April 2017

Multimedia Mobile Learning Application Software for Non-Verbal Children with Autism

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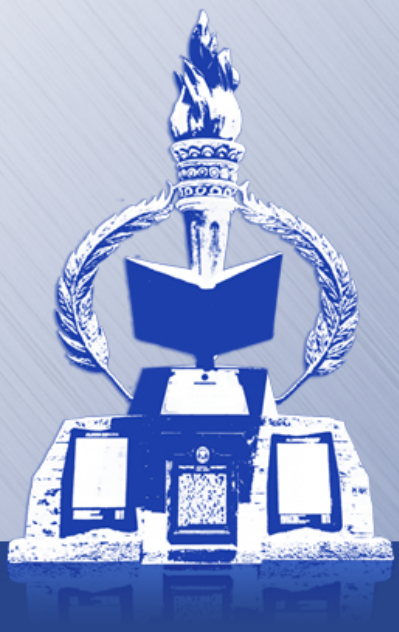

MULTIMEDIA MOBILE LEARNING APPLICATION SOFTWARE FOR NON-VERBAL CHILDREN WITH AUTISM

A THESIS
Presented to
the Faculty of the College of Graduate Studies and
Teacher Education Research
Philippine Normal University
Manila

In Partial Fulfillment
of the Requirements for the Degree
MASTER OF ARTS IN EDUCATION
with Specialization in Special Education
(Teaching Children with Intellectual Disabilities)

by

REMEDIOS E. PARROCHA
APRIL 2017

APPROVAL SHEET

This thesis entitled "**MULTIMEDIA MOBILE LEARNING APPLICATION SOFTWARE FOR NON-VERBAL CHILDREN WITH AUTISM"** prepared and submitted by **REMEDIOS E. PARROCHA** in partial fulfillment of the requirements for the degree of Master of Arts in Education with specialization in Special Education, is hereby recommended for approval and acceptance.

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ACKNOWLEDGMENT

The researcher would never have imagined the realization of this study without the assistance and support of the kindhearted individuals whom to express her deepest gratitude and appreciation.

Dr. Teresita G. de Mesa and Dr. Teresita G. Inciong, her advisers, for they guided her throughout the research and writing of this thesis. They consistently prompted the researcher to be on tasked and provided insights that greatly assisted her in the right direction until the study was completed.

The five experts for their proficiency in validating the research' instruments, with their ardent evaluation, remarks and suggestions, the administration of the instruments were successfully conducted.

The special education teachers of Commonwealth Elementary School SPED Center, Quezon City with their expertise in evaluating the researcher's instructional material through constructive remarks, comments and suggestions, the output was realistic and valuable.

The Learning Resource teachers: Marites R. Santiago, Flordeliza A. Cabacaba, Dolly Jayne P. Calbario, Honeylet M. Banay and Gemma Rie B. Zamora, the parents and their siblings of the Holy Spirit Elementary School, Quezon City for their active participation that extended a great contribution in the successful try-out of the study.

Special thanks to Lester R. Mirabueno, Jestoni Obice, Archie Disono, and Angelica Fabillar for their technical assistance and thoroughness in the conduct of the study.

Her co-teachers Janica T. Santos, Catherine Cimatu, and friends for they extended their unending support and inspiration to finish this endeavor.

The school principal of the Holy Spirit Elementary School, Dr. Zenaida A. Mallilin for her unwavering support and permission granted to conduct this research.

The special education division supervisor of Quezon City, Dr. Serafia C. Vargas who has assisted in the validation of the instructional plans her effective remarks, comments, and suggestions had a great influence of the study.

The schools division superintendent of Quezon City, Dr. Elizabeth E. Quesada for entrusted the researcher to go through sabbatical leave and allowed her to conduct the study in selected schools.

Dr. Edilberta C. Bala for her expertise in editing that greatly improved the manuscript of the study.

The panel of examiners: Prof. Aurora B. Ramirez, Prof. Jingle L. Sergote and Dr. Fortunato G. Vendivel for their encouragement, insightful comments and questions that guided the researcher to further enrich her study.

Dr. Teresita T. Rungduin, Chairperson of the Thesis Committee for her presence in the oral presentation and for her support, suggestions and guidance that further enhanced the study.

Dr. Zenaida Q. Reyes, the Dean of the College of Graduate Studies and Teacher Education Research for painstakingly reading the manuscript and with her observations, comments and suggestions have impressively improved the manuscript of the thesis.

Above all, to God our Father Almighty for always being at her side to bless and guide her most especially in times of difficulties and worries felt and problems encountered during the conduct of the study.

R.E.P

DEDICATION

To the man behind my sweet success, my husband

Wawan

to my loving mothers

Myrna Parrocha, Delia Supelana

to my family especially

Mr. & Mrs. Azanza, Mr. & Mrs. Walker,

Jun and Dennis

with their everlasting love and support

to my Godparents

Mr. and Mrs. Diaz

to my **nieces and friends,**

to my **SPED LRC family**

who are always there to encourage and understand me

to all my lovable **students** who are my inspiration

to the **Alay kay Inay Foundation, Inc.**

for granting me the scholarship in this endeavor

and to **God the Father Almighty**

who loves me unconditionally and gave me the courage and strength to go beyond

this modest work is lovingly

dedicated

R.E.P

ABSTRACT

Name: **Remedios E. Parrocha**

Title: **Multimedia Mobile Learning Application Software for Non-verbal Children with Autism**

Key concepts: **multimedia, mobile learning, application software, non-verbal children with autism**

Degree: **Master of Arts in Education**

Specialization: **Special Education (Teaching Children with Intellectual Disabilities)**

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The main purpose of this study was to develop multimedia mobile learning application software to reinforce the communication skills of non-verbal children with autism. The descriptive-developmental method was used to determine the non-verbal children with autism in terms of their social, communication and behavioral characteristics, communication displays, identification of things by pointing, and manipulation of things. It also identified their general preferences at home and school setting such as foods to eat, hygiene products used, clothes to wear, toys to play with, people enjoyed being with, places to go, and the school materials that were served as the basis for the content development of the multimedia mobile learning application.

In designing the multimedia mobile learning application software, the study made use of the combination of *ADDIE* and *Rapid Prototype Instructional Design Model* which was modified by the researcher into the following phases namely: Preparatory Phase, Design Phase, Development Phase which included digitization and prototyping, Review and Validation, Refinement, Implementation Phase, and Evaluation Phase. In the preparatory phase, the researcher gathered information to identify the non-verbal children with autism as the participants of the study. A review on literature and other related research in identifying and determining the criteria of the participants The criteria were adopted and modified in terms of social, communication, and behavioral characteristics, communication displays, medium used, identification of things by pointing and manipulation skills. It also determined the general preferences of the non-verbal children with autism in terms of their favorite food and drinks which includes breakfast, lunch/dinner, snacks, and fruit. The needed self-help skills were categorized into hygiene products and personal care, clothes they wear, toys to play with, people they recognized and enjoyed being with, places like to visit, and school materials they needed. In the design stage, there were several steps undertaken in developing the content of the multimedia mobile application software: preparation of the instructional plans based on the PECS principles as the teaching strategy and crafting the features of the mobile learning application software. The development phase includes the digitization of the material utilizing the rapid prototype model in collaboration with the Information Technology (IT) experts, utilizing the prototype model which shows the conduct of the development of the IT expert using the platform of devices with android version. The review and content validation was done to determine the suitability of the mobile learning

app for the non-verbal children with autism. The experts' suggestions and opinions were gathered and interpreted for the refinement of the multimedia mobile learning application software. The Implementation phase was the preliminary and post try-out of the output of the study to observe the behavior and screen gestures of these children when using the mobile learning app. The evaluation phase was done through the analyzed results from the try-out of the multimedia mobile learning application software.

The study employed the descriptive survey questionnaires and made use of checklists as tools in gathering and collecting the needed data and information to identify the characteristics of the non-verbal children, their general preferences, validation of the mobile learning app in terms of the content features and technical quality, as well as the observable behavior and screen gestures while using the multimedia mobile learning application software. The results gathered were tallied, tabulated, analyzed and interpreted. Computation of the weighted mean was employed in the treatment of the data. The researcher used the purposive sampling method in selecting the non-verbal children among the group of children with autism as the participants of the study.

The respondents were special education teachers, parents and IT practitioners. The participation of the special education teachers in the study was to assist the researcher in identification of non-verbal children among the children with autism in their respective classes as they have the knowledge and the profile records of these children. The parents played the role of the prompters during the try-out of the mobile learning app. They prodded the participants as needed to perform the screen gestures such as press the on/off button, single tap, double tap, swipe up and swipe down of the mobile device. And IT practitioners collaboratively worked with the researcher in digitizing the features of the

multimedia mobile learning application software such as choose a category, choose sub-category, choose an item or picture, request the item, handover the mobile device to the communicative partner, reply to the request of the non-verbal child with autism, and countdown timer to enhance the ideals of waiting patiently.

Based on the analysis and interpretation of the results, the following findings were revealed: (1) Out of nineteen (19) respondents, five non-verbal children with autism ages six to eleven years old were selected as participants of the study.

(2) The validator experts were composed of two (2) information technology programmers, one special supervisor, one special education teacher in-charge and a university professor and they validated the seven instruments of the study as suitable.

(3) The five (5) special educators evaluated the content features and two (2) Information Technology experts evaluated the technical appearance of the mobile learning app revealed that the whole output is very suitable for non-verbal children with autism to enhance their communication skills through the Picture Exchange Communication System.

The study came up with the following findings: The result of the identification of the characteristics of non-verbal children with autism revealed that these children have difficulties in identification of things by pointing got the weakest rating of 1.16 among the skills. It implies that pointing is the struggle among these children who needs maximum prompting to express his wants and needs through gestures. The result of identifying the children's general preferences at home and in the school setting revealed that they have most wanted some items, objects, food and toys for themselves. However, the survey indicated that most of these children are picky-eater specifically during lunch

or dinner.; the outcome of the evaluation of the multimedia mobile learning application software were found to be appropriate and suitable in enhancing the communication skills on non-verbal children with autism; it revealed that integrating technology in preparing teaching materials for these children can develop though slowly their communication skills; the features in the mobile learning app that were incorporated with the colorful pictures to see, sounds to hear, touch to feel the screen of the mobile device, and customization settings revealed that through these senses the participants were attracted, motivated, and interested to manipulate and use the developed multimedia mobile learning application software; it can be attested that the developed multimedia mobile learning application software is an appropriate tool for teachers to use in teaching non-verbal children with autism for the enhancement of their communication skills.

Based on the findings, the following conclusion were drawn: the multimedia mobile learning application software can help the children communicate their wants and needs by using pictures representing the item/s they would like to get; localized materials for varied activities are appropriate and suitable for the participants as its focus is to develop their communication skills; non-verbal children with autism are interested in using gadgets to learn and understand their surroundings. It shows that they can imitate what the adults are doing and they want to be part of the world we live in.

Based on the findings and conclusions of the study, the researcher presents the following recommendations: the implementation of the multimedia mobile learning application software may be adopted for the use of teaching communication skills to other special children who have difficulties in their expressive skills; other types of mobile apps can be designed and created to learn other lessons like following schedule,

visual, and oral directions to address the unique needs of special children in general and children with autism in particular, since it is easy have more pictures to add in the mobile phone; an annual review for the multimedia mobile learning application software must be done to see if revisions, upgrading and updating are needed and special schools can include the procurement of technology-based materials in the plans and a regular schedule for using the multimedia mobile learning application software may be allotted to institutionalize the use of technology in the classroom for children with special needs.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1
THE PROBLEM AND ITS BACKGROUND

1.1 Introduction

Every individual wants to express one's thoughts, ideas and feelings. In order to make communication effective there must be two persons to exchange a message that is understood by both. A conversation makes a connection to both persons and it facilitates to tell even negative and difficult messages without creating a disagreement and discord. Listening skills, nonverbal and gestures and understanding emotions are involved every time a conversation happens. This is the scenario of two or more abled persons interchanging messages (Robinson, Segal and Smith, 2016).

Children need to develop their interpersonal skills. They develop these skills while socializing with others, during play and exchanging ideas as they work on the tasks and activities in the classroom. However, for most children with autism specifically those non-verbal children have a major difficulty in their ability to express one's desires, needs, ideas, and feelings. In particular, Raising Children Network (2017) cited that they behaved in challenging ways because they might have trouble in understanding on what is happening around them and also find it difficult to communicate through facial expressions, gestures, and body language which leads for both parent and child to frustration.

Every child with autism is a unique individual from one another and has his/her own way of perceiving the situation (Autism Queensland, 2014). It is in the sense that children with autism have individual differences in terms of characteristics and behaviors manifested in despite of their exceptionalities. Autism Speaks Inc. (2017) asserted that

there are many types of autism caused by different combinations of genetic and environmental influences. Chris (2015) cited that according to the study by Boston University, about 30% of people diagnosed with autism spectrum disorder who never learn to speak more than a few words and all of these individuals could be described as non-verbal with autism. Non-verbal children with autism used words with minimal meaning and intent (Rudy, 2016).

The researcher who is currently teaching children with autism in a public school has observed that children with autism in general influence and affect all learning areas to perform functionally and independently. According to Kendra (2014), children with autism encounter and face challenges everyday such as difficulty in understanding what a teacher and others say, lack of eye contact, difficulty in understanding the body language like gestures and facial expression. They also tend to take things literally, as well as being awkward and not ease in a social situation. Moreover, they have unusual responses to sensory stimuli to certain textures, sounds, movement, tastes, visual patterns and light. Apart from the challenges, they also manifested repetitive behaviors such as hand flapping, body rocking, or finger flicking and they always wanting to do certain things in the same manner or to hold on to the same kind of things.

These patterns of unusual and intense behaviors sparkled a major concern of the researcher on how to enhance their communication skills and reinforce through the use of modern technology. The researcher believes in developing an Augmentative and Alternative Communication (AAC) and using a high technology intended for non-verbal children with autism as the main recipient of the study improved their skills in adapting to the daily life activities they encounter.

New technologies in the 21st century are created with the rising of the prevalence of autism to treat and teach particular needs of children with autism to face the challenges and make easier the peculiar way of life.

Bonsignore et. al, (2013) stated that developing multimedia application for children's education has become popular today and evidently shows increase in child's learning performance. This was supported by Tang et. al, (2013) stated that multimedia application for children with autism can develop their communication skills.

For this reason, it is the researcher's desires to reinforce the communication skills of non-verbal children with autism in her own class by developing multimedia mobile learning application software. The researcher considered past experiences and computer skills of the participants to maximize their potentials using the mobile phone devices.

In designing the multimedia mobile learning application software the principles of reinforcement towards behavior were used by the researcher. In addition, the Behavior Analyst Certification Board (2013) elaborated about the reinforcement principle in simplest words, the child with autism asked a question and in return he/she gives the response then received a positive or negative reinforcement that depends on the suitability of the child's response.

As shown in the behavior of children with autism, the assimilation of the multimedia mobile learning application software of the design and activities to enjoy from itself increased the children's interest to learn to communicate. However, children with autism have their own behavioral characteristics and cognitive limitations which must be analysed in terms of their differences (Norshahila et.al, 2015).

Taking into consideration the above actualities, the researcher adopted the Picture

Exchange Communication System (PECS) considered to be the strategy in teaching the multimedia mobile learning application software to the non-verbal children with autism. According to Frost and Bondy (2002), PECS involves the skills that are necessary for the development of independence, reinforcement, communication, social skills, initiation, responding, and imitation as well as reduce inappropriate behavior. Having this in mind, the researcher was motivated further to seek the support of individuals who can purchase the needed materials in preparing the multimedia mobile learning application software for non-verbal children with autism to develop their communication skills.

Background of the Study

The number of people with autism worldwide has almost doubled in the past six years and the number is still rising according to the news article of Philstar (2012). It was also mentioned that in the Philippines estimated cases of autism rose from 500,000 in 2008 to one million at present (Philstar, 2012). This prevalence of autism generated a stronger advocacy of educating children with autism in the public schools. The Department of Education organized a comprehensive training for teachers to equip them with the necessary knowledge, skills and attitude of teaching children with autism. The researcher is one of the recipients of these trainings and with passion and courage, she willingly accepted to be assigned in teaching children with autism. However, she experienced difficulties and challenges in handling these CWA especially those non-verbal children with autism. Exchanging communication is almost worthless as the children seemingly have their own world to interact with. With this, the researcher explored the best instructional system that is appropriate to develop and motivate the children to be able to

talk through pictures. She discovered a more fitting teaching aid and determined to develop this augmentative material which will help the children to speak. With this reason, the researcher resolved to conduct a study and develop multimedia mobile learning application software for non-verbal children with autism.

Communication of Children with Autism and Development of Language Using Different Tools

Children with autism find it difficult to establish rapport with other people because they cannot tell what they feel, their needs and wants and to express it is hard. They develop their expressive skills slowly, some have no language at all and others have problems in using spoken language. When a teacher talks to them, they do not answer back because they do not know how to use eye contact, facial expressions and gestures as well as words. Understanding their needs to be able to communicate, the teacher can help them develop language skills (Raising Children Network, 2006). Many researches were conducted on the different ways to enhance the communication skills of children with autism. These researches are discussed below:

The research conducted by The Hanen Centre (2016) showed that early intervention can create a significant improvement in the communication skills of children with autism and this can be done by having parents to participate actively in the process and as they mingle with their children they motivate, encourage and support the communication of their children thus making a difference to the child's social and communication development. It implies that parents are partners in educating their children as they act the role of the prompter in this study.

The reviews of researches from National Academy of Science (2017) have shown the following studies conducted to develop and enhance the communication of children with autism:

In the study of Merinda (2003) as mentioned in the journal, revealed that eight children with autism were capable to grasp and use augmentative communication strategies to change undesirable behaviors specifically hurting oneself, uncontrollable anger, crying, shattering, damaging belongings, and disobedience.

Frost and Bondy (1998) studied the benefit of using a giving gesture to select from a display of objects or visual symbols and pictures. The Picture Exchange Communication System (PECS) is a structured curriculum that develops communication through exchanging of pictures. It is also described as an orderly behavioral program that helps a child with autism to make the first move to express his/her needs and wants by moving towards to the communicative partner and exchange the picture for the preferred thing like food, toy etc. The study revealed that 19 children were able to acquire independent speech for less than a year of usage. Twelve children used PECS as their main communication tool to express messages.

Furthermore, the study of Krantz and Mclannahan (1999) was also included in the journal where they focused on using assistive technology to develop literacy and communication of children with autism. Children with autism are visual learners and their strong visual-spatial strengths had a strong bearing in their cognitive and processing styles. Likewise, a written script on commenting and questioning was used to structure the instruction then the script is slowly faded out, hence the children can express the script verbally.

Computer-assisted instruction (CAI) which includes the use of computer provided prompts, systematic learning programs, technology based curricular adaptation was utilized in the study of Chen and Bernard-Optiz (1993) and the results show that there was minimal destructions and the participants were more motivated during instruction. Another study by Heimann et al., (1995) about CAI used an interactive multimedia reading and language software program for 11 children with autism. The results revealed a significant improvement in reading, phonological awareness, verbal behavior and motivation over five months. Parsons and LaSorte (1993) used CAI with synthesized speech demonstrated substantial increases in spontaneous utterances when the speech was turned on, compared with when it was turned off and when there was no computer used.

The Augmentative and Alternative Communication (AAC) is a collective term used to refer to different devices used by many children with autism who do not speak or have communication deficit. Using such kind of communication is one of the ways to reduce or prevent behavior problems that stem from their frustration to express their wants and needs. One of the augmentative and alternative communication devices that are effective in developing and enhancing the communication skills of non-verbal children with autism is the picture exchange communication system.

The above discussion of the different equipment and materials in developing the communication skills specifically the auditory and expressive skills that can be acquired by the children with autism is a manifestation of hope for this group of children is similar to the researcher's desire to reinforce the communication skills and increase the desired behaviors of non-verbal children with autism through the developed multimedia mobile learning application.

1.2 Conceptual Framework

The study is anchored on the underlying basic concepts that have been helpful in formulating the conceptual framework of the study. The present study is being conducted to develop a suitable multimedia mobile learning application software appropriately designed according to the unique characteristics of non-verbal children with autism to reinforce their communication skills and increase their desirable behaviors. The design of the multimedia mobile learning application software incorporated the Picture Exchange Communication (PECS) as teaching strategy and integrated the different theories and concepts in conducting the study.

Figure 1.1 Conceptual Framework

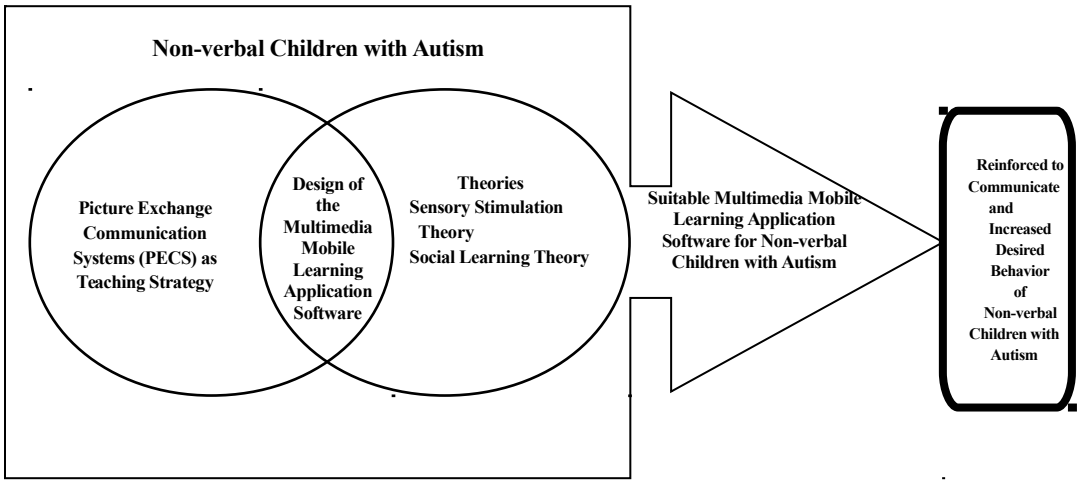


Figure 1.1 shows the conceptual framework of the study and the features are presented in the following paragraphs.

Non-verbal Children with Autism's Characteristics

Autism, or autism spectrum disorder, refers to a range of conditions characterized by challenges with social skills, repetitive behaviors, speech and non-verbal communication, as well as by unique strengths and differences. According to the U.S. National Library of Medicine (2017), autism spectrum disorder (ASD) is a neurological and developmental disorder that begins early in childhood and lasts throughout an individual's life. It affects how a child acts and interacts with others, communicates, and learns. In addition, it is called a "spectrum" disorder because individuals with ASD can have a range of symptoms. Children with ASD might have problems talking with someone else, most of the time they might not look in the eyes of a communicative partner, have limited interests and displayed repetitive behaviors. They really like arranging things orderly, utter sentences repeatedly and seem to have their own world.

We now know that there is not one type of autism but many types, caused by different combinations of genetic and environmental influences. Nearly a third of people on the autism spectrum use no spoken language or only a few words. All of these individuals could be described as having non-verbal autism. Yet the term non-verbal autism has not been categorized in the spectrum of autism and there is no clear line between verbal and non-verbal individuals with autism. Non-verbal individuals with autism actually use words but with minimal meaning or intent. Many people with autism use non-spoken

communication quite effectively (Rudy, 2016).

The researcher took into consideration with these observable characteristics that were exhibited by the non-verbal individuals to painstakingly plan the appropriate instructional material to help these children enhance their communication skills and eliminate behavior problems. The researcher also considered the general preferences of these children in terms of their favorite food to eat, self-help skills, clothes to wear, toys to play with, people they love, places visit, and school materials they needed.

Design of the Multimedia Mobile Learning Application Software

Mobile devices had gained popularity among the special needs of the community. Recent advancement in computer technology in mobile devices has opened up immense possibilities particularly the non-verbal children with autism. Mobile devices serve as an augmentative and alternative communication (AAC) in the pocket and gained popularity because of its flexible multimedia content and storage, portability, mobility, and affordability (Song, 2012). The multimedia principles are generally defined as the combination of text and pictures (Mayer, 2005b). He also claims that people learn more deeply from words and pictures than from words alone (Mayer 2005a).

The researcher thought of integrating these new trends of technology to conceptualize the instructional material which was derived from the identified characteristics displayed by the non-verbal children with autism. In designing and developing a mobile learning app that fits on the characteristics of these children, the researcher collaborated with the two (2) groups of experts: the special educators as to the content features such as the objective, content, procedure, and activities of the mobile

learning app and the information technology (IT) experts which were guided by the multimedia principles in creating the technical quality in terms of the appearance and flexibility of the mobile app to the user which is the non-verbal children with autism.

Tang, Jheng, and Chen (2013) supported the present study and stated that developing multimedia mobile learning application for children's education offered many advantages by the application itself which includes the developing of the communication skills of children with autism especially those children who are non-verbal. The integration of the multimedia application and the learning activities increases children's interest during the learning process due to its success in attracting children's attention with the multimedia elements included in the application. In addition, there are a lot of studies that proved that by adopting the right and suitable learning theories into multimedia application, children will be able to learn effectively (Ibrahim, Ahmad, and Shafie, 2015).

Aside from the design and development of the instructional material it is also integrated with the strategy used to teach the non-verbal with autism to communicate functionally and that is the Picture Exchange Communication System.

Picture Exchange Communication System as Teaching Strategy

PECS teaching strategy was adopted by the researcher as the teaching practice of the multimedia mobile learning application that involves task analysis. According to Franzone (2009b), task analysis is the process of splitting a skill into smaller sub-skills, with controllable steps to complete the skill. Moreover, a task analysis allows the child to work on the task one step at a time instead of learning the whole task at once. The activities of

the multimedia are patterned according to task analyzing the steps to do the task given. For example 1. opening of the mobile phone; 2. tapping the start button; 3 choosing an item food for breakfast; 4. selecting an item to eat for breakfast; 5. giving the mobile phone to the communicate partner in exchange for the real item; 6. waiting patiently the requested item as the countdown timer stopped; 7. imitate the communicative partner in reading the requested item and the last step is 8. get the real item as reward.

Task analysis stated by Aligada (2001), was to help the non-verbal children with autism to organize a concept by presenting tasks in a systematic and much anticipated manner. Moreover, task analysis was used on the procedure during implementation of the lesson. It followed a simple task broken down into steps to be accomplished by the child through the presence of the parent and a teacher. They have important roles to help master the skill in using the developed multimedia mobile learning application software. The researcher encourages repetition of the task to strengthen the child's initiation to communicate through exchanging of pictures of child's favorite things and activities using the mobile device.

In this study, prompting was used and had a great role as the child is doing the task to perform the activity. Prompting refers to the step 4 in the procedure of the activity in teaching the picture exchange communication system where the parent acted as the prompter helping the child to do the activities such as: press the button of the mobile device, tap, select, handover the mobile device and wait patiently to give the real item by the communicative partner. Prompting is the support given by the parent so that the child can follow the steps of the activity until it is completed. The prompter guides the child as to what necessary response should take place to the communicative partner. The prompter is

trained not to talk and give any reactions but just to assist the child in responding to the situation. The prompt is faded once the child can do the step independently.

The development of the multimedia mobile learning application software is anchored on the PECS Curriculum as the framework of designing effective learning environment and activities commensurate to the ability of non-verbal children with autism. The researcher believed that when the learning environment is prepared, learning will occur as these children prefer to study in a conducive learning atmosphere. When the atmosphere is pleasant, interaction between the teacher as the communicative partner and the child will happen in the natural setting of the classroom (Vicker, 2002). In addition the philosophy of Montessori education is revealed in this belief because the CWA works in a calm, orderly environment of their own choice and at their own pace (North American Montessori Teachers' Association, 2017).

The researcher purchased a set of the PECS training manual, lesson plans and a CD that contain pictures published in 2002 United States by Pyramid Educational Products, Inc. The Picture Exchange Communication System (PECS) materials were adopted as the bases for the development of the pictures for the various themes for the mobile device. Through exchanging of picture/s, the non-verbal child with autism can initiate and expressed his/her desire to the communicative partner by showing a picture of his wants/needs. The PECS materials can be accessible for use by parents and teachers and it is appropriate for use in different learning settings (Bondy and Frost, 2016).

The PECS materials consist of sensory solutions, classroom solutions like visual aids, toys etc. that nonverbal children with autism need to learn, play, feel good and get

better. In this study the materials are categorized accordingly: Theme 1. Food to Eat; 2. Self-Help Skills; 3. Clothes to Wear; 4. Toys to Play With; 5. People I Love; 6. Learning Center; 7. School Materials; and 8. Number Skills.

