Jurnal EVOLUSI

Please cite this article as: Mustafa, N. W., Manan, D. I. A., Jantan, S. R., Isa, R., Mohd, M. M., Azwary, R. A. & Azmi, M. I. S. N. (2021). HIRARC system (Hazard and Risk Management System). *Jurnal Evolusi 2*(2).

HIRARC SYSTEM (HAZARD AND RISK MANAGEMENT SYSTEM)

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ABSTRACT

In recent years, hazard identification, risk assessment and risk control (HIRARC) have become fundamental to the practice of planning, management and the operation of a business as a basic of risk management. The organisations that have carried out risk assessments at the workplace have noted numerous changes in their working practice. Those who have performed the risk assessment at work found there are positive changes in their working practice. They recognise the substandard act and working conditions as they develop and take necessary corrective action. With HIRARC, one will identify the hazard, analyse and assess its associated risk and then apply the suitable control measures. Legislation requires that this process be systematic, analysed, and recorded so that the results are reliable.

ARTICLE INFO

Keywords:

HIRARC,
Hazard,
Risk

1.0 INTRODUCTION

HIRARC stands for Hazard Identification, Risk Analysis and Risk Control. It is the system created for the use of mobile and web applications. The system shall cover online complaints, assignment of 'person-in-charge', maintenance report, until risk management report. The main rationale for this project is to adhere to the MARA ECOSYSTEM QUALITY STANDARD (MQS) certification that requires a more systematic hazard and risk management. Also, HIRARC system would aid KUPTM to manage its hazards and risk within the time, fund and labour constraints.

The development of the system is based on the Rational Unified Process (RUP) Model that encompasses four phases: inception, elaboration, construction, and transition. These phases will further spread into six sub-stages: requirements gathering, design & analysis, software development, testing, launch, and maintenance. Interview sessions are conducted at the inception stage to identify the requirements and architecture of the system. And a simple is used to determine the achievement of the project's objectives. The system would significantly contribute to the efficiency of HIRARC management in KUPTM and later extended to KPTM SB and KPTM branches..

2.0 LITERATURE REVIEW

2.1 HAZARD PROCESS

Hazard is defined as anything (e.g. condition, situation, practice, behaviour) that can cause harm, including injury, disease, death, environmental, property and equipment damage. Hence, the purpose of hazard identification and risk assessment is to highlight the critical operations of tasks that have significant risks to the health and safety of employees. Besides highlighting those hazards on specific equipment due to energy sources, working conditions or activities performed.

The process of hazard identification and risk assessment is called HIRARC. HIRARC involves several steps that are:

Step 1. Identify hazard

There are several types of hazards: electrical, mechanical, chemical, radiation, biological, and physical (Infografik Pengurusan Keselamatan dan Kesihatan, 2018).

Step 2. Assign risk probability

Hazard is a closed relationship with the risk. Risk is a measurement to analyse and evaluate the danger (Majid and McCaffer, 1997). The measurement is made by identifying how severe and when likely the hazard is. In other words, the risk assessment is an in-depth look to specify situations, process and other harmful activities or dangers at the workplace. Risk is presented in various ways to communicate the distribution of the risk throughout the workplace. There are four risk probabilities: Very likely, likely, unlikely, and highly unlikely.

Step 3. Determine the consequence of the hazard

There are four main consequences of a hazard: death, major injuries, minor injuries, and first aid. These consequences are labelled as intolerable, unacceptable, tolerable, and acceptable.

Step 4. Determine the level of risk

The risk level is assigned to each hazard for identifying required corrective action to minimise the risk or eliminate the threat. Level of risk is calculated based on the interaction of risk probability and consequence. There are three levels of risk: high, moderate, and low

Step 5. Develop risk matrix

The risk matrix is developed to illustrate overall hazard and risk assessment and is essential for deciding on risk control. The risk matrix is shown in Figure 2(a) and 2(b).

