



Culturally responsive multimedia tool framework for dyslexic children in Malaysia: A preliminary study

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Abstract

Cultural and language factors may aggravate difficulties associated with dyslexia and thus need to be studied. Malaysia is a multiracial and multicultural country comprising Malay, Chinese, Indian, Kadazan, Iban and other ethnic groups. There are many multimedia teaching and learning course-wares for dyslexic children to learn English but none of the courseware takes into account the cross-cultural difficulties and impediments, in particular, the phonological difficulties faced by individuals with dyslexia. This study examined a framework that could integrate cultural and linguistic factors for Malaysian dyslexic English language learners. This tool would substantially benefit the instructors who train the dyslexia students as well.

Keywords: dyslexia, English language, language literacy, multicultural Malaysia, multimedia tool framework, phonological difficulties

Introduction

In this era of academic excellence, learning disabilities among children has become a common issue where there are viewed as a grown concern. Dyslexia is a general term that has been used widely in the fields of psychology, linguistics, culture, education and technology (AlRowais et al., 2014). According to European Dyslexia Association, Dyslexia is defined as the difficulties in obtaining reading, spelling and writing skills that are neurological in origin (Ivanova et al., 2010).

In Malaysia, the Statistics Department of Special Education, Ministry of Education (Annual Report, 2010), estimated about 314000 school children suffer dyslexia syndrome and in year 2013, there is as many as 400000 children with dyslexia in Malaysia (Thanasayan, 2013). Ministry of Education in 2004 stated that there was 5 % dyslexia case in any community or in the ratio of 1: 20 school children. The dyslexia problem always exists in the reading process but many teachers do not realize it because they have less knowledge about such syndrome. So many dyslexia pupils are put in the normal class in school (Ahmad, N. 2005).

The current learning materials that available in Malaysia for dyslexic children are majority for Malay language learning and less learning materials available for English learning by the Malaysian researchers. The English learning materials for dyslexic children are majority from the UK in which it is not much suitable since Malaysian speaking English is different from the UK due to its phonological differences. English language learning in Malaysia need to adopt the way the words in English are pronounced by Malaysian. The official language that is the Malay Language, together with the other ethnic language the Chinese Mandarin and the Indian Tamil language have a strong influence over the learning of English. Interference of mother tongue language system in some ways contributes to different pronunciation use of

English (Phoon et al., 2013). Various ways of speaking one language due to cultural factors could interfere in the phonological difficulties faced by individuals with dyslexia to master a language such as English. The language pronunciation – phonological- variations give a great impact on the language orthographies (Ramus et al., 2013).

According to Siliman et al. (2002), language variations in terms of its pronunciations may cause children with dyslexia to be less responsive to phonological process. English language is a language with non-transparent orthography where the readers of this language highly depend on the lexical method that made the English phonological process more complex (Spencer, 1999). The increase in the complexity of phonological processes will give an impact on language orthographies in which ultimately effect the children with dyslexia ability to master the language and also the literacy skills as well.

Multimedia applications provide powerful tools to dyslexic children in terms of training, assessment and teaching aid (AlRowais et al., 2014). Multimedia language learning tools widely used to train dyslexic children all over the world. However, there should be an appropriate framework for designing and developing the tools since different children from different countries are bounded with various language and cultural factors. Therefore, not all multimedia tools are suitable for language learning, especially for children with dyslexia. There is a great deal of achievements yet to be obtained in the area of English dyslexia for multicultural country like Malaysia.

Thus, a framework that integrates the cultural factors and linguistics features for English language learners with dyslexia in Malaysia will be proposed in this paper. The framework will provides an effective set of scopes for dyslexia training tools in which these guidelines will lead us to build an effective dyslexia language learning instruction tool using multimedia applications. This tool would substantially benefits Malaysian English speakers with dyslexia and also the instructors who train the dyslexia students.

Dyslexia in Malaysia

Malaysia is a multi-ethnic and multilingual society whose population comprises 67.4% Malays, 24.6% Chinese, 7.3% Indians and 0.7% other ethnic groups (ETP, 2012). As envisaged by Malaysian government through its National Transformation Programme (NTP) through Education National Key Results Area, every child should be able to master the basic literacy and numerical skills within three years in primary education (ETP, 2012). On the other hand, it has been reported that in year 2013, there are as many as 400000 children with dyslexia. It is about 24.7% increment compared to the number children with dyslexia around 314000 in year 2010 (Thanasayan, 2013). The number of children with dyslexia is getting higher every year. This situation could hinder the target of Malaysian government to achieve its national education agenda, especially in achieving good quality of English language among children in schools.

