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3D AUDIO VISUAL COURSEWARE REQUIREMENTS FOR TRAINING SELF-CARE SKILLS FOR CHILDREN WITH AUTISM

Farah Nazmin Binti Kamarudin

Master of Science in Information and Communication Technology

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3D AUDIO VISUAL COURSEWARE REQUIREMENTS FOR TRAINING SELF-CARE SKILLS FOR CHILDREN WITH AUTISM

FARAH NAZMIN BINTI KAMARUDIN

A thesis submitted in fulfillment of the requirements for the degree of Master of Science in Information and Communication Technology

Faculty of Information and Communication Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2014

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DECLARATION

I declare that this thesis entitled "3D audio visual courseware requirements for training self-care skills for children with autism" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have read this dissertation/report and in my opinion this dissertation/report is sufficient in terms of scope and quality as a partial fulfillment of Master of Information and Communication Technology.

Signature :…….....

Supervisor Name :…….....

Date :…….....

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DEDICATION

To my beloved mother and father.

My supportive friends and my kind supervisors.

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ABSTRACT

This research is a study on assistive learning tool for autism in doing daily task by using audio visual techniques. Autism is a developmental disability of the brain, much like dyslexia, mental retardation, or attention deficit disorder. Autism is a developmental disability, but many autistic people appear to function as related and frequently quite intelligent. Autistic people are also good in visual. It is because they are visual thinkers. The problem of these special children is that they are not independent. Therefore teacher or parent should ask or teach them repeatedly until they can manage the job by themselves in doing their daily jobs. Autism children also are lack of eye contact. Actually they have the eye contact but less than normal children. Therefore, this study is proposing audio visual assistive tools to help them in stimulating independence in autistic children. The objectives of this research are to investigate the requirement of using audio visual for occupational treatment of autistic children, to identify suitable development modul for autism, to design and develop asistive Audio Visual learning tools for occupational therapies of autism treatment and to evaluate the effectiveness of the learning tools and dependency level of the autistic children in doing daily tasks. The study incorporates music, multisensory stimulation and video usage in developing the assistive learning tools. Music is included in animation as a part of the treatment. Animation is a technique that can visualize characters or movement as same as in the real live. Music is taken from the existing music and often heard by the children so that they are not surprised or feel weird when listening to the new music. The design and methodology used in this research is the Participatory design which is related and suitable to the prosess of developing the assistive tools for the autistic children. Participatory design is an approach to design the tools by actively involving all stakeholders in the design process in order to ensure the product designed meets their needs and is usable. It focuses on the repeated patterns of the behavior until it happens instantaneously. Ten autistic children for private and public schools in Melaka are taken part in this study. The kids were called one by one in a room. For each prototype, the kids were shown the tools repeatedly. The reaction and responses the kids listed and recorded. Every two weeks, the kids tested without using the tool to see whether ro not they can remember or not the step. The whole testing period took about two month. The data collected include the responses and dependency of autistic children prior and after using this audio visual tool. The result shown that audio visual tools can help autistic children on their remembering the steps for doing self-care tasks, when the tools were played repeatedly. It can be seen that the independency of the autistic children were gradually increased. Additionally, the application can be a learning tool that can be used by the teachers and the parents for teaching the autistic children. It is hoped that this research can contribute and usefull for training self care skills to teacher, parents and also autistic children.

