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“Optimizing Innovation in Knowledge, Education and Design”

EXTENDED ABSTRACT



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Assalamualaikum warahmatullahi wabarakatuh,



First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality. I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services. By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality. I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH



WELCOME MESSAGE (i-SPIKE 2023 CHAIR)



We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPIKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPIKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail

Chair

3rd International Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023)

FIRE PREVENTION AND SAFETY(FIPRESA)

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ABSTRACT

Fire hazards had rampantly been reported in the news. Hence, it is essential for the public to self-assess the fire safety level at their dwelling places like their home and public buildings. In this digital era, it is essential to have an application that can be accessed on mobile devices or via the web for self-assess fire management purposes. The application was developed for four purposes. First, is to self-assess home and buildings fire risk and safety level. The second is to promote awareness of home fire safety. Third, to educate the public on the topics related to fire safety. Fourth, fire prevention at homes. To measure home fire safety, the application will generate a fire safety index to alert homeowners the status of fire safety at their homes and indicate suggestions on areas where actions

need to be taken immediately. Videos on how to escape from a home fire, how to use the fire extinguisher, kitchen safety, electrical safety, and metal home grill safety are also incorporated into the application to achieve its second, third, and fourth objectives. The application was developed based on a study conducted in Sarawak on fire safety management employing fire safety requirements, measurements, and guidelines by the Fire and Rescue Department Malaysia (Bomba). Bomba officers had tried out FIPRESA and prompted its credential as a potential fire safety management tool. It is a user-friendly application and can be used by anyone without age constraints. FIPRESA helps prevent fire hazards at homes. It saves our loved one's life and property as it offers preventive measures. It also supports the "Sustainable Cities and Communities" of the United Nations Sustainable Development Goals

Keywords: Fire Prevention and Safety Application, Fire Safety Management Tool, Fire Hazards, Fire outbreak, fire risk

INTRODUCTION

A home is a place where one lives. Home can come in many forms and categories. One of home disasters is fire outbreaks. Home fire hazards had rampantly been reported in the news. Fire outbreak cases occurred all around the globe due to different factors. Global and local research has shown that among the factors of fire outbreaks are arson, combustion and maintenance, technical faults, human errors, and natural disasters. The statistics of fire outbreaks from the Fire and Rescue Department of Malaysia Headquarters, Sarawak (2020) reported that most of the cases of fire outbreaks were caused by electrical and technical installations such as short circuits and overloaded current, gas appliances, and kitchen activities associated such as unattended cooking activities and so forth. Hence, it is essential to promote awareness on fire safety, and educate the public on fire prevention and safety. In this digital era, an application for the public to self-assess fire risk and safety at homes and public buildings can be very helpful for fire prevention and safety. Thus, this paper discussed an application for self-assessing fire safety at homes and public buildings which was developed based on a study conducted in Kuching on fire safety requirements, measurements, and guidelines by the Fire and Rescue Department of Malaysia.

LITERATURE REVIEW

The Fire and Rescue Department Malaysia (Bomba) has spelled out five elements of Fire Prevention. It can help to reduce fire risks and incidents while increasing fire safety. The elements included were Education, Enforcement, Emergency Response, Engineering, and Economy Incentives, which are referred to as 5Es.

According to the Fire and Rescue Department of Malaysia (2020), the public need to be aware of the danger of fire and take fire safety seriously to prevent the increasing number of victims during fire occurrences. There are some ways that can be done to provide education on fire prevention. A fire prevention campaign is conducted to increase public awareness of fire prevention and fire safety. The campaign can be done through lectures, demonstrations, or any other possible ways.

Enforcement plays a big role during the occurrence of fire and disasters (Fire and Rescue Department, 2020). The committee involved in the enforcement team will help in giving assistance to rescue people during and after the fire occurrence. The committee needs to make an inspection once in a while at the buildings to make sure that the fire safety level is

maintained and the risk of fire occurrence is very low. By doing the inspection, the fire safety committee is able to identify certain things that may need to be changed or updated to prevent them from becoming the cause of fire occurrence.

Other than that, emergency response is also one of the elements of fire prevention and safety. Emergency responses include evacuation plans and emergency procedures (Fire and Rescue Department, 2020). During an emergency, the occupants must be able to evacuate the premises. This is to ensure a low risk of injuries upon occupants. Instructions regarding emergency procedures also need to be shown visibly, especially in public buildings. The emergency procedures may provide several steps such as activating fire alarms to inform other occupants of the risk of fire outbreak or occurrence of fire.

