follow what I did. But I think other class also do imitate—

Atiqah: So, who do you think is the best model for video modeling, either their own parents, stranger or any animation cartoon? Or buddies?

Victor: buddies? Really not suitable.

Atiqah: how about parents?

Victor: Some don't like their parents. So I think—

Atiqah: how about cartoon?

Victor: not all types of cartoon they like also. It is the best if there are combination of teacher, parents and cartoon together.

Atiqah: If in my intersystem, I make 2 choice for example in real life, parents. For the animation, cartoon. So, they can choose. Is it Ok?

Victor: if the thing can attract them then should be Ok.

Atiqah: Usually, do they attract with the cartoon on the TV?

Victor: They have watched Lion King and they attract with that—Like Disney.

Atiqah: do they imitate the cartoon?

Victor: yaaaa, they imitate their favorites cartoon.

Atiqah: How many times they watch the same cartoon so they can imitate them?

Victor: that one I am not sure because the boys since young already been here. So I am not sure how many time they watch their favorite cartoon.

Atiqah: Do you ever heard that video modeling tool as treatment approach to children?

Victor: No.

Atiqah: Basically, video modeling is just like I mentioned before. When the children reach at the destination, so then pop out normal child and behave properly for example at the restaurant, first they need to enter the entrance, then sit, after that take order, eat, pay and go home and like that. This will teach them what to do in each location or common location like restaurant, playground and mall. Basically that is video modeling tool. So based on my explanation, do you think that this video modeling can be the best appropriate way to teach autism on their social skills?

Victor: Maybe need to take time to familiar with the system because now all are done manually by the teachers.

Atiqah: So, the teacher becomes the model?

Victor: yaaa,

Atiqah: So do you have any suggestion in order to improve this video modeling?

Victor: because I don't see the real system so--

Atiqah: So do you have any suggestion in order to make my system become more interactive?
As you know that my system look so simple.

Victor: maybe instead of word can put picture so make it more attractive to children.

Atiqah: Ouhh, actually I already replace all the word by picture, list of location also I replace with the picture. For example, I take picture of front view of the restaurant to be put in the system.

Victor: and then when press got sound or not?

Atiqah: Do you think I need to add sound?

Victor: they also can hear well so – you must teach them how to use it.

Atiqah: So, I think that all from me and do you have any suggestion to add?

Victor: regarding to behavior that I most worry about, they usually don't get chance to go outside so when they go outside they become more hyperactive

Atiqah: OK alright, thank you for your cooperation and see you again.

Transcript 3

Interviewer: Nurul Atiqah Amran

Interviewee: Chua Bee Hoe, Autism Teacher

Interview Setting: Interview conducted at National Autism Society of Malaysia (NASOM) Ipoh branch, No.6 & 8, Tingkat Taman Ipoh 1, Taman Ipoh Selatan, 31400 Ipoh, Perak

Affiliation with interviewee: Teachers are suitable respondents for this project. I have had no previous relationship with Chua

(Start of Interview)

Atiqah: So from your experience, can you tell me what is the common behavior that autism children at this school always do?

Chua: according to my class only, because I am not yet be exposed to others classes yet, so, In my class there like free school, 4, 5 and 8 years old. For example, 4 years old child, they come here and do not know how to speak anything, so I need to talk with them. For example I call him "Come here... (With smile)", but he does know understand because he is malay, so I need to translate them into malay, so I call him "Datang sini... (with soft tune and wave them to come here)". And then he can understand me. So here just like kindergarten, need to start from the beginning. You must tell them with the action so they can understand you easily. At first I call Iman just like this "Iman, mari sini, mari sini"(without action to wave them), he does not respond but if I call him "Iman, mari sini, mari sini"(while my hand waving at them), he will respond to me.

Atiqah: So for your class, what do you do to them in order to make sure they can behave properly? For example mentioned by Puan Siti just now, she said maybe there is some reward or something that they like much.

Chua: Ouhh, usually they like cars. Toy cars. If they don't like that thing they just ignore it. Nowadays the children are so clever. For example "Iman, mari sini", ()while showing his car toy, then he will respond to me and come to get the the car toy.

Atiqah: So, usually you give it to them before of after they finished their task?