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ABSTRAK

Kajian ini merupakan satu kajian mengenai alat bantuan pembelajaran untuk terapi aktiviti harian autisme yang menggunakan teknik audio visual. Autisme adalah kecacatan perkembangan otak, sama seperti disleksia, terencat akal, atau gangguan defisit perhatian. Autisme adalah kecacatan perkembangan otak dalam pembangunan, tetapi ramai orang autisme kelihatan berfungsi sebagai berkaitan dan sering agak pintar. Autisme juga baik dalam visual. Ini adalah kerana mereka adalah pemikir visual. Masalah bagi kanak-kanak autisme adalah mereka tidak boleh berdikari. Oleh itu guru atau ibu bapa perlu bertanya atau mengajar mereka berulang kali sehingga mereka boleh menguruskan diri mereka dengan baik terutamanya di dalam pengurusan diri. Selain itu juga mereka ini kekurangan fokus apabila kita mengajar mereka. Sebenarnya mereka mempunyai fokus mata yang kurang berbanding kanak-kanak normal. Oleh itu, kajian ini mencadangkan alat bantu audio visual untuk membantu mereka dalam merangsang tahap kebolehan mereka berdikari dan fokus kanak-kanak autisme. Objektif kajian ini adalah untuk menyiasat keperluan menggunakan audio visual bagi rawatan pekerjaan kanak-kanak autisme, untuk merekabentuk dan membangunkan alat pembelajaran audio visual bagi rawatan terapi pekerjaan autism dan untuk menilai keberkesanan alat pembelajaran dan tahap kebergantungan kanak-kanak autisme dalam menjalankan tugas harian. Kajian ini menggabungkan muzik, rangsangan pelbagai deria dan penggunaan video dalam membangunkan alat bantuan pembelajaran. Muzik adalah termasuk dalam animasi sebagai sebahagian daripada rawatan. Animasi adalah satu teknik yang boleh mempamirkan watak-watak atau pergerakan yang sama seperti dalam kehidupan sebenar. Muzik diambil daripada muzik yang sedia ada yang sering mendengar kanak-kanak supaya mereka tidak terkejut atau berasa pelik apabila mendengar muzik tersebut. Reka bentuk dan kaedah yang digunakan dalam kajian ini adalah rekabentuk "Participatory Design" merupakan satu pendekatan untuk reka bentuk satu alat dengan melibatkan semua pihak secara aktif dalam proses dalam rekabentuk demi untuk memastikan produk yang direka memnuhi keperluan dan bergun. Ia memfokuskan corak tingkahlaku yang berulang yang sehingga ia berlaku secara serta-merta. 10 kanak-kanak autism daripada sekolah awam dan swasta di Melaka telah mengambil bahagian di dalam kajian ini. Kanak-kanak tersebut di panggil seorang deni seorang ke dalam sebuah bilik. Untuk setiap prototaip kanak-kanak tersebut di persembahkan dengan alat yang dibangunkan secara berulang. Riaksi dan tidakbalas mereka dicatat dan direkodkan.Setiap dua minggu mereka duji tanpa menggunakan alat bantuan bagi melihat samada mereka boleh mengingat langkah-langkah atau tidak. Keseluruhan tempoh pengujian mengambil masa selama dua bulan. Data yang dikumpul termasuk tindakbalas dan tahap kebergantungan kanak-kanak autism sebelum dan selepas menggunkan alat audio visual ini. Keputusan menunjukkan bahawa alat audio visual ini dapat membantu kanak-kanak autism dalam mengingat langkah-langkah untuk melakukan tugan-tugas penjagaan diri apabila ia dimainkan berulang kali. Hasilnya, kebolehan berdikari kanak-kanak autism telah dilihat meningkat secara beransur-ansur. Aplikasi ini juga boleh dijadikan alat pembelajaran oleh guru dan keluarga. Adalah diharapkan bahawa kajian ini dapat menyumbang dan berguna dalam melatih kemahiran diri kepada guru, keluarga dan kanak-kanak autism.

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LIST OF ABBREVIATIONS

PDD-NOS	-	Pervasive developmental disorder not otherwise specified
ASD	-	Autism Spectrum Disorder
NGO	-	Non-Government Agencies
NASOM	-	National Autism Society of Malaysia
OT	-	Occupational Therapy
SKJ(C)	-	Sekolah Jenis Kebangsaan Cina
SK	-	Sekolah Kebangsaan
AC	-	Assistive Courseware
VI	-	Visually Impaired

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CHAPTER I

INTRODUCTION

1.1 Introduction

Autism is a disability significantly impairs a child's ability ti interact and communicate with others. Autism interferes with normal brain development, causing deficits in verbal and non-verbal communication, social interaction, and play. These deficits make it hard for children with autism to relate to the world around them. The may exhibit odd behaviors, such as repeated body movements, flapping their hands in the air, or rocking back and forth. They may also develop unusual attachments to objects and resist changes in routine. Other than their unique behaviors and lack of normal language development, they do not look different from a typically developing child (Holmes, 1997; Powers, 1989). Boys are 5 times more likely to have autism than girls are, but girls with autism tend to exhibit more characteristic (APA, 2000).

