Emergency Response Procedure for the New Residential College

by

Mohd Nazreen Mohd Nasir

Dissertation submitted in partial fulfillment of
the requirements of the
Bachelor of Technology (Hons)
(Information System)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information Technology / Information System Programme
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Approved by,

_____
(Hasiah Binti Mohamed)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

MOHD NAZREEN BIN MOHD NASIR

ABSTRACT

Emergency Response Procedure for the New Residential College was developed in order to enable the Village 3 and Village 4 residents, staffs and the public to learn about the Emergency Procedure that should be taken during the emergency situation. Thus the main objective of this project is to develop a simulation that can educate the residents about the Emergency Procedure. Other objective is to create a simulation to increase the resident's awareness about the important of Emergency procedure. The project was developed using 3D modeling where 3D studio max was used to create and animate it. Later the animation will be imported into flash and presented using flash as a platform.

ACKNOWLEDGEMENT

The author would like to convey his highest gratitude to Mrs Hasiah Mohamed for her guidance through the period of this project as supervisor. Without their advices and helps, the project may not be able to finish within the given period of time.

The compliment should also goes to the personnel of KLCC Berhad and the Final Year Project computer laboratory technicians for their cooperation and assistance in making the project a success.

Lastly, the author would like to thank all the people that have contributed in completing this project especially to all friends for their advice and support.

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INTRODUCTION

The emergency response procedure (ERP) is a step by step instruction that must be followed if a disaster strikes like fire, gas leakage and others. The procedure is a crucial knowledge that a new resident must know. As new resident the University of Technology PETRONAS (UTP) new residential college, we might not know the residential response procedure that has been setup by the Health Safety Department.

Emergency response procedure can minimize losses. Top management is responsible for emergency response planning, which is usually done under the guidance of the safety, health and environmental protection department of an organization. Planning should focus on protecting the health and safety of employees and the public, as well as property and the environment, and on restoring normal operations after accident.

A comprehensive emergency plan should cover fires, natural disasters, and other such incidents. Developing a good plan requires knowledge of the resources, operations and capabilities of the facility and the surrounding area. Response teams should be readily accessible to the disaster. Building and operations that are potential hazards should be designed so that they can be segregated from other loss hazardous operations or offices. Damaged utilities, building, process equipment, and storage should be salvaged, overhauled, and made operational as soon as possible. Environmental contamination should contain and mitigated, in compliance with regulations. The plan should be applicable to all anticipated emergencies and tailored to the needs of the organization.

As a fact, to some it may not be an issue at all. However such minor problem could turn into a major one if overlooked entirely.

1.1 Background of Study

UTP will be the research area for this project. The new residential college is located within the UTP compound. The campus is still on the development phases right now. Four fifth of the campus is still on development and construction. Year by year, there must be expansion in the number of campus community. So, it is perfectly the time for UTP to have its own campus information system in order to present itself more efficiently and manageably.

The purpose of this project is to perform a research about the best method of developing an effective user interface for the emergency response procedure for the new residential college. Since there are many guidelines in developing an interface, the project will only focus on the most common type of guidelines that will help users to learn about the procedure. Guidelines constitute a popular means of providing input for human factors design in the development of interactive computer-based products and services.

The project title is Emergency Response Procedure for the New Residential College. The main application that will be developed in the project is 3 dimensional (3D) visualization of the new residential college. The analysis part of the projects will be the searching of information for the university. Also, the analysis will include an emergency escape simulation plan that will simulate the emergency route in the new residential college.

1.2 Problem Statement

Currently, the university community really depends on hardcopy materials in order to conduct training for the student. Hardcopy materials are usually easy to gets damaged or soaked if not carefully taken care of. Usage of hardcopy materials is undesirable with nowadays principles, which is to reduce the use of paper in everyday transaction towards paperless environment. Apart from that, hardcopy materials are also difficult to be distributed to each and everyone of the campus community because of the large number of students.

Up till this moment, the emergency escape exit plan being displayed at only certain places of a building. Usually, most people tend to ignore that kind of plan. It is because of its dull look and also not interactive. People in this millennium era want things to be interactive and real-time.

Besides that, the students of the new residential college must be aware of the emergency procedure if there an emergency occurs. As for now, there is no simulation procedure for student to learn and know about the steps that should be taken for the emergency situation.

Some problems faced by the new residents are no training or drill for residents who are not experts, of which will consume a lot of time to think during the critical situation. Residents are unsure of the responsibility and task of the emergency procedure. There is no written documentation for the residents as the guidance on how to react if there is a critical situation.

