Conceptual Approach of Developing a Courseware to Educate Schoolchildren in Raising Resilence Towards Flood Disaster

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ABSTRACT

Flood has been a common natural disaster which can occur at any time since its magnitude and frequency are highly dependent on climate change. During floods, children appear to be at greater risk of injury and death as well as other health issues including long-term psychological effect. Hence, it brings into focus the responsibility of educating schoolchildren to be better prepared for floods. Although there are numerous awareness campaigns related to flood disaster being conducted at school levels, child drowning statistics still appears to be a major concern over the years. It is envisaged that multimedia technology would be appropriate to better equip schoolchildren residing in flood prone areas with the necessary knowledge and skills to increase their resilience towards flood disaster. Adopting AGILE technology, a courseware entitled "Jom SIAP Bersama Si Kelip" will be developed and tested involving the stakeholders throughout the development phase. Based upon, experiential learning this multimedia courseware aims to educate schoolchildren on flood disaster and what to do in the event of a flood. The schoolchildren will be tested on their understanding of flood hazard and its related disaster risk reduction by a quiz module which gauges the effectiveness of this courseware. Given the plethora of teaching resources on flood disaster, this paper pays particular attention to the need to develop a dedicated courseware that can be utilized in disaster risk reduction effort amongst schoolchildren.

Keywords: Multimedia courseware, disaster risk reduction, resilience, empowerment

I   INTRODUCTION

As world being constantly affected by the unpredictable climate change trends, issues of hydro-meterological related disasters are of greater concern at the global stage. Among the related calamities are floods, tropical cyclones, droughts, landslides, avalanches, heat waves and debris flow. In Malaysia, flooding is one of the hydro-meterological hazard which tends to occur annually. Flash floods, urban floods and coastal flooding are the common ones in Malaysia with aftermath effects towards economy, social and environmental aspects. One of the states that experienced severe flooding is Kelantan, whereby during the "Big Yellow Flood" in December 2014, almost 3390 people were evacuated and it was considered the worst ever flood episode in our nation's history (English, 2014).

The impact of a disaster may be different for each individual depending on the level of exposure, level of vulnerability, the ability to minimise and the recover from the arising negative impacts (Brooks, 2005). The statistics show that most of the affected victims were women, children, elderly and disable person. (Tarazona, 2011) also said that children have high vulnerability towards disaster due to their physical fragility, emotional and lack of independency to make decisions. Adequate preparedness and response approaches is one of the way to minimize the impact of the disaster (Wahyudin & Hasegawa, 2017).

Dedicated courseware for children could be an appropriate solution in order to increase their preparedness to face the outbreak of flood. In this modern and technological era, the millennial generation tends to armed with technologies, which the other generation were unable to enjoy it (Leight, 2006). Games simulation has been adopted as an aiding teaching and learning tools in education. With the interactive teaching and learning tools, children were given the ample opportunity to prepare and learn about the preparedness to face flood disaster. The objective of this paper is to discuss the use of courseware as an alternative tools to educate schoolchildren on flood disaster.

II   LITERATURE REVIEW

Natural disaster such as flood annually hit the nation although Malaysia lies stable in geological area free from volcanic eruption, earthquakes and strong wind (Chan, 2015). In 2014, 'Tsunami-like Disaster' in Kelantan hit the record as a largest and significant history causing 202,000 victims were displaced (Baharuddin et al., 2015; Su-Lyn, 2015). Another flood disaster in Malaysia also recorded in 2013 where four people died and eighty three people from eighty families have been evacuated to the Ringlet Community Hall after the heavy rain and releasing of

water from dam in Cameron Highlands (Davies, 2014; Kaur et al., 2013).

During the flood disaster, children are classified as vulnerable (Freeman, Nairn, & Gollop, 2015). As the frequency kept increasing, children are among those who at risk during the disaster (Lori, 2008). Lack of preparedness to the families, societies and emergency managers make them unaware on the situations that might be happened to them. Through the effective education, children can actively involve in identifying their own exposure and the significant level of risk to various disasters (Apronti, 2015). Flood disaster preparedness in education can help them to prepare and interact if the disaster occur in their life. Preparing before disaster occurrence plays an important role to ensure that the essential skills, knowledge and equipment to solves the disaster issues.