Chua: Actually my task just basic, not yet to give them any task to complete, I just make sure that the children can respond to any reaction or trying to talk to them. Now, I want to ask them to do any specific task, they do not know to do it. For example, "throw the ball" (must include the action of throwing ball), if there is no action, they do not know how to do it. We know how to

throw the ball but they don't. So every day we teach them so they can do it. You cannot see the result now but there is long effect of this.

Atiqah: Ouhh I see.

Chua: This is for the young one, for the older one, I just throw for one time and they know how to do it again. but not all older children can do it.

Atiqah: so since you have being here for one year, did you notice any change or improvement of behavior of the children here?

Chua: the behavior of the younger children is easy to mold, they just follow what I tell, so there are no protest heard from them. "Do this and this", and they just follow. However the older children maybe protest a little bit.

Atiqah: so in 1 year, there is any improvement?

Chua: yes, they have improve, you teach them alphabets every day and sing alphabets song together for 3 months, they can manage to remember all the alphabets although slowly. When they back home, they will say again the alphabets in front of their parent, but they are shy to say the alphabets in front of me.

Atiqah: So, the parents get surprise because their child can say alphabets and this make the parents feel happy. So, since you have been teacher here, what is the behavior that you feel most worry about?

Chua: they don't want to talk. They don't know how to respond. For example, "dani, please take the spoon for me", but Dani just look at your face and don't know how to respond. It is one way communication. I show this is a pen, and I ask him "where is pen?", and he does not respond to that. So I can teach them the very basic one only.

Atiqah: So your students are just from 4 to 8 years old?

Chua: my class is transition class, just like pre-school class. Last year got one student that can go to standard one.

Atiqah: ouhhh I see, so the children from 4 to 8 years are difficult to talk—

Chua: Yes, they cannot respond to talk. That is one way communication. "Go to toilet.", and then the children just follow to toilet, they will not say "I want to go to toilet". So we need to show the picture of toilet. When we ask them where is toilet, they will show us where is the toilet. We must follow them to go to toilet, must watch them because afraid they will play with water. Most of them need to be accompanied. But few of them such as Aiman, he can manage himself to go to toilet. But different with Husaini, we must wear off his trouser and shirt one by one, if not he will urinate inside in his trouser and get wet. We must help him every day, not because he cannot manage himself but need more time to manage himself. So hopefully by helping him every day, he will know the proper way to manage himself.

Atiqah: for the autism children, did they can recognize the common places which they always visit to?

Chua: Cannot, we must bring them but, maybe this can be trained and take time for them to recognize the common places. For example, I invite them by saying "let's go to the computer room" and tomorrow I must say the same thing so they know where they will go and know what to do. All this things take long period to give the result.

Atiqah: So for the pre-school, what the best approach way to teach them? For instance you use YouTube, or repetition and so on.

Chua: ouhh, here for example when we teach them about the alphabets, I will teach them by showing alphabets flash card and sometimes write the alphabets on the whiteboard. Then I will bring them into the computer room. In the computer room, they will learn the alphabets by singing from the video showed, so it is more sophisticated and more fun for them. I teach them to sing until I feel tired (Laugh). Last 4 months I teach them to sing and now few of them can sing by themselves (shocked face) . When I teach them to sing, they don't give any respond but after repeat and repeat for a long time, they can sing by themselves (Happy face).so at last it is just like a good result of us anf we feel so happy.

Atiqah: So for example, if you want to teach them this is a pencil. How did you teach them? Do you write the sentence on the whiteboard? Or shows them the picture of pencil?

Chua: I give them the real pencil and I will say "This is pencil"(while holding the pencil).

Atiqah: So you teach them with the real thing—

Chua: Haa aa, the real one and also the picture.

Atiqah: So, for their self care and social skill, do you think that they can be independence in the future?

Chua: Yes they can but the parents also must cooperate with us. For me, we must teach them since they are small. Every day I will observe them and teach them the right way, so by that, they will know the right thing.

Atiqah: At what age that you think they will independence?

Chua: depend on the child actually, depend of the background also. There some parents don't know how to take care their children and we here must teach them everything from the beginning.

Atiqah: in your opinion, what is your suggestion to improve interaction in the community?

Chua: must always talk to each other, I mean always greeting, play together—

Atiqah: Do you think they are accepted by the community?

Chua: Actually depend on the community.