Ministries in Malaysia have provided service for children with autism in specific and children with special needs in general. There are Ministry of Education, Ministry of Health and Ministry of Woman, Family and Community Development particularly Social Welfare Department. Non-Government Agencies (NGOs) also play an important role in providing services for these children. Many parents send their children with autism to school (Mey, 2005). In Malaysia, there are special education schools as well as private school provided to these special children.

In school, they learn about sensory simulation, music therapy, massage treatment, art and creativity programmed, occupational treatment, and much more. In occupational

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treatment, they learn about personal skill, hygiene and health, using toilet and bath room, using classroom and shelter management. In hygiene and health, they learn about self-care tools function and how to clean up the head and body. In this task, the teachers teach them how to brush teeth, comb hair and clean up the face.

Music is a method for hearing. It may neutralizes negative feeling, increase stress tolerance level and harmonize inner peace. Music therapy is pertinent in among children's activities. Music therapy is shown to be effective intervention for emotional recognition deflects in autism. It can play an important role in special education because many students with disabilities need special instructional treatment.

The use of music therapy can help people who are crippled by various cognitive and bio-psychosocial problems. It also helps to improve the quality of life for people with disabilities of various kinds (Sze & Yu, 2004). Neha Khetrapal, 2009 states that use of rhythmic patterns and melodies have been found to be beneficial for aiding learning and memory in autism. Music can also help improve eye contact and other forms of social acknowledgement.

Visual thinker has been argued by Temple Grandin in his paper. He also said that delayed speech situation is origin for people with autism. However, picture thinking itself is only one form of "non-linguistic thinking" which includes physical (kinaesthetic), aural (musical) and logical (mathematical/systems) style of through. Among whose main form of thought and learning style is a non-linguistic form. Visual thinking is the most common, while most people have a combination of thinking and learning styles. It has been suggested that visual thinking has some necessary connection with autism. Therefore, we used visual to give a simulation to the autistic children to do their routine.

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1.2 Research Background

Autism is a developmental disorder characterized by impaired social interaction and communication as well as repetitive behaviors and restricted interests (Elisabeth L. & Uta, 2003). In the website of Centers for Distance Control and Presentation, 2000 it experiment that this diagnostic criteria symptoms become apparent before a child is three years old. Autism affects information processing in the brain by altering the connection and organization nerve cells and their synapses connect and organize. However, how this occurs is still not well understood (Susan E, et al., 2009). There are three recognized disorders in the autism spectrum (ASDs). The other two being Asperger syndrome, which lacks delays in cognitive development and language, and pervasive developmental disorder, not otherwise specified (Commonly abbreviated as PDD-NOS), which is diagnosed when the full set of criteria for autism or Asperger syndrome are not met (Chris Plauche & Scoot M., 2007).

Each individual with an autism spectrum disorder (ASD) is unique and may demonstrate markedly different behaviors and skills. The following information provides an overview of some of the common characteristics seen in children with ASD. Table 1.2.1 shows the diagnostic criteria for autistic disorder.

Table 1.2.1 : Diagnostic Criteria for autistic disorders (APA, 2000)

A total of 6 (or more) items from 1, 2, and 3, with at least two from 1, and one each from 2 and 3: 1. Qualitative impairment in social interactions, as manifested by at least two of the following: (a) marked impairment in the use of multiple nonverbal behaviours such

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as eye-to-eye gaze, facial expressions, body postures, and guestures to regulated social interaction; (b) failure to develop peer relationship appropriate to developmental level; (c) lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g, by a lack of showing, briging, or pointing out objects of interest); (d) lack of social or emotional reciprocity.

