DEVELOPMENT OF GIS SPATIAL MODELS ON CRITICAL PLACE NEEDED OF MALAYSIA SIGN LANGUAGE (MSL) FOR PERSONS WITH DISABILITIES (PWDS) DEAF IN TERENGGANU, MALAYSIA

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ABSTRACT

Sign language is the priority of communication language between normal and deaf person. Usually normal person tries to communicate with the deaf but due to the absence of knowledge about the sign language making it difficult for them. Before getting a translator, deaf people have to do an appointment with sign language interpreter first. Then, looking at the public officer sector it is also one of the problems for deaf when they try communicating and making an appointment. At the abroad things like administration, religion or traffic signboard they already use the sign language for deaf to facilitate in daily life. The study will analyse the use and requirements of sign language in Terengganu. Geography Information System (GIS) aims to development the spatial models of critical place at Kuala Terengganu that really need a sign language. Before doing GIS Analysis, the study collected data about the percentage needed from respondent and coordinate of critical place in Kuala Terengganu. Respondents are the members of Terengganu Deaf Association will respond to the questionnaire. Based on the study, the regression findings show there are strong and significant between the two variables which is the use and requirements of sign language with value of R^2 0.624 (62.4%). The researcher also found that there is positive relationship between these two variables. In the spatial models finding by GIS, Hospital Sultanah Nur Zahirah (HSNZ) had been selected as the main critical place that really need to use of sign language from the respondent. It is hoped that this finding can assist the government to apply in each place and at the same time can recover deaf person in social functionality.

KEYWORDS: Spatial Models; Sign Language; Persons with Disabilities; Regression; Geography Information System (GIS)

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INTRODUCTION

Sign language continues to be a priority and widely used at internationally such as administrative affairs, world sports, religion, traffic signboard or workplaces (Kalsh & Garewal, 2013). According to Sigrid & Borgunn (2015) the signals produced by deaf person are their minimum requirement to communicate with others. So, environmental elements greatly influence the formation of sign language for them such as movement, object size, privileges or action based on cultural.

According to Meir et al., (2010), sign language is a language that represents the human linguistic system with the same line for human to understand. Stokoe, (1980), Sign languages have a characteristic and need to understand. The meaning of signals can be different even the symbol look like the same. So, it deeply needs to understand (William, 2005). Next Ketelaar et al., (2012), sign language should be exposure early and especially for the children who had deaf parents. This is because if they have a problem involving health or personal matters it will be easier for them to help.

History in Malaysia shows that sign language has been introduced begin from 1960s by Mr Tan. This is after he had lived in United States to study sign language. After proficient, sign language continued to be brought at Malaysia for helping the deaf facilitate communication with normal person (Hurlbut, 2000). Furthermore, the highest cost for learning sign language becomes one of the critical problems. According to Gupta et al., (2014), usually only the minority population willing to participate to study sign language. For examples is individuals who have deaf families or individuals who have to working with deaf.

According to Tahrina (2012), when sign language was introduced in Malaysia there were three types of names, which is Malaysian Sign Language (MSL) or Kot Tangan Bahasa Isyarat (KTBM), Penang Sign Language and Kuala Lumpur Sign Language. For this time, KTBM was official name and adopted in Malaysia when it was borrowed from America Sign Language. However according to Act 685 the Disability Act 2008, Malaysian Sign Language (MSL) was finally used and became a daily communication tool between deaf and normal person in Malaysia until today (Yusoff & Rabiaah, 2009). This is because, requirements of sign language deeply need for the deaf to communicate and share any information (Ding & Martinez, 2009). Looking at the public sector priority, it is so difficult for deaf to make an appointment. Especially when it comes to official affairs or administrative matters (Snoddon, 2015). In Malaysia, it is still difficult to find technology enabled communication sign language for the deaf. Even, the main problem of deaf person is difficult to communicate with normal person and they cannot access to spoken and written language (Norziha et al., 2010). They also cannot fluent style reading or writing with the right sentences base on what they see (Holmer et al., 2016).

In this study, the researcher will identify the use and requirements of sign language and also will identify which places that really required the sign language at Terengganu. Thus, Geography Information System (GIS) will selected in order to map the spatial model for critical place and pinpoint the areas where with evaluate the best facilities available (Jaafar et al., 2010; Er et al., 2010; Kamarudin et al., 2015a). With GIS it can create, editing and analysing geographical knowledge and also can provided patterns and trends (Fortheringham et al., 2002; Gasim et al., 2013; Kamarudin et al., 2017a). Plus, GIS has been recognized as a strategy and analytical tool for the use of science and social science (Kamarudin et al., 2015b).