Atiqah: if you bring them to go for outing, do you think that the children can easily locate certain places?

Chua: I am not sure with that because my students only consist of young children and small and have no experience with this. I am not sure with that.

Atiqah: Ok based on your experience, do you think they can imitate others?

Chua: they take time to imitate. For small children, they must understand the action by demonstration first before they can imitate others.

Atiqah: Who do you think is the model for my video modeling—So who do you think is the most appropriate model for autism children? For example, action in the restaurant, they must enter, eat, pay and go out. Who do you think can be the best model so they can follow their proper the action?

Chua: But almost of my students are small, so—

Atiqah: do you allow them to watch any cartoon? Do they like cartoon?

Chua: cartoon? They don't like cartoon much. But they are attracted to the songs. Only the songs can make them to give attention.

Atiqah: so did they can imitate their buddies?

Chua: No, because they have no social life, so they just imitate teacher. Although I myself need to say "I am your teacher" every day so they can remember me as their teacher. Although after a month they cannot recognize their own buddies.

Atiqah: Ouh, they cannot imitate their own buddies. How about the cartoon? Did they can imitate the cartoon?

Chua: maybe they will not interest with that but I think other class will like the cartoon.

Atiqah: How about the parent as the model? Do they will imitate parents?

Chua: about this, you must ask their parents. I am not sure about this. You must have more communication with their parent if you want to know about it.

Atiqah: the autism children range between 4 to 8 years old, do they can imitate easily?

Chua: they can imitate but usually they need time also. They learn slowly on how to imitate.

Atiqah: So, now the time being, you are the model for them?

Chua: Haa a, I am the model for them right now. Once I show them the video of tiger roaring, they cried like I have punished them. They also cried when I show them a video of cat meowing. This indicates that the children are not totally exposed to the animal and being afraid of it. I need to persuade them to make them become calmer. But now I show them and they enjoy that video.

Atiqah: Ouhh, So first time they are afraid but after a period of time they enjoy it.

Chua: Same goes to learning alphabets, for the first time they don't like to hear that. But we teach them every day and lastly the children can say the alphabets one by one. This takes time usually after a month, not after a week.

Atiqah: So, do you ever hear that video modeling tool is the best way for treatment approach for autism children? Just like I said, video modeling consists of a normal child model an appropriate sequence of action. So when autism children watch it, they will follow it.

Chua: Yes, I ever hear that but I never try it because my students are very small.

Atiqah: the other one is self video modeling, in this concept; they will do the task and we take the picture of them doing task. So after they finish the task, you show them their own picture doing task just now. So they will follow it.

Chua: maybe that concept can be applied also—

Atiqah: in your opinion, do you think that video modeling is one of the best treatment approaches to teach social skill of the autism? For the older one--

Chua: Yes, it is the best method but we need to train them every day so they will learn it slowly. We cannot show them only one time and let they go by themselves. We must monitor them also. Actually, teacher is the best role model.

Atiqah: So do you any idea in order to improve my video modeling?

Chua: in video modeling, the model actually depends on the children themselves. Some like teachers, some like cartoon. Each child has own favorite model. They will not imitate if the model is not their loved teacher. If the teacher has good relationship with the students the students will like the teacher and they like to follow you.

Atiqah: Do you have anything to add about the autism?

Chua: if you want to work with this kind of people, you must have really rich heart, passion and really love them.

Atiqah: do you have any suggestion in order to improve my system for now?

Chua: your system has video that is new and fun. The teacher must be there to learn it. It helps also with the picture. So, the best model is most nearest person in their life.

Atiqah: how about the cartoon video modeling?

Chua: that is not suitable because there is no eye contact.

Atiqah: So I think that all from me, thank you and see you again.

Transcript 4

Interviewer: Nurul Atiqah Amran

Interviewee: Au Yong Chui Leng (Edline), Autism Teacher (Intern)

Interview Setting: Interview conducted at National Autism Society of Malaysia (NASOM) Ipoh branch, No.6 & 8, Tingkat Taman Ipoh 1, Taman Ipoh Selatan, 31400 Ipoh, Perak

Affiliation with interviewee: Teachers are suitable respondents for this project. I have had no previous relationship with Edline

(Start of Interview)

Atiqah: So throughout your experience, what do you see as the common behavior among autism children at this school?