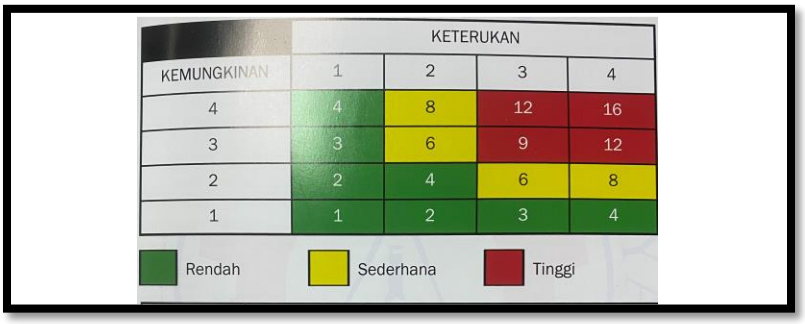
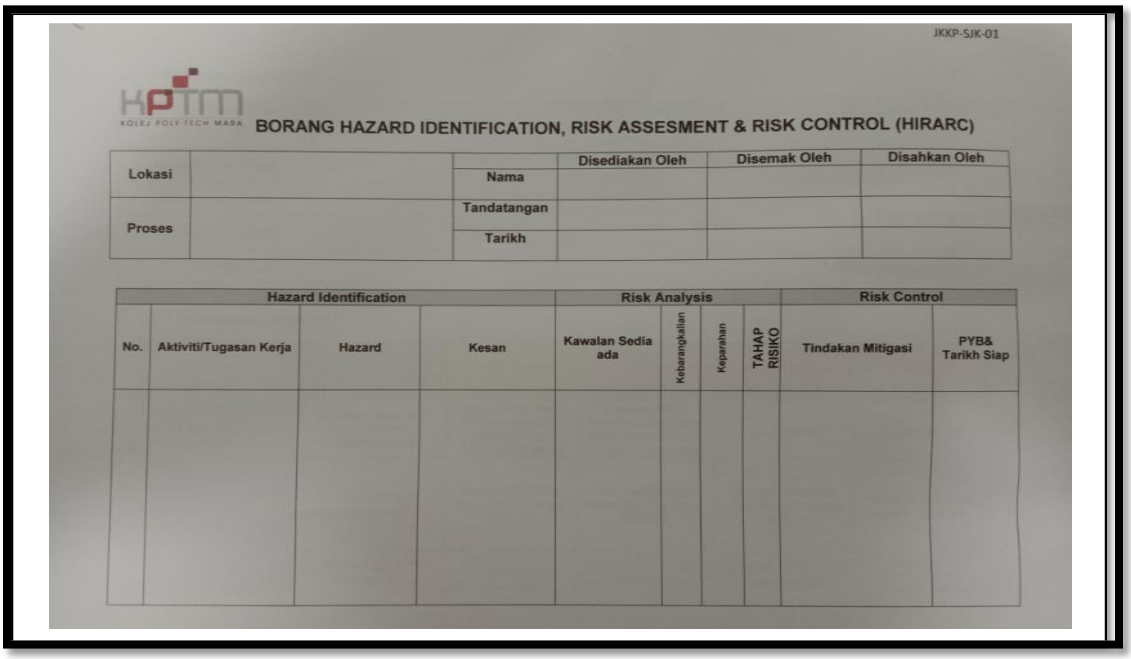


Figure 2(a): Risk Matrix

Figure 2(b): Risk Matrix, continue

2.2 CURRENT SCENARIO OF HAZARDS AND RISKS MANAGEMENT IN KUPTM

At the moment, hazards and risks management in KUPTM is conducted manually. The current practice ton process of hazard identification and risk and mitigation assessment is recorded in HIRARC form, as shown in Figure 4. It is a simple form and traditional way to report a problem where a list of a few hazards is recorded in one table. The drawback of the current practice is that the user needed to write down the hazard details. As a result, the process takes a longer time. Thus, it demotivates people to make a report. As a consequence, it is delay report submission and eventually may worsen the hazard



JKKP-SJK-01

KPTM KOLEJ POLY-TECH MARA

BORANG HAZARD IDENTIFICATION, RISK ASSESMENT & RISK CONTROL (HIRARC)

			Disediakan Oleh	Disemak Oleh	Disahkan Oleh
Lokasi		Nama			
Proses		Tandatangan			
		Tarikh			

