Disaster Resilience Education (DRE) Programmes in Schools: A Case Study in Kelantan, Malaysia

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Abstract. Flooding is not an uncommon phenomenon that occurs yearly in Malaysia. In fact, in the last few decades, the event of floods in Malaysia has become a disaster and has negatively impacted human wellbeing. Disaster Resilience Education (DRE) is one of the initiatives to prepare the community towards the unpredictable event of a disaster, including the flood. Therefore, this study will explore the Disaster Resilience Education (DRE) programmes that have been conducted in a secondary school at Tanah Merah, Kelantan. A questionnaire was adopted as the research instrument to collect data from respondents. A total of 200 respondents which consisted of students, teachers, and administrative staffs, had participated in this study. The stratified sampling approach was applied in this study to select the respondents. Descriptive and inferential analysis were executed to explore the DRE programmes that had been conducted, in order to identify the school's community awareness on DRE and the factors that influence the school's community awareness. This study revealed that there is a minimal number of DRE programmes that have been conducted by the school. However, the awareness level of the school community on DRE is good. This study has found that different socio-demographic factors have a significant influence on the school's community awareness on DRE. Therefore, the finding from this study is crucial for the local authority and government, to enhance the resilience programme in school.

1. Introduction

Flood is one of the natural disasters that usually occurs during the monsoon season where Kelantan is the worst flood affected area nearly every year [1]. During the transition period of the monsoon season, Malaysia receives the highest amount of rainfall between the Northeast monsoon and Southeast monsoon from December to March and June to September, respectively [2]. Therefore, the awareness on disaster need to be measured and implemented for the school community in order to increase resilience among themselves, whether they had recovered or were in the process of recovering.

According to Banatao [3], resilience is defined as the ability of the community, individuals and states, and their institutions to recover and to absorb the shock, whilst positively transforming and adapting their structures for living in a long-term perspective. Resilience comes with three concepts

namely survival, recovery, and the stage during pre-disaster and post-disaster. These three components are related to each other to measure the resilience and ability of the community to recover from the disaster. From this, it is essential to access the disaster related awareness program in schools that act as a benchmark for the government and other relevant agencies.

Disaster resilience education is an important part to put into action to measure the strength of the school resilience to sustain the educational activity during a disaster. There is evidence which states that children are one of the most vulnerable sections in the society during a disaster [4]. Moreover, a school functions as a community's central location for meeting and group activities, among parents and school communities. According to Wanjala & Akumu, [5], education is the source to develop common awareness about disaster in an institution as it can increase the accessibility to information and resources. This manuscript will explore the Disaster Resilience Education (DRE) programme that has been conducted at a secondary school in Kelantan.

2. Disaster Resilience Education (DRE)

Disaster Resilience Education (DRE) had been recognised as a core mechanism for reducing risk and building resilience. Krasny [6], indicates that school communities can increase their safety with necessary support and guidance. One of the ways is by holding an awareness programme that gives a broad view on how to react in the event of a disaster such as a flash flood. This will develop a common awareness of the natural hazard and increase the accessibility to information and resources. Thus, it is compatible with this research that the purpose to measure the level of knowledge on disaster among school communities. DRE is one of the methods for assessing and recognising the future impacts of vulnerabilities, risks and hazards, to identifying capacities and strengths of the school communities [3].

The main goal of Disaster Resilience Education (DRE) is to promote public safety and reduce damage from disasters. This indicates that the objective of the Disaster Resilience Education is to give exposure on awareness towards a disaster during post recovery. Dufty [7] has categorised the current activities on Disaster Resilience Education (DRE) into four main groups, i.e. public communication, development of training, community engagement programmes, and personal education programmes. This research will focus on one activity towards a comprehensive personal education programme for the school to develop disaster awareness among school communities. Therefore, it is related that disaster education, engagement and communications will lead towards an effective disaster learning.

