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Exploring the Elements of Multimedia Needed for Deaf and Hearing-impaired Students in Polytechnics

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Abstract: Educational revolution has been updated a long years ago and give more advantages in education world instead of making Malaysian as a developing country. The technology has been implemented in teaching and learning by fulfilling the recommendation government to apply the 21st century approaches. Multimedia-based learning is one of the best methods to deliver knowledge to deaf and hearing-impaired students. Hearing-impaired and deaf students really need this learning style to help them understand the input of studies. By implementing this 21st century approaches, we should not put aside teaching and learning of these students. Lack of hearing sense and lack of communication should not be a barrier for them to get the same education as normal person. This is because they have the right to have the same education as ours. However, the elements of multimedia need for hearing impaired and deaf students still questionable. This article exploring the elements of multimedia in teaching aid needed by deaf and hearing impaired students in polytechnics. Document analysis and informal interview have been used to explore the elements of multimedia. Four elements of multimedia elements have been revealed through this article which is sign language video, text, picture and audio. 3 lecturers have been interviewed to get the reason why all these elements of multimedia important in developing the teaching aids for deaf students in polytechnics. By integrate all those elements in teaching aids of deaf students hopefully will help them to have better understanding in learning.

Keywords: Deaf and hearing-impaired students, elements of multimedia, multimedia-based learning

1. Introduction

Deaf and hearing-impaired students were students who are lack of hearing sense and hearing impaired that will affect their language, academic and social skills (Hidayat, Gurhanadi, & Hidayatulloh, 2017). There were four level of hearing loss which are mild (26 - 40 dB), moderate (41 - 55dB), moderately severe (56 – 70dB) and severe (71 – 90dB) (World Health Organization, 2015). Deaf refer to those who are suffering which cannot hear sounds softer than 90 – 120dB while hearing-impaired is referring to the other level of deafness. They faced some difficulty to communicate because their limitation of language (Hidayat, Gurhanadi, & Hidayatulloh, 2017). In the higher institutions, these student's knowns as special needs students. They should be given the same opportunity as normal so that they are not excluded from education because there are also some who have the same level achievement that is comparable to the normal class (Salleh, 2003; Mahmood, 2007). Teaching and learning for these students should be emphasized. Hence, the transferring knowledge to them will be more effective.

Teachers play a role in in fulfilling the deaf and hearing-impaired student's needs. Lack of educators who are not capable in sign-language interpreter is the main problem to deliver knowledge to these students. Tahar & Alias (2003)

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found that only 30.4% of teacher have knowledge in special needs students field. This contributed to the ineffectiveness of the subsequent teaching and learning session, resulting in the achievement of these groups declining at the end of the study although they had the same qualifications when enrolling in higher education institutions (Riddle, Wilson, & Trinklin, 2002).

Indeed, the profession of special student educators is not easy. This can be seen through the role that the educators should consider in providing teaching aids or activities that meet the diversity of special students' disabilities under their guidance (Abdul Rahman & Abu Samah, 2011). Special education teachers need to be more creative in attracting special students to study. As you know, special students do not have the capabilities and abilities like normal students

Based on previous research, deaf and hearing-impaired students use their vision to process language (Loughlin & Keating, 2017) and obtaining information (Hidayat, Gurhanadi, & Hidayatulloh, 2017). Hence, the educators should know the learning style to meet their needs. In the educational world, development of multimedia materials can help deaf and hearing-impaired students to have better understanding in learning (Hidayat, Gurhanadi, & Hidayatulloh, 2017). Deaf and hearing-impaired students more preferable working with computers compare interact with people (Ibrahim, Alias, & Nordin, 2015). Therefore, this study explores the elements of multimedia needed by hearing impaired and deaf students in polytechnic.

2. Methodology

In this study, researcher used qualitative approach by documenting analysis and semi-structure interview. Cohen, Manion, & Morrison (2005) said by making document analysis obtained from theories and previous researchers, this method will provide information that will explain a phenomenon. Document analysis has been used to find the elements of multimedia which meet the needs of deaf and hearing-impaired students for teaching aid in polytechnics. The search engine use to obtain the multimedia elements for deaf students from various sources including Google Scholar. Researchers has been analysing previous research such as journal articles, conference proceedings, theses and dissertations. Researchers has been analysed document since 2009 until 2017. This because researcher needs to know the elements multimedia needed for deaf hearing-impaired students and have been highlighted by the previous study last 10 years ago to look improvement in teaching and learning for them.