Hazard Identification				Risk Analysis				Risk Control	
No.	Aktiviti/Tugasan Kerja	Hazard	Kesan	Kawalan Sedia ada	Kebarangkalian	Keparahan	TAHAP RISIKO	Tindakan Mitigasi	PYB& Tarikh Siap

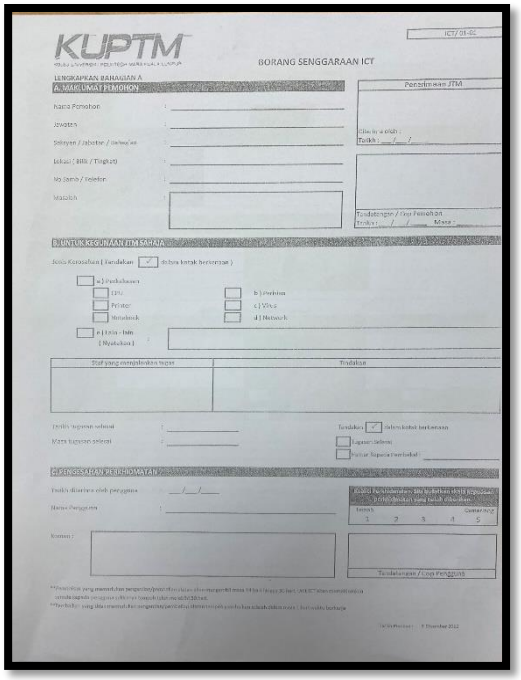
Figure 4: KUPTM HIRARC Form

Besides that, KUPTM also depends on PTD/06-02 (refer figure 5) and ICT/01-01 (refer figure 6) forms to file a report on damages to physical assets and information technology tools and equipment.

KPTM

PTD/06-02

Figure 5: Damage Complain Form



KUPTM

ICT/ 01-01

BORANG SENGGARAAN ICT

Figure 6: ICT Maintenance Form

Consequently, all of these forms make the overall process of damages complaint, request for maintenance, and hazard and risk management slow. As a result, KUPTM resources like time and labour were unable to be utilised efficiently. The issues will be solved when a mobile application of the HIRARC system is created.

2.3 EXISTING TOOLS / SYSTEMS / APPLICATIONS

Case 1: E-HIRARC: A Market Ready System

There is one system readily available in the market, called e-HIRARC. The system is sold for USD85 inclusive of HIRARC form (refer to figure 7), hazard and risk table (refer to figure 8 and 9), and the manual. The cost is considered lower than paying for the system development fee. However, the system could partially fulfil KUPTM requirements and do not reflect the complete hazard and risk management process in KUPTM. Also, the system is a web system used on the website only.