1.3 Significance of the Project

The significance of this project to the problem is that the prototype of a 3D ERP of this project gives a guideline to the problems faced by new residents. The product and guideline of this project will help to give ideas and alternative design especially for the safety of the new student. New residents usually face difficulty learning from written materials. This maybe due to lack of interest or knowledge of the procedure done by the UTP Health Safety Officer who used only a written materials.

Moreover, the prototype of 3D ERP focuses on emergency procedure for the new residential college purposes. It is a prototype for the residential management that focuses on promoting smooth steps to be taken by the new resident's when there is a critical situation occur. Here lies the advantage of the application because the design applies the guideline from the research study. The application is simple, user-friendly, and easy to understand. It is time consuming to train for users.

The aim of this project is to help both designers and new residents so that they will be able to take action whenever emergency situation occurs.

1.4 Objective

1. To alert the new resident about the emergency procedure by using 3D simulation.
2. To identify and compile a procedure to assist in developing user-friendly prototype. The prototype inference usability of the interface through product and process. Usability in terms of:
   - Ease of learning
   - High speed of new resident task performance
   - Low new resident error rate
   - Subjective new resident satisfaction
3. To develop working 3D ERP based on research findings.

1.5 Scope of Study

The research is based on the importance of ERP in developing a usable interface. The guidelines to be used to utilize the usability of the application developed are user-friendly and easy to understand. The research also looks into suitable and user-friendly designs. The research scope caters the new residents and resident management.

The design and development of the prototype of the 3D ERP prototype will include the followings but not necessarily limited to than:

1. To have a system that applies the guideline of Health Safety Environment Act.
2. To have a user-friendly.

It is a hope that the prototype will be further improved in the future. This is simply to ensure that the procedure is used in an effective and efficient way to deliver a user-friendly environment.

1.6 The Relevancy of the Project

There are two different approaches involved in each stage of the development process.

- Research on the importance of ERP

  Research will be carried out on what procedure is important to develop the prototype and developing the prototype using Health Safety Environment guidelines.

- Development of the prototype

  Developing the 3D ERP to implement the research findings using appropriate software.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Emergency Response Procedure is a major step in preparing for all emergencies or potential hazards that usually occur suddenly and unexpectedly. The main objective of developing this ERP is to ensure the capability of residents and surrounding people in dealing and managing an adverse situation, which has the potential to cause harm to life, property, environment, operations and reputations. It is also prepared for the UTP's ERP Teams and the new residential college hostel occupiers to prepare the pre-incident planning and to mitigate the situation in the event of an outbreak of fire.

2.2 What is Emergency Response Procedure?

According to Occupational Safety Health Act, ERP is an effort by residence outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fore departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized or otherwise controlled at the time of release by residence in the immediate release area, or by maintenance personnel are not considered to be emergency responses. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion or chemical exposure) are not considered to be emergency responses.

An emergency is the most serious event and consists of any unwanted operational, civil, natural-phenomenon, or security occurrence which could endanger or adversely affect people, property, or the environment. The implementation of planning and preparedness during an emergency involving the effective decisions, actions, and application of

resources that must be accomplished to mitigate consequences and recover from an emergency.

The plan is a brief, clear, and concise description of the overall emergency organization, designation of responsibilities, and procedures, including notifications, involved in coping with any or all aspects of a potential credible emergency.

2.3 AutoCAD in Architecture

Computer Aid Design's (CAD) growth within architecture seems to have leveled off. A few years ago, there were great debates as to whether CAD would prove to be a cost-effective production tool. Although many architects remain sentimentally attached to their T-squares and practiced chisel-point lettering, the majority will agree that CAD has become the preferred tool for generating contract documents. Producing these drawings is but one facet -- perhaps not the most glamorous -- of an architect's job. However, it represents the largest part of the average architect's billable hours. So, those who draft either use CAD, intend to learn it, or hope to retire soon and let the youngsters deal with it. CAD grew as it was accepted as a drafting tool. For CAD's growth in architecture to surge again, it must graduate from being the tool of the draftsperson to being the tool of the architect, a tool for a much broader set of tasks.

Suggesting that CAD grows beyond drafting may seem to disregard its very definition. After all, the acronym CAD comes from either computer-aided design or computer-aided drafting. But, just as drawing has always been the central means of expression for the architect, CAD is central to a variety of computer-aided tools. The T-square has been more symbolic of the architect's work than the typewriter; CAD has a more central role than the word processor. The point is not that CAD should strive to do the work of a full-fledged word processor, but that a better CAD system would result from integrating the most useful functions of a word processor, spreadsheet, and so on. The definition of CAD must be broadened.