Edline: Emm..they loss control. Some of them children they are very --quite active. So sometimes we are lack of human power. So that we are very hard to control them. Sometimes when they are very excited, they we'll be like quite active lah. Very common behavior is that they don't know how to focus lah. When we want to teach them something like sorting all the things they have lah. One of the activity lah like in the classroom. What kind of thing they need to do. Sometimes they'll know how to do, but they will do for 1 or 2 minutes, then they loss concentrate already [laugh].

Atiqah: So throughout your internship period, what do you think will attract them to behave properly? For example you buy candies, ice cream then only after that they will follow your instruction.

Edline: We are not encouraged to give them sweet, because sweet is something like sugar which can increase their hyper activeness. So, that's why we cannot offer them some sweets like that. But we can offer them food lah. Food like bread.

Atiqah: So means like you'll give them something like reward lah?

Pn. Siti: Not we give lah. Sometimes it's like their own food lah. They will bring their own food, so sometimes we give some food to them but not every sugar thing can.

Atiqah: Then if you want to give them something like reward, is it after they complete the task or before they start?

Edline: Got one special kids, it's like before start doing the task we have to give him to motivate but sometimes he will cheat. But only for that kids only. The other kids, after complete the task, then only we give them a reward.

Atiqah: So for these 4 months you've been here, do you see any improvement among the kids? Or is it 4 months is not enough for them to change?

Edline: Some of them change lah. The small kids one. Around 4 --4 years old. That one I see a lot of improvements within 3 months.

Atiqah: So in 3 months we already can see the improvement lah?

Edline: Yes, because when I come to this centre, first I see is the children are just coming. In this centre around, one or two weeks before I come. So after that I'm going to class and then I have the introduction with them lah. Then the teacher also will teach many things lah. After these 3 months I can see he focuses when we called his name. before this he just like ignore when people call him. Nothing to do like loss already lah. He will do the things that he like to do or he wants to do.

Atiqah: So actually when they will become aggressive? Is that when they didn't get something or else?

Edline: Err..when their routines changed. Because autistic children, some of them lah, they will be very focus. They'll have their own routine. So you cannot break their routines. If you break their routines, they will feel like angry and uneasy. Got one kid is like that lah. When you break his routine, then he will angry at you. He don't know why the things changed.

Atiqah: What is the most worrisome behavior among the kids?

Edline: The thing that I most worry is, I think like..em self injury lah I think. Another thing is hygiene lah. Because many of them they do not how to control the hygiene.

Atiqah: Then if they go to the toilet, do they know to wash etc.?

Edline: We will teach first then later they know lah. After few times they go to the toilet, we teach them what to do, what do, like "when you finish already then you wash hand haa". Then they will know lah. Still need some times for them to know it.

Atiqah: So what do you think the best approach to teach them? Picture? Video? Or maybe you repeat order?

Edline: Emm..it depends on each children loh. Some of the children they can learn more from exercises. We got one exercise, they can learn counting, they can learn to make their body move. Some sort of activities lah.

Atiqah: If from educational perspective, how to teach them? For example, to behave properly lah. So what do you think is the best approach? Animation? Or by audio?

Edline: Picture I think. The most.

Atiqah: If video? Like what I'll be doing, a normal child will model appropriate courses of action. Do you think they'll imitate it?

Edline: Emm..yeah, some of them will imitate. But for them lah, they like to watch cartoon, is movie lah, TV shows.

Atiqah: But they interested lah to watch video?

Edline: Their favourite is to watch animal. If has many animals, then they will like. Few of them lah. Different children, different types lah.

Atiqah: Then, when they go outing, can they recognize the common places? Or places they usually go? For example you guys bring them to Tesco, then is the second time they go, they already can recognize Tesco?

Edline: Yeah, got one children that they always bring him to Tesco to buy all the vegetables, all the food to cook. The children he knows lah when to go and where to go lah.

Atiqah: How do you think he recognized Tesco? Is it by the signboard of the shop, or color of the shop?

Edline: Emm.. I think mostly the --emm I'm not really sure lah because I'm not often go out with them lah.

Atiqah: But when they reach in front of the Tesco, they already know lah?

Edline: Before they go they already know. Before the children go ah, then he already knows it. "Aa later I want to go Tesco, buy blab la...".

