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EARLY STUDY OF DYNAMIC ASSESSMENT OF PHONOLOGICAL AWARENESS IN HEARING IMPAIRED CHILDREN

by

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CERTIFICATE

This is to certify the dissertation entitled "EARLY STUDY OF DYNAMIC ASSESSMENT OF PHONOLOGICAL AWARENESS IN HEARING IMPAIRED CHILDREN" is a bonafide record of research done by MR. IZZAT B. ISMAIL during the period of July 2008 to April 2009 under my supervision.

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ABSTRACT

This early study was done to investigate the implementation of dynamic assessment to assess hearing impaired children performances. The other purpose of this study is to investigate the effects of teaching phonological awareness on the children listening skills. Through phonological awareness teaching also, the researcher investigates the learning ability of the children. This research was a case study done on 3 subjects; 1 cochlear implantee and 2 hearing aids wearer children. The subjects' age range is 8; 0 to 8; 6 years old. Cochlear implant subject hearing age was 6; 5 months old, the other two hearing aids wearers hearing age were 4; 6 years old and 5; 3 years old. The children had undergone pre-test session to get the early information about the children achievement. Then, they had 2 mediated learning experience (MLE) sessions that teaches on how to perform in the test prepared by the researcher. After that, they had their post-test session. The data obtained were analyzed descriptively. The results reveal that dynamic assessment was proven to be successful in assessing hearing impaired children true potential. Post-test findings showed that listening skills improved for all of the children. Their learning ability of each child was discussed. Conclusion, dynamic assessment was proven effective for assessing children with hearing impaired true potential ruling out any possible biases. For clinical purpose, one can implement dynamic assessment in other communication disorders children.

Chapter 1

INTRODUCTION

In assessing children with disorders, researcher had come up with dynamic assessment. Through dynamic assessment, one can assess the true potential of the children in performing in certain task. Dynamic assessment consists of three phases; testing phase, teaching phase, and retest phase. Testing phase serves as the baseline the children performs without conditioning or guiding the children on how to perform on the test. Teaching phase is where the children being guide on how to perform through activity that the stimuli were quite similar to the testing materials. Retest phase uses the same testing materials from testing phase. Retest phase assess the true ability of the children after being condition.

Dynamic assessment can be time consuming because of the children need to be condition first before they were tested again. Compare to objective assessment, objective assessment just done the testing for only one session and directly get the results from assessing the children. Although objective assessment saves more time but there will be lot of biases. Dynamic assessment rule out all of the biases in order to assess the true potential in certain task of the children. Dynamic assessment excludes the biases such as frequency going to therapy, culturally, when children with hearing impaired starts wearing assistive hearing devices and parents motivation. Dynamic assessment might not be suitable for all cases, but in certain consideration, dynamic assessment will be essential.

The ability to manipulate and segment the sounds is called phonological awareness. Phonological awareness development is essential for each child in order to acquire the skills in reading and writing. Phonological awareness has three stages that are syllable, onset-rime and phonemes. For example, in word /surat/ in Bahasa Melayu, the word has

two syllables, /su/ and /rat/. The onset for the word is /s/ sound and the rime is /urat/. The phonemes involve in the words are /s/, /u/, /r/, /a/ and /t/ sound. Phonemic awareness is the subset of phonological awareness. Phonemic awareness is the ability to deal with sounds lower than syllable level. Phonemic awareness more concerns in word structure rather than the meaning of the word.

Hearing impairment can be classified into two types, which are conductive hearing loss or sensorineural hearing loss. Conductive hearing loss occurs when there is a complication or a problem at the outer ear region, from pinnae to tympanic membrane. The causes for conductive hearing loss are impacted ear wax in the ear canal and tympanic membrane, foreign bodies in the ear canal, infection to the outer ear region and occluded ear canal. Conductive hearing loss mostly are treatable by ENT doctors so the hearing come back to normal after treatment done. Sensorineural hearing loss happens when the auditory nerve or the inner ear, consists of cochlear had difficulties to fire the impulse to the brain. Sensorineural hearing loss affected speech and language due to the person cannot hear and perceive sounds. This type of hearing loss can be treated by using amplification devices to help the person hearing level increase.