However, the issues of low Disaster Resilience Education (DRE) depend on the school communities, on how they encounter the disaster. Muttarak & Lutz [8], found that most educated individuals are better aware of disaster risk and are more likely to undertake disaster preparedness. This high awareness that is associated with education would then contribute to the vulnerability reduction behaviours. Highly educated individuals usually have diversified communication linkages and have better access to useful information. This proves that education in disaster resilience is essential through school communities and better disaster recovery. Within this they would have a better access of useful information during disaster attack [9].

Education is also related to greater social support, social capital and social networks. Social network will be useful during an emergency. For instance, individuals who are embedded in well-established and large friendship groups and good social networks have a higher chance to receive informal warning and are more likely to confirm and engage in response quickly. Other than that, social networks and social capital will increase the propensity to facilitate and evacuate towards recovery and relocation. Furthermore, increasing socio economic resources will facilitate the access to information and enhance education, social capital and promote vulnerability reduction, economic, social and education [10].

It is found that a better educated society will enjoy greater economic growth at the societal level. This implies that a better educated society will also have a greater economic, social and education capabilities that are necessary for a successful adaptation towards disaster. Consequently, this is a logical assumption when face with climate risks and natural hazards. Educated societies are more

empowered and hence will be more adaptive towards response and recovery from disasters. During disasters, understanding and carrying out appropriate response to warning messages are crucial in minimising losses. In terms of recovery, it seems that better educated individuals or communities are faster in getting back to a partial normal life. This is because educated people will have better economic and social resources [4].

3. Awareness Programmes on Disaster Resilience Education

Awareness programme is important in fostering a good impact on public communities. To gain the awareness from a community towards DRE, an integrated approach needs to be more systematic on enhancing the knowledge from the community [3]. The public sector, volunteer groups, academic institutions and community organisation are some of the factors that will influence the awareness programme, in implementing for the society. This is one of the platforms that can also establish a mutual support system and a cooperative government mechanism to increase the knowledge and awareness of the public in Disaster Resilience Education (DRE). This approach encourages the strong development of community organisations that is consistent on increasing the awareness to implement DRE. Thus, this will enhance the capability of the community to have a good adaptation towards a flood disaster.

Besides educational materials on preparedness, warnings and self-protection should be distributed in the form of information or training. This is to ensure that all the school communities have local knowledge on how to respond during a flood disaster and not to panic in that situation. Similar training initiatives should be given to teachers and all the staff members at the school in order to increase the awareness towards a flood disaster. These steps would also raise the level of knowledge among school communities during a flood disaster. According to Chou & Wu [11], attitude and behaviour is one of the factors that contribute to the development of the awareness in implementing the Disaster Resilience Education (DRE) for school communities.

4. Methodology

4.1 Study Area

The location of the study area is at Tanah Merah, Kelantan. The selection of the study area is based on the history of a flood disaster event that has happened in 2014 that has affected 619 victims at 14 centers. Tanah Merah is at 38% critical level for flood in between five days in 2014. Tanah Merah indicates 33 schools in the primary standard and 15 secondary schools. Accordingly, three schools have been chosen that are vulnerable to floods, they are Sekolah Menengah Kebangsaan Tanah Merah 1 (SMKTM1), Sekolah Menengah Kebangsaan Tanah Merah 2 (SMKTM2) and Sekolah Menengah Kebangsaan Dato Paduka Raja 2 (SMKDPR2)..

4.2 Sampling Strategy

The respondents who have participated in this study consist of school communities such as students, teachers, administration staffs at three (3) schools that are vulnerable to floods in the district of Tanah Merah, Kelantan. Stratified sampling has been used in surveying the data because the stratified sampling is a type of sampling method in which the total population is divided into smaller groups or strata to complete the sampling process. Random samples are then selected from each stratum. This is because, it is important that the group selected is representative of the population, and not biased in a systematic manner.

In determining the specific size of sample, Krejcie & Morgan [12] had proposed a table to determine the sample of size through the total population of the place. The process of choosing the sample size will be a lot easier by just referring to the table of the sampling size. Sample size for this research were determined by using a number of populations from the three vulnerable schools. In this study, 200 respondents had participated to answer the questionnaire (Table 1).