Based on the information above, researcher interviewed three experts in special needs education to get the reason why all the elements are important to be added in teaching aid of deaf and hearing-impaired students. The expert who have been interviewed by researcher who are experienced in teaching deaf and hearing-impaired students in polytechnic. They have been qualified by public higher institution in special needs. They are also have been experience in teaching deaf and hearing-impaired students almost 10 years in polytechnics. Semi-structured interviewed have been conducted to get the reasons why all the elements of multimedia needed for deaf and hearing-impaired students in polytechnics.

3. Findings

Table 3.1 showed the document analysis by researcher that browse from year 2009 to 2017. There are twelve document that have been analysed by the researcher.

Table 3.1 - Analysis elements of multimedia

Authors	Sign Languag	Text	Picture	Audio	Graphic	Animations	Video
Ibrahim, Alias, & Nordin	√			√	√	√	
Hidayat, Gunarhadi, & Hidayatulloh				√			
Vinoth & Nirmala (2016)	√						
Ricardo Rosas, Soledad Veliz, Rodrigo Arroyo, María Ignacia Sánchez, Marcelo Pizarro,	√	√	√	√			
Magda Nikolaraizi, Ioanna Vekiri, Susan R. Easterbrooks	√	√	√				√
AlDekhail (2015)	√						

Masitry, Abdul Majid, Toh, Sutarman, &	√		√	√		√	√
Debevc, Kosec, & Holzinger	√						
Mohamed Elshaiekh, Mursi Idris, & Hussein			√			√	√
Holmer (2016)	√						
Husein & Al-Nisour (2009)	√						
Total	9	2	4	4	1	3	3

Tables 1.1 shows the document analysis which has been analyse by researcher to find the elements of multimedia that meet the deaf hearing-impaired students' needs. From the table, researcher found that sign language is the element that have dominant because of the frequency in 9 journals out of 12 journals. Secondly is picture and audio which has been in 4 journals. Next followed by animation and video. Lastly, text which only found in 2 journals.

3.1 Sign Language Video

Sign language is a form of communication used by the deaf and hearing-impaired community. Sign language can also be used by communities with problems in speaking, communities that cannot learn language through speech, and non-listening community (Wilbur, 2013). This is because the use of sign language facilitates deaf and hearing-impaired community communication and gives them the opportunity to expressing feelings, opinions, ideas, feelings and so forth. The sign language distinctness can be seen when it arises shape or symbol of hand that gives meaning to a situation (Loughran, 2013). In addition, languages body and facial expressions are attraction and intonation in the use of sign language (Wilbur, 2013). At Malaysia *Bahasa Isyarat Malaysia* (BIM) is the main language of the deaf (Lim, 2006). According to Shaari (2004) BIM is the language of the deaf and hearing-impaired used in their daily communication and is a symbol the diversity of deaf people in Malaysia who are culturally rich. BIM is regarded as a symbol of identity deaf because their form of signals is according to their way of life and culture as well as unaffected to other external elements (Shaari, 2004). Therefore, it is clear that BIM is the primary medium for communicating among deaf communities to insert in their teaching aid.

"…..sign language is seemed can help deaf students here. As we know they are used it daily. So, I think sign language video can help them to have better understanding in studies..here, we used BIM…and it almost all the polytechnic in Malaysia used it…" (participant 1)

"…we must use sign language because not all the lecturers here have certified to teach them..they do not have any pedagogical background teach these students…" (participant 2)

"…sign language is very important to those who teach deaf and hearing-impaired students…" (participant 3)

3.2 Audio

Audio is one of the multimedia elements that will help educators to fulfil deaf and hearing-impaired students' needs in polytechnics. This is because they still have residual of hearing. By adding an audio in their teaching aid will make those who can hear will be more sensitive in responding information. Even though, some studies did not highlight the importance of audio in teaching aid for deaf students, Hidayat, Gunarhadi, and Hidayatulloh (2015) thought audio will train deaf students to be more sensitive to sounds. Hearing aid also will help students to be more sensitive and responsive during classes.