Chapter 2

LITERATURE REVIEW

There are three types of hearing loss, conductive hearing loss, sensorineural hearing loss and mixed hearing loss. In this study, researcher only accept sensorineural hearing loss children due to conductive hearing loss can be treated and the hearing level back to normal after treatment. Mixed hearing loss was too complicated because of the combination of conductive hearing loss and sensorineural hearing loss. Sensorineural hearing loss damage the auditory nerve to send auditory impulse to the brain. That is why sensorineural hearing loss affected speech and language (Barker et al., 2009). The symptoms for sensorineural hearing loss are in babies in congenital deafness; failure to respond to sound, no babbling or other baby noises, sounds heard are quieter and less clear, high tones are less audible, the sounds of /s/, /f/ and /z/ are not heard, speech may be difficult to understand if there is background noise, tinnitus and vertigo. It should be manage as early as possible.

Phonological awareness among deaf children is important because of this ability to manipulate with sounds as hearing impaired children had problems with sounds (Adam, 1990). Phonological awareness is the broader field to phonemic awareness. Phonemic awareness is the ability to deal with sounds lower than syllable level such as phoneme level (Adam, 1990, Stanovich, 1994, Harris and Hodges, 1995). Adam, 1990 stated that there are 5 levels of phonemic awareness in terms of ability that are (1) to hear rhymes and alliteration as measured by knowledge of nursery rhymes, (2) to compare and contrast the sounds of words for rhyme and alliteration, (3) to blend and split syllables, (4) to perform phoneme segmentation and (5) to perform phoneme manipulation task. These phonemic awareness skills are important because research indicates that phonemic awareness is the

awareness is the best predictor of the early reading acquisition (Stanovich, 1994) even better than IQ, vocabulary and listening comprehension. In this study, researcher had the objective that improving phonological awareness will lead to better listening skills.

The developmental stages in phonemic awareness as stated by Griffith, Priscilla, and Mary W. Olson (1992) and Ehri et al., 2001 are auditory discrimination, visual discrimination, broken words into syllables, broken words into onset and rime, words that begin and end with the same sounds, words broken down to individual phonemes, ability to blend sounds to make words and ability to segment words into constituent sounds. For most children, the ability to produce better discrimination of phonemes begins in about Year I of their schooling (Ball, 1993) but the norms should be different in Malaysia because culturally and other aspects are different. In most children the ability to synthesise (blend) sounds into words occurs earlier than analytic (segmentation) skills (Bryen & Gerber, 1987; Caravolas & Bruck, 1993; Solomons, 1992; Torgesen et al., 1992; Yopp, 1992).

The management of hearing impaired children in Malaysia mostly done by health professionals and teachers. For conductive hearing loss, the treatment was done by ENT doctors. Usually, ENT doctors will prescribe medication or sometimes minor surgery to treat the hearing loss patient. Conductive hearing loss mostly is treatable and does not need to advice on using assistive hearing devices. Sensorineural hearing loss has a lot of problems such as speech and language disorders. Treatment for sensorineural hearing loss was suggested to use assistive hearing devices such as hearing aids and cochlear implant. Hearing aids is a small electronic device that fits into the ear. A hearing aid consists of a microphone to pick up the sounds, an amplifier that increases the volume and a speaker that transmits sounds to the ear. Cochlear implant is an electronic device implanted behind the ear. Unlike a hearing aid that amplifies sounds; cochlear implants directly stimulate the

auditory nerve fibers in the cochlear. The implant consists of internal and external components. The internal component is a receiver that is positioned under the skin in a portion created in the bone behind the ear. An electrode array, consisting of 22 tiny bands arranged within biocompatible tubing is surgically inserted into the cochlear. The external components include a speech processor and a head-set composed of a directional microphone worn behind the ear and a transmitter that is held in place over the implanted receiver by small magnets. Figure 1 and 2 shows the diagram of behind the ear hearing aids and cochlear implant.

