DEVELOPMENT AND EVALUATION OF AUTISM E-LEARNING: PARENT ABA INTERVENTION MODULE

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Bachelor of Science with Honours
(Cognitive Science)
Year 2015
UNIVERSITI MALAYSIA SARAWAK

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Final Year Project Report ☒
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DEVELOPMENT AND EVALUATION OF AUTISM E-LEARNING: PARENT ABA INTERVENTION MODULE

HANISAH BINTI SAHARI

This project is submitted in partial fulfillment of the requirement for a Bachelor of Science with Honours (Cognitive Science)

Faculty of Cognitive Sciences and Human Development UNIVERSITY OF MALAYSIA SARAWAK (2015)
The project entitled ‘Development and evaluation of Autism E-learning: Parent ABA intervention module” was prepared by Hanisah Binti Sahari and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Science with Honours (Cognitive Science)

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ACKNOWLEDGMENTS

Alhamdulillah, praise to God who always give me strength and courage to complete my thesis. I am grateful to Him for giving me insightful supervisor who have provide me useful guidance and groundwork for me to finish my thesis fruitfully.

To my supervisor, Encik Ahmad Sofian Shminan, thanks for all the time that you have spent for me, your effort and guidance that helps me a lot in completing my thesis. I also want to thank you for trusting me and support me throughout the process. You have patiently fostered my potential in these two years.

To my parents, Sahari and Habibi, thank you for your continuous support and eternal love. I will not able to complete this thesis without support from both of you. Thank you for always being with me though we are apart and have faith in me to finish my work. I appreciate your prayers and encouragement all these years. I am very grateful to have both of you in my life.
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ABSTRACT

E-learning is a useful mechanism to help parents in Malaysia improve their knowledge on autism spectrum disorder. This study is focused on development and evaluation of autism e-learning with parent ABA intervention module. Analysis of contents, interactivity and screen design of e-learning were analyzed using a set of questionnaire. Validation of contents of the e-learning was analyzed using formative evaluation. Content of e-learning is at satisfaction level while interactivity and screen design of e-learning are at average level. Users agreed that this study helps them to gain a better understanding about autism and helps them to discover way to approach autism children. These results highlight the significant of improving the e-learning in terms of its contents, interactivity and screen design in order to achieve greater satisfaction of the users in the future use.

Keywords: e-learning, parents, autism spectrum disorder, ABA intervention module, autism children
ABSTRAK


Hasil kajian menunjukkan kepentingan untuk memperbaiki pembelajaran dalam talian dalam aspek isi kandungan, interaktiviti dan reka bentuk skrin untuk memperoleh tahap kepuasan pengguna yang lebih tinggi di masa hadapan.

Kata kunci: pembelajaran dalam talian, ibu bapa, penyakit autisme, modul intervensi ABA, kanak-kanak autisme
Designing and supervising programs for autism people is possible with the skills of expert that are competent to build them. Online learning or e learning offers convenient way for people who have limitation to gain knowledge about autism. Autism spectrum disorder (ASD) is a disorder of neural information processing that causes impairment in behaviour of an individual (Vittorias et al., 2008). There have been efforts to develop e learning for autism with several courses. Results from past studies has demonstrated that blending with different sorts of instruction such as discussions and reading sable to facilitate process of learning. Multimedia environment offers flexible time in learning and give control over the learning process. The blending elements include on-site (face to face) meetings and interactive telecom lectures which is through the application of Moodle web based communication.

Teachers and parents with autism can apply similar technique in the real world setting. They can both learn via online learning and attend face to face courses. In order to develop a comprehensive learning environments for adults learner (teachers and parents with autism children), three factors need to be concerned are curriculum requirements, communication technology and knowledge of adult learning. The objectives of this study are possible to be reached if learners obtain an understanding of procedures and principles of Applied Behaviour Analysis (ABA) and they are able to apply the knowledge in accordance to the histories of individuals with autism.
THE PRESENT STUDY

According to Roll-Pettersson, Ala’iRosales, Keenan, and Dillenburger (2011), behaviour analysis is not offered in a university. However, there are few websites that has been developed to introduce the principles and procedures of behaviour analysis along with other courses. Besides, concerned community also initiates their own websites to deliver knowledge about autism to the society. Some websites exclusively built for autism people are Autism Speaks, Autism Society, Disability Scoop, Autism New Jersey, Autism Research Institute, Autism Web, Asperger Syndrome and High Functioning Autism Association website, Autism Highway, Autism Beacon, Healing Thresholds and National Autism Association (Higgins, n.d.). These are few common websites that provide useful information and guidelines for autism people and some of the websites offers courses to educate teachers and parents with autistic child.