Table 1. Number of respondents based on schools

Name of Schools	Number of Respondents
SMK Tanah Merah 1	69 (35%)
SMK Tanah Merah 2	67 (34%)
SMK Dato' Mahmud Paduka Raja 2	64 (31%)
Total Respondents	200

4.3 Research Instrument

The quantitative research design has been adopted in this study because it has advantages in exploring the DRE programmes that are conducted, and investigate the school community awareness and knowledge on DRE. The questionnaire consists of four sections for the respondent's action. The Likert scale and open-ended question is the design question that has been given for the respondents. The Likert-type or frequency scales use a fixed choice response formats and are designed to measure awareness and knowledge of respondents. Five (5) Likert scale was used in the survey. Number one represent 'strongly disagree', number two represent 'disagree', number three represents 'neutral', number four represent 'agree' and number five represent 'strongly agree'. The structure of the questionnaire is as follows:

Section A: Socio-Demographic
Section B: Knowledge on DRE
Section C: DRE Programmes in School
Section D: Awareness DRE

4.4 Data Analysis

Descriptive analysis will be used to analyse the survey data in order to describe the basic features of the data. For example, mean, median and mode are used to measure the central tendency in the descriptive analysis [13]. ANOVA (F-test) and T-Test will be used to generate more useful information by using inferential analysis. Inferential statistics will draw the conclusions from the dataset towards a general population. The Statistical Package for the Social Sciences (SPSS) version 21 has been used in this study for descriptive analysis and also inferential analysis. The null hyphotesis in this study are as follows:

H_0 = Different socio demographic characteristics did not influence the awareness and knowledge of the school community on DRE.

5. Results and Discussion

5.1. Respondent's Profile

The questionnaires were distributed to three (3) different schools in Tanah Merah, Kelantan. Most of the respondents are female with the percentage of 66% while the remaining 34% are male (Table 2). The highest percentage of age of the respondents is between 16-20 years old which is 75%, followed by 36-40 years old and 41-45 share the same percentage which is 5.5%, 26-30 years old, 4.5%, 46-50 with percentage 4.0% and lastly the age of 26-30 years old with the percentage of 4.5%. Most of the respondents are Malay (96.5%), followed by the Chinese (3.5%). The percentage indicated that most of the respondent are students (75%), followed by teachers (15%) and administrative staffs (10%). Moreover, a majority of the respondents are from the rural area (65%) although the schools are located in the urban area.

Table 2. Respondent's Profile

Socio-demographic characteristics		Frequency	%
Age	16 - 30 years old	163	81.5
	31 – 49 years old	29	14.5
	≥50 years old	8	4.0
Gender	Male	68	68
	Female	132	34
Ethnic	Malay	193	96.5
	Chinese	7	3.5
Occupation	Student	150	75.0
	Teacher	30	20.0
	Administrative Staff	20	10.0
Living area	Rural area	130	65.0
	Urban area	70	35.0

5.2. Disaster Resilience Education (DRE) Program at School

This study has revealed that there is a certain programme that is related towards implementing the Disaster Resilience Education (DRE) for school communities. However, this programme is still not enough to increase the awareness of the school communities on a flood disaster. Table 3 shows that some programmes are being held this year at each school, however, the programme is still not enough to strengthen the knowledge on Disaster Resilience Education (DRE) towards school communities.

Table 3. DRE related programs conducted at schools

Name of School	DRE Prorgams
SMK Tanah Merah 1	• Training on fire drill • Talk from civil defense regarding flood disaster
SMK Tanah Merah 2	• Training on fire drill • Mini exhibition on Disaster Risk Reduction (DRR)
SMK Dato Mahmud Paduka Raja 2	• Training on fire drill • Talk on school safety and disaster by Non-Government Organization (NGO)

Low Disaster Resilience Education (DRE) in school is the main issue that contributes towards the lack of awareness that is programmed at school. The school organisation plays an important role to educate the students and staffs on the importance of disaster awareness at school. This will indicate that the organisation in that school is well organised or otherwise. According to Leitao [14], there are two main types of DRE assessments which are undertaken throughout the learning process in determining the students' progress towards learning. Then, the pre-existing knowledge on how they interpret new information about disaster and hazards.