The benefits that the patient gets from hearing aids and cochlear implant are really great in order acquiring speech and language. The patient experiencing and exploring the sounds they heard when they use the assistive hearing devices. Hearing aids benefits are conversation without straining even in noisy environment, understanding friends and family easily, and improve ability to determine the location of the sounds. Cochlear implant benefits are more aids with lip reading, better perceptions on environment sound and aid in monitoring the volume of one's own voice.

Dynamic assessment commonly use in psychology field. Recently, more research done by implementing dynamic assessment in speech and language area. Dynamic assessment consists of three phases; test-teach-retest, ideally use to assess the true potential in certain areas of one's ability (Lidz, 1992, Gillam, Peña & Miller, 1999, Gutiérrez-Clellen, Peña, 2001). Advantages from dynamic assessment are less bias and assess the true potential of the child. The disadvantages are time consuming and waiting list will e longer due to waiting completing the dynamic assessment. During teaching phase, researcher will rate the children with modifiability rating form. This form consists of two sections that are learning strategy checklist and modifiability rating to rate the potential of learning in each

of the children. This rating form were developed by Gutiérrez-Clellen and Peña, 2001 consist of 6 items in learning strategy checklist; attention, comparative behavior, planning, awareness, transfer and motivation, and 3 items to rate in modifiability rating; examiner effort, child responsitivity and transfer. Modifiability rating form then were simplified by unpublished thesis, Ghani A., 2005 into 4 items in learning strategies checklist; distraction, planning, use of cues and transfer, and still 3 items in modifiability rating; examiner effort, changeability and transfer. Researcher must rate the items in 0 to 3 points. Researcher uses the simplified form because more suitable in Malaysian culture and it has been simplified for easier to use. Dynamic assessment was theoretically based on Vygotsky's theory. Vygotsky was a psychologist that introduced zone of proximal development (ZPD). Vygotsky stated that ZPD is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. Dynamic assessment suggested to be useful in assessing children with disability (Lidz, 1992, Gutiérrez-Clellen, Peña, 2001).