One example of autism website is Geneva Centre which has been developed to provide effective interventions and offers free online series to the audience. These free online series include Characteristics of Autism, Introduction to Applied Behaviour Analysis, Reinforcement Methods, Function of Behaviour, Communication Strengths and Challenges, Understanding Sensory Needs, Understanding Social Challenges in Children and Adolescents, Learning Styles, Using Visual Supports, Understanding Stress and ASD, Paying Attention to Transitions and Transition Planning, and lastly, Promoting Independence for Community Inclusion (E-Learning for effective intervention, n.d.). Other courses offered by Geneva Centre website are Applied Behaviour Analysis and Functional Behaviour Assessments. Unfortunately, these courses are not free and people are required to invest money in order to access into the selected courses. All listed websites above are built from different countries.
Malaysia also does have its own websites that are specified for autism people such as The National Autism Society of Malaysia (NASOM), Reach Segamat and Pusat Maklumat Setempat Pendidikan Khas (PMSPK). There are also blogs made by Malaysian community to deliver information about autism and as a channel to discuss issues related with autism. These blogs only provide basic information on autism, used for experience-sharing and offers suggestion on useful treatment for autism children. Meanwhile, NASOM, Reach Segamat, and PMSPK provide both education and services for people with autism. NASOM is a non-profit organization which identifies and provides the treatment, welfare, education and attempts to heighten the acceptance of people with autism (*Persatuan Kebangsaan Autism Malaysia*, n.d.). In order to fulfill the demands of people in Malaysia, e-learning for autism with specified contents should be designed and developed to advocate parents with autism children and educators. Intervention can be modified accordingly to match the needs of their children and additional intervention modules can be added over time. Based on ASD internet modules, behaviour intervention plans module is listed as the upcoming modules and is not available yet in the server. Therefore, there is a need to touch on this module as it is not accessible in the meantime. An e-learning specifically design and develop to educate parents and society about autistic child is very practical to enrich level of awareness of Malaysian society as well as to contribute knowledge on autism.

The suggested course content for the proposed system is Behaviour Intervention Plans module by using Applied Behavioural Analysis (ABA) approach. Behaviour Intervention Plans module is chosen as the course content because of inadequate websites and e-learning to communicate the knowledge in Malaysia country. In addition, Applied Behavioural Analysis (ABA) approach is chosen as there are numerous researches had validated the success of ABA approach in treating autistic child.
Current websites built for autism behaviour intervention plans module and even if it is, the course contents cannot be accessed freely. Example of such website is Geneva Centre for autism website which requires the users to be the member first before they can access to their desired modules (E-Learning for effective intervention, n.d.). The provided modules also do not serve along with specific approach. Hence, there is a need to create an E-learning with specific course content by using particular approach and most importantly, is accessible without requiring any cost. The proposed system will be designed and developed by using Moodle platform, which is an open source course management system. In summary, the objectives of this study are:

1. To design and develop contents for e-learning for ABA intervention.
2. To design and incorporate multiple of multimedia elements in e-learning.
3. To evaluate the efficacy of the e-learning contents for ABA intervention.

Questions to be addressed in this study are:

1. How to design and develop contents for e-learning for ABA intervention?
2. What are multimedia elements that are suitable to be used in the e-learning?
3. How to obtain reliable contents for the e-learning?
4. How to evaluate the efficacy of e-learning contents for ABA intervention?

Contribution of the study

This study is believed can contribute in terms of knowledge sharing. This is because parents with autism children in Malaysia have lack exposure about autism and they faced difficulty to handle autism children with a limited knowledge about it (Persatuan Kebangsaan Autism Malaysia, n.d.)
Moreover, the study also contributes to the relevant theories that are used in explaining the underlying causes of autism spectrum disorder (ASD). By proposing relevant theories with autism, people with zero knowledge about autism can understand the factors that lead to the disabilities. Besides, the study can provide theoretical framework which can contribute to a novel theoretical framework for the future works.

**Conceptual and operational definitions of terms**

**Conceptual definitions**

Autism Spectrum Disorder: Autism Spectrum Disorder (ASD) is a disorder that cause impairment in social interactions, communication skills and limit creativity as well behaviour of an individual (Vittorias et al., 2008).

Behaviour Intervention: Behaviour Intervention is a program that emphasize on two divisions which are behaviour management plans and applied behaviour analysis (Ruble & Akshoomoff, 2010).

Applied Behaviour Analysis: Applied Behaviour Analysis (ABA) is a method used scientifically to plan and control behaviour of autistic child (Baer, Wolf, & Risley as cited in Hagopian & Hardesty, 2014).