Atiqah: So for example if you want to teach this is pencil. Will you write at the whiteboard P-E-N-C-I-L or draw a pencil picture or you show the real pencil?

Edline: Show them the real picture lah. More suitable lah for them. Because they want to learn right.

Atiqah: So we have to show the real thing la instead of draw it or spell it lah. It will be a little bit difficult lah for them.

Edline: Show the picture lah to them lah. So mostly the picture lah you see here, the real picture. Mostly are real pictures. So that's one easy for them to recognize lah. The picture of a real thing.

Atiqah: So do you think they can be independent? Without parents, without teachers? In the future?

Edline: Yeah, the mild one can lah I think. Depends lah, depends on the children. How much they learn, but they can learn how to be independent. For example, they can cook, they can go buy things, they know how to differentiate money notes.

[Interview stopped for a while. There's a mother come to fetch her son, so have to move the car.]

[Interview continued]

Atiqah: So previously on the independent part, so said they can right? The mild one lah.

Edline: Yes, there must someone to guide them. There must be someone at the side to monitor how they do it.

Atiqah: Then after few times, they can already being leaved alone right? Or still cannot?

Edline: Not few times, but I think few months lah. Because there is a children, he 's currently now at normal school. Normal primary school. There will be one teacher will follow him. The student is doing quite good at the school lah. But he still need the teacher to accompany him. After this I think --because I heard Pn. Siti said, maybe after two months or few months the teacher will fade lah.

Atiqah: So what are your suggestions to improve their interactions with the community?

Edline: Emm..improve ah? Maybe talk with them more often, ask them to do, order them.

Atiqah: So do you think they'll be accepted among the community? Or depends on the community?

Edline: Depends lah. Depends on the community. Because they are still different. Sometimes their behaviors still like will make others uncomfortable lah.

Atiqah: Do you think autism children has the capability to imitate others?

Edline: Umm..can.

Atiqah: Who do you think the most appropriate model in the video? Maybe their parents or teachers or maybe buddies? Or I should do like animation? Which one is the most preferred?

Edline: Emm..i think children. Their peers.

Atiqah: Usually how many times they have to see the video that shows the appropriate actions, and then they are able to imitate those actions in the video? Few months?

Edline: For imitation, they will be a fast learner. If you really do the actions with them lah. They'll be faster to adopt that.

Atiqah: Have you heard about video modeling tools before as one of the treatment approach for autism children?

Edline: Not really lah.

Atiqah: So basically, this video modeling, like I mentioned before, a normal child will act appropriate courses of action. Then this autism children can imitate. So they will have some social skills by using this application. This video will be simple enough for them. One more is video self modeling. For this, autism children themselves will do a task, then we record what are they doing, after we recorded it, then we will show to them the video. So they will see themselves perform the task, so they tend to doing it again.

Atiqah: So based on my explanation, do you think this video modeling treatment can be one of the best treatment approaches for autism children?

Edline: I think can lah because this one seems like they can imitate something to do.

Atiqah: But it will still takes time right?

Edline: Yeah takes time. When you want them to focus on one video, you need patience because they do not know what the video says. If you want them to focus on the video, they need some time to focus.

Atiqah: Do you have any suggestion to improve this video modeling treatment approach?

Edline: Err..maybe something like you out a video, then should be someone at the side to teach them.

Atiqah: So there must someone like teachers to help them understand by explaining to them?

Edline: Yeah, help them explain, help them by giving commands.

Atiqah: Or maybe I can add audio function? But the video itself has audio right?

Edline: Yeah, yeah.

Atiqah: I think for the first time, for this application, they need to be monitored first. First few trials they do it, we have to monitor first. But then after that they can use it by themselves.

Edline: Yes, first time two times, they need to be monitored at the side, accompany him. Then explain to them what to do so that they'll know it. Because in real time they experienced it daily. So after that they'll be familiar with that lah. Rather than the video only lah.

Atiqah: So is there any matter you want to inform me about the autism kids? Other than I've asked you before.

Edline: I think no more else lah.

Atiqah: Is there anything I should add to improve this project? If Victor, he asked me to add audio function. For example if the cursor is on the restaurant icon, then there will be audio function to say "restaurant".

Edline: Like I mentioned before, just add someone to monitor at the beginning.

Atiqah: That one is external lah. What I mean is internal. What should I add in the system.