Other than that, the concept of disaster preparedness and awareness is not well implemented in school. According to Ozmen [15], the nation-wide training programme at schools for school communities should be implemented, generated and evaluated continuously for improving the level of knowledge about disaster. Other than that, the support and contributions of many associations and foundation should established every school in Malaysia towards sustainable disaster management. The role of the schools is to be a place where the student can gain a lot of knowledge and preparation towards disaster. Therefore, some obligatory subjects and courses towards mitigation in flood disaster should be added in each school.

5.3. The Awareness of Respondent on Disaster Resilience Education (DRE)

This study revealed that the awareness of the respondents towards DRE was in good condition as most of the respondents agreed with the question in that section (Table 4). However, there are a few questions that the respondents disagree with, i.e. they will prepare an emergency bag for food during a disaster and join a community for help during the disaster. This shows that the awareness towards disaster is still low although the chances of getting a flood is higher every year during the northeast monsoon [16].

Table 4. Awareness of Respondents on DRE

Questions		**Frequency/ (%)**	**Mean**	**Standard Deviation**
I always aware on the month of monsoon period to prepared for upcoming flood disaster	**Strongly Disagree**	0	4.13	0.770
	Disagree	4 (2.0)		
	Neutral	36 (18.0)		
	Agree	91 (45.5)		
	Strongly Agree	69 (34.5)		
I will attend the programmed held by school that related to flood disaster	**Strongly Disagree**	0	3.89	0.828
	Disagree	8 (4.0)		
	Neutral	57 (28.5)		
	Agree	85(42.5)		
	Strongly Agree	50 (25.0)		
I will prepare an emergency bag for food disaster	**Strongly Disagree**	1 (0.5)	4.17	0.831
	Disagree	6 (3.0)		
	Neutral	31 (15.5)		
	Agree	83 (41.5)		
	Strongly Agree	79 (39.5)		
I will participate in community activities to help others during flood disaster	**Strongly Disagree**	45 (22.5)	2.72	1.349
	Disagree	59 (29.5)		
	Neutral	26 (13.0)		
	Agree	47 (23.5)		
	Strongly Agree	23 (11.5)		
I had a disaster alert system for family and community	**Strongly Disagree**	0	4.20	0.761
	Disagree	4 (2.5)		
	Neutral	27 (13.5)		
	Agree	92 (46.0)		
	Strongly Agree	76 (38.0)		

5.4. Factors Influence Respondent's Awareness on Disaster Resilience Education (DRE)

The finding of this study has revealed that the different socio-demographic factors significantly influence the respondent's awareness on Disaster Resilience Education (DRE). Table 5 shows the statistical results of gender [t = (200), 0.174, P (0.040) < 0.05], living area [t = (200), 0.420, P (0.015) < 0.05], ethnicity [t = (200), 0.251, P (0.025) < 0.05], age [F = (200), 1.965, P (0.010) < 0.05], and occupation [F = (200), 0.975, P (0.036) < 0.05]. The statistical results proved that different socio-demographic characteristics significantly influence the school's community awareness on DRR. As such, the null hypothesis was rejected and an alternative hypothesis was accepted.

Respondents in urban area are more likely to have more knowledge on awareness compared to those in a rural area. This statement is supported by the research from Japan that has included the sub urban area as the place of the respondents [17]. This proves that the awareness of the respondents is really affected by the residential area of the respondents [18,19]. Therefore, there is a significant statistical difference for the mean awareness of the respondents towards DRE, which shows that the awareness

can be an independent test- to carry out the analysis in order to prove that the DRE will significantly impact the knowledge and awareness of the school community respondents.