**Operational definitions**

Autism Spectrum Disorder: Autism Spectrum Disorder (ASD) is a dysfunction or disabilities causes by the damaged in the brain areas which affects behaviour patterns, social interactions and creativity of thinking.
Behaviour Intervention: Behaviour Intervention can be referred as an attempt to alter behaviour patterns of autistic people by using two means which are through behaviour management plans and applied behaviour analysis (ABA) approach.

Applied Behaviour Analysis: Applied Behaviour Analysis (ABA) is a technique to change behaviours and at the same time, promoting new ability.
CHAPTER 2

LITERATURE REVIEW

Introduction to course management system

Learning management system (LMS) has been acknowledged as powerful software used to organize complicated databases, curriculum, education materials as well as evaluation tools (What is a learning management system?, n.d.). LMS is used to develop coursework and allows developer to manage it over time. There are variety types of LMS which are free or commercial, installed or Software-as-a-Service (SaaS), course-creating or non-course-creating and integrated or non-integrated. Some of LMS software are:

i) Grovoby Grovo Learning: Grovo is one of LMS software that provides an intuitive interface to develop, convey and track training. Grovo introduce micro learning approach to train critical skills to the audience (Top LMS software, n.d.).

ii) Quest Track by Knowledge Anywhere: Knowledge Anywhere has used the best approaches and newest technology to design convention e-learning tools that convey assessable outcomes (Top LMS software, n.d.).

iii) Matrix LMS by Matrix LMS: MATRIX is an LMS designed for businesses that aimed to convey the finest online training both to workforces and clients. This software consist of nine types of assessment, course templates, attractive module layouts, customizable portal, collaboration tools, content authoring, and many other features (Top LMS software, n.d.).
iv) Blackboard Learning System by Blackboard: Blackboard Learning System is web-based server software that allows course supervision and incorporates with learner information systems ([*Top LMS software*, n.d.]).

v) Moodle by Moodle: Moodle is open source software that offers solution for e-learning for the educators ([*Top LMS software*, n.d.]).

**Comparisons between existing e-learning for autism**

A few e-learning websites specifically developed for autism are depicted in the Table 1.

**Table 1**

*Comparison between Existing E-learning for Autism*

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| Geneva centre for autism    | ![Geneva centre for autism](image) Link: http://elearning.autism.net/?lang=fr/  
  - This e-learning website is specifically built to deliver information about Autism Spectrum Disorders (ASD). The site provides varieties of courses that are presented in two languages which are in English and France. However, some of the courses offered have fees and people are required to pay before they can access to the courses. This site contains 25 different courses. |
| Autism West Midlands        | ![Autism West Midlands](image) Link: http://elearning.autismwestmidlands.org.uk/store  
  - This e-learning is originated from Autism West |
Midlands. This site provides audience with a range of eLearning tools to assist them in studying more on autism. This site contains six different courses and all of them are free of charge.

E-learning module about Autism by SHIP autism workforce development and training group

Link: http://www.forms.portsmouth.gov.uk/autismawareness/

- This site demonstrates a brief e-learning module about autism to the audience with no charge applies.

- This module only consists of three courses and not a very intuitive websites compared to the e-learning developed by Geneva centre for autism and Autism West Midlands.

**Introduction to autism**

Autism spectrum disorder (ASD) is a disorder that cause impairment in social interactions, communication skills, and limit creativity as well as behaviour of an individual (Vittorias et al., 2008). Impairments in these areas have causes a repetitive behaviours and lack of interests in something. Leo Kanner who is American Psychiatrist had described autism as brain disorder that happened during the first two and a half years of infancy (Dolah, Wan Yahaya & Chong, 2011). There are five distinct types of autism disorder which depicted in Table 2.
Table 2

*Five Distinct Types of Autism Disorder*

<table>
<thead>
<tr>
<th>Types</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pervasive developmental disorder</td>
<td>• Invasive impairment in the expansion of mutual social interaction (varied from specific pervasive developmental disorder)</td>
</tr>
<tr>
<td>Autistic Disorder</td>
<td>• Abnormal growth in social interaction and limited range of actions and interests.</td>
</tr>
<tr>
<td>Rett’s disorder</td>
<td>• A disorder that has been diagnosed only in females which results after a period of normal functioning through the first five months after labor. It is an extremely distinctive pattern of development failure.</td>
</tr>
<tr>
<td>Asperger’s syndrome</td>
<td>• Invasive and persistent impairment in social interaction and the growth of limited, recurring patterns of actions, behaviour, and interests.</td>
</tr>
<tr>
<td>Childhood disintegrative disorder</td>
<td>• Noticeable failure in several areas of functioning after a period of at least two years of apparently normal growth.</td>
</tr>
</tbody>
</table>

People with autism find that social contact is disturbing which lead them to social disconnectedness. According to Dolah et al. (2011), autism people are never aware of their surrounding, they are incapable of making their own decision and clueless in expressing
themselves. Their incapability and incompetency in doing many things contribute to false understanding in many people of their surrounding and has causes erroneous perception towards them. It is totally unjust for them to be misconception resulted from the impairments of the domain areas of the brain. In the worst case, people with lack of exposure towards autism often misconstrued it as one of mental illness.