When dealing with the problem to get the translator and searching the critical area, this step will be mapping with the spatial analysis and also can help to identify and quantify patterns of features in space (Er et al., 2010; Kamarudin et al., 2015c). Even spatial analytical techniques rarely given the reason why these patterns occur, but it still knows to

identify what or where the locations of the spatial patterns occur (Wen et al., 2010; Kamarudin et al., 2017b). Next, the secondary data from the Terengganu Deaf Association will use as the reference and guideline. Based on the secondary data, it was found that the state of Terengganu was in dire requirement of sign language. When they make a program and involve the deaf, a sign language interpreter is required and one of the most critical types of services from the secondary data is telephone interpreter. This service is so important because any matter involving a telephone line with the deaf, it still needs help from normal person to speak as their mediators.

Plus, deaf person also wants high attention and commitment from all parties so that they will not belong to the marginalized groups. Therefore, the impact of difficult for deaf to getting sign language translators in some areas were motivates the researcher to fill this gap and do more research for this problem.

LITERATURE REVIEW

Research from Drion & Buhler, (2016) where conducted in France, one of the solutions to increase the use of sign language were create a hospital specific unit for the deaf to easy directly communicate. To realizing this unit, it is fully funded by the public sincerely. Then for the formation, each unit will be staffed by bilingual, psychological and social workers. So, if deaf patients have a hard time to understanding the medical items or how to use the medicine, deaf workers can act as mediators for sign language.

The use of sign language in court is also seen as necessary (Tester, 2018). This is because if the court relies too much on external interpreters it can cause a problem. For example, if the sign languages interpreter, be arrives late or cannot be attend, then the case cannot be preceded. So, there is better if the court have their own professional sign language interpreter. Normally the sign languages interpreter will only have 2 hours to translate and will be replaced by another interpreter over and over (Brunson, 2017). Next, the deaf person also wants to learn about foreign sign language from other countries. So, they can apply working at overseas or having an emergency. Therefore, this method will be conducted by a normal translator who can teach the deaf to use foreign sign language (Parton, 2014).

Now, alternative for sign language interpreting are sign language interpreters and, according research at Australia, sign language interpreters are under influence of social and administrative. So, each unit of government administration will have professional sign language interpreter (Bontempo & Levitzke-Gray, 2009). Their roles are including interpreting for children or normal families or deaf family members as well as translators for external activities (Van et al., 2006). In addition, on 2002 Australia also had opened translator education opportunities at University of Macquarie, for anyone who looking to become a translator or sign language interpreter. As a result of this opportunity, many master students or phd, doctor, and research students are participated in this course (Bontempo & Levitzke- Gray, 2009). Next, the first sign language interpreter appeared was in 1990s. Prior to this work, translators were run by their own families, welfare workers and deaf teachers. In fact, these individuals were not use official sign language or have a special training (Webb & Napier, 2015). But they still successfully convey information for the deaf. Looking at sign language in Norway as well, this usage continues growing when the Norwegian government has set sign language as primary language and needs to be learned by normal and deaf students and this subject becomes a new topic in curriculum subject. Then the school will be responsible for hiring a sign languages interpreter teaching (Sigrid & Borgunn, 2015).

In addition, the problem of requirement for sign language use in schools is increasing when deaf parents cannot communicate with the teachers when they want to know about their children at the school. Viewed from the whole

situation, they want to learn how the system working and how to express a wish without offending others person (Erting, 1985). Next in Denmark, used of sign language interpreter is free and no charge is charged. For example, when appointment with the doctor or physiotherapist or others services that had been provide. Even when the deaf wants to meet with someone else to consult about welfare assistance, wages for sign language interpreters are not charged. Also, when the deaf receive a treatment in private hospitals, cultural events and meetings (Timmermans, 2005). Then the use and requirements of sign language will be more easily developed when one of the deaf family members learn about sign language. It can be exposure early, even the basic of sign language such as social, education and employment (Smith & Wolfe, (2016).

METHODOLOGY

In order to answer this study, a quantitative method was selected to elicit information by XSLTAT for regression analysis. Geographic Information System (GIS) will use to development the spatial models on critical place needed of Malaysia sign language (MSL) by ArcGIS software. The respondents are the ages of 20 to 50 years old. They were selected randomly and volunteered to answer the questionnaire. Respondents took 10 to 20 minutes to complete this questionnaire. The goal for this study was to collect data for the use and requirement of sign language and also want to know where are the critical places that really required the sign language at Kuala Terengganu.

Study Area

Figure 1 shows the map of Kuala Terengganu, Terengganu, Malaysia that has been choosing for this study. The map has been used to identify which place at Kuala Terengganu that really required the sign language using GIS. Kuala Terengganu has been known all around the world as tourist favourite place and it is also one of the reasons why the researcher chooses this place. Other than that, members of Terengganu Deaf Association also one of the best associations and have a lot of activities has been provided to the members. Base on the secondary data too on 2018, these members has been used sign language interpreters service around 692 times. So, it shows that they are desperate need the facilities for sign language translator at any place.