To attract the interest of schoolchildren in flood disaster preparedness the usage of technology gave huge benefits. Children tends to have more interest by using the digital means including through the web forums, online video lessons, multimodal texts discussion via chat platforms and many more (Lin, Tsai, Chang, & Kang, 2013). According to the Kin Wai Michael and Giovanni Jesue Contreras (2016), courseware is define as materials which are part of educational course or class. Courseware can be defined to all types of materials but usually it is associated with technology-based materials particularly software and often found with the educational software. Courseware such as quizzes and educational games is one of the tool that can help in developing the preparedness in children. Previous research shown that by using the online quizzes, proven that quizzes can give positive influence on students' academic performance (Salas-Morera, Arauzo-Azofra, & García-Hernández, 2012).

III   MULTIMEDIA TECHNOLOGY AS LEARNING TOOL

Multimedia technology has been touted as a tool that enables human to communicate, work and learn effectively (Stemler, L.K, 1997). Further, according to Bagui (1998) computer-based multimedia learning can help students to learn more effectively when compared to traditional methods. This is evident as the integration of rich media such as text, sound, video and images provide greater interactivity to learners and allow them to retrieve data non-sequentially thus making learning an interesting experience. In a study conducted by the Computer Technology Research, it is shown that students are able to retain information up to only 20% of what they see, and up to 30% of what they hear. However, when students are required to see, hear and do simultaneously, their ability to retain information goes up to 80% (Hofstetter, F.T, 1995). Therefore, multimedia technology is the appropriate

tool to be used to attract the interest of schoolchildren and teach them flood disaster preparedness.

IV   OBJECTIVE AND SCOPE

The proposed courseware "Jom SIAP Bersama Si Kelip" is a learning tool to attract schoolchildren interest as well as to teach them about flood disaster and flood safety procedures. The objectives of this courseware development are:

1. To design a conceptual model for educating schoolchildren on flood disaster and safety procedures.

2. To develop a courseware targeted to schoolchildren that can be used in creative learning environment.

The courseware is aimed at schoolchildren between the ages of five and eleven, residing in flood prone areas within the vicinity of hydro-electric dams in Malaysia. The content of the courseware is based on the flood safety procedures outlined by Tenaga Nasional Berhad (TNB). The courseware will consist of two modules namely an animation to educate children and a quiz to gauge their awareness on flood disaster and safety procedures. Both modules are in Malay language as to fit into the demography of the user.

V   METHODOLOGY AND COURSEWARE DESIGN

The development of the courseware adopts the AGILE methodology. Under this methodology, the courseware is gradually released, each with small and incremental changes from the previous release. Under each iteration, the courseware is tested involving stakeholders throughout the development phase.

The courseware applies the concept of multimedia by integrating all ingredients – text, image, animation and sound in a digital environment. The development of the courseware begins with designing the conceptual model. The next step involves designing the interface by developing the courseware storyboard. The conceptual model of the courseware is illustrated in Figure 1.

There are two modules in this courseware which are the learning module and the quiz module. Both module centres around a central figure called "Si Kelip", and the tagline "Jom SIAP" as shown in Figure 2 which make the learning experience engaging and interesting. The module is in Malay as to reach a wider audience and fit the language requirement of the audience who predominantly are Malay.
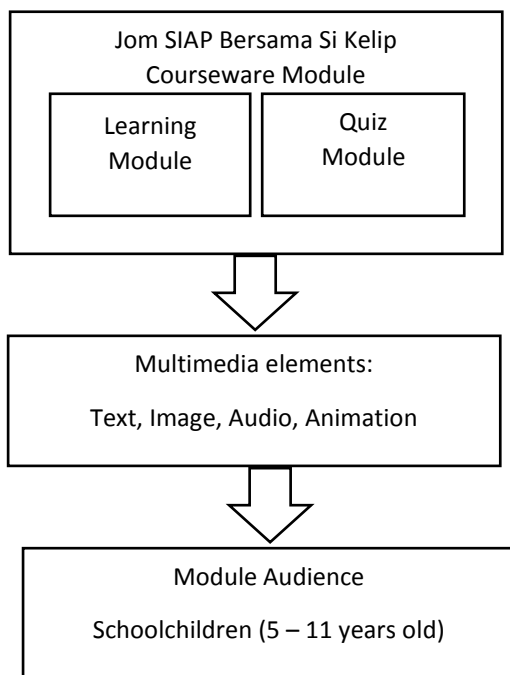
Figure 1. Conceptual Framework of Courseware

Figure 2. Courseware Figure and Tagline

A. **Education module**

The education module teaches the schoolchildren on various factors which could lead to flood. This includes incessant logging and clogging of drains and rivers due to rubbish dumping. The courseware also focussed on safety procedures to be taken before, during and after the occurrence of flood. A screenshot of the education module is shown in Figure 3.