Edline: This application is for individual or...

Atiqah: Yes, individual. Because this is mobile application right. So they just hold the hand phone and just follow. Maybe you didn't see the application yet, so you can't imagine it right?

Edline: Yes, cannot yet. But maybe should add one more kids to test because now we are currently teach imitation techniques like for 4-years-old kid. They don't know anything. But after that you put the elder one lah, maybe 7-years-old kid. So you ask them to do something like collectioning, then the kids will know. The younger kids will imitate the elder lah. This one is slightly better lah for imitation. The video lah also can lah but beside got one people monitor them.

Atiqah: So I think that's all lah for now. Thank you for your cooperation.

Transcript 5

Interviewer: Nurul Atiqah Amran

Interviewee: Anna Ong Wen Huey, Autism Teacher (Intern)

Interview Setting: Interview conducted at National Autism Society of Malaysia (NASOM) Ipoh branch, No.6 & 8, Tingkat Taman Ipoh 1, Taman Ipoh Selatan, 31400 Ipoh, Perak

Affiliation with interviewee: Teachers are suitable respondents for this project. I have had no previous relationship with Anna

(Start of Interview)

Atiqah: So based on your internship experience here, what is the common behavior of autism children that you can identify here?

Anna: They have different behavior. Some always keep shaking, some like always self stimulation, and so on.

Atiqah: How do you do in order to attract them?

Anna: I use reinforcement, if I not force them, they will not do the task.

Atiqah: Ouh I see. Did you give them the reward for their tasks? After complete the task of before do the task?

Anna: Its depend-- some of student wants the reward before do the task and some them like to get the reward after do the task.

Atiqah: So, when they will become more aggressive?

Anna: Maybe when they cannot get what they want. They will show their temper when they don't get what they want.

Atiqah: Ouh, since you have being here from January, did you notice some change of behavior of them?

Anna: for this class and vocational class, seldom got any change of behavior because they are quite immature already. Only small children can change and molded easily.

Atiqah: So what is most worried behavior that you feel? Like Puan Siti said she worries of self injuries. How about you?

Anna: I worry if they cannot be controlled. Out of control— until can hurt others.

Atiqah: in your opinion, which behavior that you think is the most difficult to change it?

Anna: They like to touch their bodies such as private part. This happens between boys and also between opposite gender.

Atiqah: what kind of task that must be accompanied by you? That really need your help.

Anna: it is depends individually actually.

Atiqah: What is the best way approach to teach them? Use picture or video or something else?

Anna: the best method is repetition of instruction.

Atiqah: how about usage of picture?

Anna: it OK but not enough attractive.

Atiqah: So you need to repeat the same thing every day so they can follow u right?

Anna: Haa a, I need to repeat the same thing every day

Atiqah: If they go outside to the common place such as restaurant. After go there for the second time, did they can recognize that place?

Anna: I think they can remember that place.

Atiqah: In your opinion, what thing that can help them to recognize that common place? Such as sign board? Color of the building?

Anna: maybe they will recognize the common place which they like to go to such as playground.

Atiqah: Just now you said picture is not attractive right? How about you want to teach them "This is a pen", do you teach them by only showing the real pen?

Anna: No, I teach them by showing the picture of pen and the real pen.

Atiqah: Do the autism can be independence without the teacher and the parents?

Anna: Maybe can after been trained.

Atiqah: At what age do you think that they can be independence?

Anna: Depends on individual actually. Because maybe some like 10 years old must be trained lot—

Atiqah: what is your suggestion in order to improve their interaction within the community?

Anna: We have to teach them since small so they can interact with the community.

Atiqah: Do you think that the community can accept them?

Anna: Some are Ok and if they can understand what autism is is, then the community can accept them.

Atiqah: Based on imitation ability, do you think that they can imitate others?

Anna: Yes they can.

Atiqah: Who do you think is suitable to be a model in the video modeling?

Anna: Maybe like similar age—Buddies

Atiqah: How about parents? Teachers?

Anna: No influence. Its more tend to imitate buddies.

Atiqah: how about if I put cartoon as the model in the video?

Anna: actually, some of them don't like to watch cartoon. When we give them to watch cartoon, some of them will watch but some of them will play around.

Atiqah: Ouh, its better to put buddies as the model right?