2. Qualitative impairment in communication as manifested by at least one of the following: (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through altenative modes of communication such as gestures or mime); (b) in inviduals with adequate speech, marked impairement in the ability to initiate or sustain a conversation with others; (c) stereotyped and repetitive use of language or idiosyncratic language; (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.
3. Restricted repetitive and stereoted patterns of behavior, interests, and activities, as manifested by at least one of the following: (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus; (b) apparently inflexible adherence to specific, nonfunctional routines or rituals; (c) stereotyped and repetitive motor mannerisms (e.g, hand or finger flapping or twisting, or complex whole-body movements); (d) persistent preoccupation with parts or objects. Delays or abnormal functioning in at least one of the following areas, with onset prior to 3 years: social interaction, language as used in social communication. Or symbolic or imaginative play. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

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There are no medications that can cure ASDs or treat the core symptoms. However, there are medications or therapies that can help some people with ASDs function better. In Malaysia, some community offer lifelong services to people with ASDs through their various services and Programed. These services and programmed are result oriented and emphasis is on the acquisition of skills and changes in behavior.

The service and programmed offered include Early Intervention Programmed, Transition programmed, Mainstream programmed, Pre-Vocational programmed, Vocational programmed Residential programmed, and Assessment and Diagnosis. The therapy programmed include in Assessment and Diagnosis. The common therapy programmed that help these ASDs are Speech therapy, behavioral therapy, educational therapy, occupational therapy and sensory therapy (Network, 2012).

Occupational therapists and occupational therapy assistants help people across the lifespan participate in the things they want and need to do through the therapeutic use of everyday activities (AOTA, 1999). Common occupational therapy interventions include helping children with disabilities to participate fully in school and social situations, helping people recovering from injury to regain skills, and providing supports for older adults experiencing physical and cognitive change (AOTA, 1999).

Music therapy is another type of therapy that can be used for autism treatment. It is trained therapist uses music in all of its facts (physical, emotional, social, etc.) to improve learning, build self-esteem, reduce anxiety or many of a number of treatment goals that are specific to the patient (Pullen & Kohn, 2006). Music therapy may be helpful for people with autism (Pullen & Kohn, 2006).

K.A. Razhiyah, 2008 state in their paper that they need to incorporate elements of music in children with autism programmed again give him the situation in various aspects.

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Some children with autism need to be taught in the form of music because it tends in that direction. Do not be surprised if a child can be disciplined through the music as well.

She also said that music activities provide a variety of effects on children with autism. Among them are list in table 1.2.2.

Table 1.2.2: Music activities.

- Development of gross motor skills and fine motor
- Hand eye coordination
- Language and speech
- Listening skills
- Awareness of musical stimulation
- They will sing together and play music together to produce an exciting tone
- Increase the interest and skills to communicate

Music plays a big part in our normal everyday lives. The rhythms and harmonies of different tunes can attract the attraction of an autistic child. And when this happens, the child becomes more responsive and reacts favorably as his or her sensory functions (sigh, sound and touch) are gradually stimulated by the music (Mey, 2005).

According to dictionary, visual means seen or able to be seen by the eye. Therefore, visual therapy or called Visual Integration Training is a neurological process that organizes sensation from one's own body and the environment (Suzanne, 2009). This therapy is including in sensory integration. Sensory integration makes it possible to use the body effectively within the environment. Children with autism are believed to have difficulties integrating sensory information (Suzanne, 2009).

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Base on an article “Teaching Exceptimal Children”, written by Shaila M. Rao and Brenda Gagie reported that although there is no one best programmed or one best way for helping children with autism, the importance of using supports based on concrete and visual teaching aids is largely upheld. Visual supports can be provided in different ways in all settings: school, home, work and community. Table 1.2.3 down show reason recommended the visual support for autism treatment by Shaila and Brenda, 2006.

Table 1.2.3: Reason recommended the visual support for autism treatment.

• It is part of everyone’s communication system
• It can attract and hold a student’s attentions
• It enables the student to focus on the message and reduce anxiety
• It can make abstract concepts more concrete for the students
• It can help the students in expressing his or her thoughts

1.3 Problem Statement

Most autistic children require help from others to carry out daily routines such as dressing, brushing teeth and so on. In other words, they always require occupational therapy. Their memories are very weak. Therefore teachers and parent have to teach them every day. The teachers or parents need to teach them repeatedly until they understand. Autistic children are also lacking of eye contact which prevent them from watching clearly any demonstration from teachers. Moreover, autistic children also cannot pay attention or focus on a subject for a long time compared to normal children. As a consequence of

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