Gomez (2000) is one of the pioneers who did a research on dyslexia in Malaysia; the author has found that 7% out of 2000 respondents (primary school children) had dyslexia which is has not been detected by the teachers. Lee (2008) pointed out that the study about dyslexia in Malaysia still in its infancy compared to many English speaking countries that has been prolific across many sectors. Vellutino et al. (2004) cited that studies on dyslexia in English speaking countries have been prolific compared to non-English speaking countries which are still in its infancy such as Malaysia (Gomez, 2004).

Nowadays, the research and awareness on dyslexia is growing in Malaysia, more funding and training has been provided by the Ministry of Education, Malaysia to build a checklist – assessment system – to detect dyslexic children. More teachers are being trained to teach dyslexia children.

Reading, writing and math are the skill set that often used to group the learning disabilities types. Firstly, is the learning disabilities in reading, this type are known as dyslexia where basic reading problems occur when there is difficulty understanding the relationship between sounds, letter and words.

Dyslexic children tend to have difficulty in letter and word recognition, understanding words, fluency in reading and pronunciation issues.

Dyslexia can be considered as language based learning disability. Dyslexia has a culture specific manifestation, and the difficulties associated with dyslexia can be partly due to characteristics of the culture such as language pronunciation variations (Orosco & O'Connor, 2013). Among speakers of a language, there are various ways of using the language, especially within multicultural community such as Malaysia. The way of a word pronounced in English is differ according to the races and usually Malaysian speaks a pidginized form of English which is detrimental for children with dyslexia.

Environmental factors are related by the poor literacy and language that is clearly established in the typical multilingual family in Malaysia. In a typical household in Malaysia, the first spoken language are Bahasa Melayu, Chinese with different dialects (*Mandarin, Hokkien, Cantonese, Hakka, Teochew*), Tamil, Hindi, Kadazan-Dusun and Jaku-Iban (Aman et al., 2014). As a result from their language, which is not English as main, learning it gives the children with Dyslexia an even harder time.

Language varieties – different ways of pronunciations- are considered as an important factor in the development of phonological representation. In English language especially; the phonological processing is based on the three distinct constructs of (i) phonological awareness, (ii) phonological memory and (iii) phonological naming (Whitehurst & Lonigan, 2002). Out of these three constructs, phonological awareness is the most prevalent problems among children with dyslexia (Lee, 2008).

English speaking in Malaysia

The ethnic roots of the speakers, Malay, Chinese and Indian, mostly contributed to the variation within the Malaysian English. The linguistic features of the mother tongues of Malays, Chinese and Indians have impacted on the production of English. Malaysian English can therefore be further divided into sub varieties of Malay-influenced, Chinese-influenced and Indian-influenced. The lectal differences are sufficient so that the ethnic groups can be perceptually identified from their speech (Deterding, 2006). These three widely used languages are place within Malaysian English where it is consider within the same geographical and linguistic context and then describes the consonantal features which are shared and not shared across them; of Malay-influenced, Chinese-influenced and Indian-influenced (Mun et al., 2015).

The lectal range and the ethnolects are the two dimensions in Malaysian English. The lectal range is a continuum of social dialects; sociolects. It consists of the acrolect, mesolect and basilect and each lect is distinguishable by phonology, morphology, syntax and lexis. The lects have different purposes in communication. The acrolect, for instance, is used for international purposes while the mesolect and basilect are used for national purposes.

Malaysian English speakers, except for the basilect speakers, are usually capable of switching between the mesolect and acrolect depending on the contexts they find themselves in. However, dental fricatives /θ/ and /ð/ are used by the acrolect speakers, but are less likely to be used by mesolect speakers, who frequently use stops for them (Phoon et al., 2013). The other dimension of Malaysian English is based on ethnolects. Ethnolects refer to the segmental and supra-segmental phonology of the different Malaysian ethnic groups.

Malaysian English is used by a made up of parts that are different group comprising different ethnicities, including large groups of Chinese, Malays and Indians. One cannot therefore assume that all Malaysians sound alike when they speak English. Malaysians maintain a combination of features in their pronunciation which mark them out as 'Malaysian', such as the reduction of final stop clusters, devoicing of final fricatives and affricates, TH-stopping in initial position, de-aspiration of voiceless stops and glotalization of stops. Other features of MalE may reveal the ethnic group the speaker comes from as Chinese, Malay or Indian. Chinese Malaysian speakers can be identified by TH-fronting in syllable-final position and deletion or vocalization of coda /l/. Indian Malaysian speakers can be identified by TH-

stopping in syllable-final position and the realization of /r/ as a tap or a trill. Malay Malaysians do not have such strong tendencies, but a combination of TH-fronting in syllable-final position 24 and the realization of /r/ as a tap or a trill would indicate a speaker of Malay ethnicity.