Anna: Haa a yes,

Atiqah: Usually how many times they watch the video before they can imitate the action in the video?

Anna: I am not sure about that—

Atiqah: Did you ever hear that video modeling is one of approach treatment for autism?

Anna: Yes I heard about it but I never apply it yet.

Atiqah: In your opinion, do you think that video modeling can be one of the best treatment approaches? For autism.

Anna: Maybe suitable for small children—we can teach them to watch video modeling from small so they can imitate when they grow older.

Atiqah: Do you have anything to add regarding to my system?

Anna: maybe add up some music and audio.

Atiqah: So, I need background music or something like that right?

Anna: Ha a..—

Atiqah: That all k from me for today. Thank you for help me and see you later. Thank you.

Appendix F – Usability Testing Schedule & Details

Project Name:

Mobile Application on Video Modeling Assistance for Autism (VIMAS)

Usability Testing Schedule & Details:

Date	Time	Name	Teacher/Autism Children	Phone Number
21/11/12	10.00 am	Siti Nordiana Abd. Hamid	Teacher	05 – 548 3570 (Office)
21/11/12	10.15 am	Mohd Danish Harith B. M. Yussof	Autism Children	05 – 548 3570 (Office)
21/11/12	10.15 am	Salina binti Safii	Teacher	05 – 548 3570 (Office)
21/11/12	10.45 am	Tan Yong Wei	Autism Children	05 – 548 3570 (Office)
21/11/12	10.45 am	Nur Izzani binti Abd. Hamid	Teacher	05 – 548 3570 (Office)
21/11/12	11.15 am	Siti Nur' Ezzati binti Hisyam	Autism Children	05 – 548 3570 (Office)
21/11/12	11.15 am	Govilavaani Krishnan	Teacher	05 – 548 3570 (Office)
21/11/12	12.15 pm	Elizabeth Jothi A/P Manikarajah	Teacher	05 – 548 3570 (Office)

Appendix G – Usability Testing Consent Form

Mobile Application on Video Modelling Assistance for Autism (VIMAS)
Nurul Atiqah binti Amran
Final Year Student
Universiti Teknologi Petronas



CONSENT FORM (USABILITY TESTING)

Project Name:

Mobile Application on Video Modeling Assistance for Autism (VIMAS)

Purpose:

This usability testing will be conducted in order to test the usability of VIMAS prototype to the autism children. The children and teachers will be asked to carry out the tasks according to the test script and the teachers will also be asked to fill in usability testing post-test questionnaire.

I agree to participate in this usability testing as the attendant to the chosen autism children, and/or the participant, whose conditions are as follows:

- The participation in this usability study is voluntary.
- All information will remain strictly confidential.
- The descriptions and findings may be used to help improve the mobile application. However, at no time will my name or any other identification be used.
- I can withdraw my consent to the experiment and stop participation at any time.
- I have read and understood the information on this form and had all of my questions answered.
- For any information about the project, I can contact Nurul Atiqah at 017-7998582 or nurulatiqahamran90@gmail.com

Subject's signature: _____

Date: _____

Usability Consultant's signature: _____

Date: _____

Appendix H – Usability Testing Post-Test Questionnaire

Project Name:

Mobile Application on Video Modeling Assistance for Autism (VIMAS)

Usability Testing Post-Test Questionnaire:

No	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
EFFICIENCY						
1	VIMAS would be easy to understand by the autism children					
2	VIMAS would be easy to carry everywhere					
3	The pictures in the VIMAS were easy to see					
4	The pictures in the VIMAS is appropriate in size					
5	The pictures in VIMAS are colorful enough to attract autism children					
6	It took too long to understand the message					
EFFECTIVENESS						
7	It was easy to understand what each picture represented					
8	It was easy to understand the voice that spoke out the instructions					
9	It was easy to understand the video played in VIMAS as the video modeling treatment approach for autism children					
10	GPS function in VIMAS is reliable for autism children					
USER SATISFACTION						
11	I liked VIMAS					
12	I would recommend autism children to use VIMAS					
13	VIMAS is an appropriate means of treatment approach for autism children to enhance their social and communication skills					
LEARNING ABILITY						
14	VIMAS provides the opportunity and mobility for autism children to learn social and communication skills					
15	VIMAS provides video modeling treatment approach in a more interactive way					