In using the PECS, six phases were followed which the researcher adopted in the whole discussion: Speech and Language Kids (2016).

1. How to Communicate – In this phase, the child learns to hand over a picture to the communicative partner and they give what he/she wants in return. Two persons are involved in guiding the child to learn to communicate through a picture. The first person stays in front holding what the child wants and the other person is behind prompting the child's hands and arm to help him pick up the picture and give it to the person in front.

2. Distance and Persistence – In this phase, the child is taught to be more determined to communicate his wants. To do this, the picture is moved farther away from the child and he/she has to go and get it. An another attempt, the picture is right next to the child but the person holding the picture will walk away in a short distance. In this manner, the child feels that he needs to be insistent to communicate and will not give up until he gets the item he wants to have.

3. Picture Discrimination – In this phase, the child will have two pictures to choose from. The child will get the picture that he wants and gives it to the person in front. (The 2nd picture is one that the child will not choose as he really does not need to look at the pictures). Two persons are involved in guiding the child to learn to communicate through a picture. The first person stays in front holding what the child wants and the other person is behind prompting the child's hands and arm to help him pick up the picture and give it to the person in front.

4. Sentence Structure – In this phase, the child learns to form a simple sentence. Picture choices are placed on a communication board along with a picture that says, " I want____". The child is motivated to place the "I want" picture on the strip along with the picture of what he wants. When the child takes that strip and hands it to the communicative partner, the child is helped to point at each picture as the teacher says the words out loud. At this point, the children with autism may begin to speak the message along with the adult.

5. Answering Questions- In this phase, the child learns how to answer the question "what do you want" using the PECS notebook and pictures. Some children with autism may not get this far but there are children who start talking with the use of different AAC system.

6. Commenting – In this phase, the child learns to comment in response to a question**.** For example, you may ask "what do you see?" and the child replies with "I see ___".

Theories in Designing the Multimedia Mobile Learning Application

Many theories have been developed as to how children acquire necessary skills. The researcher explored the use of Sensory-Stimulation Theory, Social Learning Theory and Reinforcement Theory.

The Sensory-Stimulation Theory suggested that greater learning takes place when the sense of seeing, hearing, touching, and other senses are stimulated it enhances the learning of an individual (Laird, 1985). In this study, the stimulation sensory theory was applied in designing the technical quality in terms of appearance and flexibility of the multimedia mobile learning application software. The appropriate graphics, images, color, and text used by the researcher stimulated the sense of seeing to motivate the child to manipulate the mobile learning app. Thus, the principle of multimedia of Mayer (2005a) supported this concept that people learn more deeply from words and pictures than from words alone. At the same time, the sense of hearing stimulated the desire of the child to use the mobile learning app when hearing the pleasant sound and this was observed during the try-out of the mobile learning app. Even as these children experience the sense of touch which was observed the common screen gestures manifested by these children such as pressing the button, single tap, double tap, swipe dup, swipe down of the screen of the mobile device. The sensory-stimulation theory had a great contribution in designing of the multimedia mobile learning application because it stimulates the senses of the non-verbal children with autism to interact and react to the communicative partner and shows learning take place.

Another theory that contributed to the design of the multimedia mobile learning application software is the Social Learning Theory of Bandura (1977). He postulated that people learn from one another through imitation, observation and modelling. The design included the step by step prompts and visual cues to easily understand and imitate by the non-verbal children with autism. These visual cues pertain to each phases of the multimedia mobile learning application software that were adopted to the Picture

Exchange Communication System (PECS) principles such as the select category, select sub-category, request an item, handover the device, and countdown timer.

The study employed the teaching strategy of The Picture Exchange Communication System (PECS) when delivering the lesson of the developed instructional material and the participants were able to imitate, observe and follow the step by step procedure demonstrated by the communicative partner.

In implementing the lesson plans of the multimedia mobile learning applications software, the researcher took into consideration the roles of the teacher and parent in implementing the activities. There are two individuals involved in applying the PECS strategy for every activity: the teacher as the communicative partner who interacts with the child and the parents who act as the physical prompter to hold or touch the child's hand and guide the child in using the mobile device to look for the picture of things he/she needs/wants then the requested item is exchange with the positive behavior shown by the child.

The social learning theory is often called a bridge to the Reinforcement Theory which had shaped the concept of the study. Reinforcement theory of B.F. Skinner (1957) is the process of leading a child to perform a task or to show a behavior asked by following the step by step procedure. It involves giving a reward for positive behavior performed and a negative punishment when there is an unacceptable behavior to withhold until the child performs the appropriate behavior.

In this study, the child is being observed if he/she follows the tasks to do and once it is finished with minimal prompts, a reward is given in the form of praise, activity and tangibles like food, toys etc. (Advameg Inc. , 2017).

1.3 Statement of the Purpose

This study aims to develop multimedia mobile learning application software to reinforce the functional communication skills of non-verbal autism children.

Specifically, the study aims to:

1. identify the non-verbal children with autism in terms of their :
   1.1 social, communication and behavioral characteristics
   1.2 communication displays, medium used, identification of things by pointing and manipulation skills
2. identify the general preferences of non-verbal children with autism at home and in school setting
3. develop and validate the multimedia mobile learning application software
4. try-out the developed the multimedia mobile learning application software

1.4 Significance of the Study

Alongside the rapid growth on multimedia instructional advances, the mobile learning application software will help the non-verbal autism children to express their wants and needs in daily life activities, increase their vocabulary, develop their social and functional communication skills.

The children with speech defects will improve their oral and spoken communication skills when this mobile app is used as an intervention program's material to enhance their language development.

The curriculum developer who is continuously upgrading the special education curriculum and integrating technology in the preparation of instructional materials can assist teachers in teaching children. This will make them aware that the device and the teaching strategy of this study can be included in the curriculum as an augmentative material in teaching children with autism and other children with special needs.

The parents as partners of educating their children can use the mobile app to communicate with them and improve their communication skills at home without so much preparation for the materials needed.

The policy makers can authorize the use of the multimedia mobile learning application software in improving and enhancing the communication skills of children with autism and other special children in the public schools with special education program.

The SPED teachers of non-verbal autism and children with speech impairment can use the multimedia mobile learning application software as an intervention material for tutorial or remedial classes. They will find it feasible, relevant and a realistic material in teaching children to functionally communicate.

The speech pathologist/implementer may use the mobile app as an aid device when holding a speech therapy to a child with special needs.

The SPED administrator/principal may promote the usage of mobile phones like smartphones and tablets in the classroom to improve the communication skills of the non-verbal child with autism and children with speech impairment.

The future researchers may conduct the same study and develop another type of multimedia mobile learning application software design for other groups of children with special needs.

1.5 Scope and Delimitation of the Study

As defined in the context of the study, it limits on the developing of multimedia mobile application software as instructional material using smartphones and tablets with android version 4.6. The teaching strategy in using the mobile learning application software is the PECS where the ultimate goal is that child learns to approach and give the device that contains a picture of a desired object/item to a communicative partner like teacher or parent in exchange for that item.

The researcher considers some pre-requisite skills for the intended user of this multimedia mobile learning application software in which children with autism who are non-verbal having lack of functional communication, utter multiple words, difficulty to understand the modality of communication skills, does not initiate communication and inappropriate vocabulary size with his/her age (Frost & Bondy, 2002). Furthermore, the child does not necessarily have magnificent fine motor skills to work on the mobile learning apps but must show the six (6) observable fine motor gestures when using mobile devices.

Any smartphones and tablets with android version 4.6 will be the platform of this study. It does not necessarily require network connection to function. The researcher seeks help with the application developers/programmers who are the Information Technology (IT) experts in the production of multimedia mobile learning application. Moreover, the researcher made the rough sketch, created outline with the preferred layout and background color.

1.6 Definition of Terms

There is a need to define some terms for clarity and for better understanding of this study. Hence, the following terms are conceptually and operationally defined.

Augmentative Alternative Communication. It refers to all forms of communication used to express thoughts, wants and needs of non-verbal children with autism or children with speech problems. It could be through gestures and body language or use of devices (ASHA, 2017)

Children with autism. It refers to developmental disability that affects the child's both verbal and non-verbal communication as well as social interaction (Autism Speaks, 2017).

Communication. It refers to two-way interaction of a child and the mother or the teacher. The action of a child must be directed toward the mother/teacher and in turn, will provide appropriate responses to the child (Frost & Bondy, 2002).

Functional Communication. It refers to the basics of communication skills of children with autism to get basic wants and needs like "I want that", "I am hurt", I need to use the bathroom"(Speech and Language Kids, 2016).

Mobile Learning Application Software. It refers to the instructional materials developed by the researcher using mobile phones such as smartphones and tablets. It is designed as a learning tool for children with autism who have communication problems. (Speech and Language Kids, 2016).

Multimedia. It refers to the content of the mobile device that uses a combination of text, images, graphics, video and audio (Techterms, 2015)

Picture Exchange Communication System. It refers to an alternative means of communication that allows a child to communicate using pictures of what he wants. (Speech and Language Kids, 2016).

Reinforcement. It refers to the application of consequences to increase the frequency of strength of a response. Reinforcements are rewards like praise, activity, tangibles (Advameg Inc., 2017).

CHAPTER 2

REVIEW OF RELATED LITERATURE

This chapter presents the current trends of the related literature and studies which guided the researcher in pursuing the purpose as well as the specific objectives of the study.

This paper has explored appropriate literature to help understand the characteristics, communication skills and behavior related to autism specifically the non-verbal children with autism and developed suitable multimedia mobile learning application software that may enhance their communication skills.

Characteristics of Children with Autism and Non-verbal Children with Autism

Autism significantly affects an individual's verbal and non-verbal communication as well as social interaction and it is typically evident before age 3 (Individuals With Disabilities Education Act [IDEA], 2008).

Autism spectrum disorders (ASD) are characterized by social-interaction difficulties, communication challenges and a tendency to engage in repetitive behaviors. Research suggests that children with autism are attached to their parents. However, the way they express this attachment can be unusual. To parents, it may seem as if their child is disconnected. Both children and adults with autism also tend to have difficulty interpreting what others are thinking and feeling. Many persons with autism have similar difficulty seeing things from another person's perspective. A person with autism may lack such understanding. This, in turn, can interfere with the ability to predict or understand another person's actions (Autism Speaks Inc., 2017)

Communication difficulties are other characteristics of an individual with autism.

About one third of people with autism spectrum use no spoken language or only a few words. All of these individuals could be described as having non-verbal autism. Yet the term nonverbal autism has no official status, and there is no such diagnosis as non-verbal autism. Some children with non-verbal autism do develop the ability to use a few words in a meaningful manner, but are unable to carry on any kind of significant conversation. For example, they may say "car" to mean "let's go for a ride," but would not be able to answer the question "where should we go?" But some children have the ability to speak, but lack the ability to use language in a meaningful way. These children may echo scripts from television or expressions they have been taught by the significant people around them or acquire it from their surroundings. Non-verbal autism is little-known about the thought processes of people who do not use spoken language. Nevertheless, some research is ongoing and new technologies are opening doors of communication and understanding (Rudy, 2016).

Repetitive behavior is another core of conditions and challenges faced by an individual with autism. Common repetitive behaviors include hand-flapping, rocking, jumping and twirling, arranging and rearranging objects, and repeating sounds, words, or phrases. Similarly, some adults are preoccupied with having household or other objects in a fixed order or place. It can prove extremely upsetting if someone or something disrupts the order. Slight changes can be extremely stressful and lead to outbursts (Autism Speaks Inc., 2017).

Understanding the characteristics of autism enlightened the present study because the recipient of the developed instructional material was clearly recognized in terms of the difficulties and conditions that were faced by a non-verbal child with autism that paved a way to address the appropriate communication skills needed to be enhanced by these

children.

In the article of Jurgens, Anderson and Moore (2016) they related the ways of communication which non-verbal children send their messages or the way they want to tell people of their feelings and emotions. Their ways of communicating include physically manipulating a person or an object; pointing, showing and shifting gaze where the message of the child wants to convey is telling the person that he wants the object, food or a toy.

Communication Skills of Children with Autism

According to Bondy and Frost (2001), there are two broad types of language skills that are needed in order to communicate. The expressive communication is using language to convey messages and receptive communication is the understanding of messages from others. Most children with autism have significant difficulties in expressing themselves in turn, some children with autism have much better abilities to understand others' messages. Request and comments are very important skills that every regular student must have. Nevertheless, it must be remembered that comments are very difficult to children with autism. Thus, teaching them the skill of requesting will have some immediate and powerful effects. Tincani, Bondy, & Crozier (2011) stated that requests are perhaps the most important form of functional communication for young children with autism.

The researcher found it helpful in encouraging the functional communication skills of the non-verbal children with autism as the result of using the developed multimedia mobile learning application software.

Emerging Technologies in Autism

Recently, the use of technology particularly mobile devices like smartphones and tablets has transformed the way children with autism learn to communicate. In addition, mobile application has provided parents, special educators and speech therapist several techniques and strategies to develop the child's academic concepts like reading skills, numeracy skills, art, imaginative and creative play skills.

Nelson (2014) stated that in the speech-language field, the mobile devices are called to Augmentative and Alternative Communication (AAC) and one of its effective uses mostly in non-verbal children with autism is that the device can store a whole language, and can be customized depends on the needs of the user.

On the other hand, there are critics about giving the non-verbal children with autism an electronic assistive device for communication because there is a possibility to demotivate them to learn to speak. However, research has shown that for some autism children who were used of AAC really help to enhance their verbal learning (Kagohara et al., 2012; Schlosser et al., 2017).

It is critical to evaluate the effectiveness of technology as applied to the specific challenges associated with autism because some applications may find it more important than others. Therefore, there are few criteria to consider when evaluating apps for autism as an intervention to communication deficit which include the suitability that fits into skills and characteristics of autism, improve the quality of life for the individual with autism, increase the autism child's ability to learn or apply new skills, facilitate the effectiveness of the treatment, and reduce the burden to the family in terms of financial, emotional, education or treatment (Nelson, 2014).

Augmentative and Alternative Communication (AAC) for Non-verbal Children with Autism

Augmentative and Alternative Communication (AAC) is interventions design for autism individuals with expressive communication deficits. Augmentative recommends that these interventions can be used to improve upon the effectiveness of communication means while alternative implies developing systems that temporarily or permanently replace speech. Basically it is categorized as "low-tech" or non-electronic technique and "high tech" or electronic technique (Mirenda, 2003). She also stated that AAC methods can reduce and prevent the frustration experienced by many children with autism. It can be used to children to ask for what they want, ask for help, or ask for a break from an activity instead of bad temper, screaming, or engaging in other problem behaviors. Children can be taught to use manual signs, photographs, line drawings, or other symbol for this purpose. When a child learns to communicate through these means, then he will participate better in playing and other school activities, and is more likely to develop socialization frequently by peers.

Mobile Apps for Autism

Augmentative and Alternative Communication (AAC) began with a combination of pictures, letters, and symbols placed on a platform to help children with communication problems develop speech. Because of the technology advancement, applications or "apps" for mobile tablets may simulate communication systems ranging from the Picture Exchange Communication System or PECS (Frost & Bondy, 2001).

Creating mobile apps must take into consideration some necessary features that complement to the needs of non-verbal children with autism. The use of pictures, symbols and images as well as sounds, language and customizations settings are frequently found in the autism application by which the researcher do the same features contained on the developed multimedia mobile learning application software. Avaz (2011) noted that minimizing destructions will not confuse the children with autism, using of Symbolstix picture library that he developed is helpful to the child to learn, the concept of choice by which the action of choosing one word out of many can be a challenge and reinforcement as the child benefits from multi-sensory activity such as touch, sight and sound.

Hong et. al., (2014) present an Instructional Design at Arizona State University. Hong suggests vital component in developing instructional materials that designers must consider the following: be creative which means valuing originality and new ideas, set an environment that is comfortable and relaxing, carefully consider user's experiences by assessing student's needs and use specific technique. A well-designed interaction leads to learner's active participation, which enables learners to explore content and construct their own knowledge. A good interaction is creative so that learners can engage in learning on both cognitive and emotional levels.

Overview of Picture Exchange Communication System (PECS)

PECS was developed in 1985 at the United States and was first used at the Delaware Autism Program by Andy Bondy Ph.D. and Lori Frost MS SLP produced by Pyramid Educational Consultants, Inc. They are both specialized in speech language pathology. During that time, they were working on communication skills with a young boy with autism

who was not successful at vocal imitation or pointing to pictures. They tried teaching him to point to a picture among a display of pictures that match to things he liked. However, they encountered a number of problems with that approach. Given the problems and concerns they started to teach the child to give a single picture that matched to the item he liked at that moment. They started making a line drawing of a pretzel, which was something new he enjoyed eating. They gradually taught him to give that picture in exchange for the pretzel. From then on, they started using the same method to teach other young children with autism to communicate, and in time, named the method as Picture Exchange Communication System (PECS) (Bondy and Frost, 2001).

Philosophy of PECS

The PECS teaching training is based on B.F. Skinner's book, Verbal Behavior. Using prompting and reinforcement strategies will lead to independent communication. Verbal prompts are not used, thus building immediate initiation and avoiding prompt dependency. PECS begins with teaching a non-verbal child with autism to exchange a picture of a preferred item with a communicative partner, who immediately replies to the request. After the child learns to request for a preferred item, the system goes on to teach discrimination among symbols or images and later on how to construct a simple sentence. In the most advanced phases, a non-verbal child with autism is taught to say to questions and to comment. Additionally, language attribute concepts such as size, shape, color, number, etc. are also being taught so that the student can make their message more specific (Bondy and Frost, 2002).

Intensity of Therapy

After completion of each phase of PECS, children with autism will be able to request wanted and needed items spontaneously and in response to questions, comments about aspects of language to be acquired like social greetings, answering yes or no and requesting help that may involve some gestural skills. Picture Exchange Communication System must be used during all times when children with autism still needs a method of communication. Depending on the age and cognitive level of the child, the time to master PECS will vary. Charlop-Christy et al., (2002) in their study found out that it takes an average of 246 trials for users to master all six phases of PECS

Effectiveness of Picture Exchange Communication System (PECS) in Enhancing Communication Skills of Children with Autism

Many educators study the effectiveness of implementing PECS. Evidences show that it is easily learned by most students who have limited or no speech due to autism. It is a primary means of communication by children and adults or other communication disorders. With regard to the intervention setting for AAC training, there is an evidence that PECS is most readily learned when instruction takes place in a general education setting (Ganz & Goodwyn, 2013). Evidence also indicated that learners initiate a higher number of picture exchanges when PECS is taught in a single setting versus multiple settings (Ticani and Devis, 2010).

Typical learners are constantly communicating their needs, want and desires through socially acceptable verbal expressions and physical gestures that may not come naturally to children with autism. Picture Exchange Communication System is one of the specific

teaching strategies of AAC devices that will help autism children to functional communication and it is also the teaching strategy and principles used by the researcher in delivering the lesson of the developed multimedia mobile learning application software.

According to its developers it is a unique augmentative/alternative communication intervention package for individuals with autism and related developmental disabilities. PECS does not require complex or expensive materials since it uses pictures as ways to teach communication. It is designed readily to use in various situations like home, school, and community settings.

Autism in the Philippines

This local literature is merely focused on the recent updates related to the educational system, the government programs and the rights and privileges of Person with Disabilities (PWD) as well as the technologies most commonly used by Filipino autism for learning and treatment.

In 2011, Tiffany Tan reported that the National Council for Disability Affairs (NCDA) held a forum on "K to 12" Program and the Education of Persons with Disabilities. Mr. Sanchez Chief, Information, Education and Communication Division (IECD) of NCDA cited Magna Carta for PWDs or RA 7277's Rights and Privileges, like access to quality education and assistance to PWD students. He also mentioned the Penalties for Public Ridicule and Vilification of PWD students as stipulated in RA 9442 and accessibility to students as specified in BP 344 or the Accessibility Law. He also mentioned that 1 in 6 Filipino people who live in poverty are affected by moderate to severe disabilities,"

Dr. Yolanda Quijano, Undersecretary Department of Education (DepEd) stated that

the principles on the K to 12 Basic Education for PWDs ensures Education for All." She sighted inclusive education, flexibility and differentiated learning system and balanced learning experience which ensure learner-centered pedagogical approaches, holistic development. Dr. Quijano also mentioned that DepEd is currently working on a modified curriculum framework with stakeholders. Being a long time special educator, Dr. Quijano also believes that some children with disabilities need to be mainstreamed first, then gradually integrated (for the CWD to adapt to the system) and eventually, be trained for inclusion (for the system to adapt to the CWD needs).

Dr. Isabel Inlayo, Director, Office of Student Affairs, Commission on Higher Learning (CHED), on the other hand cited, among others, the Guidelines on Student Affairs Services and Programs for PWDs, like ensuring academic accommodation and provision of programs for life skills training, counseling or testing referrals. She also mentioned scholarship programs and student financial assistance programs of the government for PWDs. According to Dr. Inlayo, as of July 2010, CHED has 133 PWD scholars around the country.

Atty. Teodoro C. Pascua, Deputy Director General for Field Operations of Technical Education and Skills Development Authority (TESDA) acknowledged that Education is key to poverty alleviation. Senior High School Students (Grades 11-12) will learn vocational and entrepreneurship skills. Together with the DepEd and CHED, TESDA is expanding the TVET or the State of Tech-Voc Education and Training Program. He cited some PWDs in Iloilo who were trained in carpentry to produce chairs for the public school.

The Autism Society Philippines (2014) is thankful for the efforts of the Commission of Elections and the National Commission on Disability Affairs to ensure that Filipinos with

autism are given the opportunity to exercise their rights to vote during National Day of PWD voter registration last 20 July 2014. In addition, the Philippines, has done much to accommodate the voting population with various disabilities. COMELEC's partnership with SM Malls to utilize the spacious, accessible, and air conditioned malls as polling places for individuals with disabilities. However, one of the more common challenges observed in the last National Day of PWD voter registration, was the inability of adults with autism to complete the process like writing the information, having biometrics using technology.

Autism Society Philippines (2014) surveyed several Filipino therapists which among these autism apps they find most useful for most of their students/patients. It was noted some autism apps that Proloquo2go App is one of the most effective communication tools for children who are nonverbal or those who have minimal utterances; it captured the essence of Alternative Augmentative Communication. It is flexible for the interventionists to create personalized files specific to the child's needs. It also facilitates improvements in the child's receptive and expressive vocabularies, lengthening of utterances. Videos and characters are interesting. The situations they included in the app reflect the common difficulties that these children manifest and encounter. Aside from it other also uses Choice Board Creator for those who are non-verbal or with minimal verbal output. It can be used as a "bridging" tool when transitioning the child from PECS to Proloquo2Go. The user is given flexibility to create picture options for the child to use. iCommunicate is visual scheduler with auditory recordings utilized to the children with autism. It can be customized storyboards, communication boards, choice boards, flash cards, and speech cards by the user. Aside from using own pictures, users can record their own audio boards.

Researches Conducted

The researcher sought foreign studies that tell about the effectiveness, advantages and disadvantages of using Picture Exchange Communication System (PECS) most especially those studies which are related in multimedia mobile application software used in teaching children with autism as evidence for functional communication.

In the study conducted by Charlop-Christy, Carpenter, Le, & Kellet (2002) examined the acquisition of PECS with three (3) children with autism and the effects of PECS training on the emergence of speech in play and academic settings. Results showed that all three (3) children met the learning criterion for PECS and showed increased in verbal speech, increased in social-communicative behaviors and decreases in problem behaviors. The result of this study is consistent with the prior research in relation between communication skills and problem behavior but they are different in the platform used in delivering the PECS. The researcher used the mobile device while the researched study used the traditional communication book.

Ganz and Goodwyn (2013) investigated the efficacy of a tablet-computer-based Picture Exchange Communication System (PECS) application for use with three (3) preschoolers with autism spectrum disorder and investigated participant preference for the app versus traditional PECS. Results indicated that participants rapidly demonstrated above-chance level mastery of the app. Following mastery, two participants demonstrated a preference for the app, while the other preferred the traditional PECS communication book. The experimental study revealed similarity of the present study particularly when using a tablet as an instructional material and result shows that learning takes place when using the app. However, the researcher used the descriptive-developmental method of research to

identify the behavior and performance of the non-verbal children with autism when using the developed mobile learning app.

The studies mentioned were the advantages of PECS as teaching strategy using various platforms of instructional materials that enhanced the communication skills and decrease the problem behaviors of the children with autism.

However, there was another experimental study of Flippin & Watson (2010) that shows the weakness of the PECS. The results indicated that PECS is a promising but not yet established evidence-based intervention for facilitating communication in children with ASD ages 1-11 years. Small to moderate gains in communication were demonstrated in the following training. Improvement in speech was small to negative. Phase IV of the PECS was identified as a possibly influential program characteristic for speech outcomes.

In the study showed by Wyer and Wheeler (2014), they found out that the communication skills of minimally verbal children with autism can be greatly improved through personalized interventions that are combined with the use of computer tablets. They found out that children who had access to the tablets during therapy were more likely to use language and interact socially and that incorporating the tablets at the beginning of the treatment was more effective than introducing it later in the therapy. In the present study, the research has the same goal for the participants of the study to be able to express their needs and wants through pictures and verbally in the near future.

Elicin and Kaya (2015) explored research articles about children with autism which were categorized according to using of computers and smart portable. The finding shows that using these devices was effective for teaching academic skills, communication skills and socio-emotional skills. The mentioned study supports the present study in the sense that both

of these were used high-technology as instructional materials which yield to the effectiveness of teaching the communication skills.

The study conducted by Hitchcock and Noonan (2003) is about the application of computer-assisted instruction (CAI) with interactive software and teacher-assisted instruction (TAI) as conditions in direct instruction for five preschool students with disabilities on learning the basic skills of matching shapes, colors, and numbers and letter of the alphabet. The results revealed that using computer aided instruction with constant time delay was effective in attaining and maintaining the acquired pre-academic skills of the participants. In the present study, the mobile learning software include a time delay moment to inculcate the value of patience in the participants.

Pennington (2010) conducted a review of researches conducted in using computer assisted instruction to teach academic skills to students with autism. The results of the study revealed that the CAI was effective in teaching a limited set of academic skills to the participants who developed functional relationship with the individualized case study and none with the controlled group. The study recommended to explore other use of CAI in a different learning environment and commercial technologies must be evaluated for proper application.

In the review of researches conducted on the use of technologies, Anohina (2005) pointed out that a careful analysis must be done because there is a rapid growth of information and technologies like computer-based learning, distance learning, e-learning and internet based learning and evaluation is necessary to make it appropriate to the level.

Vellone, Karna, and Virnes (2016) conducted a study on the communication skills of four children with autism where multiple technologies were used in the classroom. The aim

of the study was to determine the amount and forms of the expressions of children's voices while working at three technology-based workstations of bricks, symbols matching and storytelling. The results revealed that the vocal expressions of the children were high and strong and the children had a different kind of communication profile. It implies that children with autism learn through a variety of communication and interaction and the aspects of technology-enhanced learning environment must be taken into consideration to support the expressive skills of children with autism.

Drain and Engelhardt (2013) wrote an open access article which examined, suggested spontaneous communicative acts in six nonverbal children with autism. Results showed a substantial number of nonresponses from teachers, even following suggested communicative acts. These results suggest that teachers may not actively promote intentional communication as much as possible. Therefore, the findings of the study provide information concerning ways in which educators could facilitate intentional communication in non-verbal children with autism. This study is congruent with the present study as in each activity of the theme application software, the participants were induced to communicate by the parent's prompting of the child to do the task asked by the communicative partner which is played by the teacher.

In the Philippines, several studies were conducted in using PECS to improve the communication skills of children with autism. Based on the study by Pintor (2013), she identified the communication skills needed by children with autism in a public school. The identified communication deficit skills are as follows: establishing eye contact when spoken to, express needs by pointing and gestures, try to use simple phrase "I want", discriminates

between pictures, answer the question "What do you want?", demonstrate responsive and spontaneous commenting and initiate communication skills through exchanging pictures. From these identified communication deficits, Pintor developed a teacher's guide that contains six lessons using the six phases of Picture Exchange Communication System. The findings of the over-all result of her study was "very good" in terms of the content and objectives. The developed materials were also valid and activities were appropriate to enhance the communication skills of children with autism. It was also observed that during the try-out of the materials to five children with autism the pupils participated actively, and often times responded correctly. The present research has improved the result of Pintor's study in terms of upgrading the activities into a multimedia mobile learning of children with autism.