According to Tuladhar et al. [20], their research indicates that age does not really affect the awareness of the DRE in between urban areas. This research shows that the relationship between age and the level of awareness is affected; an older age has more experience and history compared to a younger age. This also indicates that the type of respondents also affects their awareness towards a flood disaster. It is proven that there is a lack of awareness being implemented in schools regarding the Disaster Resilience Education (DRE) concept.

Table 5. T-test and AVOVA statistical results

Socio-demographic Factors	Mean	t-value/ F-value	p-value
Gender			
Male	4.53	t - 0.174	0.040
Female	4.82		
Ethnic			
Malay	4.57	t - 0.251	0.026
Chinese	4.17		
Living Area			
Rural	4.23	t - 0.420	0.015
Urban	4.76		
Age			
16 - 30 years old	4.82	F - 1.965	0.010
31 – 49 years old	3.50		
≥50 years old	2.56		
Occupation			
Student	4.63	F - 0.975	0.036
Teacher	4.40		
Administrative Staff	4.17		

All Factor significant p-value<0.05**

6. Conclusion

This study has revealed that the different socio-demographic factors are statistically significant in influencing the awareness on DRE. This information enables the local authority and government to shift from reactive responses to a proactive approach which ismore likely to improve disaster management and to support disaster response to be more comprehensive and systematic. Certain schools may impose an importance in implementing this DRE, however the lack of support and fund from the government may hinder the school from pursuing the DRE. Furthermore, resilience in every place can be built through implementing this DRE concept through any programme in order to increase awareness and knowledge among victims of a disaster in Malaysia. Accordingly, this will develop the sustainable disaster management- to consider each component that is involved in disaster management, which is mitigation, preparation, response and recovery phase.

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References

[1] Sobian A 2016 *Journal of Islam and the Contemporary World* **9**(3), 87– 111.
[2] Cutter S L, Ash K D and Emrich C T 2014 *Global Environmental Change* **29**(4), 65–77.

[3] Banatao, E. J. (2013). *Community and Social*, **6**(2), 122–134.
[4] Chen L C, Liu Y C and Chan K C 2016 *Natural Hazards*, **37**(1–2), 209–223.
[5] Wanjala G and Akumu M 2017 *Social and Resilience*, **4**(3), 133–142.
[6] Krasny M E, Lundholm C and Plummer R 2014 *Environmental Education Research*, **16**(5–6), 463–474.
[7] Dufty N 2014 *Journal of Disasters and Enviroment*, **14**(7), 982–993.
[8] Muttarak R and Lutz W 2014 *Ecology and Society*, **19**(1), 1–8.
[9] Gallopín G C 2016 *Global Environmental Change*, **16**(3), 293–303.
[10] Shaw R, Shiwaku K, Kobayashi H and Kobayashi M 2014 *Disaster Prevention and Management*, **13**(1), 39–49.
[11] Chou J S and Wu J H 2014 *Natural Hazards*, **74**(2), 661–686.
[12] Krejcie R V and Morgan D W 1970 *Educational and Psychological Measurement*, **30**, 607–610.
[13] Wee S T and Abas M A 2015 *Australian Journal of Basic and Applied Sciences*, **9**(31), 459-463..
[14] Leitao, N. (2011). *Journal of Disaster Resiliience*, **3**(11), 234–256.
[15] Ozmen, F. (2016). *Disaster Prevention and Management: An International Journal*, **15**(3), 383–395.
[16] Mathbor, G. M. (2017). *International Social Work*, **50**(3), 357–369.
[17] Baytiyeh, H. (2017). *Education and Urban Society*,
[18] Seow T W, Abas M A, Goh K C and Mohamed S 2017 The constraints of good governance practice in national solid waste management policy (NSWMP) implementation: A case study of Malaysia *AIP Conference Proceeding* **1891**:020127.
[19] Seow T W, Abas M A, Mohamed S, Goh K C and Zainal R 2017 Good governance in national solid waste management policy implementation: A case study Malaysia *AIP Conference Proceeding* **1891**:020128.
[20] Tuladhar G, Yatabe R, Dahal R K and Bhandary N P 2014 *Geomatics, Natural Hazards and Risk*, **5**(3), 190–207