Dixon et al. (2012) found that ethnic language among Malays, Chinese and Indians influenced the phonological awareness of English language. The authors also found that ethnic language that differs in the orthographic depth and syllabic effect the pronunciation of English thus English is spoken with the influence of ethnic language's characteristics.

Table 1 illustrates the selected characteristics of phonological awareness of English that spoke by Malays, Chinese and Indians in Malaysia (Phoon et al., 2013).

Table 1. Phonological awareness of Malaysian English

Phonemes	Categories	Malay English	Chinese English	Indian English
Consonants	Stops	Devoicing of final stops	Insertion of epenthetic vowel after final plosive	Retro-flexion of /t/ and /d/
	Liquids	Vocalization of /l/	Substitution of /l/ with [n]	Substitution of dark /l/ with clear [l] or retroflex [ɭ]
Vowel	Monophthongs	Lack of length /tenseness of contrast in vowels	Absence of reduced vowels in unstressed syllables of words and used of nasalized vowels	The vowels /ə/ and /ʌ/ are sometimes neutralized and are used as free variants
	Diphthongs	Monophthongs realization of Diphthongs	NA	Monophthongs realization of /eɪ/ and /əʊ/

Multimedia tool for dyslexic children

In this Information and Communication Technology (ICT) era, there has been increase in the use of ICT resources in the field of education (Salman et al., 2014). Many of these ICT tools and applications offer efficient platform for students with learning disabilities (Drigas & Ioannidou, 2013).

The ICT tools and applications use the multimedia components to support learning as the multi-sensory approach invoke the interest of the users and motivations especially among the users with learning disabilities (Drigas & Dourou, 2013).

There are many multimedia tools that could be utilized to support learning for children with dyslexia. These tools always are the 'spring-board' for assisting learning since it could be easily modified according to the needs of the dyslexic children. Drigas&Dourou (2013) found that multimedia tool made the access to learning easy since the usage of these tools is omni-present whereby there is no need for the presence of teachers to teach the dyslexic children. The parents could take over the role of the teachers at home using the multimedia tools whereby continuous training for dyslexic children especially in language learning – speaking, reading and writing –help the children to master the language at optimum level (Lee, 2008).

Drigas & Dourou (2013) cited that the ICT tools enable the children with dyslexia to overcome literacy difficulties. The authors also suggested that there are two main approaches to use the ICT

applications for dyslexic children; (i) computerized the traditional way of teaching dyslexic children using ICT applications and (ii) design and develop a new tools and methodology using ICT applications.

Kazakou et al. (2012) found that the usage of multimedia tool for learning language has helped to improve phonological awareness problems among children with dyslexia that still carry on with them although many traditional techniques adopted to overcome the problem. Rao&Skouge (2015) cited that the multimedia tools and applications support language learning among culturally and language diverse dyslexic children. This could be an efficient way to teach Malaysian dyslexic children who are from diverse cultural and language backgrounds.

Kazakou et al. (2012) have developed Phonological Awareness Educational Software (PHAES) using multimedia applications to facilitate dyslexia readers to increase their phonological awareness. Fawcett et al. (1998) also have built a computer game platform known as Calyds to teach English to non-English speaking dyslexic children. On the other hand, (Regtvoort& van der Leij, 2007) have developed a multimedia tools for parents to train their dyslexia children on phonological awareness called Word Building at home.

At the same time, many researchers in Malaysia also have developed multimedia tools for children with dyslexia. Ahmad et al. (2012) developed an interactive multimedia learning tool using phonic reading technique to overcome the problem of reading Malay language among Malaysian dyslexic children. An online game has been developed to strengthen Jawi (religious letters) writing skills among dyslexic children in which the system has showed good results enhancing Jawi writing among children aged 5 to 12 years old (Salih et al., 2015).

Although there are many multimedia courseware are available to improve English speaking, reading and writing and also certain courseware which focusing on improve phonological awareness of English language among children with dyslexia; but the development of multimedia tools for learning English that taking into account of cultural and language diversity is scarce in the context of Malaysia.

Culturally responsive multimedia tool framework design

According to Saleh & Alias (2012), a framework which has been designed to build a multimedia tool to serve the needs and acknowledge the diversity of dyslexic children has proved to improve the children's reading capability.

A framework design for a multimedia tool to assist learning process among children with dyslexia must have the followings (Drigas & Dourou, 2013):

- 1) Implementation of phenomenological approach to learning
- 2) Learning process that adaptive to dyslexia children
- 3) Activities that improve reading

Culturally responsive elements that to be embedded into the multimedia tool framework following the needs of items (i) and (ii) which give a greater support towards achieving the item (iii) in the context of multi-cultural Malaysian dyslexic children.