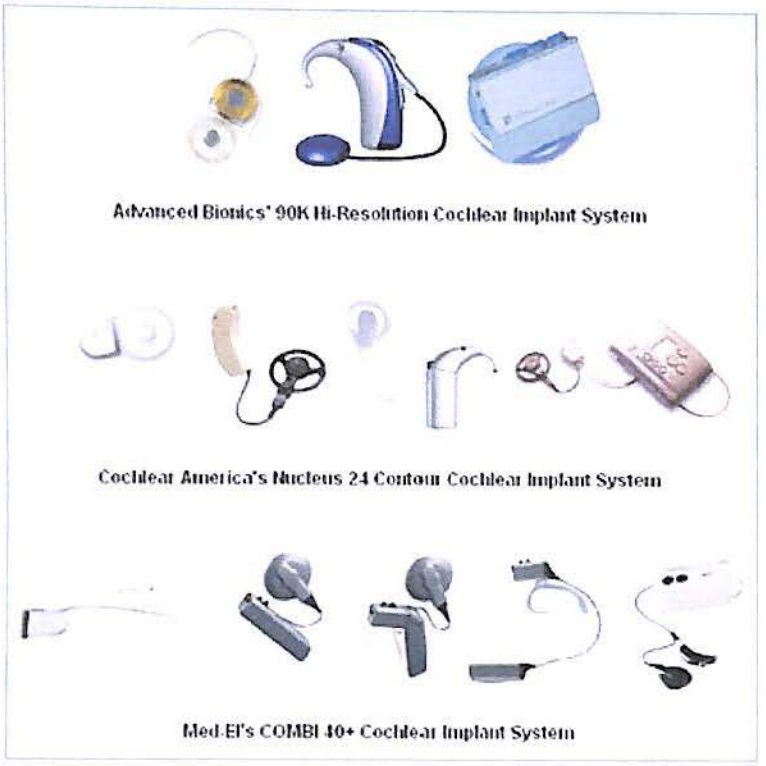

Figure 1: Diagram of cochlear implant

Figure 2: Diagram of behind the ear model of hearing aids

Research Questions

1. Does phonological awareness of onset rhyme and identifying phoneme, distinguish hearing impaired children who have potential in learning and benefited from assistive devices with the one who do not?

2. Does teaching phonological awareness will improve the listening ability of the hearing impaired children with assistive devices?

3. Does dynamic assessment of phonological awareness distinguish hearing impairment children who have learning potential from hearing impairment children who have less potential in either modifiability ratings and/or change in phonological awareness scores?

Research Objective

General objective

1) To investigate the implementation of dynamic assessment in assessing hearing impaired children's performance.

Specific objective

1) To investigate on the effects of phonological awareness teaching to the children's listening skills.
2) To investigate the effects of phonological awareness teaching on the learning ability of the children.

Chapter 3

METHODOLOGY

This chapter will explain about the participants, the development of the forms and materials, and the overall procedure to obtain the data.

The Participants

Recruiting participants

Participants in this study were randomly recruited from the follow up patient's list of hearing impaired and cochlear implanted children in Hospital Universiti Sains Malaysia (HUSM). There were 10 children that undergone cochlear implant surgery and mapping in HUSM but only 7 of them residing in Kelantan state. A list of 10 cochlear implantees and 16 hearing impaired children were short listed under the age range; 6 to 10 years old. Each of the participants' parents was called to confirm about their condition on assistive hearing devices and participant's other health problem. Parents were also being asked for their consent.

Among 10 cochlear implantees, only one parent gave their consent to join the research. Among 16 hearing aids wearers, only two from the group gave their consent to join this research. Therefore, the total number of participant for this study is three; one cochlear implantees and two hearing aids wearers.

After given their consent, all parents will have to fill up a short questionnaire that asked about the child's hearing level, information on assistive hearing devices and other information regarding child's health. These information help to distinguish the exclusion and inclusion criteria for each child. 'Littleears Questionnaire' was also being given to parents after their child had been recognized to meet the inclusion and exclusion criteria. Inclusion criteria were (1) consistently wearing for 6 to 8 hours daily, (2) having average

intelligence similar to peers of the same age, (3) congenital, pre-lingual deafness or congenital deafness and (4) within the age range of 6 to 10 years old. The exclusion criteria for this research were (1) no syndromic and (2) any other physical and/or cognitive deficit problem noted. All of the participants were reported to be pre-lingually deaf. All the participants were confirmed to meet the inclusion and exclusion criteria based on questionnaire and phone interview.

The Subjects

Subject 1

Subject 1 is an eight years and five months old Malay boy, (8; 5), implanted with MEDEL cochlear implant on the left ear. He was a premature baby, 34 weeks of gestation. He was reportedly to be a small baby for gestational age (SGA) and with sepsis. He had been intubated for two days. Tympanometry test showed type B flat for both ears suspecting middle ear problem. He failed bilaterally on otoacoustic emission (OAE) test and he was diagnosed bilateral profound sensorineural hearing loss. He was planned for hearing aid fitting and he starts wearing hearing aids in year 2002 at the age of two years old. On 21st September 2005, he was admitted to ICU due to history of bronchopneumonia. He had done the cochlear implant surgery on 22nd September 2005 at the age of five years old. He is currently at Standard 1 of special class in Sekolah Kebangsaan Tunku Indera Petra, which is one of the inclusive schools in Kelantan.