"...most of educator here still speak even though they can't hear very well…but we hope they will become more sensitive and responsive during classes…" (participant 1)

"…certain students sometimes give their feedback according to what they heard in class…for your information, in polytechnic we have different level of deafness…" (participant 2)

"…some of them can hear but cannot deliver it…" (participant 3)

3.3 Picture

Picture can be seemed to be a helpful multimedia element considering deaf and hearing-impaired student seeing is the most dominant sense that they can use. So, it can't be wasted for educator to insert the picture to make the way they deliver knowledge being useful. Picture help deaf and hearing-impaired students to have better understanding in abstract knowledge. Hence, picture will be added to make it clear enough for deaf and hearing-impaired students to understand the input of knowledge.

"...it is good if you can put the picture that related in the study…" (participant 1)

"…but make sure it not very in striking colour and its not too fast, what I mean is the picture itself no need many…just to make it them understand…" (participant 2)

"…not all the slide you need to put the picture…only certain…" (participant 3)

3.4 Text

By inserting text in their teaching aid, educators automatically enhance deaf students' grammar and vocabulary.

"….they lack of vacobulary actually…"(participant 1)

"…even there are some of them can't understand what educators delivered…text maybe not attract them to read, but still they need to read to be prepared on exam…" (participant 2)

"… the text and make sure it not too long…eight words have been maximized for them in one sentence..just short and precise…" (participant 3)

4. Discussions

To increase the effective teaching and learning for deaf and hearing-impaired students, one of the promising technique is by using multimedia-based learning (Parton, 2006; Cited Research Centre, 2007; Abdul Rahman & Abu Samah, 2011). Four over seven elements have been explored and there are four elements that have been highlighted by researcher to develop the multimedia based on the elements that acquire by the deaf and hearing-impaired students. There are sign language video, audio, picture and text.

The findings show that the most frequently used multimedia elements are sign language. Sign language is seen as the most helpful element of a deaf and hearing-impaired student to understand the knowledge. This is because sign language is their communication language (Loughlin & Keating, 2017). The element has been supported by previous study Andrews & Jordan (1998) found that multimedia applications are especially useful for hearing impaired children because the language dictionary of the sign language video can be built directly into the story. Hence, sign language should be put in the teaching aid of deaf students.

According to a study by Wharton Business School, University Pennsylvania USA, using a multimedia application as a learning tool where students will be able to remember what 10% read, what 20% are heard, 40% what is heard and seen, and 70% what is heard, seen and done. The elements of audio seem have the same frequent as pictures. Although deaf and hearing-impaired students facing difficulty of hearing sense, it doesn't be a problem for deaf and hearing-impaired students in polytechnics who are facing only communication but not deafness. There is variety level of deafness and informal interviewed with the polytechnic lecturers found that the polytechnics deaf and hearing-impaired students have variety of level deafness. Hence, the audio should be insert in the teaching aid for fulfilling their needs.

Elements of pictures seem have the role by making deaf and hearing-impaired students understand the teaching. It is also helps them to understand instead referring to the sign language. Sometimes, they need an attractive teaching aid to get rid boring. Based on the result, even though elements of text found as the least frequent by the previous study, previous researcher was highlighted the element of text is consider the grammar and vocabulary of deaf students. The aim by insert the text is to enhance the reading skills of special students with hearing impairments. It is also make deaf and hearing-impaired students easier to communicate with the normal person if they cannot understand sign language. Animations and video is considered as the least of frequent followed by texts. Focus on the content you want to deliver only without putting too much animation and videos as it can get rid of the focus of a special non-hearing student.

5. Conclusions

In conclusions, the elements of multimedia acquire for deaf and hearing-impaired students in polytechnics have been highlghtened through the documenting analysis and informal interview above. Results showed four prominent elements of mutlimedia acquire for deaf and hearing-impaired students in polytechnics are Sign Language video, audio, picture and text. Other than sign language video being more accessible by deaf students, it is also as a most used in educational purpose for deaf and hearing-impaired students (Vinoth & Nirmala, 2016). Hence, the elements of multimedia will facilitate the deaf and hearing-impaired students and more accessible to them.

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