Figure 3. The education module

The module is designed to allow schoolchildren to navigate forward to the next page, or backward for revision. There is also a button to navigate back to the courseware home page. Navigation is achieved by clicking on the arrow buttons, and the house icon to return home.

B. **Quiz module**

The quiz module is intended to gauge how far the schoolchildren have learned about flood disaster and, flood preparedness and safety procedures. To make this a personalised experience, the quiz start by asking the child's name. The child can then answer the quiz, which covers aspects such as factors which cause flood and the safety procedures before, during and after the flood occurs. Feedback is given instantly to the child when the quiz is attempted. The final score of the quiz will be displayed once all questions have been answered. The child can then opt to return to the courseware homepage, or re-attempt the quiz to score a better mark. A screenshot of the quiz module is shown in Figures 4(i) and 4(ii).

Figure 4(i). Quiz Module Question

In both modules, multimedia elements are used extensively. In the education module, the courseware is incorporated with texts, images, sound and animation that will incite interest in schoolchildren. The narration is simple and easily understood by children. Similarly, the quiz module also incorporates rich multimedia elements that make this learning experience interesting and effective.

Figure 4(ii). Quiz Module Feedback

Generally, this courseware is developed with the intention to allow schoolchildren to learn and to create, reflect and work out on their understanding on the subject matter. This is evident from the flow of the interfaces. As shown in Figure 5, a child can opt to learn and to attempt the quiz. Should the child need to backtrack to revise on the content, this is achievable by simply clicking on the back button.
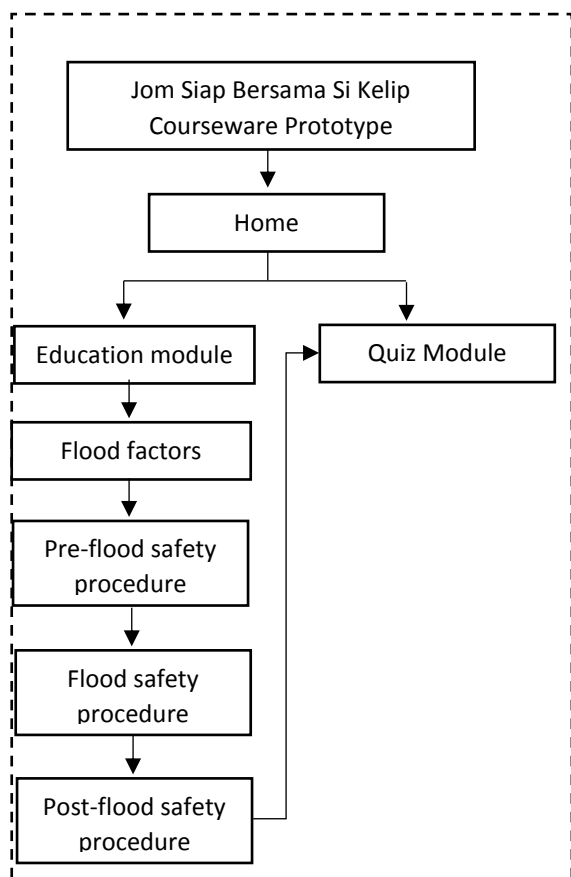

Figure 5. Courseware Navigation Flow

VI   CONCLUSION

Multimedia technology has made in-roads into sectors such as entertainment, health and education. Its integration into learning material has allowed learners to learn more effectively thus retaining more information. This courseware is an appropriate solution in order to increase schoolchildren preparedness to face the outbreak of flood, and is

expected to contribute vastly to them particularly those residing near hydroelectric dams on flood safety.

It is hoped that this courseware will be expanded to all schoolchildren nationwide and disaster preparedness lessons can be incorporated in school curriculum so that schoolchildren and the society can prepare and interact if disaster occur in their life.

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