Subject 2

Subject 2 is an eight years and one months old Malay boy,(8; 1), using hearing aids Phonak Supero, behind the ear model bilaterally. Medical's report that his mother had prolonged labored during delivery. On 27th Mac 2004, at the age of three years and two

months old, Speech Language Pathologist (SLP) in ORL clinic, HUSM reported that he had speech and language delay and refer him to the audiologist there. Audiological report dated on 12th May 2004, at the age of three years and 4 months old, showed type C tympanometry suggesting for negative middle ear pressure and otitis media. He was referred to child pediatric psychologist to confirm whether he had autism. Report from child psychologist shows negative results in this child having autism. He was fitted with hearing aids, Phoenix 313 bilaterally in August 2004 at the age of three years and seven months old and he had regular appointment with speech language pathologist since then. He switched to other brand of hearing aids Siemens, behind the ear model for both ears. Currently, he switched to Phonak, behind the ear model bilaterally. He is now in Standard 2 and placed in a normal class in Sekolah Kebangsaan Tunku Indera Petra, which is one of the inclusive schools in Kelantan.

Subject 3

Subject 3 was eight years and three months old Malay boy using hearing aids bilaterally. There was no significant information noted from the birth history. On 2nd November 2002, he was referred from a doctor in Hospital Pakar Perdana to SLP in HUSM for delayed speech and failed automated otoacoustic emission (AOAE) and acoustic reflex bilaterally. He was then diagnosed as profound sensorineural hearing loss. He started to wear hearing aids on February 2003 at the age of three years and three months old. On 13th Mac 2006, he was admitted to CT scan and he was diagnosed profound sensorineural hearing loss. On the same day, doctor from ORL clinic confirms that he had high frequency hearing loss with pure tone audiometry test. Currently, he wears Phonak, behind the ear

model bilaterally and attending special class in Sekolah Kebangsaan Tunku Indera Petra, which is one of the inclusive school in Kelantan.

Materials

Several forms has been develop and used in this study as well as using questionnaires.

Questionnaires

The questionnaire used in this study served in two purposes. One, was to obtain information regarding the subject's assistive hearing devices, participant's hearing level and other health problem. Refer to Appendix 2 for the example of the questionnaires. The second purpose was to obtain information regarding the subject's hearing status as perceived by the caregiver. *"Littleears- Auditory Questionnaire" Malay version* was used to fulfill the second purpose (Appendix 3). The *"Littleears"* questionnaire consists of thirty five questions of yes and no answer. It is designed to assess the age-appropriate auditory behavior of children who wears hearing aids or cochlear implants. It is developed as a continuation from the Evaluation of Auditory Response for Speech (EARS) battery. EARS was designed in 1996 to monitor voice and speech perception progress, to support fitting and to aid in the rehabilitation of cochlear implant and hearing aids children aged 3 years and older. This questionnaire is from Germany. Many intervention specialists contributed to the description of the developmental process and all the validation of the questionnaire.

Testing kit

A testing instrument was used in both pre and post-test. This testing instrument assesses the listening skills of the subjects, phonemic awareness and grapheme-phoneme correspondence in 11 subtests. This testing instrument consists of ten subtests (Appendix

4). They are (1) detecting the presence of speech syllable with varied intonation, (2) detecting the sounds of the six sounds test, (3) identifying rhymes, songs or jingles, (4) identifying phonemes, (5) identifying one, two, three and four syllable words, (6) identifying phoneme sequences, (7) relationship alphabet to its sound, (8) phoneme segmentation, (9) blending, and (10) spelling test. Below are the descriptions of each subtest.

Subtest 1 - Placement test (Detecting the presence of a speech syllable with varied intonation)

This test was adapted from the placement test auditory verbal therapy book 1written by Estabrooks. It is designed to test the subjects on the skills to detect sounds at varied intonation. The subjects had to respond by putting blocks into its place when subject heard or detect the sounds given. There are 2 test items in this subtest. This test was done in 4 trials so each test items will be repeated one time. One mark is given to one correct response, zero for incorrect response and NR for no response.