Fire safety engineering is another important element in fire prevention and safety. It refers to the enabling of scale-related and aesthetically relevant structures that meet the requirements of fire safety to be built, where it helps to shape civil engineering development by allowing cheaper and lighter structures to withstand fire for an equal duration, due to better materials and techniques (Fire and Rescue Department, 2020). Fire protection basic requirements such as smoke and heat exhaust ventilation, water sprinkler system, and fire alarms should be installed in premises as prescribed in the law.

Lastly, economic incentives include fire prevention activities such as campaigns and fire drills (Fire and Rescue Department, 2020). They are often the first line of budgetary cuts, and this may result in much higher expenditures if a major fire occurs. Before the damage happens, the economic effect of the fire is not apparent (“Community Risk Reduction”. n.d.). The management of public buildings should have economic incentives to increase the awareness of their occupants about fire prevention and safety. Banners or flyers are also considered as activities of fire prevention and safety. Therefore, the budget allocated for fire prevention and safety activities is important to reduce fire risk.

METHODOLOGY

The focus of the study was on all types of private homes and public buildings including learning institutions, the airport, federal buildings, state buildings, hospitals, hotels, shopping malls, heritage buildings, housing areas, and longhouses. The study was conducted in the first Division of Sarawak which is Kuching. The general public was the respondent of the study. A cross-sectional study was conducted employing both offline and online surveys. A total of hundred fifty home occupants and employees of public buildings participated in the survey. The survey covered the five main areas of 5Es which include Enforcement, Engineering, Education, Emergency Response, and Economic Incentives. A total of twenty-four questions were written in both English and Malay languages. Six-point Likert-type rating Scale was assigned to represent respondents’ responses, where ‘0’ for mixed feelings, ‘1’ for strongly disagree, ‘2’ for disagree, ‘3’ for neutral, ‘4’ for agree, and ‘5’ for strongly agree. The survey was tested for its reliability before it was innovated and transformed into a fire prevention and safety application.

FINDINGS

Table 1 below exhibits the Cronbach alpha coefficient score obtained for each of the five main items in the survey established based on Malaysia's Fire and Rescue Department's 5Es fire prevention and safety approach.

Table 1: Cronbach Alpha Coefficient Score

Item	Cronbach Alpha
Education	0.929
Enforcement	0.946
Emergency Response	0.816
Engineering	0.836
Economic Incentives	0.840

Based on Table 1, all dimensions have an excellent alpha coefficient score above 0.8. All items are reliable for establishing fire prevention and safety measures. According to Ursachi, Horodnic, and Zait (2015), the alpha coefficient score is a range of not satisfactory when $\alpha < 0.55$, an acceptable level of reliability when $\alpha < 0.6 - 0.7$, and very good when $\alpha > 0.8$. The element of enforcement has the highest alpha coefficient score, followed by education, fire occurrence, economic incentives, engineering, and emergency response.

CONCLUSION

It can be concluded that the fire prevention and safety 5Es approach by Malaysia's Fire and Rescue Department can be used to be innovated into a digital application that can be used to conduct fire prevention and safety self-assessment by homeowners and the general public. The application will be able to help prevent fire hazards in homes and public buildings. It saves lives and properties as it offers preventive measures. It also supports the "Sustainable Cities and Communities" of the United Nations Sustainable Development Goals. Nevertheless, further research involving both West Malaysia and East Malaysia regents is highly recommended as the study only covered a division in Sarawak and involved only hundred fifty respondents.

ACKNOWLEDGEMENT

We would like to express our deepest gratitude and appreciation to all those who contributed to the successful completion of our extended abstract and research on fire prevention and safety applications, with a special focus on the invaluable cooperation and support provided by the villagers of Kampung Annah Rais.

First and foremost, we extend our heartfelt thanks to the villagers of Kampung Annah Rais for opening their homes and hearts to us during our field study. Their willingness to share

their experiences and insights was instrumental in shaping our research and the development of practical solutions for fire prevention and safety in rural communities.

Our sincere appreciation goes to our dedicated lecturers, Madam Elizabeth Caroline Augustine and Miss Nur Farhani binti Samasu, for their unwavering guidance, mentorship, and the wealth of knowledge they generously imparted throughout the research process. Their expertise and encouragement were pivotal in our academic journey.

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This research experience, made possible by the cooperation of the villagers, the guidance of our lecturers, and the dedication of our group members, has been immensely rewarding and enlightening. It has not only deepened our understanding of fire safety in rural settings but has also empowered us to make a positive impact through the application of our findings. In closing, we extend our heartfelt gratitude to all who contributed to this endeavor. Your support, cooperation, and expertise have been instrumental in the success of our research, and we look forward to continuing our efforts to enhance fire prevention and safety in rural communities.

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