Figure 7: E-HIRARC Form

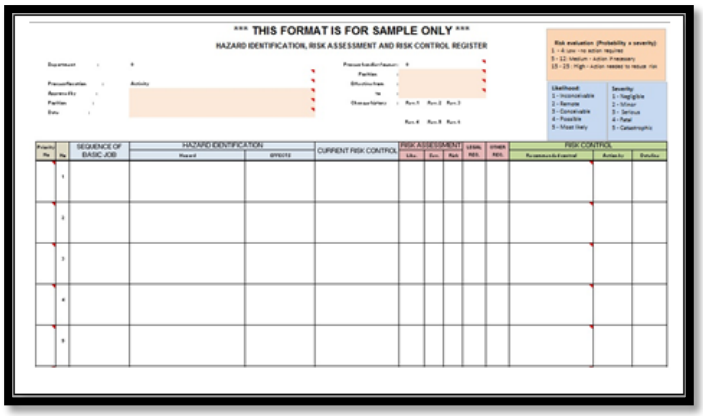


Figure 8: Hazard and Risk Table

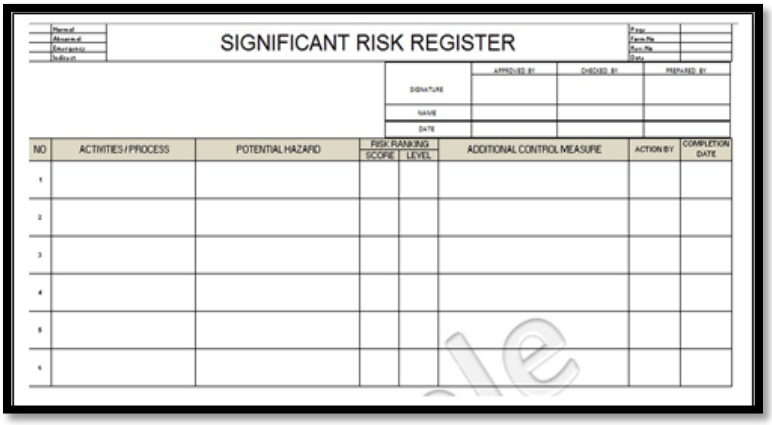


Figure 9: Risk Register

Case 2: Universiti Teknologi Malaysia (UTM)

UTM has a website dedicated to occupational safety and health for its residents. However, the system was not fully applied to UTM's operation (refer to figure 10), as Nurul Asyikin and Noh (2016) reported. At most, there only consists of digital forms as a process input (https://www.utm.my/oshe/).

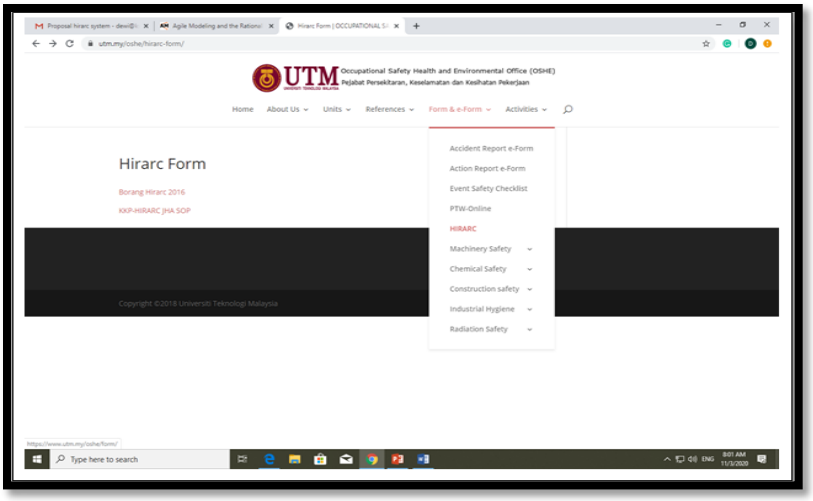


Figure 10: UTM HIRARC website

3.0 METHODOLOGY

3.1 DESCRIPTION OF METHODOLOGY

As shown in figure 11, six phases will be involved in the HIRARC development, namely,

I) Requirement Gathering

II) Design & Analysis

III) Software Development

IV) Testing

V) Launch

VI) Maintenance

a. Requirement Gathering

This stage will study the project in detail and list down the features that the app requires. It will look into the requirements about the best tools for developing an app. It prepares the list of necessary items and installs the essential software on the system. The essential cost will be identified in this phase based on the functional requirements of the project or solution.

b. Design & Analysis

System analysis is vital in determining the needs of the project's requirements. In this phase, the study will describe in detail the necessary specifications, features and operations that will satisfy the functional requirements of the proposed application. The project's design will be defined clearly before going to the next stage.

c. Software Development

The software will be developed following the timeline that has been set.

d. Testing

The primary purpose of the testing phase is to determine whether the application software developed is ready for implementation. This phase will be conducted a couple of times using different testing techniques.

e. Launch & Installation

Application software will be launched to use by the user. Installation and setup will be conducted at this stage.

f. Maintenance

This application software will undergo a trial period for one semester of running class. During this trial period, any feedback that received from users will be collected for improvement and future enhancements