Bicera (2011) studied the development of Filipino culturally- sensitive instructional materials using PECS to develop communication skills of children with autism. The conclusions of her study are as follows: the PECS instructional materials and prepared lessons develop the communication skills of a child with autism. The PECS instructional materials encourage the child with autism to initiate communication and to further enhance it. The PECS instructional material is appropriate not only to children with autism but also to other children with mild mental retardation who have difficulty in verbal communication. It indicates that using PECS as a teaching strategy for developing expressive skills of children with autism was updated with the use of technology for 21st century learners.

The study of Babao (2008) which aimed to develop instructional materials using the PECS to develop communication skills needed by children with autism found out that the use of PECS is an effective tool in developing the communication skills among students

with autism particularly in the early elementary level. Moreover, the use of PECS assisted the students with autism and children who had difficulty in expressing their wants in different learning areas like Math, English Language, Arts, Fine Motor Skills, Gross Motor Skills, and Activities for Daily Living. It shows that children with autism can acquire the skills for daily living together with physical development and academic skills.

Tore (2007) prepared and validated instructional activities using visual symbols and functional signed words as an augmentative and alternative communication device in developing the communication skills of non-verbal autistic children. The study aimed to identify the communicative behavior exhibited by nonverbal autistic children and based on conducted interviews and observations manifested behaviors like crying, pointing, gazing, and pulling of adult hand were the most common form of non-verbal communication used by these children and that it may sometimes accompany distractive and self-injurious behaviors especially in very unpleasant situations. Given the present communicative functioning of the non-verbal autistic child and their physical and cognitive limitations, manual signs and symbols were selected as the kind of communication approach to be used to address each child's unique needs to augment their communication skills and to enrich already existing skills as to functionality and direction of use particularly in the school and home setting. Based on the findings, the use of augmentative communication tool is essential for non-verbal autistic children and for it to be carried out successfully in varying situations, children should at least be physically and cognitively able to understand the flow of what is taking place during communication. This study serves to be the foundation for any research to be conducted in improving the communication skills of nonverbal children with autism.

Sison (2004) conducted an experimental study to find out the effectiveness of PECS among 17 children with autism and with mental retardation. The study was conducted for almost four months intervention of PECS, Phase I and Phase II. As the statistical tools in the study, the findings showed that there were more males who suffer severe communication deficits than females and most of them are children with autism. Although more male children with autism have communication deficits, they also have a high rate in acquiring communication through PECS. Furthermore, the study revealed that the children with autism are more capable than children with mental retardation in acquiring communication through PECS. Therefore, the use of PECS was recommended among special children with communication deficits and early intervention should be given once a delay in communication has been noticed.

Synthesis

The related literature and studies which were examined and analyzed found the need to develop and enhance the communication skills of nonverbal children with autism as discussed in the background of the study, the requisite to upgrade the level of preparing instructional resources and to create augmentative materials which had driven the researcher to conduct and produce a multimedia mobile learning application software for this group of special children.

The concepts about the characteristics of children with autism and non-verbal children with autism were enlightened by the thoughts from Individuals With Disabilities Education Act [IDEA] (2008), Autism Speaks Inc., (2017), and Rudy (2016). Understanding the characteristics of autism paved a way to address the appropriate communication skills

needed to be enhanced by these children.

The ideas of Bondy and Frost (2001) and Tincani, Bondy, & Crozier (2011) about language skills of the expressive and receptive skills specifically the requesting skills needed by a child with autism to functionally communicate served as the main focus of the study.

The study made by Nelson (2014), Kagohara et al., 2012; Schlosser et al., (2017) and Mirenda(2003) about the emerging technologies in particular for using the augmentative and alternative communication devices (AAC) in autism made a spring board to the present study because both were shown effectiveness when using AAC devices that enhance to speak the non-verbal children with autism.

The concept about mobile apps for autism guided the present study in terms of designing the features of the mobile learning app by which Avaz (2011) and Hong et. al., (2014) stated few pointers of the vital components on how to design and develop a mobile app to make it interactive and effective.

The principles about Picture Exchange Communication System (PECS) by Bondy & Frost (2002) have a great contribution to the present study. The teaching strategy employed was made possible to lead the children learn to communicate systematically and express his wants and needs by exchanging his desired picture/s to the communicative partner with the real item. Once the child follows the procedure with or minimal prompts, reinforcement in the same way as reward was given in the form of praise or tangible material/s that the child's like. The increase in desired behavior of non-verbal children with autism was also the objectives of the PECS principle.

In the Philippines, several studies were conducted in using PECS to improve the

communication skills of children with autism. Pintor (2013), Bicera (2011), Babao (2008), Tore (2007), developed various type augmentative and alternative communication instructional materials in using PECS as teaching strategy and they have common findings that PECS is an effective tool to encourage the children with autism to initiate communication and enhance their communication skills through valid and appropriate instructional materials. Furthermore, Sison (2004) recommends that the use of PECS among special children with communication deficits and early intervention should be given once a delay in communication has been noticed.

The notable difference between the past studies conducted and the present study being conducted in developing the communication skills of children with autism is in the number of participants involved, the types of technology used were high tech, availability and affordability of multiple types of technology and funds, the research method used were case studies, experimental while the present study developed a simple multimedia mobile learning apps because it is too expensive to make and it is not funded by any agency.

The researcher is very optimistic and hopeful that her study will be an inspiration to teachers, parents and advocates of special education for children with autism. Materials may not be very expensive with the use of the developed multimedia mobile learning application software. And lastly, the output of the study will be of unlimited benefits to many people in the life of children with autism and it will make a great contribution in the material development of all public schools and of the Department of Education as a whole.

CHAPTER 3

METHODOLOGY

This chapter presents the descriptions of the research method used, research design, respondents of the study, procedures, preparation and validation of the instruments used in the gathering of data, methods of data-collection, and statistical tools used in the analysis of data obtained.

3.1 Research Design

The descriptive-developmental design was utilized in this study. The purpose of the research is to develop an application software as one of the communication devices that is commonly used among children with autism as popular known as Picture Exchange Communication System. Descriptive research characterized as the attempt to determine, describe or identify what is, while analytical research attempts to establish why it is that way or how it came to be (Ethridge, 2004).

The focus of this method was a thorough description of the developed instructional content and design anchored through incorporating ideas of related studies and philosophies of cognitive, affective, stimulation-sensory and imitation learning theories.

The researcher utilized the descriptive method because it defines the characteristics of non-verbal children with autism, their favorite things, activities, needs and wants as well

as their screen gestures towards the mobile phone. Therefore, the researcher made use of interviews, survey questionnaires, and observation checklist to interpret using statistical method.

3.2 Research Process

On the way to design the multimedia mobile learning application software requires a systematic planning to ensure its purpose, relevance, and usefulness for non-verbal children with autism. The researcher adopted and modified the combination of the ADDIE and Rapid Prototype Instructional Design Model. According to Cullata (2013) the idea of rapid prototyping as it applies to instructional design, is to develop learning experiences in a repeated design-evaluation cycle that continue to improve throughout the life of the project. While the ADDIE instructional design model is the generic process traditionally used by instructional designers and training developers. The ADDIE model is at the very core of instructional design and is the basis of instructional systems design (ISD) (Training Industry, Inc., 2016). The research process of the study used the cyclical phases such as Preparatory Phase, Design Phase, and Development Phase which consist of Digitization and Prototyping, Review and Validation, Refinement, Implementation Phase and Evaluation Phase.

Figure 3.1 Research Process

Modified ADDIE and Rapid Prototype Instructional Design Mode

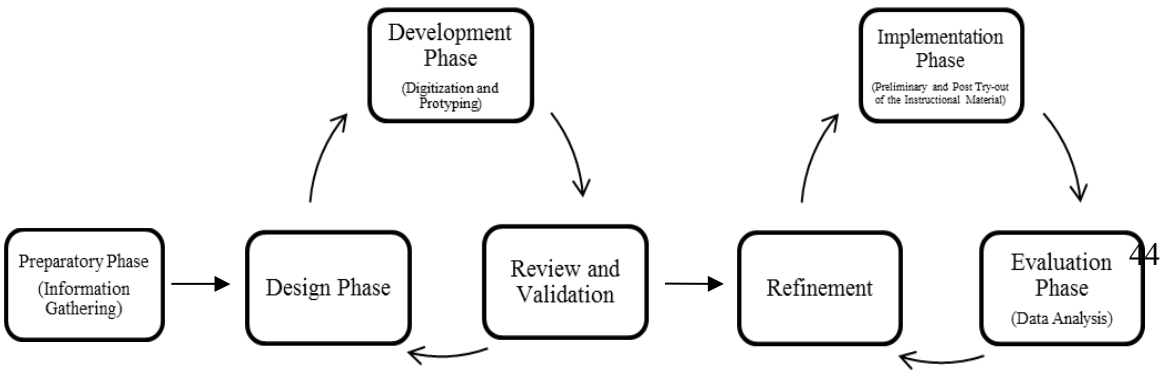


Figure 3.1 shows the research process paradigm of designing the multimedia mobile learning application using the combination of ADDIE and rapid prototype model. This process involved the Picture Exchange Communication System (PECS) as teaching strategy in delivering the lesson of the instructional content for non-verbal children with autism.

I. Preparatory Phase: Identification of Non-verbal Children with Autism and their General Preferences at Home and in the School Setting

Data Gathering Procedure

The first stage was carried through creating the checklists to identify specific characteristics of a non-verbal child with autism and their general preferences at home and in the school setting. The researcher adopted and modified the checklists from Frost and Bondy (2002) PECS Training Manual 2nd Edition. The criteria were completed in terms of social, communication and behavioral characteristics, communication displays, medium used, identification of things by pointing, and manipulation of skill. The children's general preferences were completed in terms of the foods like to eat, hygiene products used, clothes to wear, toys to play with, places to visit, recognize people that they enjoyed being with, and the materials needed in the school.

The researcher submitted a letter of permission to the superintendent of the city schools division of Quezon City to let selected special educators who were experts to validate and evaluate the research instruments of the study. The letter was also enclosed with a request for approval of the selected SPED teachers, parents and their non-verbal children with autism as another group of participants of the study. After the letter was approved, the researcher went to the experts to validate the research instruments and noted

all their remarks and suggestions to develop the instruments comprehensively.

The researcher handed a copy furnish of the letter to the principal of the locale of the study which stated the purpose and permission to allow the SPED teachers, non-verbal children with autism and their parents to participate in the study. The principal endorsed the researcher directly to the five (5) SPED teachers who handled autism children at different levels. The selection of the participants in the study began with the evaluation of the checklist in identifying the characteristics of the non-verbal children among the children with autism by SPED teachers. Then the researcher made a purposive sampling of the participants out of the data gathered.

The researcher also sought the involvement of parents of the non-verbal children with autism because these children are attached to their parents and expressed this attachment in unusual ways (Autism Speaks Inc., 2017). They were also the participants of the study and evaluate their children's general preferences in terms of their favorite food and drinks which includes breakfast, lunch/dinner, snacks, and fruit. The needed self-help skills are categorized into hygiene products and personal care, clothes they wear, toys to play with, people they recognized and enjoyed being with, places like to visit, and school materials they needed.

The observation checklist and survey questionnaires validated by the special education experts were used for this purpose. The researcher gathered the data, reviewed, analyzed and evaluated the result to be utilized in next phase.

Locale of the Study

The study was conducted in one of the SPED Class Programs at the Division of City

Schools in Quezon City. The researcher conducted the study during the 1st quarter of school year 2016-2017. The school has 62 enrollees and 19 of them were identified as children with autism. The study was conducted on the said school because it was the desire of the researcher to help the non-verbal children with autism through needed intervention to enhance their communication skills using technology. As observed by the researcher, most of the parents of these children are using android phones and have tablets gadgets. In addition, it was accessible to the researcher to conduct the study in the said school because of the location of her residence.

Participants of the Study in Phase 1

The following were the four (4) groups who participated in the conduct of the study at this phase: Five (5) experts who were validated the checklist on identification of the characteristics of the non-verbal children with autism and their general preferences at home and in the school setting, five (5) SPED teachers who were evaluated the checklist on the identification of the non-verbal children with autism, five (5) identified non-verbal children with autism and five (5) parents who were evaluated the general preferences of these children at home and in the school setting.

Table 3.1 presents the experts' qualifications on validation of the instruments in identification of the characteristics of the non-verbal children with autism and their general preferences at home and in the school setting and content analysis of the multimedia mobile learning application software.

Table 3.1

Profile of the Experts on Validation of the Instruments

Expert	Sex	Position	School Office	Years of Teaching Handling Autism	Educational Background
1	F	Master Teacher-I	Public School Teacher	5	Master's Degree with Doctoral Units
2	F	SPED Teacher-III	Public School Teacher	8	Master's Degree
3	F	SPED Teacher-III	Public School Teacher	5	Master's Degree
4	F	SPED Teacher-I	Public School Teacher	5	Bachelor's Degree with Units
5	F	SPED Teacher-I	Public School Teacher	5	Master's Degree

To validate the suitability of the instruments used in the study, the researcher sought the opinions of the five experts who have experienced in teaching children with autism from five (5) years to eight (8) years in serving the public school. All of them were in good position having master's degree and units in special education.

Table 3.2 presents the profile of the experts to evaluate and assess the non-verbal children with autism in their classes.

Table 3.2

Profile of the Experts in Identifying the Characteristics of the Non-verbal Children

Expert	Sex	Position	School Office	Years of Teaching Handling	Educational Background

				Autism	
1	F	SPED Teacher	Public School Teacher	2	With SPED Units
2	F	SPED Teacher	Public School Teacher	3	Bachelor's Degree in SPED
3	F	SPED Teacher	Public School Teacher	3	Bachelor's Degree in SPED
4	F	SPED Teacher	Public School Teacher	2	Bachelor's Degree with Units
5	F	SPED Teacher	Public School Teacher	2	Bachelor's Degree in SPED

To identify the non-verbal children with autism as the participants in the try-out of the developed multimedia mobile learning application software, the researcher asked support from the special education teachers from the locale of the study using the review of their current school assessment record and evaluate these children using the checklists on identification the characteristics of the non-verbal children with autism. The researcher gathered, reviewed, analyzed and evaluated the result of the assessment.

Table 3.3 presents the profile of the non-verbal children with autism from the data analysis of the assessment by their special education teachers.

Table 3.3

Profile of the Non-verbal Children with Autism

Participants	Sex	Age
1	Boy	10 years old
2	Boy	11 years old

3	Boy	6 years old
4	Boy	6 years old
5	Girl	7 years old

Table 3.3 presents the non-verbal children with autism as the participants in the try-out of the developed multimedia mobile learning application software and most of them were boys ranging from (6) six to (11) eleven years old.

Research Instruments used in Phase I

There were three (3) checklists prepared in this phase. (1) Checklist on the Identification of Nonverbal Children with Autism in terms of Social, Communication, and Behavioral Characteristics. See Appendix F. (2) Checklist on the Identification of Nonverbal Children with Autism in terms of Communication Displays, Medium Used, Identification of Things by Pointing and Manipulation Skills. See Appendix G. (3) Checklist on the General Preferences of a Non-verbal Child with Autism at Home and in the School Setting. See Appendix H.

II. Design Phase: Preparation of the Instructional Plans and Crafting the Features of the Multimedia Mobile Learning Application Software

Preparation of the instructional plans. The design phase deals with lesson planning in developing the features of the multimedia mobile learning application software. Preparing the instructional plans based on the Picture Exchange Communication System principles as the teaching strategy pursued an orderly method of

identifying the learning objectives, content, activities, procedure, and evaluating the instructional plans for meeting the criteria of the content features of the multimedia mobile learning application software.

The researcher prepared a set of written manuscripts of the multimedia mobile learning application software format for easier understanding of the user. The principle that anchored in teaching PECS that modified by the researcher is the task analysis. Franzone (2009b) stated that task analysis is the process of breaking a skill into smaller sub-skills, with controllable steps to complete the skill. In this study, a child allows to work on the procedure during the implementation of the lesson. The child followed a simple task broken down into steps to be accomplished by a child through prompts of a parent and facilitated by a teacher. The researcher encourages repetition of the task to strengthen and established the child's initiation to communicate through exchanging of pictures of child's favorite things and activities using the developed instructional material.

In the conduct of the study, the user pertains to the communicative partner of a non-verbal child who is the Special Education Teacher that executed the lesson for the child. A physical prompter refers to the parent of a child who gives prompts and assistance to the child during the lesson. The prompter holds the child and guides physically in the procedure of the lesson. These trainers received orientation and mocked training before the try-out of the developed multimedia mobile learning application software to the participants of the study.

The researcher came up with twenty-four (24) lesson plans. Each lesson has the following parts:

A. Objectives. This contains the skills expected to be acquired by the non-verbal autism children at the end of the training/lesson.

B. Subject Matter. This contains the themes, category and materials used in the lesson presented.

C. Activities. This contains the engagement activity by the non-verbal child with autism towards the mobile app through initiation.

D. Procedure. This contains the steps in executing the lesson with the involvement of the person responsible during the training: SPED Teacher as communicative partner of the child and his/her parent as physical prompter who guides/holds his hand to manipulate the mobile phones.

E. Evaluation. This contains questions for each activity engaged by the child towards the multimedia application software.

F. Note to Teachers. This contains helpful notes, reminders, and suggestions, for the teacher about the training on how to make it realistic, relevant, and meaningful to the child.

Table 3.4

Instructional Plan Format

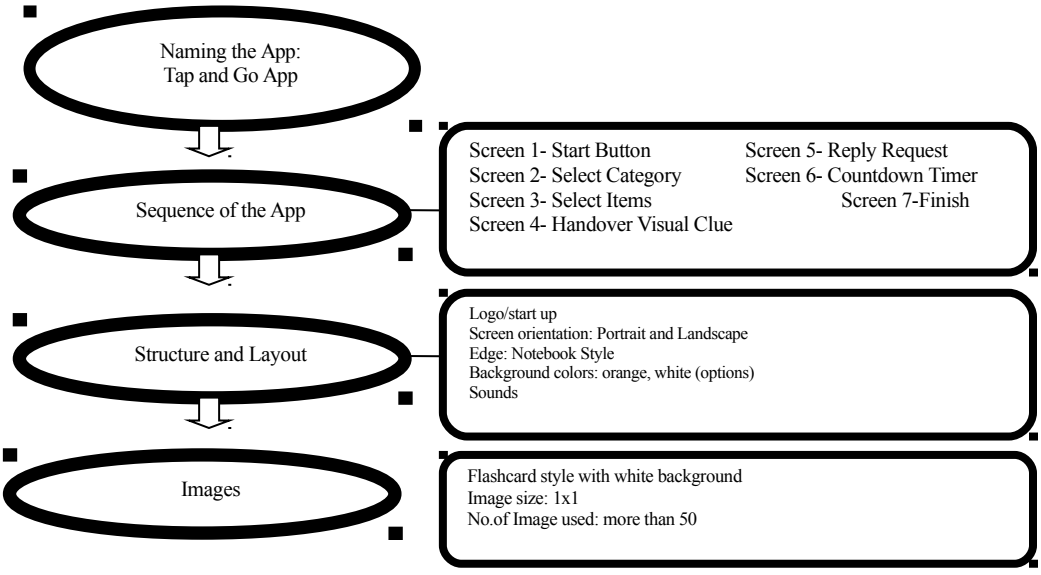
Theme:				
LESSON OUTLINE:				
Objectives				
Subject Matter				
Activities				
Procedure	Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Evaluation				
Note to Teacher:				

Table 3.4 shows the structure of the multimedia mobile learning application software format and it has segments for the themes, the lesson outline contains the objectives, subject matter, activities, procedure and evaluation of the performance of the participants in each activity. Note to teacher denotes few suggestions in the conduct of the lesson.

Crafting the features of the multimedia mobile learning application software. The second stage includes the planning of the instructional design based on the principles of PECS, learning theories of sensory stimulation theory, social learning theory, and reinforcement theory. In this step, the researcher made a rough sketch of the sequence, structure, layout, number and selection of images, and child's screen gestures to be used in each slide of the application software then submit it to the IT expert to digitize.

Figure 3.2

Flowchart on Crafting the Features of the Multimedia Mobile Learning Application Software "Tap and Go App"



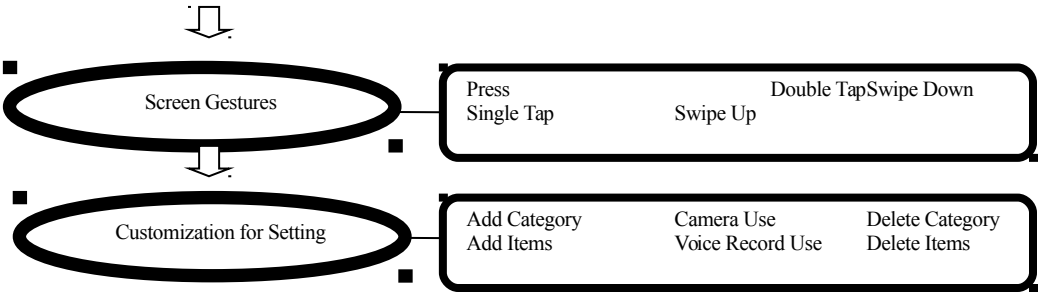


Figure 3.2 is the representation of the process followed by the researcher conceptualizing the design of the multimedia mobile learning application software.

Firstly, the researcher thought of a proper title for the app based on the tapping skills that the nonverbal children with autism would be performing. Hence, she gave it a name, "Tap and Go" which means that when a child taps an item, picture will immediately appear. Once it appears, the child will initiate communicating by gesturing hand over the mobile learning device to the communicative partner. Secondly, the researcher came up with nine (9) screen slides as the main features of the mobile learning app that adopted and modified from the six phases of PECS namely: Screen 1- Start Button; Screen 2- Select Category; Screen 3- Select Sub- Category; Screen 4- Select Items; Screen 5- Sentence Structure "I want __"; Screen 6- Handover Visual Clue; Screen 7-Reply to Request; Screen 8- Countdown Timer if the request is available; Screen 9-Finish. The Sensory-Stimulation theory suggested that greater learning takes place when the sense of seeing, hearing, touching, and other senses are stimulated it enhances the learning of an individual (Laird, 1985). This theory was guided by the researcher in creating the main feature of the instructional material. The nine (9) screen slides stimulated the senses of a non-verbal child with autism to interact and react to the communicative partner and shows learning take place.

Thirdly, the researcher did structuring and lay-outing of the following features of the

mobile learning app namely: The logo/start up ; Screen Orientation: Portrait and Landscape; Edge looks like a notebook style; Sounds, Background colors: orange, white, and (options) were conducted. These objects create a very important feature of the mobile learning app because the appropriate graphics, images, colors, and text used by the researcher stimulated the senses to motivate the child to manipulate the mobile learning app.

Fourthly, imaging of the size of the pictures was decided to make it a 1x1 picture size; the pictures are in a flashcard style with white background and it contains more than fifty pictures. Thus, the principle of multimedia of Mayer (2005a) supported this concept that people learn more deeply from words and pictures than from words alone.

The fifth step, the researcher selected the screen gestures such as press, single tap, double tap, swipe up and swipe down to make it easy for the participants to follow. Lastly, customization for the setting was done to be able to add more pictures when needed with the option of recording the voice of the user. These features of the mobile learning app motivated the children to explore and experience and utilized their sense of touch which anchored from the sensory-stimulation theory. The concept of this theory had a great contribution in designing the multimedia mobile learning application because it stimulates the senses of the non-verbal children with autism that they enjoy and learn at the same time.

III. Development Phase: Digitization the Material Utilizing the Rapid Prototype Model

The development phase is where instructional designers and developers create and assemble the content assets that were blueprinted in the design phase. In this phase, storyboards are created, content is written and graphics are designed. It involved the IT experts' collaboration to develop and integrate technologies.

Digitization the Material. The design through rough sketch made by the researcher was transmitted by the IT experts into graphics, images and applied the appropriate sounds including the use of actual photos captured in the local setting. The IT experts utilized Android Verion 4.6, 5.0 and 6.0 which means that from these type of platforms, the user is enable to utilize the developed mobile learning app because of its compatibility. The researcher provided the content of the material by following the sequence of adopted and modified PECS principles: Slide 1 Choose a category. It appears on the theme of the lesson; Slide 2 Choose an item. It appears on the specific image where the child wants to request; Slide 3 Request Item. It appears when the child selects his requested item; Slide 4 Handover requested item. It appears as visual cues to pass the device to the communicative partner; Screen 5 Sentence structure "I want___". It appears when a child finally selected appropriate item for requesting; Slide 6 Reply to requested Item. It appears when the communicative partner holds the device and reply to the availability of the real item; Slide 7 Set Timer. It appears when the requested item is available and the communicative partner sets the time depends on his ability to give the real item; Slide 8 Waiting Time. It appears during the countdown timer set by the communicative partner; Slide 9 Alert on countdown. It appears when the countdown timer is finished and gets the item.

The PECS teaching training is based on B.F. Skinner's book, Verbal Behavior. PECS begins with teaching a non-verbal child with autism to exchange a picture of a preferred item with a communicative partner, who immediately replies to the request. After the child learns to request for a preferred item, the system goes on to teach discrimination among symbols or images and later on how to construct a simple sentence. In the most advanced phases, non-verbal child with autism is taught to say to questions and to comment. Additionally, language attribute concepts such as size, shape, color, number, etc. are also being taught so that the

student can make their message more specific (Bondy and Frost, 2002).

In this stage, the researcher made a prototype model to guide the IT experts who sequentially constructed the design based on PECS strategy. Figure 3.3 presents the idea of receiving continual or formative feedback while instructional materials are being created. This model attempts to save time and money by catching problems while they are still easy to fix (Training Industry, Inc., 2016).

Figure 3.3

Prototype Model in Digitization of the Multimedia Mobile Learning Application Software

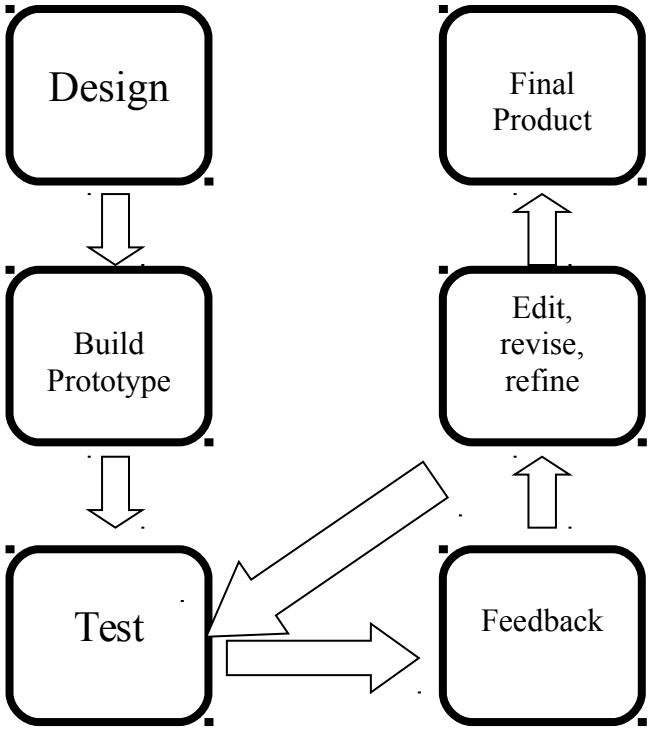


Figure 3.3 displays the flow of the development of the digitization of the multimedia mobile learning application software with the participation of the IT experts. In the design stage the rough draft of the multimedia mobile learning application software was drawn; in the build prototype stage the flow chart was also outlined by the information technology expert; in the test stage the prototype was presented by the expert to the researcher for testing out the slides/materials of its congruency with the Picture Exchange Communication System procedures. In the feedback stage, the researcher shared her observation and corrections to be made. She observed that the handover instruction and timer were missing, thus, she instructed the IT to put them in one of the slides. In the edit, revise, and refine stage, the IT created the revisions needed. It took four revisions to upgrade the multimedia mobile learning application software. In the final stage, the multimedia mobile learning application software is completed as the final product.

Subsequent to the development of the content was the evaluation made by the SPED Teachers of Commonwealth Elementary School. The experts tested, analyzed, and evaluated the suitability of the criteria in terms of the objectives, subject matter, activities, procedure, and evaluation. The suggestions and recommendations were solicited to improve the content.