Subtest 2 - Placement test (Detecting the sounds of the six sounds test)

Subtest 2 was also was adapted from the Placement test of Auditory Verbal Therapy book 1, written by Estabrooks. It is designed to test the detection skills of the subject in the six Ling sounds given. The subjects had to respond by putting blocks into its place when subjects heard or detect any sounds. This test had 6 test items. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 3 - Placement test (Identifying rhymes, songs or jingles)

This test was adapted from the Placement test of Auditory Verbal Therapy book 1, written by Estabrooks. It is designed to test the subjects on identifying songs that corresponds with picture cards provided. A set of sequential picture cards were develop to represent each songs. Each set of picture cards consists of 3 to 5 according to that song. The picture describes about the main idea in the song. All together, there were three stimulus songs; burung kakak tua, bubbles and up and down song. The subjects need to respond by pointing to the correct picture cards after the examiner had finished singing one of the three songs. This was done in 3 trials. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 4 - Lindamood Auditory Conceptualization (Identifying phonemes)

This test was adapted from Lindamood Auditory Coceptualization-3 (LAC-3). It is designed to test on the subject's phonemic awareness skills. Subject need to respond by arranging the colored blocks provided corresponds to the stimulus given. Subject need to arrange the blocks for one color representing one sound. Two same colored cubes for the same sounds given. There are 10 stimuli on this test (Appendix 2). One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 5 - Identifying one, two, three and four syllables words

This test was adapted from the Placement test of Auditory Verbal Therapy book 1, written by Estabrooks. It is designed to test on the ability to identify the syllable in words. There are 20 test items consists of one to four syllable words.The subject needs to respond

by repeating the words that the examiner produced. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 6 - Lindamood Auditory Conceptualization (Identifying phoneme sequences)

This test was adapted from Lindamood Auditory Conceptualization-3 (LAC-3). This test is to test on the subject's phonemic awareness skills: identifying the phoneme sequence. This test was quite similar with subtest 4, only a slight different that the subjects are required to arrange the colored blocks in correct sequence corresponding with the examiner producing the stimulus sounds. There were 6 test items in this test. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 7 - Relationship alphabet to its sound

This test was adapted from previous study by Ghani, A. who conducted a study on phonological awareness. It is designed to test about subjects' ability to relate the sounds with the correct alphabet presented. The subjects need to respond by producing the correct sound when the examiner presented the alphabet blocks (grapheme) to them. There were 15 test items in this test. One mark will be given for one correct respond, zero for incorrect response and NR for no response.

Subtest 8 - Phoneme segmentation

This test was adapted from previous study by Ghani, A. It is designed to test upon the subjects' ability to segment the phoneme in each word stimulus. The subjects must respond by producing all the correct sounds (phonemes) that formed the word. There were

20 stimulus words in this test. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 9 - Blending

This test was also adapted from previous study by Ghani, A. It is designed to test upon the subjects' ability to combine the sounds that they heard into words. The subjects need to respond by producing the correct word after the examiner presented them with sounds that make up the target word. Overall, there were 12 stimuli in this test. One mark is given for one correct respond, zero for incorrect response and NR for no response.

Subtest 10 - Spelling

This test was adapted from previous study by Ghani, A. It is designed to test the subjects on spelling ability. Initially the subjects were asked to name each picture on the right column of the test paper. Then, they are asked to write down the name for each picture in the column provided. They were given their own time and space while doing this test and the researcher tell them that the researcher would not mind if its wrong answer. The most important thing is that the subject must try to spell as much as he can. There were 10 pictures printed, 5 pictures on each paper on the right column of the test paper. One mark is given for each correct respond, zero for incorrect response and NR for no response.

Modifiability scale

Modifiability scale was used to rate the subject's modifiability changes during teaching phase. We use modifiability forms originated from Gutiérrez-Clellen and Peña, 2001. The forms were then adapted from Ghani, A., 2005 because it had been simplified.