Gay (2013) cited that culturally responsive education model is defined as using cultural characteristics, experiences and perspectives of ethnically diverse learners into the learning and teaching process. Gay (2014) found that children learn more easily and thoroughly when the delivery of knowledge is situated within the context of lived experiences and frames of references of the children. Therefore, the culturally responsive framework should be taking into account in the design and development of multimedia tool for dyslexic children.

Knowing the language variations and the way it is pronounced is not sufficient, but at the same time, we need to know on how to transform those differences into instructional strategies. Therefore, the elements in the culturally responsive model need to be designed.

The culturally responsive framework for multimedia tool was designed and constructed based on four main components as followings:

- 1) Fundamental Principles of Dyslexia
- 2) Malaysian English Linguistic Features
- 3) Characteristics of English Language Learners with Dyslexia
- 4) Malaysian Cultural Factors

The framework is depicted as in Figure 1.

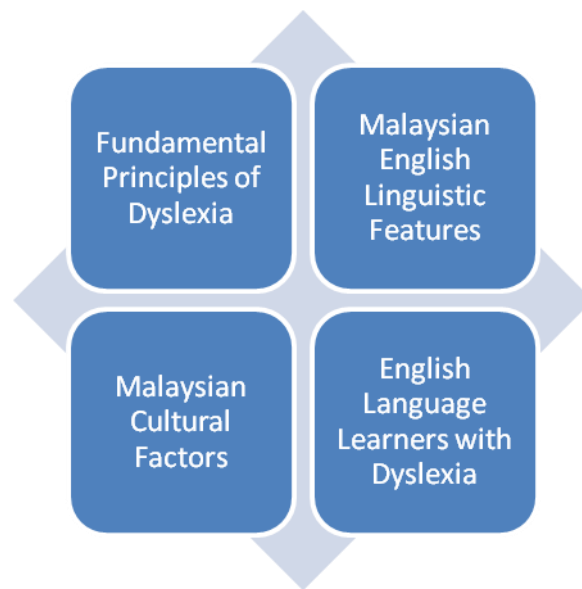


Figure 1. *Culturally responsive framework for multimedia tool*

The element of fundamental principles of dyslexia which are included in the framework could bring effectiveness in terms of adoptability of the tool among dyslexia learners (Drigas & Ioannidou, 2013). As these learners affected by specific learning disabilities due to neurobiological problems, it is important for educators to realize that deficit in phonological component of language could affected the dyslexia students' learning process. Therefore, the inclusion of linguistic features in the framework is vital for the development of multimedia tool.

Each component of the framework should be infused into each element of the English instructional multimedia tool for dyslexic children. The key elements are as followings:

- 1) Instruction Materials – there must be an optimum level of materials – instructions, tutorial, activities and etc. - in the tool to motivate the learners to learn. The materials must suit the pedagogical requirements considering the ability of the learners.
- 2) Interactivity – multi sensory approach that used in the tool should help the learners to focus and enable the learning process. The learning objects used should follow the Malaysian cultural aspects.
- 3) Audio – the pronunciation of the English words must be clear and able to understand by the dyslexic learners. The learners also should be able to pronounce the English words with correct phonology. At the same time, the system must be adaptable to accept different way pronunciations of the words in the English by the Malaysian dyslexic learners who are from different language and cultural backgrounds to assist language learning.
- 4) Visual Illustrations – The images used must guarantee better understanding and clarity for the learners whereby the images that represent the learners' context of living experiences.

- 5) With the infusion of culturally responsive framework into multimedia tool design and development, the impact of the tool could be greater for dyslexic children especially in learning English.

Conclusion

The proposed framework is to enable the English learners with dyslexia to master the language effectively via the inclusion of four main elements of cultural responsive model into the multimedia tool design and development.

As the English language has very complex phonological components – phonological awareness- in the multicultural society such as Malaysia, the framework that has been proposed could overcome the difficulties among dyslexia students from different races to understand the pronunciation of the English words since it combines Malaysian English Linguistic features and Malaysian Cultural factors.

As the culturally responsive multimedia tool is not widely available; thus, it is important that the multimedia tool which build with combination of language features and cultural factors is vital. At the same time, focus also should be given to the learners themselves in order to give better coverage of the basic aspects of dyslexia and deeper understanding about the learners. Therefore, comprehensive and effective multimedia tool that assist Malaysian children with dyslexia to learn English language could be realized.

Acknowledgement

This research has been supported via Research Acculturation Grant Scheme, under Ministry of Education, Malaysia (Research code: 2013-0160-109-72).

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