Participants of the Study in Phase II

There researcher collaborated with the two (2) IT experts in digitizing the instructional design. Table 3.5 presents the qualification of the program developers and their expertise that were remarkably contributed in materialization of the "Tap and Go App"

Table 3.5
Profile of the Information Technology (IT) Experts in Digitization of the Multimedia Mobile Learning Application Software

Experts	Sex	Position	Educational Background
1	M	Co-founder/ Front End Developer	AMA Project. 8 Bachelor's Degree
2	M	Co-founder/ Full Stack Developer	AMA Project. 8 Bachelor's Degree

The researcher sought support from the application developers and programmers to digitize the crafted instructional material in the design phase.

Table 3.6 shows the profile of the five experts who validated the instruments and the features of the multimedia mobile learning application software as to content and technical quality.

Table 3.6

Profile of the Experts on Validation of the Instruments for the Content Analysis

Experts	Sex	Position	Educational Background
1	F	University Professor	Doctoral Degree
2	F	Special Education Supervisor	Doctoral Degree
3	F	SPED Master Teacher In-Charge	Master's Degree With Doctoral Units
4	M	ICT Coordinator	Bachelor's Degree
5	M	ICT Coordinator	Bachelor's Degree

One of the experts is a university professor with a doctoral degree in educational management and she has been teaching children with special needs for 25 years; another expert is a special education supervisor with a doctoral degree in educational management and work as a school supervisor in DepEd. The third expert is a special education, master

teacher in-charge and taking a doctoral course and she teaches special children in a public school; and two experts on teaching information and communication technology in computer lessons.

To complete the participants in this phase, the evaluators for the content analysis of the multimedia mobile learning application software are also the validators on the instruments used in identifying the characteristics of the non-verbal children with autism. See Table 3.1 for the profile of the evaluators on content analysis of the multimedia mobile learning application software. Furthermore, Table 3.7 presents the profile of the IT experts evaluators in terms of the technical quality.

Table 3.7

Profile of the Evaluators on Technical Quality of the Multimedia Mobile Learning Application Software

Expert	Sex	Position	Educational Background
1	M	ICT	Bachelor's Degree with SPED Units
2	M	Team Leader Web Developer, Game Developer	STI Bachelor's Degree

To provide substantial evaluation in terms of suitability of the technical quality in the developed multimedia mobile learning application software the IT experts were both knowledgeable in information technology.

Research Instruments used in Phase II

Checklist on Evaluation of the Content Features and Technical Quality of the Multimedia Mobile Learning Application Software has two (2) parts; **Part I. Checklist on the Content Features** using PECS as teaching strategy and it was presented at appendix I. The checklist was evaluated by the special education experts in terms of objectives, content, activities and procedure. The first area of this instrument is the objective and has five criteria on its being specific and clearly stated, measurable, attainable, relevant and time based was evaluated and validated for its suitability by five experts; the second area is the content with the criteria on its congruency to the objectives of the lesson, materials are cleary specified, it is appropriate for nonverbal children with autism, and it shows relevant pictures for the children to understand easily; in the third area are the activities of the multimedia mobile learning application software and it follows the criteria on its congruency with the objective, the children can follow it with ease, it is suited to their ability level; and the fourth area is the procedure of teaching the activities adhere to the criteria that the steps show relevance to the learning objective, it is simple and the language can be understood by the children through promptings by the communicative partner and parent as the prompter, it provides active participation and adaptable to their interest and learning; and the teachers can implement it without assistance. The fifth area is the procedure and it has five criteria on its relevance to the learning objectives, simple and direct instruction, it entice the participants to participate actively, it can by followed easily by the communicative partner and prompter and it is adapted to the interest and willingness to communicate through exchange of pictures; **Part II. Checklist on the Technical Quality** presented at appendix J. This was evaluated by the IT experts in terms of technical appearance and flexibility to the non-verbal children with autism. The first area of the instrument is the technical appearance and has five criteria on its

being clear, organized and appealing to the participants; images and text used were accurate; the color, size and font style are appropriate; the touc screen functions properly and the sound is pleasant to hear. The second criteria is on flexibiity where the appls includes setting that can be changed; it is child-friendly, simple and clear; the layout and gesture are consistent; and it encourages independent learning to nonverbal children with autism.

Review and Content Validation

Five educators in the field of special education validated the multimedia mobile learning application software on suitability and attainability, measurability of the objectives, content, activities and procedures. These results of the evaluation are found on Table 4.10, Chapter 4. Furthermore, experts of the Information Technology (IT) were sought to ascertain the suitability and necessity of the materials to develop the communication skills of the participants through exchange of pictures.

Comments and suggestions were noted in the revisions of the instrument such as modifying some instructions, procedures for teaching and easy execution of the lessons. There was replacement for a few pictures to be used like jacket, towel, color of the t-shirt, and water.

Refinement

The research instrument was retrieved from the experts; their suggestions and opinions were gathered and interpreted. The instruments were revised in accordance with the results of the evaluation and suggestions made by the experts. See Table 4.5 for the summary results of the content validation for revisions of the multimedia mobile learning

application software.

IV. Implementation Phase: Try-out of the Multimedia Mobile Learning Application Software

The researcher underwent preliminary and post try-out in gathering the data needed in the study. The purpose of the first try-out was to train the five (5) non-verbal children with autism participants to be familiar with the mobile learning app. And the post try-out yielded the result of the observable characteristics and screen gestures when using the mobile by the participants of the study.

Conduct of Preliminary Try-out of the Multimedia Mobile Learning Application Software

A correspondence letter was submitted to the principal of the locale of the study to allow the researcher to conduct her study to the SPED teachers, non-verbal autism children and their parents. A letter for the teachers and parents was also presented to know all about the researcher's purpose. After the letter was approved, the researcher went to a briefing with the teachers as well as to the parents on how to use the material with their participation. The SPED teachers and parents showed interest and felt at ease when practicing the device and easily learn the procedure. With their cooperation, the researcher suggested to conduct the preliminary try-out in natural condition while having the recess or break time of these children. The results of the preliminary try-out showed that the fifteen (15) non-verbal children with autism have shown difficulties in using the multimedia mobile learning application software. Hence, the researcher chose to have five (5) non-verbal children with autism as the participants of the study.

Conduct of Post Try-out of the Multimedia Mobile Learning Application Software

This stage involves the preparation of real items as the materials to be used in the lesson, briefing for the SPED teachers and parents as the responsible persons in the procedure of multimedia mobile learning application software in conducting the lesson. The researcher trains the participants in a week without distracting the teacher's lesson instead integrating the multimedia learning application software. It was advised that the use of this intervention was used only one lesson per day. The SPED teacher evaluated the participant's performance in terms of observed behavior towards manipulating the multimedia mobile learning application software. Revision and finalization of the product was done after the evaluation of the SPED Teachers.

Research Instruments used in Phase IV

There instruments used in the preliminary and post try-out were validated by the five (5) special education teachers who were also validated and evaluated the previous instruments. See Table 3.1 for the complete profile of the evaluators.

The Try-out Evaluation Checklist of the Multimedia Mobile Learning Application is presented at appendix K. and it has two (2) parts: **Part I- Behavior**. It consists of the behavior manifested during the manipulation of the multimedia mobile device and **Part II- Touch Screen Gesture**s. It includes the observation on the exhibited action by the child towards the mobile device and served as the basis on how to manipulate the developed multimedia mobile learning application software.

The researcher conducted a preliminary try-out then a post try-out of the study to observe the performance of the child when using the multimedia application. The criteria were created in line with the principles of PECS, Sensory-Stimulation theory, Social Learning Theory, and Reinforcement Theory. It shows the try-out evaluation form to assess the performance of the participants in terms of their performance in working on the activities in the multimedia mobile learning application software. It has six criteria: 1) The child was motivated to use the multimedia mobile learning application software through establishing eye contact; 2) The child was appeared to initiate to start using the multimedia mobile learning application software; 3) The child manipulated the multimedia mobile learning application software with the help of the physical prompter; 4) The child was observed imitated and followed his/her prompter while using multimedia mobile learning application software; 5) The child was observed to use screen gestures of the mobile app (press power button, tap, double tap ,swipe up, down ,left and right of screen); and The child acted with enjoy when hearing sounds from the multimedia mobile learning application software.

V. Evaluation Phase: Data Analysis

The quantitative part of this study was analysed through statistical tools like, weighted mean and standard deviation. The researcher made use of the following statistical tools to complete the study.

Weighted Mean. This was used to get the average of the overall respondents given that the data is a scale. The "*x*" stands for each value of the variables while "*N*" stands for the overall population. The formula for getting the mean is as follows:

$$\frac{\sum x}{N} = \bar{X}$$

Standard Deviation. Standard deviation is used to determine the dispersion or distance of the scores or values of the respondents form the mean. This is also an indication if there are outliers in the data and if the distribution of the data is even.

The results of the statistical computation were compared in arbitrary intervals and interpretation;

1. Identification of non-verbal autism child in terms of social, communication and behavioral characteristics, communication displays, medium used identification of things by pointing, and manipulation skills. Identification of the general preferences of a non-verbal with autism at home and school settings. Screen gestures to multimedia mobile learning application software.

Range	Interpretation
2.50 - 3.00	Highly Suitable
1.50 - 2.49	Very Suitable
1.00 - 1.49	Suitable

2. Try-out Evaluation of the Multimedia Mobile Learning Application

Range	Interpretation
2.50 - 3.00	Strongly Observed
1.50 - 2.49	Very Much Observed
1.00 - 1.49	Observed

CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter presents the data as gathered, tallied, analyzed and interpreted. Appropriate tables were used for the descriptive presentation of findings, followed by the discussions in relation to the problems stipulated in Chapter 1.

Problem 4.1 Identify Characteristics of the Non-verbal Children with Autism

To attain to the first purpose of the study, which is to identify the nonverbal children with autism, the checklist on the characteristics of non-verbal children was utilized. The results of the evaluation were gathered and used as the basis for establishing that the participants of the study are non-verbal children with autism.

The following scale and verbal interpretation were used in establishing the characteristics of non-verbal children with autism in the area of social, communication, behavioral characteristics. The scale of three (3) ranged from 2.51 to 3.00 was interpreted as very much observed revealing that the characteristics of the non-verbal are very strongly noticeable, as to the scale of 2 as suitable ranges 1.51 to 2.50 interpreted as much observed indicating that the characteristics of nonverbal children with autism are much noticeable and the scale of 1 ranging from 1.00-150 interpreted as observed showing that the characteristics of nonverbal children with autism are noticeable.

Table 4.1 exhibits the weighted mean of the identification of the characteristics of nonverbal children with autism.

Table 4.1 Summary of the Weighted Mean Results of the Characteristics of Non-verbal Children with Autism in terms of Social, Communication and Behavioral Characteristics

Participants	Social Concerns	Communication Concerns	Behavioral Concerns	Weighted Mean	Interpretation

Child 1	2.52	2.27	2.50	2.43	**Much Observed**
Child 2	2.68	2.41	2.48	2.52	**Very Much Observed**
Child 3	2.57	2.67	2.66	2.63	**Very Much Observed**
Child 4	2.72	2.65	2.58	2.65	**Very Much Observed**
Child 5	2.72	2.75	2.72	2.73	**Very Much Observed**
Overall Rating	**2.64**	**2.55**	**2.56**	**2.59**	**Very Much Observed**

Table 4.1 shows the summary of the characteristics of the participants in terms of their social concerns, communication concerns and behavioral concerns. Child 1 got a weighted mean rating of 2.43, interpreted as much observed which shows that the three areas of behavior are much noticeable. Child 2 got a rating of 2.52 interpreted as very much observed; Child 3 was rated 2.63, interpreted as very much observed; Child 4 with a rating of 2.65, interpreted as very much observed and Child 5 got a rating of 2.73, interpreted as very much observed. The overall weighted mean results ranges from 2.55 to 2.64 which is interpreted as very observed. The four children's characteristics are very strongly noticeable by which there is needed intervention to discourse these characteristics. Thus far, the study resorted to the new technologies in the 21st century to treat and teach particular needs of children with autism. Bonsignore et. al, (2013) stated that developing multimedia application for children's education has become popular today and evidently shows increase in child's learning performance. This was supported by Tang et. al, (2013) stated that multimedia application for children with autism can develop their communication skills.

The following scale and verbal interpretation were employed in identifying nonverbal children in terms of their characteristics exhibited in communication display, medium used, identification of things by pointing and manipulation skills. The scale of

three (3) ranged from 2.51 to 3.00 was interpreted as extremely evident revealing that the characteristics of nonverbal children with autism do not need prompting, as to the scale of 2 as suitable ranges 1.51 to 2.50 interpreted as very evident indicating that the characteristics of nonverbal children with autism needs minimal prompting and the scale of 1 ranging from 1.00-1.50 interpreted as evident showing that the characteristics of nonverbal children with autism need maximum prompting.

Below is Table 4.2 shows the summary of the weighted mean and standard deviation results of the identification of the characteristics of nonverbal children with autism in terms of communication displays, medium used, identification of things by pointing, and manipulation skills.

Table 4.2 Weighted Mean and Interpretation on Identification of the Characteristics of Non-Verbal Children with Autism in terms of Communication Displays, Medium Used, Identification of Things by Pointing, and Manipulation Skills

CRITERIA	Mean	SD	Interpretation
A. COMMUNICATION DISPLAYS			
1. Requesting things he/she needs and wants	1.20	0.45	Very Evident
2. Asking for assistance or help	1.20	0.45	Very Evident
3. Asking for a break	1.00	0.00	Less Evident
4. Rejecting (indicating "no" to "Do you want____?")	2.20	0.45	Very Evident
5. Affirming (indicating "yes" to "Do you want____?")	2.40	0.55	Very Evident
Overall	1.60	0.65	Very Evident
B. MEDIUM USED TO COMMUNICATE			
1. Produces sounds understood by significant other (the people around him/her)	1.80	0.84	Very Evident
2. Expresses needs by pointing and gesturing	2.00	1.00	Very Evident
3. Expresses needs and wants through sign language	1.60	0.89	Very Evident
4. Expresses needs and wants through pictures	1.60	0.89	Very Evident
5. Expresses needs and wants through writing/drawing	1.00	0.00	Less Evident
Overall	1.60	0.37	Very Evident
D. IDENTIFICATION OF THINGS BY POINTING:			
1. Food and drinks	1.00	0.00	Less Evident
2. Clothes	1.20	0.45	Less Evident
3. Toys	1.20	0.45	Less Evident
4. School materials	1.20	0.45	Less Evident
5. Attributes like color, shape, numbers, alphabet, etc.	1.20	0.45	Less Evident
Overall	1.16	0.09	Less Evident
C. MANIPULATION SKILLS			
1. Pick up thing/s that the child's needs and wants	2.20	0.45	Very Evident
2. Reach for the thing/s that the child's needs and wants	2.20	0.84	Very Evident
3. Release thing/s that the child's needs and wants	2.00	0.71	Very Evident
4. Select thing/s that the child's needs and wants	2.20	0.84	Very Evident
Overall	2.15	0.10	Very Evident

Table 4.2 shows that the characteristics of non-verbal children with autism in terms of communication display got an overall rating weighted mean of 1.60 and SD of 0.65. It implies that their communication display is evident and it needs maximum prompting. Items 1 and 2 with a 1.20+0.45 requesting things he/she needs and wants and asking for assistance or help are evident but needs maximum prompting; item 3 asking for a break with a (1.00+0.00) is evident and needs maximum prompting. Items 4 and 5 with 2.20+0.45 and 2.40+0.55 are very evident and needs minimal prompting item and item 5 affirming

(indicating "yes" to "Do you want____?") with 1.60+.065 is very evident which needs minimal prompting.

The characteristics in term of medium used to communicate got an overall rating of 1.60+0.37 with verbal interpretation as very evident and it needs minimal prompting. Items 3 and 4 got a rating of 1.60+0.89 which is interpreted as very evident needs maximum prompting; item 1 produces sounds understood by the significant other (the people around him/her) is very evident and it needs minimal prompting; item 2 expresses needs by pointing and gesturing with 2.00+1.00 is very evident needed a minimal prompting and item 5 expresses needs and wants through writing/drawing with 1.00+.00 is evident which needs maximum prompting.

Identification of things by pointing as their characteristic got an overall weighted mean 1.16 and SD 0.37 and is interpreted as evident needs maximum prompting. Items 2,3,4 and 5 got a rating of 1.20+0.45 are interpreted as evident needs maximum prompting and item 1 food and drinks got 1.00+0.00 is interpreted as evident and needs maximum prompting. It implies that the nonverbal children with autism characteristics on identification of things by pointing are their difficulties and it need maximum prompting.

The characteristics on manipulation skills got an overall rating of 2.15+0.10 is interpreted ad very evident needs minimal prompting. Items 1, 2, and 4 pickup thing/s that the child's needs and wants, reach for the thing/s that the child's needs and wants, and and wants got a rating of 2.20+0.45/0.84/84 which needed minimal promptings. And select thing/s that the child's needs and wants with an interpretation of very evident with minimal prompting. It implies that the overall characteristics of nonverbal children

ranges from 1.16 to 2.20 and +0.09 and 0.45 are very evident and evident with minimal and maximum promptings.

Figure 4.1 shows the identified characteristics of nonverbal children with autism in terms of their characteristics exhibited in communication display, medium used to communicate, identifying things by pointing and manipulation skills.

Figure 4.1 Characteristics of Nonverbal Children with Autism

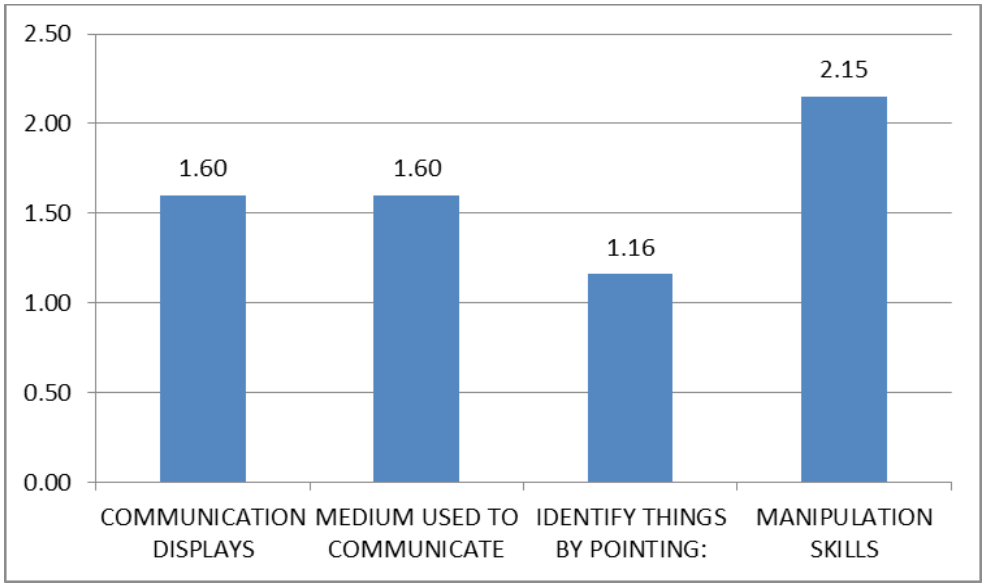


Figure 4.1 shows the graphical presentation of the characteristics of non-verbal children with autism. In terms of the manipulation skills of the participants it got a highest rating of 2.15 which means the child needs minimal promptings especially picking up thing/s that the child's needs and wants; reach for the thing/s that the child's needs and wants; release thing/s that the child's needs and wants and select thing/s that the child's needs and wants. Communication skills of the participants as well as the medium used to communicate got the same rating of 1.60 which implies that these

children need minimal prompting. Whereas, identifying things by pointing got the weakest rating of 1.16 among the mentioned skills. It implies that pointing skill is the difficulty among these children who needs maximum prompting to express his wants and needs through gestures.

Problem 4.2 Identify the General Preferences of Non-verbal Children with Autism at Home and in the School Setting

In relation with the second objective of this study which is identifying the general preferences of nonverbal children with autism a checklist was used. The results of the evaluation were gathered and used as the basis for establishing the favorite things and preferences of non-verbal children with autism. Table 4.3 shows the weighted mean and standard deviation results of the identification of the favorite things and preferences of nonverbal children with autism.

Table 4.3 Weighted Mean And Standard Deviation Results the General Preferences of Non-verbal Children with Autism at Home and School Setting

CRITERIA	Mean	SD	Interpretation
A. Things your child likes to eat for breakfast			
1. Ham	2.00	1.00	Much Preferred
2. Hotdog	2.60	0.55	Very Much Preferred
3. Noodles	2.20	0.84	Much Preferred
4. Egg	2.40	0.89	Much Preferred
5. Bread	2.40	0.89	Much Preferred
6. Sandwich	2.40	0.89	Much Preferred
Overall	2.33	0.20	Much Preferred

B. Things your child likes to eat for lunch/dinner with rice			
1. Adobo Chicken	1.40	0.55	Preferred
2. Chopseuy	1.00	0.00	Preferred
3. Fried Chicken	3.00	0.00	Very Much Preferred
4. Fried Liempo	2.20	1.10	Much Preferred
5. Grilled fish	1.00	0.00	Preferred
6. Sinigang	1.00	0.00	Preferred
Overall	1.60	0.90	Preferred
C. Things your child likes to eat for snack			
1. Biscuit	2.00	1.00	Much Preferred
2. Cake	2.40	0.89	Much Preferred
3. Candy	2.40	0.89	Much Preferred
4. Chocolate	3.00	0.00	Very Much Preferred
5. French fries	3.00	0.00	Very Much Preferred
6. Ice cream	3.00	0.00	Very Much Preferred
Overall	2.63	0.40	Very Much Preferred
D. Things your child likes to drink			
1. Milk	1.40	0.89	Preferred
2. Juice	2.80	0.45	Very Much Preferred
3. Yougurt	1.00	0.00	Preferred
4. Yakult	2.20	0.84	Much Preferred
5. Zest-O	2.80	0.45	Very Much Preferred
6. Water	2.80	0.45	Very Much Preferred
Overall	2.17	0.80	Much Preferred
E. Favorite fruit			
1. Apple	2.20	0.84	Much Preferred
2. Banana	2.40	0.55	Much Preferred
3. Grapes	2.20	0.84	Much Preferred
4. Mango	1.40	0.55	Preferred
5. Orange	1.40	0.55	Preferred
Overall	1.92	0.50	Much Preferred
F. Things your child needs to wear for boys			
1. Brief	3.00	0.00	Very Much Preferred
2. Jacket	3.00	0.00	Very Much Preferred
3. School uniform	2.75	0.50	Very Much Preferred
4. Shorts	3.00	0.00	Very Much Preferred
5. Socks	2.75	0.50	Very Much Preferred
6. T-shirt	3.00	0.00	Very Much Preferred
Overall	2.92	0.13	Very Much Preferred
G. Things your child needs to wear for girls			
1. Blouse	3.00	0.00	Very Much Preferred
2. Panty	3.00	0.00	Very Much Preferred

3. School uniform	3.00	0.00	Very Much Preferred
4. Shorts	3.00	0.00	Very Much Preferred
5. Skirt	3.00	0.00	Very Much Preferred
6. Socks	3.00	0.00	Very Much Preferred
Overall	3.00	0.00	Very Much Preferred
H. What your child's activities chosen to do during free time			
1. Ball	2.60	0.89	Very Much Preferred
2. Computer games	2.40	0.89	Much Preferred
3. Puzzle	2.20	0.84	Much Preferred
4. Story book	2.00	1.00	Much Preferred
5. Stuff toys	2.80	0.45	Very Much Preferred
6. Toy car	2.20	1.10	Much Preferred
Overall	2.37	0.29	Much Preferred
I. Places your child likes to visit			
1. Beach	1.00	0.00	Preferred
2. Church	1.40	0.55	Preferred
3. Mall	2.00	1.00	Much Preferred
4. Park	2.00	1.00	Much Preferred
5. School	2.60	0.55	Very Much Preferred
6. Supermarket	1.40	0.55	Preferred
Overall	1.73	0.58	Much Preferred
J. Things your child needed inside the school			
1. books (coloring, story, and academic books)	3.00	0.00	Very Much Preferred
2. crayons	3.00	0.00	Very Much Preferred
3. eraser	3.00	0.00	Very Much Preferred
4. paper	3.00	0.00	Very Much Preferred
5. pencil	3.00	0.00	Very Much Preferred
6. water color	3.00	0.00	Very Much Preferred
Overall	3.00	0.00	Very Much Preferred
K. People your child recognizes and enjoys being with			
1. Baby	2.40	0.89	Much Preferred
2. Brother	2.40	0.89	Much Preferred
3. Father	3.00	0.00	Very Much Preferred
4. Friends	1.60	0.89	Much Preferred
5. Mother	3.00	0.00	Very Much Preferred
6. Sister	2.60	0.89	Much Preferred
Overall	2.50	0.52	Much Preferred
L. Personal hygiene product your child needs			
1. Cologne	3.00	0.00	Very Much Preferred
2. Deodorant (N=1)	3.00	0.00	Very Much Preferred
3. Shampoo	3.00	0.00	Very Much Preferred
4. Soap	3.00	0.00	Very Much Preferred
5. Toothbrush	3.00	0.00	Very Much Preferred

6. Toothpaste	3.00	0.00	Very Much Preferred

The above table shows the favorite things and preferences in terms of food and fruits to eat, clothes to wear, activities at free time, places to visit, school supplies, close people and personal hygiene. The participants preferred to eat ham, hotdog, noodles, egg, bread and sandwich for breakfast. It got an overall rating of 2.33+0.20 interpreted as very much preferred and much preferred. The food for lunch and dinner preference were fried chicken, fried liempo which was rated from 2.20+1.10 to 3.00+0.00 and the snacks they prefer to eat were chocolate, French fries, ice cream with a rating of 3.00+0.00. It implies that the food chosen were not nutritious; hence, the participants must be trained to eat vegetables, carbohydrates to develop their physical growth properly.

The beverages, the participants most preferred were juice, zest-o and water with was rated 2.80+0.45; less preferred were milk, yogurt with a rating of 1.40+0.89 and 2.20+0.84. It shows that nonverbal children drink beverages that are easy to get. The NVCWA favourite fruits were apples, banana, grapes and the less preferred fruits were mangoes and oranges. The overall rating is 1.92+0.50 with an interpretation of much preferred.

All the clothes for boys were rated 3/00+0.00 were very much preferred and it implies that all of the apparels are suitable to the male participants. The same rating was given to all the clothes for girls (3.00+0.00). It shows that the girls wear all the clothes stated.

The participants very much preferred toys were balls and stuff toys; much preferred were computer games, puzzle, story book and toy car. It got an overall rating of

2.37+0.29 with an interpretation of much preferred. It implies that the participants can socialize with others by playing their favourite toys. As to the places, they want to go to, they like best be in school, supermarket, and they preferred much going to malls, church. The less preferred places were the beach, and supermarket. It got an overall rating of 1/73+0.58 interpreted at preferred.

The people that the participants recognized and enjoyed being with are the members of the family. The most favorite family member was their father and mother with a rating of 3.00+1.00. It implies that the participants have a closer relationship with their parents. Baby, brother, sister and friends are much preferred. It got a rating that ranges from 1.60+0.89 to 2.60+0.89. It implies that nonverbal children with autism can live harmoniously with all the family members and friends.

All the items in the school supplies were very much preferred with an overall rating of 3.00+0.00. Likewise with the items for personal hygiene were very much preferred: cologne, deodorant, shampoo, soap, toothbrush and toothpaste. It got an overall rating of 3.00+0.00 and interpreted as very much preferred.

All the clothing for boys and girls were very much preferred. For toys to play with, ball and playing with stuff toys are perceived very suitable while they liked to visit schools where books, coloring, story and academic books, crayons, eraser, paper, pencil and water color were perceive to be very suitable and preferred.