In Malaysia, there is one non-profit organization recognized as The National Autism Society of Malaysia (NASOM) which recognize and endorse the treatment, welfare, education and acceptance of people with autism (Persatuan Kebangsaan Autism Malaysia, n.d.). This organization is useful to give support to families of children with autism. Despite of this fact, there are still lots of children who incapable to get an access for proper therapy that can aid them lead satisfying lives. The top reason of their inability to get an access for the therapy is because of the high cost needed to engage in the established intervention programs. In order to join the intervention programs, they need at least RM700 and RM1,800 for the fees. These costs are extremely high as the programs takes place about three to five times per week. Even NASOM, a non-profit organization charged a half-day class with minimum RM350 in which each class is held for five times a week. Dr Hasnah Toran as cited in Money and distance (2010) claimed that lots of families could not meet the expense of the treatment particularly those originate from the rural region. Based on stated costs earlier, it is obviously difficult for families with autism children to get a treatment regularly because of the cost constraint. Though government centers provide free therapies for autism people, but it is too time consuming because people need to wait for their turn. Research has proven that earlier intervention lead to better prognosis. On the contrary, late intervention will cause significant secondary impairments in their development if they were to receive late treatments (Money and distance, 2010). Since there are wide teaching
strategies can be used to educate autism children, there is a convenient way to deliver the knowledge to the society. One of them is through Learning Management Systems (LMSs) Moodle. In this study, a system is proposed to provide alternatives for autistic child. The proposed system is web-based and design specifically for Behaviour Intervention Plans module by using Applied Behavioural Analysis (ABA) approach.

**Theories related to Autism Spectrum Disorder**

Autism spectrum disorder (ASD) can be described with executive dysfunction, weak central coherence, and mind blindness. Executive dysfunction is the capability to control behaviours. These include thoughts, physical activity and also giving attention on the subject. Weak central coherence is impaired capability to incorporate information in order to build the big picture of the information. Autistic people only can interact with little information and works with small details. Mind blindness on the other hand, is the capability to infer people’s states of mind by watching their gestures and speech. Research has shown that autistic children are experiencing impaired ability in many aspects such as in joint attention, understanding other’s reaction, read emotions, construe facial expression, and failed to understand deception (*Theories of autism spectrum*, 2011).

**Executive Function Theory.** Executive Function Theory stated that there are undeveloped areas in the brain or damaged part of the brain which contributes to the disabilities (*Theories of autism spectrum*, 2011).

**Weak Central Coherence Theory.** Weak Central Coherence Theory stated that autistic children are drawn to specified information due to incapability to incorporate information into
one representation. Based on this theory, this event occurred because of missing in some function of the brain (Theories of autism spectrum, 2011).

**Magnocellular Theory.** Magnocellular Theory stated that brain has experienced impairment in the visual magnocellular pathway in which the pathway is in charge for motion processing (Theories of autism spectrum, 2011).

**Extreme Male Brain Theory.** Extreme Male Brain Theory stated that there are abnormalities occurring in terms of the brain’s size in ASD people. There are parts of the brain which is bigger in females than males but ASD people have even smaller size compared to the males. The regions are Superior Temporal Gyrus, Anterior Cingulate, and Inferior Frontal Gyrus. Other parts of the brain which is smaller in females than males but ASD people have even bigger size compared to the males. The regions include general brain weight and size, head circumference, and amygdala during early infancy (Theories of autism spectrum, 2011).

**Mirror Neuron Theory.** Mirror Neuron Theory stated that there are fewer activities detected in specific region of the brain while ASD children create facial expressions to express some emotion or watching other’s face. The region is located on inferior frontal gyrus and spotted specifically in the pars opercularis (Theories of autism spectrum, 2011).

**Parents and teachers’ autism interventions**

It is worth to mention that no relative research has been carried out that shows any approach is superior to another (Ruble & Akshoomoff, 2010). In a paper prepared by Ruble and Akshoomoff (2010), there are two kind of interventions has been touched in the paper. The interventions are focusing on educational intervention and behavioural intervention. These interventions are considered as primary interventions and can be integrated with medication