Figure 1: Map of Study Area at District of Kuala Terengganu, Malaysia.

Assessment Tool

These studies were used regression to analyse the use and requirement of sign language. For this study too, Geographic Information System Mapping were selected to know where is the critical place in Kuala Terengganu that really need the sign language. So, for this instrument the researcher has developed the questionnaire based on previous research and revised the value of *Alpha Cronbachs*. From the table 1 it shows the highest *Alpha Cronbachs* for the use of sign language with 0.8258 and for the requirement of sign language with 0.7259. So, based on the results it shows that it is significant and can be used for study base on Bond and Fox (2015).

Table 1: Value of Cronbachs Alpha

Variable of Study	
Use of Sign Language	0.8258
Requirement of Sign Language	0.7259

Next, the questionnaire will divide into 2 sections. Section A is the respondent's demographic including category of respondents and the job. For this result, it involves the percentage and frequency calculation. Then, for section B is about the use and requirement of sign language in Terengganu including 24 questions. Respondents answered this questionnaire using scale liker of 1 (min) to 4 (max). This is a common format and had been widely used research for deaf by previous researchers (De Wit & Sluis, 2012).

Then, question about the critical place that required the sign language at Kuala Terengganu were created by the report of secondary data and others items. To locate the spatial areas (coordination), Google Earth had been used for coding the longitude and latitude respectively. For getting the result, the interpolation will run with the data collection in the ArcMap. The step for getting this is ArcGIS >ArcMap > toolbox> 3D Analyst Tools > Spatial Analyst Tools > Interpolation > IDW (Kamarudin et al., 2015b). Then, the result will show the highest and lowest of output range with the percentage. During the data smoothing process too, we excluded the uncompleted data to avoid any biasness.

RESULT

Table 2 shows the categories of respondents that have been obtained respond this questioner. The highest categories were severe hearing loss with 68% compared with a moderate hearing loss with 32%.

Table 2: Categories of Respondents

Type	Frequency	Percentage (%)
Severe Hearing Loss	13	68
Moderate Hearing Loss	6	32

Table 3 shows the types of job respondents obtained. It shows that 37% are deaf self- employment and somewhat surprisingly, when the researcher found that actually some of respondent are unemployment deaf with 16%. Next, the caregiver and shopkeeper jobs were the same percentage with 11%. Thus, it is a source of anxiety for the authority to deal with this problem. With this finding too, it shows that they really need the job but due to difficult to communicate it become more burden (Kamarudin & Hussain, 2019).

Table 3: Types of Job

Type	Frequency	Percentage (%)
Unemployed	3	16
Self-employed	7	37
Caregiver / babysitter	2	11
Cake maker	1	5
Van / Motorcycle vehicle repair	1	5
Fabric Tailor	1	5
Shopkeeper	2	11
Administration	1	5
Car wash workshop	1	5

In the Table 4 and Figure 2, it shows the results of regression analysis for the use and requirement of sign language at Kuala Terengganu and it is at the level of regression simple with R^2 0.624 (62.4%). It is indicating that there are strongly characteristics and strengths between these two variables which are the use and requirement of sign language. Base on this statistical analysis also it shows that the results are significant and can be used for study based on reference Linear Regression Interpretations by Levin and Rubin (1998).

Table 4: Analysis Regression for the use and Requirement

Observations	19.000
Sum of weights	19.000
DF	17.000
R^2	0.624
Adjusted R^2	0.601
MSE	8.784
RMSE	2.964
DW	2.248

Figure 2: The Regression Analysis for the use and Requirement of Sign Language at Kuala Terengganu, Terengganu, Malaysia.

Figure 3 shows the result of spatial model for the critical place that really need the sign languages translator around Kuala Terengganu. The highest percentage is at the Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu with 73.76 until 89.27%, second highest is PERKESO Kuala Terengganu with 65.74 until 73.76 % and the last for the third highest is Majlis Bandar Raya Kuala Terengganu (MBKT) with 61.59 until 65.74%). Base on this finding too, the authorities sector has to take note and need to find the best solution to resolve this problem.

Figure 3: The Spatial Models on Critical Place Needed of Malaysia Sign Language (MSL) for Persons with Disabilities (Pwds) Deaf in Kuala Terengganu, Terengganu, Malaysia.