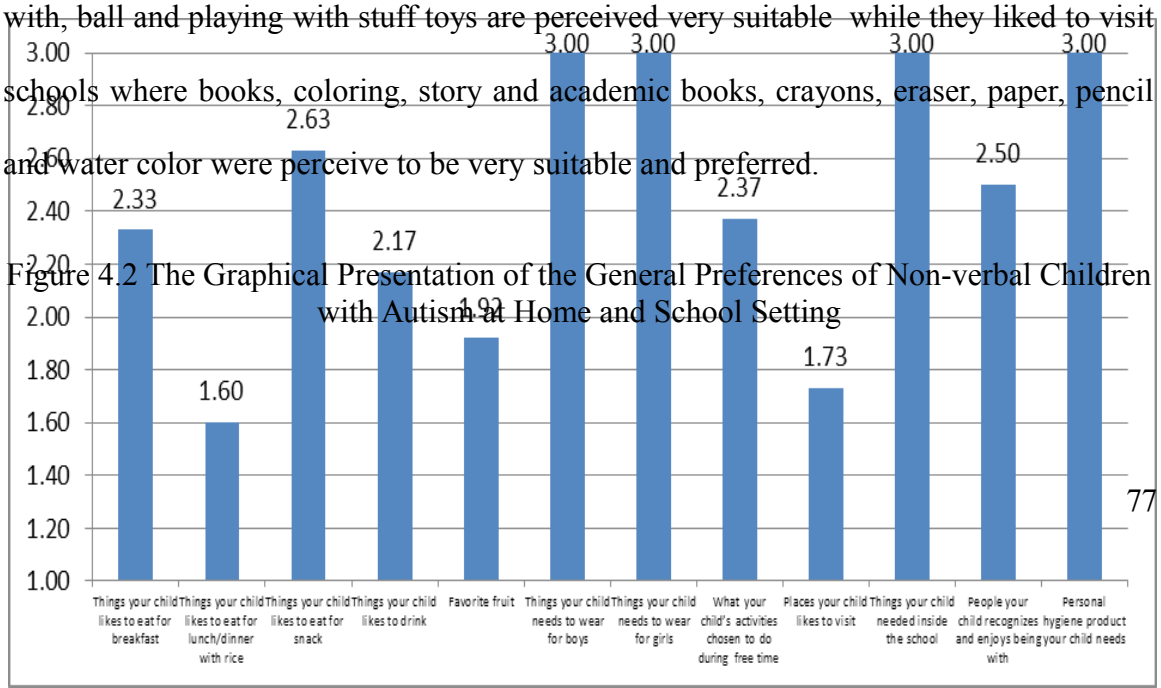


Figure 4.2 The Graphical Presentation of the General Preferences of Non-verbal Children with Autism at Home and School Setting

Figure 4.2 shows the favorite things of non-verbal children with autism as perceived by their parents. As observed, parents have high regards on the snacks liked to eat by their children, things to wear, school supplies and their hygiene. As to the food to eat, it was observed very suitable by parents with mean value of 3.00 while adobo, chicken, chopseuy, grilled fish and sinigang were perceived less preferred (1.00+1.50. For snacks, chocolates, French fries, and ice-cream (3.00) were perceived too much preferred. When it comes to beverages; juice, Zest-O and water were perceived to be very much preferred (3.00+2.50) while mango and orange were less favorite.

This shows that non-verbal children with autism have their own general preferences of things and activities at home and in the school. Autism Queensland (2014) pointed out that every child with autism is a unique individual from one another and has his/her own way of perceiving the situation.

However, the survey indicated that most of these children are picky-eater specifically during lunch or dinner. Researchers about feeding problems and nutrient intake in children with autism spectrum disorders found out that these children are five

times more likely to have mealtime challenges such as tantrums, extreme food selectivity and ritualistic eating behaviors. Chronic eating problems also increase a child's risk for social difficulties and poor academic achievement (Sharp, W.G., Berry, R.C., McCracken, C. et al. J Autism Dev Disord (2013).

Problem 4.3 Develop and Validate the Multimedia Mobile Learning Application Software

In relation with the third purpose of the study, the researcher designed and developed the multimedia mobile learning application software based on the data gathered, the findings revealed the characteristics of nonverbal children with autism, their favorite and preferred things obtained an overall rating of 1.62+0.30 interpreted as evident and they need maximum promptings in terms of their communicative displays behavior, medium used to communicate, identifying thing by pointing, and manipulation skills while the overall rating for their preferred things was 2.91+0.38 with a verbal interpretation of very much preferred and they need minimal promptings. With these findings, it is in order that multimedia mobile learning application software is developed to enhance their communication skills through picture exchange communication system as they are non-verbal. The Picture Exchange Communication System curriculum served as the guide in designing the multimedia mobile learning application software.

Table 4.4 Themes of Picture Exchange Communication System Curriculum

Themes: Picture Exchange Communication System Curriculum:

Feeding, Grooming, Hygiene, School Materials, My Family, Places to See, Playing Time			
Sub-domain	Content Standards	Benchmark/Expectation	Performance Standards
Self-Help Skills			
• Eating	The NVCWA demonstrates understanding of food to eat.	The child selects the food to eat with minimal promptings, gain proper table manners while eating	➢ Demonstrates pointing to food she/he like to eat ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• Grooming	The NVCWA demonstrates understanding of what clothes to wear and using things for grooming	The child selects clothes to wear according to activity, observe wearing clean clothes with minimal promptings	➢ Demonstrates pointing to clothes she/he like to wear ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• Health	The NVCWA demonstrates understanding of what things to use and using things for good hygiene	The child selects things for daily good hygiene with minimal promptings	➢ Demonstrates pointing to hygiene objects she/he like to use ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• The People I Love	The NVCWA demonstrates understanding of who the family members are	The child selects pictures of family members with minimal promptings	➢ Demonstrates pointing to pictures of the people he/she loves and likes ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• School Materials	The NVCWA demonstrates understanding the coloring, writing materials	The child selects pictures of school materials with minimal promptings	➢ Demonstrates pointing to pictures of school materials ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• Places to Go	The NVCWA demonstrates understanding of places to go to	The child selects pictures of places to go to with minimal promptings	➢ Demonstrates pointing to pictures of places to go to ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently
• Toys I Play	The NVCWA demonstrates understanding of toys for leisure time	The child selects pictures of toys to play with minimal promptings	➢ Demonstrates pointing to pictures of toys to play with ➢ Demonstrates handing over pictures of the item ➢ Demonstrate waiting patiently

Table 4.4 displays the themes of the Picture Exchange Communication System Curriculum which were used as the guide to develop the multimedia mobile learning application software. It has seven sub-themes based on the Special Education Curriculum prescribed by DepEd specifically chosen to the needs of the participants. The thematic areas contain the competencies for daily living skills, school materials, my family, places in the community, leisure and recreation. The content of the multimedia mobile learning application software were based on the following 1) actual observation of the participants learning activities in the school. 2) the researcher studied the PECS curriculum and made consultation with special education teachers who are also handling

children with autism and so with the parents of the participants; 3) consultation with IT experts in crafting and digitizing the application software into a multimedia format and 4) sought the support of the school principal and analyzed the Sped Curriculum and connected it with the PECS curriculum.

The design of the multimedia mobile learning application software is anchored on the Sensory-Stimulation Theory and suggested that greater learning takes place when the sense of seeing, hearing, touching, and other senses are stimulated it enhances the learning of an individual (Laird, 1985). This theory was guided by the researcher in creating the main feature of the instructional material. The nine (9) screen slides stimulated the senses of a non-verbal child with autism to interact and react to the communicative partner and shows learning take place. These nine (9) screen slides are the main features of the mobile learning app that adopted and modified from the six phases of PECS namely: Screen 1- Start Button; Screen 2- Select Category; Screen 3- Select Sub- Category; Screen 4- Select Items; Screen 5- Sentence Structure "I want __"; Screen 6- Handover Visual Clue; Screen 7-Reply to Request; Screen 8- Countdown Timer if the request is available; Screen 9-Finish. The researcher structuring and lay-outing of the following features of the mobile learning app namely: The logo/start up ; Screen Orientation: Portrait and Landscape; Edge looks like a notebook style; Sounds, Background colors: orange, white, and (options) were conducted. These objects create a very important feature of the mobile learning app because the appropriate graphics, images, colors, and text used by the researcher stimulated the senses to motivate the child to manipulate the mobile learning app. In addition, imaging of the size of the pictures was decided to make it a 1x1 picture size; the pictures are in a flashcard style with white background and it contains more than fifty pictures. Thus, the principle of multimedia of Mayer (2005a) supported this

concept that people learn more deeply from words and pictures than from words alone.

The researcher selected the screen gestures such as press, single tap, double tap, swipe up and swipe down to make it easy for the participants to follow. Customization for the setting was done to be able to add more pictures when needed with the option of recording the voice of the user. These features of the mobile learning app motivated the children to explore and experience and utilized their sense of touch which anchored from the sensory-stimulation theory. The concept of this theory had a great contribution in designing the multimedia mobile learning application because it stimulates the senses of the non-verbal children with autism that they enjoyed and learned at the same time.

Description of the Multimedia Mobile Learning Application Software

The developed multimedia mobile learning application software considered the result of the data gathered in terms of the characteristics of the identified non-verbal children with autism. The results determined their strengths and weaknesses in some learning areas that served as the basis in developing the instructional materials needed to enhance and reinforce. The identified weakness in the area of communication is the identification of things by pointing and reinforces their strengths in the area of manipulation skills. This signifies that the instructional material must be created and design to use in teaching the child how to point an object so that he/she can express what one's needs and wants.

In the developed mobile learning app, the screen gestures that created as one of the features on the instructional material play significant parts to enhance the pointing skills of these non-verbal children with autism. Screen gestures such as, pressing on/off button, single tap, double tap, swipe up and swipe down suggested in the present study is a form of

intervention to learn and improve the pointing skills of these children and once the child already mastered these skills, requesting of thing/s that he/she needs will follow. Hence, communication is improved and decreased the frustration and undesirable behavior of these children.

The multimedia mobile learning application software is also developed into an instructional plan to give the user a clear direction on how to use the mobile device in enhancing the communication skills of nonverbal children with autism.

1. Themes refer to the unit of activity/ies to be learned on a given schedule.

2. Objectives refer to the goals of the activities to develop the communication skills of the participants. It follows the SMART style of writing objectives that are specific, measurable, attainable, relevant and time-bound.

3. Subject-matter refers to the topic to be worked on by the participants with the support of the communicative partner and the prompter.

4. Activities refer to skills to perform leading to the development of communication skills of the participants.

5. Procedure refers to the task analyzed steps to acquire the skills of manipulating the mobile device.

6. Evaluation refers to the formative assessment of the performance of the participants for each theme of activity.

Expert's Validation

In relation with Objective 3, the researcher requested the opinions of five (5) experts in the field of information technology and special education teachers to support the study in

terms of their expertise in validating the multimedia mobile learning application software. The experts have given suggestions and comments in improving the instruments. The various tables below present the evaluation and validation of experts on the different contents of the multimedia mobile learning application software.

Table 4.5 shows the summary of the results of the validation of experts on the multimedia activities with their remarks and suggestions on the theme food to eat, it was suggested that meal time is divided into breakfast, lunch/dinner and snack time, localized the picture used; for the procedure of the activities, a matrix format must be used to show the specific role of each individual involve in the conduct of the lesson plan. The matrix format has four columns with each is assigned the person responsible, activities, communicative partner and nonverbal child with autism. The lesson plan looks more structured and easy to follow.

Expert 1 commented on the titles of the themes, the word "things" was replaced with specifically appropriate term like food to eat, instead of things to eat; things to wear to clothes for boys and girls, toys to play with instead of activities chosen during the free time. Overall the word "things" was properly designated a more suitable description like the people your child recognizes and enjoys being with to My Family/The People I Love.

Expert 2 suggested to review the pictures and make it more realistic and set it locally.

Expert 3 advised to include the statement minimal, maximum prompting and no prompting is needed to show that the observable behavior of the participants needs assistance. Expert 4 recommended to make the rating description to highly suitable, very suitable and suitable to show that the performance of skills of the participants are evident and it describes how the behavior was executed. Expert 5 instructed to use and design the

themes that are appropriate to the ability of the participants.

Expert 1, 3 and 4 suggested changing verbal interpretation from very suitable, suitable and not suitable to highly preferred, very much preferred, and less preferred on the favorite things and activities that the nonverbal children with autism like.

Table 4.5 Summary Results of the Validation of the Multimedia Mobile Learning Application Software

Lesson Plan	Suggestions
1. Theme 1: Things to Eat	Use specific word to establish the food to eat for breakfast, lunch/dinner, and snacks.
2. Verbal Description	Use highly preferred, very much preferred, less preferred
3. Family pictures	Make the picture in a local setting
4. Part II on Technical Quality	Change verbal interpretation from very suitable, suitable, not suitable to strongly agree, agree and disagree
5. Technical Quality: Delete criteria: (7. Swipe left; 8. Swipe right)	Use gestures used in handling mobile device 1. Press the power on/off button of the mobile device 2. Glance/Browse the screen of the mobile device 3. Single tap the screen of the mobile device 4. Double tap the screen of the mobile device 5. Swipe up the screen of the mobile device 6. Swipe down the screen of the mobile device
Criteria: The child was motivated t use the multimedia mobile learning application software through establishing eye contact	Change criteria to behavior
6. Parts of the performance of the child	Divide the criteria into two parts: Part I-Behavior Manifestations; Part II-Gestures in manipulating the device

The ratings of the five experts were tabulated and computed as to their opinions on the suitability of the multimedia mobile learning application software for nonverbal children with autism. The experts validated the multimedia mobile learning application software using the evaluation instrument with the following criteria: objectives, content, activities and procedures.

The criteria on the objectives deal with the appropriateness of all the goals in the lesson plans of the multimedia which is specific, measurable, attainable and relevant to the needs of the participants. The content focuses on the suitability of the instrument to the participants for its congruency to the objectives, clarity of the materials and pictures for the

nonverbal children with autism to recognize easily. The activities show the sufficiency of the developed multimedia mobile learning application software. Different activities were designed thematically which the participants can easily identify with because it is realistic and it is done in daily life events. The procedures can easily be followed with the motivation of the communication partner and the prompter.

Table 4.6 summarizes the evaluation of the five experts on the objectives of the developed multimedia mobile learning application software designed to enhance the communication skills of nonverbal children with autism

Table 4.6 Weighted Mean and Verbal Interpretation of the Experts' Evaluation of the Multimedia Mobile Learning Application Software in terms of the Criteria on the Objectives

OBJECTIVES	**EVALUATORS**					**Mean Weighted**	**VERBAL INTERPRETATION**
Criteria	**1**	**2**	**3**	**4**	**5**		
1. Objectives are specific and clearly stated	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
2. Objectives are measurable	3.00	3.00	3.00	2.00	3.00	2.80	**Very Suitable**
3. Objectives are attainable	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
4. Objectives are relevant	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
5. Objectives are time- bound	2.00	2.00	2.00	2.00	1.00	1.80	**Very Suitable**
TOTAL MEAN							**2.72**

Table 4.6 shows the objective setting and its criteria as evaluated and validated for its suitability by five experts. As to Item 1 that the objectives are specific and clearly stated was given a rating of 3.00 interpreted as very suitable. Item 2 as the objectives are measurable, got a rating mean of 2.80 interpreted as very suitable. Item 3 as to objectives are attainable, a rating of 3.00, interpreted as very suitable was given. Items 4 as to the

objectives are relevant got a rating of 3.00, interpreted as very suitable and Item 5 as to objectives are time-bound got a rating of 1.80 and is interpreted as very suitable. The total weighted mean for Table 4.6 is rated 2.72 with an interpretation as very suitable. This implies that the developed objectives followed the standards in developing the multimedia mobile learning application software to improve the communication skills of nonverbal children with autism.

Table 4.7 Weighted Mean and Verbal Interpretation of the Experts' Evaluation of the Multimedia Mobile Learning Application Software in terms of the Criteria on the Content

CONTENT	EVALUATORS					Mean Weighted	VERBAL INTERPRETATION
Criteria	**1**	**2**	**3**	**4**	**5**		
1. Contents are congruent to the objectives	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
2. Materials are clearly specified	3.00	2.00	3.00	3.00	3.00	2.80	**Very Suitable**
3. Content is appropriate for the children	3.00	3.00	2.00	2.00	2.00	2.40	**Very Suitable**
4. Shows relevant pictures for understanding of the activities	3.00	3.00	2.00	2.00	2.00	2.40	**Very Suitable**
TOTAL MEAN							**2.75**

Table 4.7 shows the results of the experts' evaluation on the content of the multimedia mobile learning application software. Item 1 as to contents are congruent to the objectives was rated 3.00 interpreted as very suitable, item 2 as to materials are clearly specified got a rating of 2.80 interpreted as very suitable, item 3 as its appropriateness for the children was given a rating of 2.40 interpreted as very suitable and item 4 as it shows relevant pictures for understanding of the activity was rated 3 interpreted as very suitable. Table 4.7 got an overall rating of 2.75 and it implies that the content of the mobile application software is appropriate for the nonverbal children with autism. Table 4.7

revealed that five evaluators approved that the content of the activities are tailored-fit to the participants of the study.

Table 4.8 Weighted Mean and Verbal Interpretation of the Experts' Evaluation of the Multimedia Mobile Learning Application Software in terms of the Criteria on the Activities

ACTIVITIES	EVALUATORS					Weighted Mean	VERBAL INTERPRETATION
Criteria	1	2	3	4	5		
1. Activities are congruent with the objectives	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
2. Activities are easy to follow by the children	2.00	2.00	2.00	3.00	2.00	2.20	**Very Suitable**
3. Activities are suited to the ability level of the children	2.00	2.00	3.00	3.00	3.00	2.60	**Very Suitable**
4. Activities are presented in a thematic manner	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
TOTAL MEAN							**2.70**

As the results shown on Table 4.8 the evaluators gave an overall rating of 2.70 to the activities of the multimedia mobile learning application software. Item 1 as to the congruency of the activities to its objectives and Item 4 as to the activities are presented in a thematic manner were given a rating of 3.00 interpreted as very suitable, item 2 that activities are easy to follow by the children was rated 2.20 interpreted as suitable and Item 3 as to the suitability to the ability level of children got a rating of 2.60 interpreted as very suitable. It implies that the mobile application software is standardized-based and provides additional pictures that are suited to the ability of the children to enhance their communication skills through exchange of pictures. The activities are thematically arranged and realistic for the children to perform because it is part of their adaptive skills.

Table 4.9 Weighted Mean and Verbal Interpretation of the Experts' Evaluation of the Multimedia Mobile Learning Application Software in terms of the Criteria on the Procedures

PROCEDURES	EVALUATORS	$\bar{W}$	

Criteria	1	2	3	4	5	eighted Mean	VERBAL INTERPRETATION
1. Shows relevance to the learning objective	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
2. Simple and precise language	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
3. Provides full participation of the pupils	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
4. Easy to follow by the teachers	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
5. Adaptable to children's interest and learning	3.00	3.00	3.00	3.00	3.00	3.00	**Very Suitable**
TOTAL MEAN							**3.00**

As shown on Table 4.9, the five evaluators rated the multimedia mobile learning application software with overall rating of 3.00 interpreted as very suitable. All the items from 1-5 were rated 3.00 interpreted as very suitable. It signifies that the application software is very suitable to the participants and it can utilize by other schools in teaching children with autism.

After the validation of the instruments and materials of the study, the researcher improved the mobile apps by making the revisions need based on the remarks, advices and suggestions from the experts.

Table 4.10 Summary of the Weighted Mean and Verbal Interpretation of the Evaluation of the Multimedia Mobile Learning Application Software in terms of the Four (4) Criteria: Objectives, Content, Activities and Procedures

		VERBAL

CRITERIA	SCALE VALUE	INTERPRETATION
Objectives	2.72	Very Suitable
Content	2.75	Very Suitable
Activities	2.70	Very Suitable
Procedures	3.00	Very Suitable

Table 4.10 presents the evaluation of the whole output is very suitable for developing a multimedia mobile learning application software for nonverbal children with autism to enhance their communication skills through the PECS.

Table 4.11 summarizes the evaluation of the two IT experts on the technical appearance of the developed multimedia mobile learning application software designed to enhance the communication skills of non-verbal children with autism.

Table 4.11 Weighted Mean and Verbal Interpretation of the Evaluation on Technical Appearance of the Multimedia Mobile Learning Application Software

Technical Appearance	**EVALUATORS**		**Weighted Mean**	**VERBAL INTERPRETATION**
Criteria	**1**	**2**		
1. The graphics are clear, organized, and appealing	3.00	3.00	3.00	**Very Suitable**
2. The images and text used are accurate	2.00	3.00	2.50	**Very Suitable**
3. The color , size and font style choice are relatively appropriate	3.00	3.00	3.00	**Very Suitable**
4. Touch screen gestures work properly	2.00	2.00	2.00	**Very Suitable**
5. Sound used is pleasant to hear	2.00	3.00	2.50	**Very Suitable**
TOTAL MEAN				**2.60**

As the results shown on Table 4.11, the evaluators gave an overall rating of 2.60 to the technical appearance of the multimedia mobile learning application software. Item 1 as to the graphics are clear, organized and appealing and Item 3 as the color, size and font style choice were given a rating of 3.00 interpreted as very suitable, item 2 that the images and text used are accurate and item 5 as to the sound used is pleasant to hear got a rating of 2.50

interpreted as suitable and item 4 as to the touch screen gestures work properly was rated 2.00 interpreted as very suitable. It implies that the mobile application software is appropriate for the non-verbal children with autism.

Table 4.12 summarizes the evaluation of the two IT experts on the flexibility of the developed multimedia mobile learning application software designed to enhance the communication skills of non-verbal children with autism.

Table 4.12 Weighted Mean and Verbal Interpretation of the Evaluation on Flexibility of the Multimedia Mobile Learning Application Software

Flexibility	**EVALUATORS**		**Weighted Mean**	**VERBAL INTERPRETATION**
Criteria	**1**	**2**		
1.The app includes settings that can be changed (e.g. take photos, add or remove pictures, voice record,)	3.00	3.00	3.00	**Very Suitable**
2 The app is child-friendly, simple and clear	3.00	3.00	3.00	**Very Suitable**
3. The app layout is consistent.	3.00	3.00	3.00	**Very Suitable**
4. The app gesture command is consistent	3.00	3.00	3.00	**Very Suitable**
5. The app encourages independent learning	2.00	2.00	2.00	**Very Suitable**
TOTAL MEAN				**2.80**

As the results shown on Table 4.12 the evaluators gave an overall rating of 2.80 to the flexibility of the multimedia mobile learning application software. Item 1 as to the settings of the mobile apps by which it can be customized by the user like take photos, add or remove pictures, voice record and item 2 as to the child-friendly, simple and clear and item 3 as to the layout is consistent and item 4 as to the app's gesture command is consistent were rated as 3.00 interpreted as very suitable. Item 5 as to encourage independent learning was given a rating of 2.00 interpreted as very suitable. It implies that the flexibility of the mobile application software is fitted to the skills and ability of the non-verbal children.

Table 4.13 presents the summary of the evaluators for the Technical quality of the multimedia mobile learning application software in terms of technical appearance and flexibility.

Table 4.13 Summary of the Weighted Mean and Verbal Interpretation on Technical Quality

CRITERIA	SCALE VALUE	VERBAL INTERPRETATION
Technical Appearance	2.60	**Very Suitable**
Flexibility	2.80	**Very Suitable**

Table 4.13 presents the evaluation of the entire technical quality presents very suitable to use by the non-verbal children with autism the developed multimedia mobile learning application software.

Problem 4.4 Try–out of the Multimedia Mobile Learning Application Software

The validated and improved multimedia mobile learning application software was tried out to five (5) non-verbal children with autism which is composed of four (4) males and one (1) female only because it is done on a one-on-one instruction. During the try-out, the presence of the special education teachers, parents and the researcher were encouraged at the locale of the study. A prepared environment was set up to make the place a conducive learning for the participants. The participants showed interest in working on the activities and they display a long attention span and patience because they are interested to manipulate the mobile devices. In the structured picture exchange activities, the child with autism can initiate and expressed his/her desire to the communication partner by showing a picture of his wants/needs. The PECS materials can be accessible for use by parents and teachers and

it is appropriate for use in different learning settings (Bondy and Frost, 2016).

Table 4.14 revealed the summary of the weighted mean scores of the try-out of the application software.

Table 4.14 Weighted Mean And Verbal Interpretation of the Try-out of the Multimedia Mobile Learning Application Software for Non-verbal Children with Autism

Thematic Activities									
Theme	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Participant	**Food to Eat**	**Self-help Skills**	**Grooming**	**timePlaying at Free**	**My Family**	**School Materials**	**go toPlaces to**	**Weighted Mean**	**Verbal Interpretation**
Child 1	3.00	2.90	3.00	3.00	3.00	3.00	3.00	2.98	**Strongly observed**
Child 2	3.00	3.00	2.90	2.90	3.00	3.00	2.80	2.94	**Strongly observed**
Child 3	3.00	2.80	2.80	2.80	3.00	3.00	2.90	2.90	**Strongly observed**
Child 4	2.90	2.90	3.00	3.00	3.00	3.00	2.80	2.94	**Strongly observed**
Child 5	2.90	3.00	2.90	2.98	3.00	3.00	2.80	2.94	**Strongly observed**

Child 1 got a rating of 3.00 for items 1, 2, 3, 4, 5, and 6. A rating of 2.90 for item 2 under the themes: Food to Eat, Self-help Skills, Grooming, Playing at Free time, My Family, School Materials School Materials, Places to go to. He can follow the procedure of each theme activity which includes opening of the mobile phone; tapping the start button; choosing the item; selecting a picture of the requested item; giving the mobile phone to the communicate partner in exchange for a the real item; waiting patiently the requested item as the countdown timer stopped; waiting patiently the requested item as the countdown timer stopped and get the real item as reward. The performance of Child 1 is strongly observed in this activity.

The performance of Child 2 was rated 3.00 for items 1, 2, 5, and 6 with verbal interpretation of strongly observed. The highest rating he got is 3.00 for themes 1,3,4,5,6,and 7 entitled Food to Eat, ,Grooming, Playing at Free time, My Family, School Materials School Materials, Places to go to and a rating of 2.90 for theme 2 –Self-Hel- Skills. His performance is strongly observed with an overall rating of 2.94. He can follow the procedure of this activity which include opening of the mobile phone; tapping the start button; choosing an item specifically for each theme; selecting a picture representing the item of each theme; giving the mobile phone to the communicate partner in exchange for the real item; waiting patiently the requested item as the countdown timer stopped; waiting patiently the requested item as the countdown timer stopped and get the real item as reward.

The performance of Child 1 is strongly observed in this activity as he got an overall rating of 2.98.

During the try-out, Child 3 got the highest rating of 3.00 for themes 1 Food to Eat; 5 My Family and 6 School Materials. For items 2, 3,and 4, he was rated 2.80 for each theme: Self-help skills, Grooming and Playing at Free Time with verbal interpretation of strongly observed. In theme 7- Places to go to got a rating of 2.90 An overall rating of 2.90 was the performance of Child 3 in all the theme activity of the multimedia mobile learning application software. He performs strongly in opening of the mobile phone; tapping the start button; choosing an item for each them; selecting a picture representing the item requested; giving the mobile phone to the communicate partner in exchange for the real item; waiting patiently the requested item as the countdown timer stopped; and get the real item as reward.

The overall rating of 2.94 interpreted as strongly observed was given to Child 4 in performing the activities for all the themes of the mobile apps. He got a rating of 2.90 for

theme 1 Food to Eat and theme 2 Self-help skills interpreted as strongly observed. A rating of 2.80 for theme 7 Places to go to. The highest rating of 3.00 was given to his performance on themes 3 Grooming, theme 4 Playing at Free time, theme 5 My Family, theme 6 School Materials interpreted as strongly observed. Child 4 performed strongly in opening of the mobile phone; tapping the start button; choosing an item for each them; selecting a picture representing the item requested; giving the mobile phone to the communicate partner in exchange for the real item; waiting patiently the requested item as the countdown timer stopped; and get the real item as reward.

Child 5, the only female participant of the study got an overall rating of 2.94 for performing all the theme activities of the multimedia mobile learning application software. She performed strongly in theme 2 Self-help Skills, theme 5 My Family and theme 6 School materials with the highest rating of 3.00 each theme. The next highest rating is 2.98 for the theme 4 Playing at free time followed by a rating of 2.90 each for theme 1 Food to eat and theme 3. Grooming, her performance was interpreted as strongly observed. The lowest rating she got is 2.80 for theme 7 Places to go. Child 5 performs very strongly in opening of the mobile phone; tapping the start button; choosing an item for each them; selecting a picture representing the item requested; giving the mobile phone to the communicate partner in exchange for the real item; waiting patiently the requested item as the countdown timer stopped; and get the real item as reward.

Table 4.15 shows the summary of the weighted mean scores on the try-out of the multimedia mobile learning application software for nonverbal children with autism. It can be analyzed that the participants of the study can perform the activities with the support of the communication partner and prompter.