Referring to that modifiability forms, it had two sections that is learning strategies checklist and modifiability rate that need to be rated by the researcher (Appendix 5). In the learning strategies section, there were four measurement stated in this form. The measurements were (1) distractibility, (2) planning, (3) use of cues, and (4) transfer. Distractibility is the level of distractibility or diversion that the child showed during the session. Planning is the preparation before the subject response during the teaching. Use of cues is the ability of the subjects to use cues to solve the tasks. Transfer is the subject showed understanding and able to use it to learn new skills within the session. These measurements were rated from 0 to 3 points, with 0 indicating none of the time, 1point indicating occasionally, 2 points for some of the time, and 3 points indicating most of the time. The second section of this forms are the modifiability rate section. This section consists of three measurements; (1) examiner effort, (2) changebility, and (3) transfer. In examiner effort measurement, rated from 0 to 3 points with 0 point indicating extreme, 1 point indicating high-moderate, 2 points indicating moderate, and 3 points for slight. In changebility measurement, the rating was as follows; 0 indicating none, 1 point for slight, 2 points for moderate, and 3 points indicating high. In transfer measurement, it is rated from 0 to 3 points with 0 point indicates very low or none, 1 point indicates slight and 2 points indicates moderate and 3 points indicate high.

The changeability refers to the subject's potential and their performance during the teaching. All the components in the modifiability rate section correlate with one another. How much the transfer; understanding of new skills and the changeability during teaching reflect the examiner effort through the teaching session. The less examiner effort resulting in better transfer and changeability was the good response for the subject.

Teaching materials

The materials needed for teaching was colored stone to teach on (1) identifying phonemes, (2) identifying phoneme sequences and (3) sequence picture cards to teach on rhyming. Other materials were taken from the speech clinic such as blocks and holes and alphabet blocks to aid during the teaching process.

For the colored stones, the stones were bought at the store. The stones were selected in approximately same size. Then, the stones were colored in yellow, blue, red and green. After coloring the stones, hair dryer were used to dry up the color. After the colors had dried, cutex (nail polished material) were applied to the stone before the stones were dried up again using the hair dryer. The colored stones were stored in four different containers.

Prior to teaching about rhymes, a set of sequenced picture cards were develop to represent songs. These picture cards were used during pre and post test for subtest 3, identifying songs, jingles and rhymes. Each card consists of picture that describe about the main idea in the song. All together, there are three songs; burung kakak tua, bubbles, and up and down song. In burung kakak tua song, a set of 4 cards had been made, in bubbles song, a total of 5 cards had been made while for up and down song, 3 cards were made.

PROCEDURES

This phonological awareness and listening assessment comprise of three phases which was the pre-test phase, teaching phase and post-test phase. For the pre-test phase, Littlears auditory questionnaire, inform consent and questionnaire developed by researcher will be given to each of the participants' parents. Once informed consents were given, parents were asked to answers the questionnaires for parents. Based on the questionnaires, the participants were screened for the inclusion and exclusion criteria. During pre-test

session, examiner will deal with the subjects one-to-one in a 45 minutes session. Pre-test consist of 11 tests. The test will assess the subject's phonological awareness skills using modified-Lindamood Auditory Conceptualization 3(m-LAC-3) and assessing listening assessments using Placement Test 1 to 3 and some other areas that contribute to listening skills and phonological awareness. Their performances will be recorded using video camera and the achievements of each participant were recorded.

Teaching phase consist of two stages, teaching phase 1 (T1) and teaching phase 2 (T2). Each session was done in group and done in 1 hour's session per day. The teaching was done to assist and helps the subjects to achieve the goal on acquiring phonological awareness skills and consequently improve hearing skills. During the session, the subject's performance will be recorded and later will be rate using modifiability rating form.

Post-test phase comprise of re-assess the skills that the examiner taught the subjects during T1 until T2. Post-test also consists of 11 tests. Each session last 45 minutes in one-to-one condition with all the participants. Their performance will be recorded using video camera and their achievements will be recorded.