DISCUSSION

Through this study, it was found that this problem deeply has to be resolve. Research by Snoddon, (2015) and Cooper et al., (2013), use of sign language is particularly important in personal life, public, occupational, and educational affairs, locations, institutions, objects, events, and operations that will always require translator assistance. Overall, the finding from researcher shows that majority respondent is severe hearing loss. Goss, (2003) had said that severe hearing loss is someone who only can hear by using the hearing aids. Next, mostly respondent is self-employment which means they have their own jobs and only can get the salary base on their persistence or ability. Sometimes deaf people want to work with normal person but due to difficulties to communicate, it become a problem for them to apply the others jobs (Kamarudin & Hussain, 2019).

Then finding from regression result, it shows that the use of sign language in Terengganu is really needed and has a strong relationship between these two variables which is the use and requirement of sign languages. Then, it shows that they are desperate for exposure the sign language in Kuala Terengganu, such as in the legal sector or in schools, hospitals and another public place (Web & Napier, 2015). The use and requirement of sign language continues to be supported by the research of Snoddon, (2015) saying that internationally existing initiatives is teach sign language to parents or young deaf children and always be prioritized. Then they will go by home visits with consultants or mentors engaged for interaction and discussion as well as informal to teaching about sign language.

Next, when researcher asks to respondents if the use of this sign language is being expanded to public or private places, do they support? As a result, deaf people strongly agree. This is because it means they do not rely too much on external sign language interpreter where is they had to make an appointment first. Based on Couch, (2017) research which is conducted in court administration is supporting this finding. Even in the court it has provided a permanent sign language interpreter. The deaf inmates can feel free to share about the problems and difficult things at any time. In fact, it is better to understand if they are wrongly convicted and this role is so important for their respect, justice, dignity and care (Tester,

2018). If misunderstand the sentences happened, the result can become prosecute or defend for them. Now, the government of Malaysian has only put up facilities for sign language with box at the screen television for news slots. That means deaf people can watch it and understand the info. But it is only for news slot not the other program. Furthermore, deaf people also want each television and program show will have a sign language translator. This can be seen from the research Timmermans (2005), who had doing this at the Czech Republic. Base on the finding, deaf people really need their own television program with sign language translator. Even their government already had set a mandatory for every Czech Republic television channel to arrange at least 70% of all broadcast programs featuring subtitles for deaf people. And they also had up their own television program with sign language deaf, who is called "Television for the Deaf", it will run for 30 minutes and airs once a month. Another that, every Monday to Thursday for five minutes before main news television program begins, it will have news in sign language.

Another that based on spatial model result too, it shows that deaf people at Kuala Terengganu really need a translator at the Hospital. It means when they go to the hospital, they can communicate with the doctor and take information or advance. Especially, for those who have a critical sick or pregnancy. Research from Drion & Buhler (2016) had say there is so important for deaf patient went they want to communicate at the Hospital. Even went they need helping to get the things or asking about the mediation. Hospital always be the main place that we will be looking for went we get the fever or unhealthy. Research from Smith (2016) and Snoddon (2015) has shown that, Hearing Health Specialists had supported any families deaf need to learned event the basic of sign language. Base on this finding too, it also can help authorities sector saving their timing and costing went they collecting the data. Event in this model spatial, it also can help any agency or sector to use this model as a reference for resolve their problem if they were looking something like critical place or mapping view.

As a conclusion, the effected of hearing or deaf person will be limited for them to communicate with others and also can affect something like social life or speech. So, based on the results it can assist the authorities to apply these facilities for deaf people. Then, the problem for getting the sign languages translator in each place at Kuala Terengganu will be solved and at the same time will increasing the use and requirement in sign language.

CONCLUSIONS

For now, we can see that, only minor people will include or get along with deaf people whether because of their family or have things to do with deaf people. So, only this minority people know about how to signal. If government of Terengganu is able to enforce the sign language use, it could be one of the best solutions for deaf people to develop themselves through with modern way. For example, research from De Wit & Sluis, (2012) the government of Dutch acknowledges that sign language is an important element of communication for deaf people. So, it really means for them and it can provide a better social position. In Finland Television, they had created a sign language interpreter box for daily news and the Finland Deaf Association will publish a monthly bulletin video in sign language for information. It can be seen that Finland government are protective for the deaf people (Van et al., 2011).

Therefore, if the government can provide the employment opportunities for the deaf as a special assistant to help communicate between the normal and deaf as a translator, it will be more advantages. It is because some of signal sign language is difficult to understand (Yusoff & Mohamed, 2009). So, the special assistant from deaf ultimately can help them. In addition, it also can increase the use of sign language at government or private sectors. As a conclusion, if there is no helping from authority members to developing the use of sign languages, then the deaf would be left behind. It is our

responsibility to help deaf people as they also want to develop themselves and live as normal families. And hope, there is no bias and discrimination will occur.

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