Table 4.15 Weighted Mean And Verbal Interpretation of the Try-Out of the Multimedia Mobile Learning Application Software for Non-verbal Children with Autism

Gestures Performance on Handling the Mobile Device								
Item	1	2	3	4	5	6	**Weighted Mean**	**Verbal Interpretation**
Participant	**Press the power on/off button of the mobile device**	**Glance/ browse the screen of the mobile device**	**Single tap the screen of the mobile device**	**Double tap the screen of the mobile device**	**Swipe up the screen of the mobile device**	**Swipe down the screen of the mobile device**		
Child 1	3.00	2.90	3.00	3.00	3.00	3.00	2.98	**Strongly observed**
Child 2	2.80	2.85	2.90	2.80	3.00	3.00	2.89	**Strongly observed**
Child 3	2.75	2.80	2.70	2.80	3.00	3.00	2.84	**Strongly observed**
Child 4	2.90	2.85	2.80	2.90	3.00	3.00	2.90	**Strongly observed**
Child 5	2.95	2.88	2.90	2.80	3.00	3.00	2.92	**Strongly observed**

Table 4.15 shows that the Child 1 got a rating of 3.00 in each item in pressing the power on/off button of the mobile device; single tap the screen of the device, double tap the screen of the mobile device, swipe up and down the screen of the mobile device. He got a rating of 2.90 for glance/browse the screen of the mobile device. An overall rating of 2.98 was bestowed to Child 1, interpreted as strongly observed. It implies that he acquired the skills of gesturing the screen of the mobile device.

The performance of Child 2 in items 1 and 4 got a rating of 2.80 each to press the power on/off button of the mobile device and double tap the screen of the mobile device. Item 2 glance/browse the screen of the mobile device, child B was rated 2.85, interpreted as strongly observed; item 3 single tap the screen of the mobile device with a rating of 2.90, interpreted as strongly observed. The overall rating of Child B is 2.89 with a verbal interpretation of strongly observed. It implies that Child B has shown a strong performance

in the gesture skills in manipulating the mobile device.

Child 3 got an overall rating of 2.84, interpreted as strongly observed. He got a rating of 2.90 for item 1 press the power on/off button of the mobile device Press the power on/off button of the mobile device; 2.80 for items 2 glance/browse the screen of the mobile device glance/browse the screen of the mobile device and 4 double tap the screen of the mobile device. In item 1 press the power on/off button of the mobile device, he got a rating of 2.75, item 3 single tap the screen of the mobile device, 2.70 and the highest rating of 3.00 is on item 5 and 6 swipe up the screen of the mobile device and swipe down the screen of the mobile device. It implies that Child 3 performance in gesturing skills, he strongly performed in all the skills for manipulating the mobile device.

Child 4 was rated an overall weighted mean of 2.90 interpreted as strongly observed. He got a rating of 2.90 for item 1 press the power on/off button of the mobile device, press the power on/off button of the mobile device; item 2 – 2.85 for glancing/browsing the screen of the mobile device; item 3 with 2.80 rating for single tap the screen of the mobile device; item 4 with 2.90 for double tap the screen of the mobile device; item 5 with 3.00 for swipe up the screen of the mobile device and also a rating of 3.00 for item 6, swipe down the screen of the mobile device. It shows that Child 4 can learn manipulating the mobile device with the communicative partner and prompter as support.

A rating of 2.92 was given to Child 5 interpreted as strongly observed. Item 1 with 2.95; item 2 -2.88, item 3-2.90, item 4 2.80 and items 5 and 6 with a rating of 3.00 with verbal interpretation of strongly observed. She can perform the gesturing skills and enjoyed manipulating the mobile device with minimal promptings from her communicative partner and prompter. The presentation for Table 4.13 shows the performance of the participants

during the try-out of the multimedia mobile learning application software in terms of the activities for the different themes.

To recap the results of the try-out of the multimedia mobile learning application software was appropriate and it suits well to develop the communication skills of nonverbal children with autism. It has enhanced their communication skills by saying it with pictures and exchanging it with the real objects, things and items requested. Hence, the goal of the study has been attained. It can also be recognized that the goal of this study had been productively implemented through the use of the mobile apps in motivating the participants to express their wants and needs by requesting it through the picture exchange communication system. Learning together and living together in a prepared environment made them enjoy using the mobile device as it is a tool that can be used for enhancing communication skills as well as socialization skills. The participants' strongly observed behavior in working on the activities of the multimedia mobile learning application software is a proof that with a teaching material like multimedia mobile learning application software will contribute in the development of language as well as the expressive skills of non-verbal children with autism.

The results of the study conducted showed the impacts of the different theories used as anchors of this study. Constructivism believed that learners are constructing their own learning as they are experiencing the activities hands on. This is exemplified in the work undertaken by the present study that active learning promotes as the participants perform the activities and procedure of requesting wants and needs by the child through Picture Exchange Communication System (PECS) with the support of the communicative partner and prompter. The Piagetian theory implies that children learn fast during their

developmental milestone, the themes in the study were selected based on the curriculum used by the researcher in her school and the multimedia mobile learning app were appropriately designed according to their mental and chronological age. The developmental theory showed that the language development of the participants are so delayed that a material on picture exchange communication system will greatly contribute to the creation of the mobile learning app. Overall, the theories used in this study have greatly influenced the making of the multimedia mobile learning application software.

The results of the evaluation and validation by experts of the multimedia mobile learning application software were examined and carefully analyzed after revisions were done. The experts rated the entire material as very suitable with a rating of 2.80-3.00. It shows that the developed multimedia mobile learning application software was approved to be an effective and appropriate in developing and enhancing the communication skills of children with autism. The revisions of the mobile apps were more on the replacing titles to themes, rephrasing directions/instructions, making pictures more accurate and localized; the technical appearance of the apps was improved.

A final copy of the multimedia mobile learning application software on enhancing the communication skills of nonverbal children with autism was crafted. The comments and suggestions of the experts were incorporated to improve the mobile apps and made it more appropriate for children with autism. The final form of the developed multimedia mobile learning application software contained the following parts: 1) Cover Page, 2) Foreword, 3) Introduction 4) Rationale 5) About the Mobile Apps; 6) Who is this for? 7) How to use this mobile apps, 8) The Themes of Activities includes: Food to Eat, Self-help Skills, Grooming, Playing at Free time, My Family, School Materials School Materials, Places to go to; and

Objectives. The cover page is followed by the table of contents and the curriculum vita of the researcher is attached at the last page.

Features of the Multimedia Mobile Learning Application Software

The app feature design was into high quality and functionality, easy to find pictures, easy to manipulate and explored, easy to understand responses, customize and create categories, and create own icon. These features were adopted and modified from the researches gathered and reviewed in the google play store and other concepts from autism apps like the iasku app, Avaz app, PECS app that are available in the apps stores. The researcher adopted and modified some features of these autism apps by which parallel to the present study because all of these apps are intended for non-verbal or minimally verbal children that needed to improve their communication skills. However, the present instructional material which is the Tap and Go app differs from the app cited in number of important ways because the Tap and Go app provided a comprehensive structure of a whole package of teaching and utilizing the app at home and in the school Philippine settings, as well as it reinforced the interaction and increased the desirable behaviors. See Appendix L for the complete Multimedia Mobile Learning Application Software.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary, findings, conclusions, and recommendations for further studies.

5.1 Summary

This study aimed to develop a multimedia mobile application software to reinforce the communication skills of non-verbal children with autism. Specifically, this study intended to determine the characteristics of non-verbal children with autism including their favorite things to be used as the bases for designing the mobile app. Based on the identified data, the multimedia mobile application software was developed for these special children so that they will be able to express their needs and wants by communicating it through pictures.

The participants of this study were five (5) non-verbal children with autism who are studying in a public school where the researcher is teaching. They were selected among 19 children with autism and the researcher delimits the study for five participants

only because each child needs a one-on-one instruction.

In this study, the descriptive-developmental method was used and utilized the combination of the ADDIE and Rapid Prototype Instructional model in crafting the mobile apps. The Picture Exchange Communication System's principles and procedure was employed in motivating the children to actively participate in the activities to develop their communication skills.

5.2 Findings

Based on the data gathered, the researcher came up with the following findings:

5.2.1 The result of the identification of the Checklist on the Characteristics of Non-verbal Children with Autism revealed that these children have difficulties in identification of things by pointing got the weakest rating of 1.16 among the skills. It implies that pointing is the struggle among these children who needs maximum prompting to express his wants and needs through gestures. The result of identifying the children's general preferences at home and in the school setting using the Checklist of General Preferences of Things and Activities revealed that they have most wanted some items, objects, food and toys for themselves. However, the survey indicated that most of these children are picky-eater specifically during lunch or dinner. Researchers about feeding problems and nutrient intake in children with autism spectrum disorders found out that these children are five times more likely to have mealtime challenges such as tantrums, extreme food selectivity and ritualistic eating behaviors. It also increases a child's risk for social difficulties and poor academic achievement (Sharp, W.G., Berry, R.C., McCracken, C. et al. J Autism Dev Disord (2013). The results were used to carry out to determine and consider the structure of the multimedia mobile learning application software that is needed to enhance the

communication skills through requesting his/her wants and needs..

5.2.2 The multimedia mobile learning application software was developed using the descriptive-developmental method of the combination of ADDIE-Rapid Prototype Instructional Design Model. Together with the Picture Exchange Communication System curriculum and the Special Education Curriculum, the writing of the thematic lesson plans and the crafting of the mobile application software were found to be appropriate and suitable in enhancing the communication skills on non-verbal children with autism. Using the PECS and task analysis as the method of teaching these children guided the special education teachers and parents in helping the participants to talk through pictures and express their needs and wants.

5.2.3 The result of the validation of the multimedia mobile learning application software on the content of the thematic lesson plans and the mobile device containing the pictorial representation of the PECS were found to be suitable and appropriate to the level of understanding of the participants in terms of their communicating skills. The experts interpreted the objectives to be relevant to the communication skills' needs of the children in the study. The activities provided adequate skills to enhance the expressive skills of the non-verbal children with autism. Likewise, the experts agreed that the procedures were clearly stated in simple and direct instruction for better implementation. The developed objectives were specific, clear, measurable, attainable, time-bound and relevant to the needs of children in developing their communication skills. Furthermore, it is suitable and it fits to the ability of the participants to reinforce their language development.

The outcome of the evaluation revealed that non-verbal children with autism have improved their communication skills by using pictures in expressing needs and wants.

During the actual try-out the participants were eager to participate as they are in their own classroom together with their teacher, parents and the researcher. It revealed that integrating technology in preparing teaching materials for these children can develop though slowly their communication skills.

5.2.4 The multimedia mobile learning application software has been developed in its final form based on the results of the evaluation was finalized with the support of IT experts. It is can be attested that a multimedia mobile learning application software is an appropriate tool for teachers to use in teaching non-verbal children with autism for the enhancement of their communication skills.

5.3 Implications and Conclusions

The main insights gained from the research have to do with the authentic preparation of the multimedia mobile learning application software following the best practices for enhancing the communication skills non-verbal children with autism.

5.3.1 It was observed that the multimedia mobile learning application software can help the children communicate their wants and needs by using pictures representing the item/s they would like to get. As regards to Social Learning Theory, learning takes place through imitation and modelling. In the procedure of exchanging the picture of desired item the children communicate and expressed their needs and wants. To quote, Abou (2015) in his study stated "that non-verbal people with autism can learn and communicate with their surrounding using a smart device. They can be taught to use specific symbols and images through mobile phones. They can form simple words to express their feelings and needs. The application must be flexible and allows the addition of new content very

easily."

5.3.2 Localized materials for varied activities are appropriate and suitable for the participants as its focus is to develop their communication skills. Using the task analysis approach helped them to work on the activity gradually and step by step.

5.3.3 An important observation is that non-verbal children with autism are also interested in using gadgets to learn and understand their surroundings by using their senses to manipulate and explore which pointed out in the Sensory-Stimulation Theory. It also concluded that they can imitate what the adults are doing, they want to be part of the world we live in. The carefully designed application software can develop the communication skills by following the research process of ADDIE and Rapid Prototype Instructional models. The communication skills of the participants will be developed and enhanced successfully when they are given the appropriate activities suitable to their ability to learn and acquire those skills.

5.4 Recommendations

Based on the findings of the study, the following are recommended:

5.4.1 The implementation of the multimedia mobile learning application software may be adopted for the use of teaching communication skills to other special children who have difficulties in their expressive skills.

5.4.2 Other mobile apps can be designed and created to address the unique needs of special children in general and children with autism in particular, since it is easy have more pictures to add in the mobile phone.

5.4.3 An annual review for the multimedia mobile learning application software must

be done to see if revisions and upgrading are needed and special schools can include the procurement of technology-based materials in the plans.

5.4.4 A regular schedule for using the multimedia mobile learning application software may be allotted to institutionalize the use of technology in the classroom for children with special needs.

5.5. Recommendation for further research

5.5.1 Further research is recommended on the attaining of the vision-mission of special education in developing the basic skills of all children with special needs. Much bigger respondents can be selected as the participants to try-out the multimedia mobile learning application software

5.5.2 A research on developing mobile applications materials using a more realistic figures and images adopted in the local setting can be used to develop the communication skills of other special children with speech disorder.

5.5.3 Another method of research on this study can be conducted to compare the findings of this paper multimedia mobile learning application software such as a longitudinal research to find out if the communication skills of non-verbal children with autism can be much developed when those methodology are used.

5.5.4 An experimental research or a case study can be used to determine the applicability of the multimedia mobile learning application software for other children with special needs like children with ADHD, EDBP, and the Deaf.

5.6 Limitations of the Study

The study has some weakness to consider but further research may be undertaken in order to improve the research conducted.

5.6.1 This study is only focused on five non-verbal children with autism and the try-out was conducted in the school where the researcher is working and maybe it can be done in other school setting. The findings may be different if it was done in other environment.

5.6.2 The try-out should have been done on a longer period to observe how much the participants can enhance their communication skills when they are exposed to the materials lengthier.

5.6.3 For a more successful implementation of the try-out and for creating awareness to teachers and parents with special children of the locale of the study could also have been invited to assure them that there many ways to develop the communication skills of non-verbal children with autism.

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APPENDICES

APPENDIX A

LETTER TO EXPERTS

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND TEACHER EDUCATION RESEARCH
Special Education Program

Date: _____

_____
_____
_____

Dear _____,

Greetings of peace and love!

The undersigned is a graduate student of the Philippine Normal University who is currently taking up Masters of Education with specialization in Special Education. I am conducting a study entitled "Multimedia Mobile Learning Application Software for Non-verbal Children with Autism". The study aims to develop a mobile apps based on PECS principles that will serve as an intervention to functional communication for non-verbal children with autism.

I am in the process of making the instruments for the respondents' evaluation of the characteristics and behavior of non-verbal children with autism; favorite things of NVCWA; contents of the developed "Multimedia Mobile Learning Application Software for Non-verbal Children with Autism

In this regard, please evaluate and rate the questionnaire and checklist items attached herewith, if they are valid enough to measure that the behaviors are observable and its appropriateness:

1. Characteristics/behavior of non-verbal children with autism.
2. Favorite things and activities of non-verbal children with autism as basis for designing the multimedia mobile learning application software
3. The content features of the developed multimedia mobile learning application software"

Your comments and suggestions for each item are solicited. We believed that your expertise will greatly contribute in the completion of the instrument.

May I then retrieved the attached survey instruments on _____. Your favorable reply will be highly appreciated.

Thank you and more power.

Truly yours,

REMEDIOS E. PARROCHA
Researcher

Noted:

DR. TERESITA G. INCIONG
Thesis Adviser

DR. TERESITA G. DE MESA
Thesis Adviser

APPENDIX B

LETTER TO THE SUPERINTENDENT FOR PERMISSION TO ADMINISTER RESEARCH QUESTIONNAIRES OF THE STUDY

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND TEACHER EDUCATION RESEARCH
Special Education Program

Date: _____

Elizabeth Quezada, CESO V
Schools Division Superintendent
Division of City Schools, Quezon City

Dear Madam,

Greetings of peace and love!

I am Ms. Remedios E. Parrocha, a graduate student of the Philippine Normal University who is currently taking up Masters of Education with specialization in Special Education. I am currently working on my thesis entitled, " A Multimedia Mobile Learning Application Software for Non-verbal Children with Autism". The study aims to develop a mobile apps based on PECS principles that will serve as an intervention to functional communication for non-verbal children with autism.

In connection with this, may I request your approval in order for me to conduct my questionnaires to the following respected special educators:

1. Dr. Serafia C. Vargas/ Division Special Education Supervisor
2. Holy Spirit Elementary School Learning Resource Non-Center
3. Commonwealth Elementary School Learning Resource Center

Thank you for your cooperation and support in this undertaking.

Truly yours,

REMEDIOS E. PARROCHA
Researcher

Noted:

DR. TERESITA G. INCIONG
Thesis Adviser

DR. TERESITA G. DE MESA
Thesis Adviser

APPENDIX C

LETTER TO THE PRINCIPAL

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Date: _____

Zenaida A. Mallillin
Principal IV
Holy Spirit Elementary School

Dear Ma'am Mallillin,

Greetings of peace and love!

The undersigned is a graduate student of the Philippine Normal University who is currently taking up Masters of Education with specialization in Special Education. I am conducting a study entitled "Multimedia Mobile Learning Application Software for Non-verbal Children with Autism". The study aims to develop a mobile apps based on PECS principles that will serve as an intervention to functional communication for non-verbal children with autism.

I am in the process of evaluating my instruments to the participants of my study in your school. The following are the instruments to be used:

1. Characteristics/behavior of non-verbal children with autism.
2. Favorite things and activities of non-verbal children with autism as basis for designing the multimedia mobile learning application software
3. The content features of the developed multimedia mobile learning application software"

In connection with this, may I request your approval in order for me to conduct my study to the following participants in your school:

1. SPED Teachers
2. Parents
3. Non-verbal Children with Autism

Thank you for your cooperation and support in this undertaking.

Truly yours,

REMEDIOS E. PARROCHA
Researcher

Noted:

DR. TERESITA G. INCIONG
Thesis Adviser

DR. TERESITA G. DE MESA
Thesis Adviser

APPENDIX D

LETTER TO THE SPECIAL EDUCATION TEACHERS

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND TEACHER EDUCATION RESEARCH
Special Education Program

Date: _____

_____
_____
_____

Dear _____,

Greetings of peace and love!

The undersigned is a graduate student of the Philippine Normal University who is currently taking up Masters of Education with specialization in Special Education. I am conducting a study entitled "Multimedia Mobile Learning Application Software for Non-verbal Children with Autism". The study aims to develop a mobile apps based on PECS principles that will serve as an intervention to functional communication for non-verbal children with autism.

In this regard, may I request you to be one of my respondents of the study. Attached herewith are the checklists and questionnaires of the study. I will greatly appreciate any help/assistance you could provide me.

Thank you for your cooperation and support in this undertaking.

Truly yours,

REMEDIOS E. PARROCHA
Researcher

Noted:

DR. TERESITA G. INCIONG
Thesis Adviser

DR. TERESITA G. DE MESA
Thesis Adviser

APPENDIX E

LETTER OF REQUEST TO THE PARENT

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Date: _____

Dear Parent,

Greetings of peace and love!

The undersigned is a graduate student of the Philippine Normal University who is currently taking up Masters of Education with specialization in Special Education. I am conducting a study entitled "Multimedia Mobile Learning Application Software for Non-verbal Children with Autism". The study aims to develop a mobile apps based on PECS principles that will serve as an intervention to functional communication for non-verbal children with autism.

In line with this, I would like to request for your permission to participate you and your child in my study. With your permission, I would be soliciting information through interview regarding the personal profile of your child as well as his/her favorite things and activities.

Thank you very much. God bless!

Truly yours,

REMEDIOS E. PARROCHA
Researcher

Noted:

DR. TERESITA G. INCIONG
Thesis Adviser

DR. TERESITA G. DE MESA
Thesis Adviser

APPENDIX F

Checklist on the Identification of the Characteristics of Non-verbal Children with Autism in Terms of Social, Communication, and Behavioral Characteristics

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of Respondent: _____ Date: _____
School/Office: _____ Present Position: _____
Educational Attainment: _____
Years of Teaching Experience in Handling Autism Students: _____

Directions: The following items pertain to the characteristics/behavior of non-verbal autism children. Kindly put a check (/) mark on the column that represent the observable characteristics on each area where:

3- Highly Suitable
2- Very Suitable
1- Suitable

CRITERIA	3	2	1
A. Social Concerns			
1. Does not smile socially			
2. Seems to prefer to play alone			
3. Gets things to himself			
4. Is very independent			
5. Has poor eye contact			
6. Is in his own world			
7. Tunes us out			
8. Is not interested with other children			
9. Plays alone			
B. Communication Concerns			
1. Does not respond to his/her name			
2. Cannot tell what he/she wants			
3. Language is delayed			
4. Does not follow instruction/directions			
5. Appears "deaf" at times			
6. Seems to hear sounds sometimes			
7. Does not wave bye-bye			
8. Used or say few words, then he does not			
C. Behavioral Concerns			
1. Tantrums			
2. Is hyperactive, uncooperative or oppositional			
3. Does not know how to play with toys			
4. Gets stuck on things over and over (perseveration)			
5. Toe walks			
6. Has unusual attachment to toys			
7. Lines things up			
8. Is oversensitive to certain textures or sounds			
9. Has odd movement patterns			

APPENDIX G

Checklist on the Identification of the Characteristics of Non-verbal Children with Autism in Terms of Communication Displays, Medium Used, Identification of Things by Pointing and Manipulation Skills

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of Respondent: _____ Date: _____
School/Office: _____ Present Position: _____
Educational Attainment: _____
Years of Teaching Experience in Handling Autism Students: _____

Directions: The following items pertain to the characteristics/behavior of non-verbal autism children. Kindly put a check (/) mark on the column that represent the observable characteristics on each area where:

3- Highly Suitable

2- Very Suitable
1- Suitable

CRITERIA	3	2	1
A. COMMUNICATION DISPLAYS			
1. Requesting things he/she needs and wants			
2. Asking for assistance or help			
3. Asking for a break			
4. Rejecting (indicating "no" to "Do you want____?")			
5. Affirming (indicating "yes" to "Do you want____?")			
B. MEDIUM USED TO COMMUNICATE			
1. Produces sounds understood by significant other (the people around him/her)			
2. Expresses needs by pointing and gesturing			
3. Expresses needs and wants through sign language			
4. Expresses needs and wants through pictures			
5. Expresses needs and wants through writing/drawing			
D. IDENTIFY THINGS BY POINTING:			
1. Food and drinks			
2. Clothes			
3. Toys			
4. School materials			
5. Attributes like color, shape, numbers, alphabet, etc.			
C. MANIPULATION SKILLS			
1. Pick up thing/s that the child's needs and wants			
2. Reach for the thing/s that the child's needs and wants			
3. Release thing/s that the child's needs and wants			
4. Select thing/s that the child's needs and wants			

APPENDIX H

Checklist on the General Preferences of Non-verbal Children with Autism at Home and in the School Setting

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of Parent: _____ Date: _____
Name of Child: _____ Age: _____ Gender: _____

Directions: The following items pertain to the favorite things and activities a non-verbal child Kindly put a check (/) mark on the column that represents the child's favorite of each area where:

3- Very Much Preferred
2- Much Preferred
1- Preferred

FAVORITE THINGS AND ACTIVITIES OF NON-VERBAL AUTISM CHILDREN	3	2	1
A. Food your child likes to eat for breakfast			
1. Ham			
2. Hotdog			
3. Noodles			
4. Egg			
5. Bread			
6. Sandwich			
Others:			
B. Food your child likes to eat for lunch/dinner with rice			
1. Adobo Chicken			
2. Chopseuy			
3. Fried Chicken			
4. Fried Liempo			
5. Grilled fish			
6. Sinigang			
Others:			
C. Food your child likes to eat for snack			
1. Biscuit			
2. Cake			
3. Candy			
4. Chocolate			
5. French fries			
6. Ice cream			
Others:			
D. Beverages your child likes to drink			
1. Milk			
2. Juice			
3. Yougurt			
4. Yakult			
5. Zest-O			
6. Water			
Others:			
E. Your child's favorite fruit			
1. Apple			
2. Banana			
3. Grapes			
4. Mango			
5. Orange			
6. Pineapple			
Others:			
F. Clothes your male child needs to wear			
1. Brief			
2. Jacket			
3. School uniform			
4. Shorts			
5. Socks			
6. T-shirt			
Others:			
G. Clothes your female child needs to wear for girls			
1. Blouse			
2. Panty			
3. School uniform			
4. Shorts			
5. Skirt			
6. Socks			
Others:			
H. What your child's activities chosen to do during free time			

APPENDIX I

Content Features Evaluation of the Multimedia Mobile Learning Application Software

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of Evaluator: __ _____ Date: _____
School/Office: _____ Present Position: _____
Educational Attainment: _____
Years of Teaching Experience in Handling Autism Students: _____

Directions: The following items pertain to the developed multimedia mobile learning application software based on the PECS principles for non-verbal autism children. Kindly put a check (/) mark on the column that represent the suitability of the criteria in terms of its objectives, content, activities, procedures where:

3- Highly Suitable
2- Very Suitable
1- Suitable

Part I	3	2	1
Objectives			
Criteria:			
1. Objectives are specific and clearly stated			
2. Objectives are measurable			
3. Objectives are attainable			
4. Objectives are relevant			
5. Objectives are time-bound			
Content			
Criteria:			
1. Contents are congruent to the objectives			
2. Materials are clearly specified			
3. Content is appropriate for the participants			
4. Shows relevant pictures for understanding of the activities			
Activities			
Criteria:			
1. Activities are congruent with the objectives			
2. Activities are easy to follow by the participants			
3. Activities are suited to the ability level of the participants			
4. Activities are presented in thematic manner.			
Procedure			
Criteria:			
1. Shows relevance to the learning objectives			
2. Simple and precise instruction			
3. Provides full participation of the participants			
4. Easy to follow by the communicative partner and the prompter			
5. Adaptable participants' interest and willingness to communicate			

APPENDIX J

Technical Quality of the Multimedia Mobile Learning Application Software

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of Evaluator: __ _____ Date: _____
School/Office: _____ Present Position: _____
Educational Attainment: _____
Years of Teaching Experience in Handling Autism Students: _____

Directions: The following items pertain to the developed multimedia mobile learning application software based on the PECS principles for non-verbal autism children. Kindly put a check (/) mark on the column that represent the suitability of the criteria in terms of its technical appearance and flexibility where:

3- Highly Suitable
2- Very Suitable
1- Suitable

Technical Appearance	**3**	**2**	**1**
Criteria:			
1. The graphics are clear, organized, and appealing			
2. The images and text used are accurate			
3. The color , size and font style choice are relatively appropriate			
4. Touch screen gestures work properly			
5. Sound used is pleasant to hear			
Flexibility			
Criteria:			
1. The app includes settings that can be changed (e.g. take photos, add or remove pictures, voice record,)			
2 The app is child-friendly, simple and clear.			
3. The app layout is consistent.			
4. The app gesture command is consistent			
5. The app encourages independent learning			

APPENDIX K

Evaluation Form of Multimedia Mobile Learning Application

Software to a Non-verbal Children with Autism
Preliminary Try -out and Post Tryout

Philippine Normal University
Taft Avenue, Manila
COLLEGE OF GRADUATE STUDIES AND
TEACHER EDUCATION RESEARCH
Special Education Program

Name of a Child: _____ Date: _____
Age: _____ Gender: _____

Directions: The following items pertain to the observation of the child while using the multimedia application software. Kindly put a check (/) mark on the column for your corresponding response where:

3- Strongly Observed
2- Very Much Observed
1- Observed

Criteria	3	2	1
Part I. Behavior			
1. The child was motivated to use the multimedia mobile learning application software through establishing eye contact.			
2. The child was appeared to initiate to start using the multimedia mobile learning application software.			
3. The child manipulated the multimedia mobile learning application software with the help of the physical prompter.			
4. The child was seen imitated and followed his/her prompter while using multimedia mobile learning application software .			
6. The child acted with enjoy when hearing sounds from the multimedia mobile learning application software.			
Part II. Screen Gestures			
1. Press the power on/off button of the mobile device			
2. Glance/browse the screen of the mobile device			
3. Single tap the screen of the mobile device			
4. Double tap the screen of the mobile device			
5. Swipe up the screen of the mobile device			
6. Swipe down the screen of the mobile device			

Multimedia Mobile Learning Application Software for Non-verbal Children with Autism

APPENDIX L

Format

by

Remedios E. Parrocha

Foreword

Over the years, teaching children with autism is like a battle of thoughts and feelings because these children have difficulties in expressing their wants and need more so lack of understanding to interpret facial expressions, gestures, and use speech in

strange ways. Therefore, it is crucial to help these non-verbal children with autism to ease the burden between the child and his/her environment, to interact socially in acceptable manner and to be understood with the help of the communication device.

As technology is becoming more popular today there are ways on how to help these non-verbal children with autism to at least initiate communication using devices that can be both accessible in school and at home.