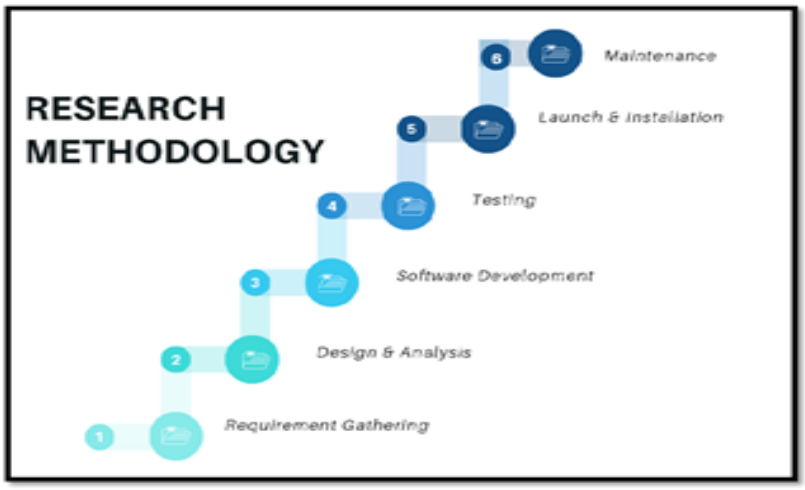


Figure 11: Research Methodology

3.2 USE CASE DIAGRAM

A diagram will be produced for an early stage of development to identify the context requirement and validate a system architecture. Figure 12 shows the initial requirement of the system based on the previous investigation. It may change to achieve the objective of the project. The basic flow of this system is to produce a HIRARC report from the user input through the complaint form. The system should also analyse the input to determine the type of hazard and recommend the possibility of risk action and control plan.

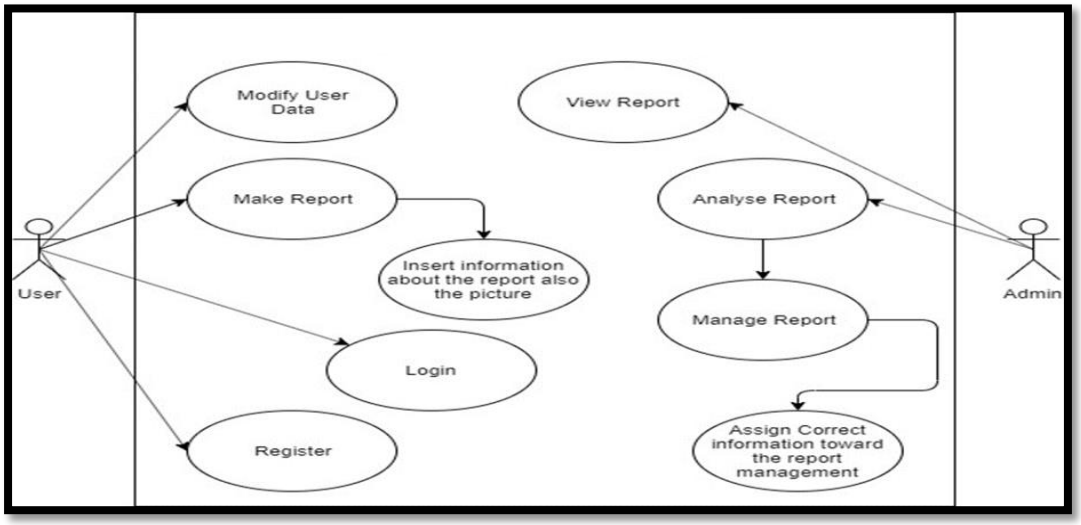


Figure 12: Use Case Diagram

4.0 FINDINGS AND DISCUSSION

. As one of the subsidiaries of MARA, Kolej Universiti Poly-Tech MARA (KUPTM) also must apply for the MQS certificate. However, complying with new policies and standard is quite challenging. With the high demand to increase the number of students, upgrade to full university status, and provide excellent service to students, KUPTM is working in a very fast-moving environment.

One of the challenging areas that KUPTM must comply with and improve is the conducive environment. In other words, KUPTM needs to manage its hazards and risks to meet the conducive environment requirement.

5.0 CONCLUSION

The system will benefit KUPTM because of its easy access to it. It will be developed as an independent platform for both mobile and web applications, so the admin can maintain proper contact with their users, which may be accessed anywhere. All communications between the client/user and administrator will be done online easily. This project will be implemented in September 2021. Many constraints are expected while working on a project. The project foresees issues like cost, scope, quality, client satisfaction, risk, resource, and time. However, the team is very committed to making this project successful to achieve Mara Ecosystem Quality Standard (MQS) in KUPTM.

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