Testing procedure

1) Identifying phonemes

i. Demonstrate to the students to perform the activities with same sounds and different sounds. Example, for the sound /b, b/, the students must place 2 same colored blocks on the table. For different sounds such as /b, a/, the students must place 2 different colored blocks on top of the table.

ii. Give blocks to the students

iii. Present the sounds according to stimulus, refer to Appendices

iv. Prompt the students and teach them one on one in the session

v. The student that performs correctly will get a sticker.

2) Identifying phoneme sequences

i. Procedures were quite the same as above

ii. For this task, the students must place the blocks sequentially with the sound that had been produced.

iii. Present the sounds according to stimulus, refer to Appendices

iv. Prompt and teach the students one to one

v. Student that performs correctly will get a sticker

3) Placement test, test item 1: Detecting the presence of a speech syllable with varied intonation

i. Condition the child on how to respond when he/she hears the sound by placing the cube in the box

ii. Present the sound with different intonation

iii. Wait for child's response with placing the cube in the box

iv. If the sound presented 3 times and still no response from the patient, change to next stimulus

4) Placement test, test item 2: Detecting the sounds of the six sound test

i. Condition the child on how to respond if he/she hears the sound by throwing the ball into the pail.

ii. Present one of these sounds, one at a time, /a/, /i/, /u/, /m/, /s/ and /ʃ/

iii. Wait for the child's response

iv. If the sound presented 3 times and still no response from the patient, change to next stimulus

5) Placement test, test item 3: Identifying rhymes, songs or jingles

i. Present picture cards that illustrate the song that about to be sang.

ii. Sing the song and wait for patient's response by pointing to the appropriate picture

iii. This must be done through audition alone

iv. Repeat with different songs and vary the order of song presented

v. Repeat until 5 trials

6) Identifying one, two, three and four syllables word

i. Tester must produce the syllables starting from one syllable up to four syllables

ii. The child must respond by imitating the syllables produce by the tester

iii. Tester will transcribed syllables produce by the child

iv. Present all of the syllables

7) Identifying sentences

i. Tester must read a whole sentence then ask the child to repeat the sentence produce

ii. Child must repeat the sentence that the tester produce

iii. Child's respond will be transcribed

8) Relationship alphabet to its sound

i. Tester will present a block of alphabet in front of the child

ii. The child must respond by produce the sound of the alphabet not the alphabet's name

iii. If fail, show all the alphabets and ask the child which one that he/she knows about their sound

9) Phoneme segmentation

i. Tester will produce a word

ii. The child must segment the word into its sound (phoneme level)

iii. The test considered fail after 3 consecutive trials

10) Blending

i. Tester now will produce sounds of alphabet making a word

ii. The child must respond by name the word that the tester try to make the sound of it

iii. The test considered fail after 3 consecutive trials

11) Spelling

i. Tester will give a pencil to the child

ii. The child will look at the picture on the paper and spell the object he/she sees in the picture printed

Teaching Procedure

The subjects will be taught on identifying phonemes, identifying phonemes sequences and onset-rime. The procedures were:

1) Identifying phoneme

i. Demonstrate to the students to perform the activities with same sounds and different sounds. Example, for the sound /b, b/, the students must place 2 same colored blocks on the table. For different sounds such as /b, a/, the students must place 2 different colored blocks on top of the table.

ii. Give blocks to the students

iii. Present the sounds according to stimulus, refer to Appendices

iv. Prompt the students and teach them one on one in the session

v. The student that performs correctly will get a sticker.

2) Identifying phoneme sequences

i. Procedures were quite the same as above

ii. For this task, the students must place the blocks sequentially with the sound that had been produced.

iii. Present the sounds according to stimulus, refer to Appendices

iv. Prompt and teach the students one to one

v. Student that performs correctly will get a sticker

3) Onset-rime

i. Demonstrate the song "Burung kakak tua", "bubbles" and "up and down"

ii. One song for every week