The researcher came up with a multimedia mobile learning application software which was shaped with all her effort and resources that offer to increase the child's vocabulary and later on to speak and display appropriate behavior. The parents and SPED teachers have significant roles in executing the lesson in the developed multimedia mobile learning application software so that there is a proper orientation for the child on how to use the device purposely for him/her to help develop his/her communication skills. To deliver the lesson meaningfully the researcher used the principle of Picture Exchange Communication System (PECS) as an augmentative and alternative communication type of teaching strategy and guide.

With wisdom and knowledge in preparing instructional material electronically it is the researcher's eagerness to find people who are experts to digitize her concepts and ideas thus, multimedia mobile learning application software will not be possible without those people who impart their knowledge and skills.

The output of this study, can be used and adopted by special education teachers, parents and school administrators and use it a model for creating other mobile application materials to deal with the unique needs of children with autism (Cowen, 2012).

Introduction

The multimedia mobile application software was developed for non-verbal children with autism whom I have been teaching for almost three years now. They are my inspiration to conduct a research of this kind to help them develop their communication skills through the Picture Exchange Communication System principles that by exchanging pictures with real items they will understand that communication is going on.

In developing this material, I consulted experts to make it authentic and applicable to the needs of nonverbal children with autism. With the support of my two advisers who painstakingly and joyfully guided me in my journey to finish my study, the principal of the school where I teach, the special education teachers and parents who actively participated in the study, this research paper was reviewed and endorsed positively.

The structure procedures can be easily followed and the teaching strategy used is intended to improve the communication skills of the non-verbal children with autism and with the thematic lesson plans created resulted to the improvement of the expressive skills of these children.

Rationale

The development of the multimedia mobile learning application software is based on Sensory -Stimulation Theory because it stimulates the senses of the non-verbal children with autism to interact and react to the communicative partner and shows learning take place. The Social Learning Theory that people learn from one another through imitation, observation and modelling. The design included the step by step prompts and visual cues to easily understand and imitate by the non-verbal children with autism. These visual cues pertain to

each phases of the multimedia mobile learning application software that were adopted to the Picture Exchange Communication System (PECS) principles. And Reinforcement Theory can broadly be defined as the process of leading a child to perform a task or to show a behavior asked by following the step by step procedure. It involves giving a reward for positive behavior performed and a negative punishment when there is an unacceptable behavior to withheld until the child performs the appropriate behavior. In this study, the child is being observed if he/she follows the tasks to do and once it is finished with minimal prompts, a reward is given in the form of praise, activity and tangibles like food, toys etc. (Advameg Inc. , 2017).

The multimedia mobile learning application software is viewed as part of a getting strong advocacy of using and integrating technology in developing the communication skills of nonverbal children with autism. Researches have been conducted and results revealed that non-verbal people with autism can communicate through exchanging picture to express their wants and needs. In preparing teaching materials, the researcher looked for something that will motivate them to talk through pictures by developing a multimedia mobile application software and integrating technology so that it will be more effective (El-Seoud et.al., 2015)

Goals

1. Motivate and enhance the communication skills of non-verbal children with autism.
2. Inspire special education teachers teach children with autism by using the mobile application software.
3. Boost the morale of parents that their special children can talk through pictures and adopt the mobile apps in teaching them expressive skills at home and consider

themselves as the school partner in educating special children.

4. Encourage school administrators to support their teachers in creating other materials for special children in their schools.
5. Work in partnership with experts to develop other technology based materials for children with educational needs.

Terms defined:

Mobile Learning Application Software is a kind of instructional materials using mobile phones such as smartphones and tablets. It is designed as a learning tool for children with autism who have communication problems.

Multimedia are the content of the mobile device that uses a combination of text, images, graphics, video and audio.

Picture Exchange Communication System is an alternative means of communication that allows a child to communicate using pictures of what he wants.

Preparing Thematic Instructional Plans

The lessons are organized thematically by having set of activities with a theme. It is short and precise as direct instruction is more effective for non-verbal children with autism. The Picture Exchange Communication System was used to design the activities integrating it with the DepEd prescribed Special Education Curriculum. Below are the contents of the thematic lesson plan:

a. **Objectives –** The aims of the lesson is focused on the skills that the children will develop. It follows the SMART model of writing objectives to attain the criteria: specific, measurable, attainable, relevant and time-bound.
b. **Subject Matter –** The thematic topic of each lesson consists of the area of development specifically the communication skills of non-verbal children with autism. It also

includes the topic, materials and references used in the development of the mobile application software

c. **Procedures** – these are the steps to be followed in leading the child to acquire the skills of communicating wants and needs. The Picture Exchange Communication System procedure was adopted with the integration of the task analysis method of teaching a skill step by step.

d. **Variation of Activity –**In this area, addition of more pictures can be done when needed especially when the children have already learned the pictures used in the mobile app.

e. **Evaluation** – In this part of the lesson plan, the researcher makes simple criteria in evaluating the performance of each participant on their learning using the mobile app

f. **Curriculum guide preparing the gross motor and fine motor instructional Material**

The Picture Exchange Communication System curriculum and the Special Education curriculum served as the guide in developing the content of the multimedia mobile learning application software. The thematic lesson plans include daily living skills, grooming, hygiene, school work, my family among others.

g. **Activity instruction**

During the implementation of the multimedia mobile learning application software, the user/teacher initiated the child to participate in the activity. The teacher as the communicative partner and the parent as the prompter, demonstrate the procedure and use promptings in leading the child to work and be on task to finish the activity.

The Prepared Environment

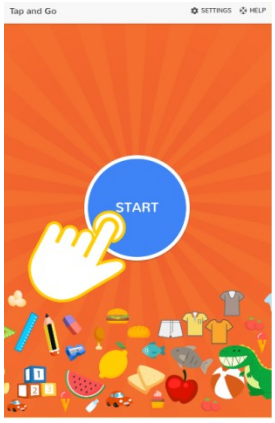
In the try-out of the study, the classroom was prepared to make it conducive place for learning. Learning centers were set to motivate the participants that there are areas designated

appropriately for each activity: feeding, grooming, learning blocks, etc.

User Guide When Making Child's Request

1. Tap and Go Starter

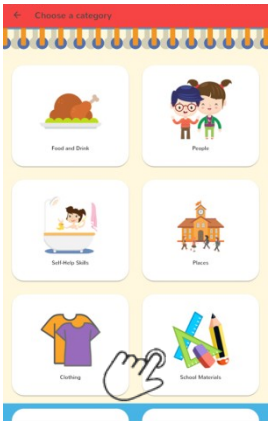
1.1 The child start the app by tapping the button start with the help of the prompter.



2. Choose Category

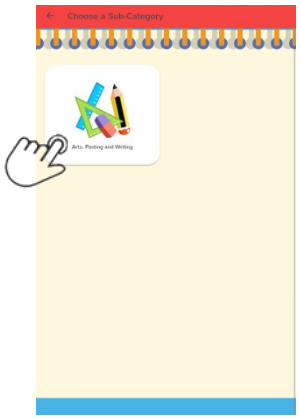
2.1 An array of different categories will appear which includes the eight (8) Themes: Food and Drinks, Self-Help Skills, Clothing Toys, People, Places, School Materials, and Numbers.

2.2 The child chooses a category which contains a picture similar to the desired item motivated by the communicative partner.



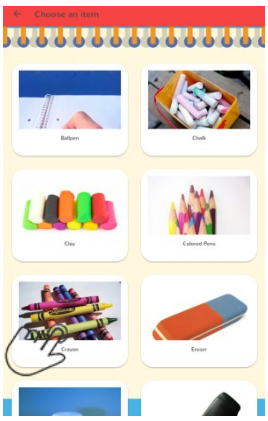
3. Choose a Sub-Category

3.1 The page appears of the selected sub-category and then taps the sub-category to choose the desired item.



4. Choose an Item

4.1 Once a category has been selected a page appears showing a variety of different pictures. Example if the child has selected the “school materials” a range of school materials appear. For example: ballpen, clay, crayon, glue, notebook, popsicle sticks, scissors, water color, and the like.

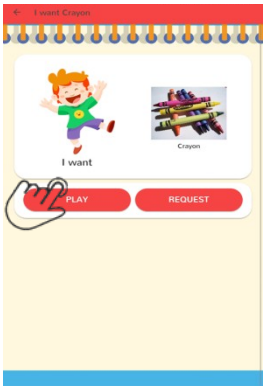


4.2 The child chooses the picture with the help of his/her prompter. Ex. The item to be selected is crayon. The prompter hold the child’s finger to tap the item crayon.

5. “I want ____”

5.1 Once a child taps the same picture as the desired item, a page appears starting with a sentence formed “I want ____.” Example: “I want crayon.” The sentence can either be found at the upper right of the page as well as the center. The “I want” implies that the picture of a child who is requesting and the picture next to is the desired item to be requested.

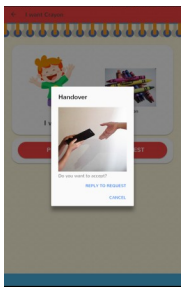
5.2 The child taps the play button to create sound simply because it catches the attention of the communicative partner to denote that the child has already done in selecting the desired item.



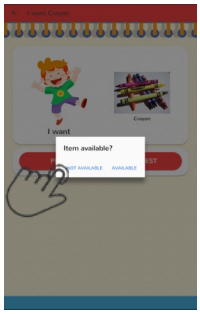
6. Handover

6.1 The handover visual clue appears when the child taps the play button and request button. It implies that the child must give the mobile device to the communicative partner.

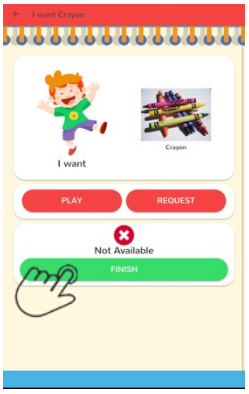
6.2 It also contains a question to the communicative partner like “Do you want to accept it?” then has two (2) options to answer: Reply to Request and Cancel.



6.3 If the communicative partner chooses the reply to request, options not available or available appear.



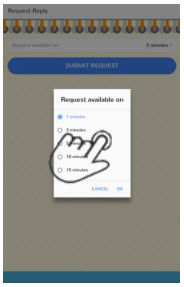
6.4 Not available means that the desired item is not being presented by the time the child request the item however, the child must try again to look for another item in choosing item category.



6.5 Available means that a child's request will be granted the proceed to the next page which is reply to request.

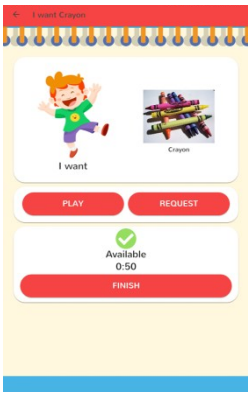
7. Reply to Request

7.1 A page by which the communicative set the time into 1, 3, 5, 10, and 15 minutes. The communicative partner selects the time depends on the availability of the desired item to be presented to the child then tap the button of submit the request and then gives back to the child to wait patiently to be presented the requested item.



8. Waiting Time

8.1 In this page, the child waits to finish the countdown timer. This involves the value of patience to be encouraged to the child.



9. Saying "I want ____."

9.1 The communicative partner encourages the child to speak while getting ready for picture exchange with real food by prompting the child to say: e.g. "I want crayon."

10. Exchanging of Picture

10.1 The child must be given the real item in exchange for the selected item in the mobile

device. When the child imitate or tries to produce and utter sounds even though it's not clear as the communicative partner, the child must receive positive reinforcement because of the good job well done.

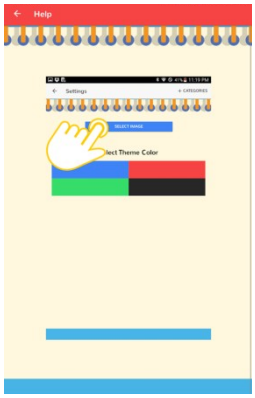
User Guide When Using the General Settings

1. Add User Image

1.1 The Tap and Go can customize the user image by tapping the select image then replace the current photo from the gallery of the mobile device.

2. Select Theme Color

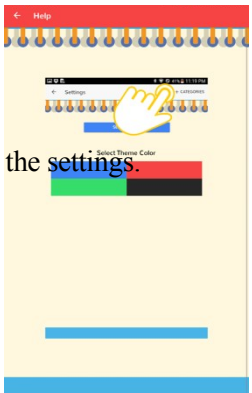
2.1 The app can be change the theme color into blue, green, red and black.



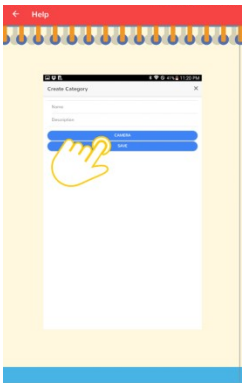
User Manual for Adding New Category, New Sub-Category, and New Item

1. Add New Category

1.1 Select the category from the settings.

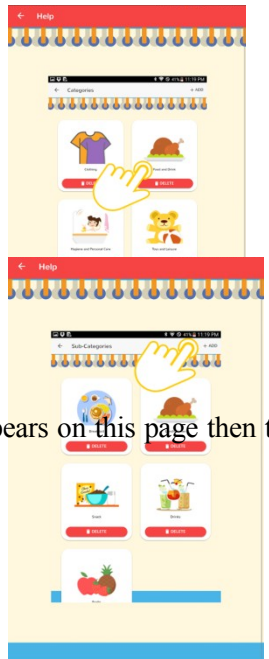


1.2 Create a category appears then fill-out the necessary box like: Name of the category you want to add, description, and then tap the camera to get the image from the photo gallery and save.



2. Add New Sub-Category

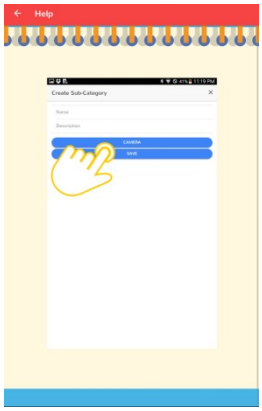
2.1 Select the category from which you want to add the new sub-category.



2.2 The sub categories appears on this page then taps “add” on the upper right part of the

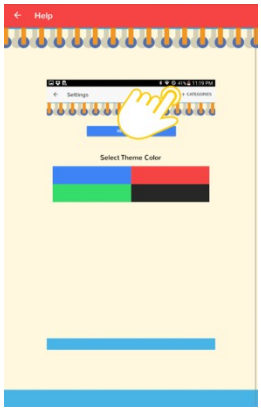
page.

2.3. “Create Sub-Category” appears then fill-out the necessary box like: Name of the sub-category you want to add, description, and then tap the camera to get the image from the photo gallery and save.

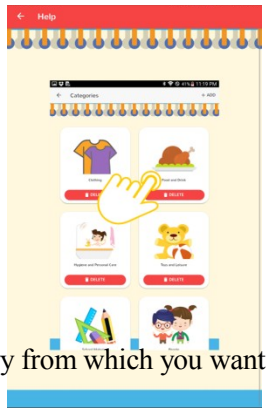


3. Add New Item

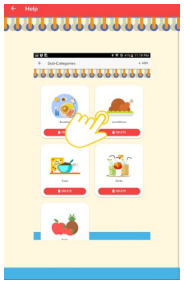
3.1 Select the category from the settings.



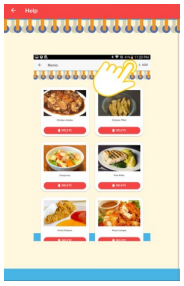
3.2 Select the category from which you want to add the new item.



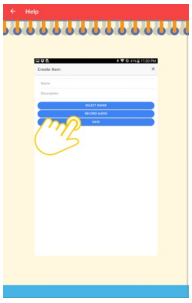
3.2 Select the sub-category from which you want to add the new item.



3.2 The items appears on this page then taps “add” on the upper right part of the page.



3.3 “Create New Item” appears then fill-out the necessary box like: Name of the item or picture that you want to add, description, select image from the photo gallery, record audio means the recorded voice of the picture’s name customized by the user and then save.



Tap and Go Flowchart

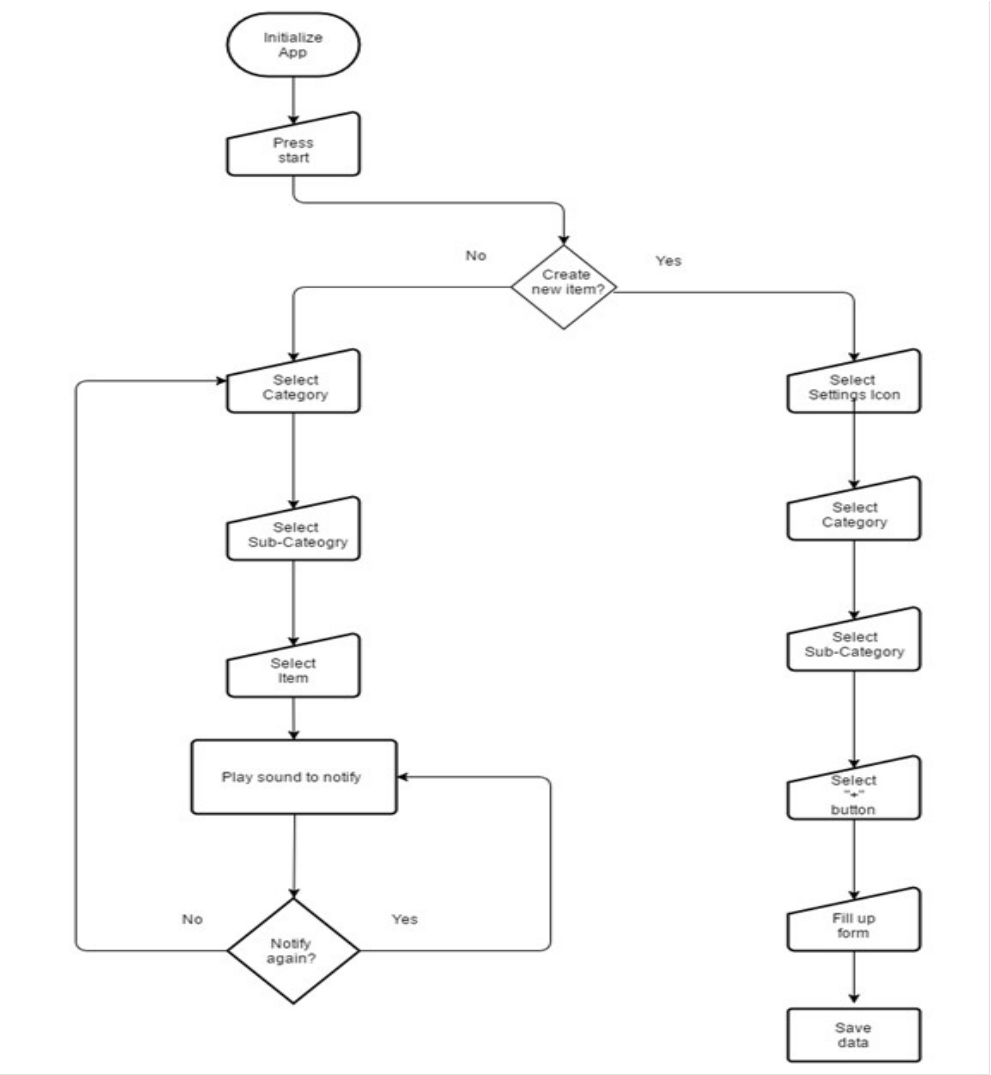


TABLE OF CONTENTS

Lesson Plan 1

TAP AND GO APP

Theme 1: Food and Drinks: Food for Breakfast

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate food to eat for breakfast
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real food within (1) hour

II. SUBJECT MATTER:

Theme 1: Food and Drinks
Sub-category: Food for Breakfast
Topic: Initiating Communication by Exchanging Pictures of Favorite Food for Breakfast
Materials: Multimedia application software, mobile phone, and real food for Breakfast

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing category of food for breakfast
1.4 selecting an item to eat for breakfast
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the real food on the table.	1. Paying attention and looking at his/her favorite food on the table.
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the food that child wants to eat for breakfast.	2. Holding the real food.
Teacher as Communicative Partner	Show	3. Getting the food from the hand of the child.	3. Looking at the picture from the mobile device.
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing category food for breakfast 4.4 selecting the food breakfast to eat from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the food for breakfast.	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the real food for breakfast in preferred hand.	6. Looking and waiting for the food for breakfast to be hand over by the teacher.
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair.
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop.	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real food, prompting the child to say, "I want _____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the food for breakfast.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device.	10. Smiling with joy as he/she is reinforced with the real food for breakfast he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement.

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for food to eat breakfast				
4. select the same breakfast item as shown by the communicative partner				
5. handover the mobile device in exchange of the real food for breakfast he/she wants to eat				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want? Or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 2

TAP AND GO APP

Theme 1: Food and Drinks: Food for Lunch/Dinner

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate food to eat for lunch/dinner
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real food within (1) hour

II. SUBJECT MATTER:

Theme 1: Food and Drinks
Sub-category: Food for Lunch/Dinner
Topic: Initiating Communication by Exchanging Pictures of Favorite Food for Lunch/Dinner
Materials: Multimedia application software, mobile phone, and real food for Lunch

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing category of food for lunch
1.4 selecting an item to eat for lunch
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the real food on the table	1. Paying attention and looking at his/her favorite food on the table
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the food that child wants to eat for lunch.	2. Holding the real food.
Teacher as Communicative		3. Getting the food from the hand	3. Looking at the picture

Partner	Show	of the child.	from the mobile device.
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing category of food for lunch 4.4 selecting the food for lunch to eat from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the food for lunch.	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the real food for lunch in preferred hand.	6. Looking and waiting for the food for lunch to be hand over by the teacher.
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child.	7. Sitting quietly on the chair.
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop.	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real food, prompting the child to say, "I want _____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the food for lunch.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device.	10. Smiling with joy as he/she is reinforced with the real food for lunch he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement.

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1

1. open the mobile app				
2. tap the start button				
3. choose the category for food to eat lunch/dinner				
4. select the same lunch item as shown by the communicative partner				
5. handover the mobile device in exchange of the real food for lunch/dinner he/she wants to eat				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 3
TAP AND GO APP

Theme 1: Food and Drinks: Food for Snack

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate food to eat for snack
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real food within (1) hour

II. SUBJECT MATTER:

Theme 1: Food and Drinks
Sub-category: Food for Snack
Topic: Initiating Communication by Exchanging Pictures of Favorite Food for Snack
Materials: Multimedia application software, mobile phone, and real food for Snack

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing category of food for snack
1.4 selecting an item to eat for snack
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the real food on the table.	1. Paying attention and looking at his/her favorite food on the table.
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the food that child wants to eat for snack.	2. Holding the real food.
Teacher as Communicative Partner	Show	3. Getting the food from the hand of the child.	3. Looking at the picture from the mobile device.

Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing category food for snack 4.4 selecting the food for snack to eat from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the food for snack.	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the real food for snack in preferred hand.	6. Looking and waiting for the food for snack to be hand over by the teacher.
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child.	7. Sitting quietly on the chair.
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop.	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real food, prompting the child to say, "I want _____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the food for snack.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device.	10. Smiling with joy as he/she is reinforced with the real food for snack he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement.

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				

3. choose the category for food to eat snack				
4. select the same snack item as shown by the communicative partner				
5. handover the mobile device in exchange of the real food for snack he/she wants to eat.				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want?" or "Give me the picture.")
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 4

TAP AND GO APP

Theme 1: Food and Drinks: Drinks

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate drink
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real drink within (1) hour

II. SUBJECT MATTER:

Theme 1: Food and Drinks
Sub-category: Drinks
Topic: Initiating Communication by Exchanging Pictures of Favorite Drink
Materials: Multimedia application software, mobile phone, and real Drinks

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing category for drink
1.4 selecting an item to drink
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the drinks on the table.	1. Paying attention and looking at his/her favorite drink on the table.
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the drink that child wants to consume.	2. Holding the real drink.
Teacher as Communicative Partner	Show	3. Getting the drink from the hand of the child.	3. Looking at the picture from the mobile device.
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing category for drink 4.4 selecting the drink item from the mobile device.
Teacher as Communicative		5. Waiting for the child to hand	6. Giving the mobile device to

Partner and Parent as Prompter work together	Time Delay	over the mobile device that contains the picture of the drink.	the teacher.
Teacher as Communicative Partner	Prepare	7. Holding the real drink in preferred hand.	6. Looking and waiting for the drink to be hand over by the teacher.
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child.	7. Sitting quietly on the chair.
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop.	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real drink, prompting the child to say, "I want _____"	9. Saying the phrase, "I want_____". Then, giving the mobile device with the picture representing the drink to be consumed.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device.	10. Smiling with joy as he/she is reinforced with the real food for lunch he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement.

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for drinks				
4. select the same drink item as shown by the communicative partner				
5. handover the mobile device in exchange of the real drink he/she wants				

6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want?" or "Give me the picture.")
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 5

TAP AND GO APP

Theme 1: Food and Drinks: Fruits

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate fruit he/she likes to eat
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real fruit to eat within (1) hour

II. SUBJECT MATTER:

Theme 1: Food and Drinks
Sub-category: Fruits
Topic: Initiating Communication by Exchanging Pictures of Favorite Fruits to Eat
Materials : Multimedia application software, mobile phone, and real fruits

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing category for the fruit to eat
1.4 selecting a fruit item to eat
1.5 giving the mobile phone to the communicate partner in exchange for the item
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the fruit on the table.	1. Paying attention and looking at his/her favorite fruit on the table
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the fruit that child wants to eat.	2. Holding the real fruit.
Teacher as Communicative Partner	Show	3. Getting the fruit from the hand of the child.	3. Looking at the picture from the mobile device.
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing category of fruit to eat 4.4 selecting the fruit to eat from the mobile device.
Teacher as Communicative Partner	Time Delay	5. Waiting for the child to hand over the mobile	6. Giving the mobile device to the teacher.

and Parent as Prompter work together		device that contains the picture of the fruit.	
Teacher as Communicative Partner	Prepare	6. Holding the real fruit by preferred hand.	6. Looking and waiting for the fruit to be hand over by the teacher.
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child.	7. Sitting quietly on the chair.
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop.	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real fruit prompting the child to say, "I want _____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the fruit to eat.
Teacher as Communicative Partner	Reinforce	10. Giving the real fruit in exchanged of the picture from the mobile device.	10. Smiling with joy as he/she is reinforced with the real fruit he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement.

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the fruit to eat				
4. select the same fruit item as shown by the communicative partner				
5. hand over the mobile device in exchange of the real fruit he/she wants to eat.				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 6

TAP AND GO APP

Theme 2: Self-Help Skills: Hygiene

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate item to wash hands
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the item (soap) to wash hands within (1) hour

II. SUBJECT MATTER:

Theme 2: Self-Help Skills
Sub-category: Hygiene
Topic: Washing Hands Initiating Communication by Exchanging Pictures of soap for washing hands
Materials: Multimedia application software, mobile phone, and real hygienic product (soap)

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category for practicing good hygiene

1.4 selecting an item for washing hands
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	2. Motivating the child to use soap for washing hands	7. Paying attention and looking at the soap for washing hands
Teacher as Communicative Partner	Explore	8. Searching the mobile device for the picture representing the item for washing hands	2. Holding the real soap
Teacher as Communicative Partner	Show	9. Getting the food from the hand of the child	3. Looking at the picture from the mobile device
Parent as Prompter	Prompt	10. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing a food for breakfast 4.4 selecting the food breakfast to eat from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	11. Waiting for the child to hand over the mobile device that contains the picture of the food for breakfast	5.Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	12. Holding the real food for breakfast in preferred hand	6. Looking and waiting for the food for breakfast to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	9. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real food, prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the food for breakfast.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real food for breakfast he/she wants to eat.
			Note: Teacher may give an award as positive

			reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the fruit to eat				
4. select the same soap item as shown by the communicative partner				
5. hand over the mobile device in exchange of the soap he/she wants to use.				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 7

TAP AND GO APP

Theme 2: Self-Help Skills: Personal Care

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate item when brushing teeth
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the item (soap) to wash hands within (1) hour

II. SUBJECT MATTER:

Theme 2: Self-Help Skills
Sub-category: Personal Care
Topic: Initiating Communication by Exchanging Pictures of toothbrush and toothpaste for brushing teeth
Materials: Multimedia application software, mobile phone, and real hygienic product (soap)

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category for practicing good hygiene
1.4 selecting an item for washing hands
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	3. Motivating the child to use toothbrush and toothpaste for brushing teeth	13. Paying attention and looking at the toothbrush and toothpaste for brushing teeth
Teacher as Communicative Partner	Explore	14. Searching the mobile device for the picture representing the item for brushing teeth	2. Holding the real soap
Teacher as Communicative Partner	Show	15. Getting the toothbrush and toothpaste from the hand of the child	3. Looking at the picture from the mobile device
Parent as Prompter	Prompt	16. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing a food for breakfast 4.4 selecting the food breakfast to eat from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	17. Waiting for the child to hand over the mobile device that contains the picture of the food for breakfast	5.Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	18. Holding the real food for breakfast in preferred hand	6. Looking and waiting for the food for breakfast to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	10. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real food, prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the food for breakfast.
Teacher as Communicative Partner	Reinforce	10. Giving the real food in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real food for breakfast he/she wants to eat.
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal Child with Autism The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the self-help skills				
4. select the same fruit item as shown by the communicative partner				
5. hand over the mobile device in exchange of the real toothbrush and toothpaste he/she wants to use.				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 8

TAP AND GO APP

Theme 3: Clothes to Wear by Boys/Girls

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate clothes to wear
1.2 handover the requested item to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real clothes he wants to wear within (1) hour

II. SUBJECT MATTER:

Theme 2: Clothing
Sub-category: Clothes to Wear by Boys/Girls
Topic: Initiating Communication by Exchanging Pictures of Clothes to Wear
Materials: Multimedia application software, mobile phone, and real clothes to wear

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing an item for the clothes to wear
1.4 selecting clothes to wear
1.5 giving the mobile phone to the communicate partner in exchange for the real item
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the clothes on the table.	1. Paying attention and looking at his clothes to wear on the table
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the clothes that child wants to wear	2. Holding the real clothes.
Teacher as Communicative Partner	Show	3. Getting the clothes from the hand of the child	3. Looking at the picture from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing a category for clothes to wear 4.4 selecting the clothes to wear from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the clothes to wear	6. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	7. Holding the clothes to wear by preferred hand	6. Looking and waiting for the clothes to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	11. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real clothes prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the clothes to wear.
Teacher as Communicative Partner	Reinforce	10. Giving the real fruit in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real clothes he wants to wear
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for clothes to wear				
4. select the same clothes to wear as shown by the communicative partner				
5. hand over the mobile device in exchange of the real clothes for he wants to wear				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 9

TAP AND GO APP

Theme 4: Toys to Play With

I. OBJECTIVES: The non-verbal children with autism will be able to:

1.1 select the appropriate toy to play with
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested item with the real toy to play with within (1) hour

II. SUBJECT MATTER:

Theme 3: Toys
Sub-category: Toys to Play With
Topic: Initiating Communication by Exchanging Pictures of Toys to Play with
Materials: Multimedia application software, mobile phone, and real toy/s to play with

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing an item for the toy/s to play with
1.4 selecting a toy/s to play with
1.5 giving the mobile phone to the communicate partner in exchange for the real toy to play with
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child with the real toy/s on the table.	1. Paying attention and looking at the toy to play with on the table
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the toy that child wants to play with	2. Holding the real toy.

Teacher as Communicative Partner	Show	3. Getting the toy from the hand of the child	3. Looking at the picture of a toy from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing a toy to play with 4.4 selecting the toy to play with from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the toy to play with	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the toy to play with by preferred hand	6. Looking and waiting for the toy to play with to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the real toy to play with prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the toy to play with
Teacher as Communicative Partner	Reinforce	10. Giving the toy to play with in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real toy he/she wants to wear
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA: The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the toy/s to play with				
4. select the same clothes to wear as shown by the communicative partner				
5. hand over the mobile device in exchange of the real toy for he/she wants to with				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 10

TAP AND GO APP

Theme 5: The Significant People I Love: My Father

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (father)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the mother of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: People
Sub-category: Significant Person in my Life: My Father
Topic: Initiating Communication by Exchanging Pictures of the mother who is invited to be present during the activity
Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her father
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her father
1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the father as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	8. Motivating the child to see his/her father in person	1. Paying attention of the presence of his/her father as announced by the teacher
Teacher as Communicative Partner	Explore	9. Searching the mobile device for the picture of his/her father	2. Holding the picture of his/her father
Teacher as Communicative Partner	Show	10. Getting the picture from the hand of the child	3. Looking at the picture of the father from the mobile device
Parent as Prompter	Prompt	11. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button

			4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her father from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	12. Waiting for the child to hand over the mobile device that contains the picture of his father	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	13. Holding the picture of his/her father	6. Looking and waiting for the father to sit beside him/her as prompted by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	14. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the father walking to hug the child prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real father
Teacher as Communicative Partner	Reinforce	10. Introduce the father to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her father.
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the significant people I love				

4. select the picture of his/her father as shown by the communicative partner				
5. hand over the mobile device in exchange of the real father for he/she wants to see				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 11

TAP AND GO APP

Theme 5: The Significant People I Love: My Mother

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life.

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (mother)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the mother of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: People
Sub-category: Significant Person in my Life: My Mother
Topic: Initiating Communication by Exchanging Pictures of the mother who is invited to be present during the activity

Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her mother
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her mother
1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the mother as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to see his/her mother in person	1. Paying attention of the presence of his/her mother as announced by the teacher
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture of his/her mother	2. Holding the picture of his/her mother
Teacher as Communicative Partner	Show	3. Getting the picture from the hand of the child	3. Looking at the picture of the mother from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her mother from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of his mother	Giving the mobile device to the teacher.
Teacher as Communicative	Prepare	6. Holding the picture of his/her mother	6. Looking and waiting for the mother to sit beside him/her as prompted by the

Partner			teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the father walking to hug the child prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real mother
Teacher as Communicative Partner	Reinforce	10. Introduce the brother to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her brother
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for the significant people I love				
4. select the same picture of a mother as shown by the communicative partner				
5. hand over the mobile device in exchange of the mother for he/she wants to see				
6. wait patiently				

7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 12

TAP AND GO APP

Theme 5: The Significant People I Love: My Brother

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (brother)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the partner of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: People
Sub-category: Significant Person in my Life: My Brother
Topic: Initiating Communication by Exchanging Pictures of

the brother who is invited to be present during the activity
Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her brother
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her brother
1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the brother as a reward

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IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to see his/her brother in person	1. Paying attention of the presence of his/her brother as announced by the teacher
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture of his/her brother	2. Holding the picture of his/her brother
Teacher as Communicative Partner	Show	3. Getting the picture from the hand of the child	3. Looking at the picture of the brother from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her brother from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of his brother	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the picture of his/her brother	6. Looking and waiting for the brother to sit beside him/her as prompted by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the brother walking to hug the child prompting the child to	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real brother

		say, "I want ____"	
Teacher as Communicative Partner	Reinforce	10. Introduce the brother to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her brother
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA: The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for significant people in my life				
4. select the same picture of his/her brother as shown by the communicative partner				
5. hand over the mobile device in exchange of the real brother for he/she wants to see				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as “What do you want” ? or “Give me the picture”).
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 13

TAP AND GO APP

Theme 5: The Significant People I Love: My Sister

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (sister)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the partner of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: People
Sub-category: Significant Person in my Life: My Sister
Topic: Initiating Communication by Exchanging Pictures of the sister who is invited to be present during the activity
Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button

1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her sister
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her sister
1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the sister as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to see his/her sister in person	1. Paying attention of the presence of his/her sister as announced by the teacher
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture of his/her sister	2. Holding the picture of his/her sister
Teacher as Communicative Partner	Show	3. Getting the picture from the hand of the child	3. Looking at the picture of the sister from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her sister from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of his sister	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the picture of his/her sister	6. Looking and waiting for the sister to sit beside him/her as prompted by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the sister walking to hug the child prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real sister
Teacher as Communicative Partner	Reinforce	10. Introduce the sister to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her sister
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for significant people in my life				
4. select the same picture of the sister as shown by the communicative partner				
5. hand over the mobile device in exchange of the real sister for he/she wants to see				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 14

TAP AND GO APP

Theme 5: Extended Family: My Grandfather

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (grandfather)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the partner of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: Significant Person in my Life: My Grandfather
Topic: Initiating Communication by Exchanging Pictures of the grandfather who is invited to be present during the activity
Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her grandfather
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her grandfather

1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the grandfather as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to see his/her grandfather in person	1. Paying attention of the presence of his/her grandfather as announced by the teacher
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture of his/her grandfather	2. Holding the picture of his/her grandfather
Teacher as Communicative Partner	Show	3. Getting the picture from the hand of the child	3. Looking at the picture of the grandfather from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her grandfather from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of his grandfather	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the picture of his/her grandfather	6. Looking and waiting for the grandfather to sit beside him/her as prompted by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the grandfather walking to hug the child prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real grandfather
Teacher as Communicative Partner	Reinforce	10. Introduce the grandfather to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her grandfather
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category for significant people in my life				
4. select the same picture of the grandfather as shown by the communicative partner				
5. hand over the mobile device in exchange of the real grandfather for he/she wants to see				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 15

TAP AND GO APP

Theme 5: Extended Family: My Grandmother

Note: In teaching this activity, invite the member/s of the family to be present in the school. Conduct an orientation on the role that each family member will play when the NVCWA will be taught to identify the members of the family who the significant people in her/his life

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate picture of a family member (grandmother)
1.2 handover the requested toy to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the presence of the partner of the child within (1) hour

II. SUBJECT MATTER:

Theme 5: People
Sub-category: Significant Person in my Life: My Grandmother
Topic: Initiating Communication by Exchanging Pictures of the grandmother who is invited to be present during the activity
Materials: Multimedia application software, mobile phone, and significant person in the life of the child

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing the category of the significant person in the life of the child
1.4 selecting the picture of his/her grandmother
1.5 giving the mobile phone to the communicate partner in exchange of the picture to see his/her grandmother
1.6 waiting patiently for the requested picture as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested picture
1.8 see or hold the hand of the grandmother as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to see his/her grandmother in person	1. Paying attention of the presence of his/her grandmother as announced by the teacher
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture of his/her grandmother	2. Holding the picture of his/her grandmother
Teacher as Communicative Partner	Show	3. Getting the picture from the hand of the child	3. Looking at the picture of the grandmother from the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the category of significant person in the child's life 4.4 selecting the picture of his/her grandmother from the mobile device
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of his grandmother	Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Holding the picture of his/her grandmother	6. Looking and waiting for the grandmother to sit beside him/her as prompted by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	8.Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready with the exchange picture with the grandmother walking to hug the child prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the real grandmother
Teacher as Communicative Partner	Reinforce	10. Introduce the grandmother to his son or her daughter in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real presence of his/her grandmother
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
2. open the mobile app				
3. tap the start button				
4. choose the category for significant people in my life				
5. select the same picture of the grandmother as shown by the communicative partner				
6. hand over the mobile device in exchange of the real grandmother for he/she wants to see				
7. wait patiently				
8. learn the next lesson as motivated by the communicative partner				
9. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 16

TAP AND GO APP

Theme 6: Places: **Learning Center in the Classroom**

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate learning center for work activity
1.2 handover the requested picture of the learning center to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture by leading calmly the child to the learning center within (1) hour

II. SUBJECT MATTER:

Theme 10 : Places: School
Sub-category: Learning Center in the Classroom: Working on the Block Center
Topic: Initiating Communication by Exchanging Pictures of the learning center to work on an activity
Materials: Multimedia application software, mobile phone, and real learning center for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of learning center for work activity
1.4 selecting the block center to create figure/s
1.5 giving the mobile phone to the communicate partner in exchange for the real blocks/materials
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to work in the block center	1. Paying attention and looking at block center

Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the block/s that child wants to manipulate to create figure/s at the block center	2. Holding the real blocks/materials
Teacher as Communicative Partner	Show	3. Getting the blocks/materials from the hand of the child	3. Looking at the picture of the blocks/ materials and the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the block center to manipulate blocks/materials and create figures using blocks 4.4 selecting the block center to create figures using the block materials
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of the block center	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Pointing the block center where the child will work in	6. Looking and waiting for the block materials to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	7. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the blocks/materials with prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the block center for working on an activity.
Teacher as Communicative Partner	Reinforce	10. Giving the blocks/materials in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real blocks/materials for creating figures in the block center.
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of a learning center: block center				
4. select the same block center and block materials as shown by the communicative partner				
5. hand over the mobile device in exchange of the real blocks materials to work on in the learning center				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 17

TAP AND GO APP

Theme 7: School Materials: Arts

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate school material category for art work

1.2 handover the requested picture of the crayons to the communicative partner (the communicative partner replies to the child)

1.3 wait patiently for the reply
1.4 exchange the requested picture with the real box of crayons within (1) hour

II. SUBJECT MATTER:

Theme 7: School Materials:
Sub-category: Arts
Topic: Initiating Communication by Exchanging Pictures of the art material to work on an activity
Materials: Multimedia application software, mobile phone, and real crayons for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a crayon/s for art work activity
1.4 selecting the school materials category to choose art material
1.5 giving the mobile phone to the communicate partner in exchange for the real crayon/s
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	8. Motivating the child to look at the art materials on the table	1. Paying attention and looking at art materials
Teacher as Communicative Partner	Explore	9. Searching the mobile device for the picture representing the art materials that child wants to use to color a picture	2. Holding the real art materials

Teacher as Communicative Partner	Show	10. Getting the art materials from the hand of the child	3. Looking at the picture of the art materials and the mobile device
Parent as Prompter	Prompt	11. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the school materials to use in coloring a picture 4.4 selecting the art material color a picture
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	12. Waiting for the child to hand over the mobile device that contains the picture of the art material (crayon)	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	13. Pointing the crayon to use in coloring a picture	6. Looking and waiting for the crayon/s to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	14. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the art material (crayon) with prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the art material (crayon) to color a picture
Teacher as Communicative Partner	Reinforce	10. Giving the crayon/s in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real art material/s for coloring a picture
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				

3. choose the category of school materials				
4. select the same art material as shown by the communicative partner				
5. hand over the mobile device in exchange of the real crayon/s to color a picture				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 18

TAP AND GO APP

Theme 7: School Materials: Glue Stick

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate school material category for pasting a picture
1.2 handover the requested picture of the glue to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real glue stick

II. SUBJECT MATTER:

Theme 7: School Materials
Sub-category: Cut and pasting: Glue Stick
Topic: Initiating Communication by Exchanging Pictures of the pasting material to paste a picture
Materials: Multimedia application software, mobile phone, and real glue stick for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of the glue for art work activity
1.4 selecting the school materials category to choose art material
1.5 giving the mobile phone to the communicate partner in exchange for the real glue stick
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the glue stick on the table	1. Paying attention and looking at art materials-glue stick
Teacher as Communicative Partner	Explore	15. Searching the mobile device for the picture representing the art materials that child wants to use to paste a picture	2. Holding the real art materials (glue stick)
Teacher as Communicative Partner	Show	16. Getting the art materials from the hand of the child	3. Looking at the picture of the art materials and the mobile device

Parent as Prompter	Prompt	17. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the glue stick to use in pasting a picture 4.4 selecting the glue stick to paste a picture
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	18. Waiting for the child to hand over the mobile device that contains the picture of the art material (glue stick)	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	19. Pointing the glue stick to use in pasting a picture	6. Looking and waiting for the glue stick to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	20. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the art material (glue stick) with prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the art material (glue stick) to paste a picture
Teacher as Communicative Partner	Reinforce	10. Giving the glue stick in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real art material/s for pasting a picture
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
2. open the mobile app				
3. tap the start button				
4. choose the category of school materials: glue stick				

5. select the same art material as shown by the communicative partner				
6. hand over the mobile device in exchange of the real glue to paste a picture				
7. wait patiently				
8. learn the next lesson as motivated by the communicative partner				
9. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day

Lesson Plan 19

TAP AND GO APP

Theme 7: School Materials: Pencil

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate school material category for connecting broken lines
1.2 handover the requested picture of the pencil to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real pencil within (1) hour

II. SUBJECT MATTER:

Theme 7: School Materials
Sub-category: Writing: Pencil
Topic: Initiating Communication by Exchanging Pictures of the writing material to connect broken lines

Materials: Multimedia application software, mobile phone, and real pencil for connecting broken lines

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a pencil to use for connecting broken lines
1.4 selecting the school materials category to choose a writing material
1.5 giving the mobile phone to the communicate partner in exchange for the real pencil
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the pencil on the table	1. Paying attention and looking at art materials- pencil
Teacher as Communicative Partner	Explore	21. Searching the mobile device for the picture representing the art materials that child wants to use to connect broken line	2. Holding the real art materials (pencil)
Teacher as Communicative Partner	Show	22. Getting the writing material from the hand of the child	3. Looking at the picture of the pencil and the mobile device
Parent as Prompter	Prompt	23. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the pencil to use in connecting broken lines 4.4 selecting the pencil to connect broken lines
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	24. Waiting for the child to hand over the mobile device that contains the picture of the art material (pencil)	5. Giving the mobile device to the teacher.

Teacher as Communicative Partner	Prepare	25. Pointing the pencil to use in connecting broken lines	6. Looking and waiting for the pencil to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	26. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the art material (pencil) with prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the art material (pencil) to connect broken lines
Teacher as Communicative Partner	Reinforce	10. Giving the pencil in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real art material/s for connecting broken lines
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of school materials: pencil				
4. select the same art material (pencil) as shown by the communicative partner				
5. hand over the mobile device in exchange of the real pencil to connect broken lines				

6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want" ? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day

Lesson Plan 20

TAP AND GO APP

Theme 8: Number Skills: My 1st Birthday

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate cupcake with one candle
1.2 handover the requested picture of a cupcake with one candle to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real cupcake with one candle within (1) hour

II. SUBJECT MATTER:

Theme 8: Number Skills
Sub-category: Number 1
Topic: Initiating Communication by Exchanging Pictures of a cupcake with one candle to work on an activity
Materials: Multimedia application software, mobile phone, and real cupcakes and candles for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a cupcake with one candle
1.4 selecting the number skills category to choose a cupcake with one candle
1.5 giving the mobile phone to the communicate partner in exchange for the real cupcake with one candle
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	27. Motivating the child to look at the cupcake with 1 candle on the table	1. Paying attention and looking at cupcake with 1 candle
Teacher as Communicative Partner	Explore	28. Searching the mobile device for the picture representing the cupcake with 1 candle that child wants to blow.	2. Holding the real "birthday cupcake"
Teacher as Communicative Partner	Show	29. Getting the picture of the cupcake with 1 candle from the hand of the child	3. Looking at the picture of the cupcake with 1 candle and the mobile device
Parent as Prompter	Prompt	30. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the number skills to use in blowing the 1 candle on the cupcake 4.4 selecting the cupcake with 1 candle to blow for "birthday party"

Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	31. Waiting for the child to hand over the mobile device that contains the picture of a cupcake with 1 candle	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	32. Pointing the cupcake with 1 candle to blow	6. Looking and waiting for the cupcake to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	33. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the cupcake with 1 candle prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____".Then, giving the mobile device with the picture representing the cupcake with 1 candle to blow in a birthday party
Teacher as Communicative Partner	Reinforce	10. Giving the crayon/s in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real cupcake and blow the candle
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of number skills				
4. select the same number skills picture of a cupcake with 1 candle as shown by the communicative partner				
5. hand over the mobile device in exchange of the real cupcake with 1 candle to blow				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 21

TAP AND GO APP

Theme 8: Number Skills: My 2nd Birthday

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate cupcake with two candles
1.2 handover the requested picture of a cupcake with two candles to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real cupcake with two candle within (1) hour

II. SUBJECT MATTER:

Theme 8: Number Skills
Sub-category: Number 2
Topic: Initiating Communication by Exchanging Pictures of a cupcake with two candles to work on an activity
Materials: Multimedia application software, mobile phone, and real cupcakes and candles for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone

1.2 tapping the start button
1.3 choosing a picture of a cupcake with two candles
1.4 selecting the number skills category to choose a cupcake with two candles
1.5 giving the mobile phone to the communicate partner in exchange for the real cupcake with two candles
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the cupcake with two candles on the table	1. Paying attention and looking at cupcake with two candles
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the cupcake with two candles that child wants to blow	2. Holding the real "birthday cupcake"
Teacher as Communicative Partner	Show	3. Getting the picture of the cupcake with two candles from the hand of the child	3. Looking at the picture of the cupcake with two candles and the mobile device
Parent as Prompter	Prompt	Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the number skills to use in blowing the two candles on the cupcake 4.4 selecting the cupcake with two candles to blow for "birthday party"
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	Waiting for the child to hand over the mobile device that contains the picture of a cupcake with two candles	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	Pointing the cupcake with two candles to blow	6. Looking and waiting for the cupcake to be hand over by the teacher

Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the cupcake with two candles prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the cupcake with two candles to blow in a birthday party
Teacher as Communicative Partner	Reinforce	10. Giving the cupcake with two candles in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real cupcake and blow the candle
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of number skills				
4. select the same number skills picture of a cupcake with two candles as shown by the communicative partner				
5. hand over the mobile device in exchange of the real cupcake with two candles to blow				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 22

TAP AND GO APP

Theme 8: Number Skills: My 3rd Birthday

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate cupcake with three candles
1.2 handover the requested picture of a cupcake with three candles to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real cupcake with three candles within (1) hour

II. SUBJECT MATTER:

Theme 8 : Number Skills
Sub-category: Number 3
Topic : Initiating Communication by Exchanging Pictures of a cupcake with three candles to work on an activity
Materials : Multimedia application software, mobile phone, and real cupcakes and candles for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a cupcake with three candles
1.4 selecting the number skills category to choose a cupcake with three candles

1.5 giving the mobile phone to the communicate partner in exchange for the real cupcake with two candles
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the cupcake with three candles on the table	1. Paying attention and looking at cupcake with three candles
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the cupcake with three candles that child wants to blow	2. Holding the real "birthday cupcake"
Teacher as Communicative Partner	Show	3. Getting the picture of the cupcake with three candles from the hand of the child	3. Looking at the picture of the cupcake with three candles and the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the number skills to use in blowing the three candles on the cupcake 4.4 selecting the cupcake with three candles to blow for "birthday party"
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of a cupcake with three candles	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Pointing the cupcake with three candles to blow	6. Looking and waiting for the cupcake to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the cupcake with three candles prompting the	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the cupcake with three

		child to say, "I want ____"	candles to blow in a birthday party
Teacher as Communicative Partner	Reinforce	10. Giving the cupcake with three in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real cupcake and blow the candle
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of number skills				
4. select the same number skills picture of a cupcake with three candles as shown by the communicative partner				
5. hand over the mobile device in exchange of the real cupcake with three candles to blow				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

Lesson Plan 23

TAP AND GO APP

Theme 8: Number Skills: My 4th Birthday

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate cupcake with four candles
1.2 handover the requested picture of a cupcake with four candles to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real cupcake with four candles within (1) hour

II. SUBJECT MATTER:

Theme 8: Number Skills
Sub-category: Number 4
Topic: Initiating Communication by Exchanging Pictures of a cupcake with four candles to work on an activity
Materials: Multimedia application software, mobile phone, and real cupcakes
\ and candles for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a cupcake with four candles
1.4 selecting the number skills category to choose a cupcake with three candles
1.5 giving the mobile phone to the communicate partner in exchange for the real cupcake with four candles
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism
Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the cupcake with four candles on the table	1. Paying attention and looking at cupcake with four candles
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the cupcake with four candles that child wants to blow	2. Holding the real "birthday cupcake"
Teacher as Communicative Partner	Show	3. Getting the picture of the cupcake with four candles from the hand of the child	3. Looking at the picture of the cupcake with four candles and the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the number skills to use in blowing the four candles on the cupcake 4.4 selecting the cupcake with four candles to blow for "birthday party"
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of a cupcake with four candles	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Pointing the cupcake with four candles to blow	6. Looking and waiting for the cupcake to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the cupcake with four candles prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the cupcake with four candles to blow in a birthday party
Teacher as Communicative Partner	Reinforce	10. Giving the cupcake with four candles in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real cupcake and blow the candle
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of number skills				
4. select the same number skills picture of a cupcake with four candles as shown by the communicative partner				
5. hand over the mobile device in exchange of the real cupcake with four candles to blow				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as "What do you want"? or "Give me the picture").
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

TAP AND GO APP

Theme 8: Number Skills: My 5th Birthday

I. OBJECTIVES:

The non-verbal children with autism will be able to:

1.1 select the appropriate cupcake with five candles
1.2 handover the requested picture of a cupcake with five candles to the communicative partner (the communicative partner replies to the child)
1.3 wait patiently for the reply
1.4 exchange the requested picture with the real cupcake with five candles within (1) hour

II. SUBJECT MATTER:

Theme 8: Number Skills
Sub-category: Number 5
Topic: Initiating Communication by Exchanging Pictures of a cupcake with five candles to work on an activity
Materials: Multimedia application software, mobile phone, and real cupcakes and candles for work activity

III. ACTIVITIES:

1.1 opening of the mobile phone
1.2 tapping the start button
1.3 choosing a picture of a cupcake with five candles
1.4 selecting the number skills category to choose a cupcake with five candles
1.5 giving the mobile phone to the communicate partner in exchange for the real cupcake with five candles
1.6 waiting patiently for the requested item as the countdown timer stopped
1.7 imitate the communicative partner in reading the requested item
1.8 get the real item as a reward

IV. PROCEDURE:

Person Responsible	Activities	Communicative Partner	Non-verbal Child with Autism

Teacher as Communicative Partner	Getting Ready	1. Motivating the child to look at the cupcake with five candles on the table	1. Paying attention and looking at cupcake with five candles
Teacher as Communicative Partner	Explore	2. Searching the mobile device for the picture representing the cupcake with five candles that child wants to blow	2. Holding the real "birthday cupcake"
Teacher as Communicative Partner	Show	3. Getting the picture of the cupcake with five candles from the hand of the child	3. Looking at the picture of the cupcake with five candles and the mobile device
Parent as Prompter	Prompt	4. Helping the child to open the mobile device then following the lesson activities: Engage	4. Following the lesson activities: Engage 4.1 opening of the mobile device 4.2. tapping the start button 4.3 choosing the number skills to use in blowing the five candles on the cupcake 4.4 selecting the cupcake with five candles to blow for "birthday party"
Teacher as Communicative Partner and Parent as Prompter work together	Time Delay	5. Waiting for the child to hand over the mobile device that contains the picture of a cupcake with five candles	5. Giving the mobile device to the teacher.
Teacher as Communicative Partner	Prepare	6. Pointing the cupcake with five candles to blow	6. Looking and waiting for the cupcake to be hand over by the teacher
Teacher as Communicative Partner	Exchange	7. Getting the mobile device from the child	7. Sitting quietly on the chair
Parent as Prompter	Waiting Time	8. Prompting the child to wait for the countdown timer to stop	8. Waiting patiently for the countdown-timer to stop.
Teacher as Communicative Partner	Speak	9. Getting ready for exchange picture with the cupcake with five candles prompting the child to say, "I want ____"	9. Saying the phrase, "I want _____". Then, giving the mobile device with the picture representing the cupcake with five candles to blow in a birthday party
Teacher as Communicative Partner	Reinforce	10. Giving the cupcake with five candles in exchanged of the picture from the mobile device	10. Smiling with joy as he/she is reinforced with the real cupcake and blow the candle
			Note: Teacher may give an award as positive reinforcement

V. EVALUATION

Direction: Please evaluate the child's behavior or performance towards the usage of the mobile device using the criteria where:

4 = Without any Prompting
3 = Minimal Prompting
2 = Moderate Prompting
1 = Maximum Prompting

Performance of the Non-verbal CWA The child was able to:	4	3	2	1
1. open the mobile app				
2. tap the start button				
3. choose the category of number skills				
4. select the same number skills picture of a cupcake with five candles as shown by the communicative partner				
5. hand over the mobile device in exchange of the real cupcake with five candles to blow				
6. wait patiently				
7. learn the next lesson as motivated by the communicative partner				
8. appreciate/show gesture of joy when a reward was given				

Note to Teacher:

1. No verbal prompts are used during this phase (such as “What do you want”? or “Give me the picture”).
2. Plan to use the variety of pictures, but only one at a time.
3. Try to practice PECS during naturally occurring situations throughout the day.

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CERTIFICATION

This is to certify that Professor Edilberta C. Bala edited the thesis entitled "**A MULTIMEDIA MOBILE LEARNING APPLICATION SOFTWARE FOR NON-VERBAL CHILDREN WITH AUTISM** " by Remedios E. Parrocha.

Edilberta C. Bala

EDILBERTA C. BALA

Professor of English

CURRICULUM VITAE

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