Architects use AutoCAD more through perceived need than through preference. Before being convinced of AutoCAD's advantages, an architect will use it because the client wants it, the consultants have it, and the work force has already been trained on it. But if

they get together and talk of the ideal CAD tools, too little optimism is directed toward AutoCAD. It is well known that the move to AutoCAD Release 13 has been shelved by many skeptical architects. Long-time AutoCAD users are asking about MicroStation more than ever. Devoted users of ARRIS, AES, and DataCAD offer good arguments as to why these now marginal systems were better friends to the architect. Architects need AutoCAD, and AutoDesk knows it. We hope AutoDesk is interested in our loyalty as well as our upgrade fee. With the right set of added tools, AutoCAD's usefulness to architects could spread beyond drafting into marketing, design, project management, and construction administration.

AutoDesk would do well to look at some of these alternative systems not as mere rivals defeated through superior marketing, but as sources of valued content and innovative approach. Some of these tools can be added to AutoCAD through third-party products. It is understood that no product can be all things to all people, and extensibility has been key to AutoCAD's success. On the other hand, many architects have become bitter after being told to research third-party solutions, spend more money, spend time configuring, and then hope their efforts are not made obsolete when AutoCAD's next version comes out.

2.3.1 Graphics

The concept of having a color equal a line weight was a good starting point, but there are many requests for independent color and weight control and the ability to display them (plot preview doesn't count). Polylines are a workaround and would need much greater flexibility if expected to handle this task. Layers need print and display hierarchies so that entities on the upper layer will automatically occlude entities on a lower layer. AutoCAD Release 13 takes an awkward first step toward this. Support for embedded raster images has been improving and should continue. These basic graphic facilities are found even in low-end illustration programs. Building them into AutoCAD's core would go a long way toward improving the graphic quality of our drawings and give us the option of using AutoCAD to put together a firm brochure.

2.3.2 Design

CAD, as a design tool, is a hot topic today. Of the many facets of our work, design is often the closest to the architect's heart. CAD, however, is thought to be a rigid, tedious, and counter-intuitive tool. It gets in the way of the process and seems to have little to contribute to it. Even the most CAD-fluent architects turn back to the pencil and roll of tracing paper when they need to work through an idea.

There are good reasons why we want CAD to become a better design tool. Project efficiency through reusing the drawings produced during design is important. The first goal of CAD must be to become as natural to the designer as the pencil and tracing paper. Here, I use the term designer instead of architect. Sometimes it is a distinct job description, but more often, it is just another of the architect's hats.

Anyway, comfort with AutoCAD must come in minutes of exploration, not weeks of training. The need for simplicity cannot be overemphasized. Designers struggling to learn AutoCAD complain that there are too many steps and too many options. They need their own menu, without xrefs, attribute creation, dimvar adjustments, and the like. Sure, they can customize their own menus, but that misses the point. A set of on-line tutorials would be an obvious help.

2.3.3 Diagramming

CAD-based design can be broken into three distinct processes: diagramming, sketching, and sculpting. Bubble diagramming could benefit from the ability to create simple parametric relationships between geometries. Imagine creating shapes that represent specific functional spaces and then constraining them by simple rules. The kitchen shape must always be within so many feet of the dining room shape, the porch shape must always be to the south of all the other shapes, and the exit shapes cannot be more than a certain distance apart. Sliding one shape results in automatic adjustments of the other shapes. Various arrangements could be explored by sliding shapes around with the confidence that the basic requirements are always taken care of. Substitute volumes for

shapes, and you can work three dimensionally. Link a numeric table to these shapes, and as they are stretched, the square footage and material estimates can be provided. Tools of this sort are available from Autodesk or third-party vendors and could be incorporated into AutoCAD. Parametric technologies -- they're not just for mechanical engineers any more.

2.3.4 Sketching

Sketching is many things to the architect. It is a tool for digging out thoughts, for visualizing and exploring, and for recording and communicating. Layers, when in design mode, could more closely mimic tracing paper. Click on the floating trace corner, and then sketch on that layer. Grab the trace corner, and slide the layer around. Double click the trace corner, and watch the layer shrink to a thumbnail sketch that sits unobtrusively off to the side of the screen until brought back later. After a sketch is developed, run the trace utility and the loose lines can be snapped to the nearest five-degree angle and half-inch module. Freehand illustrations could become the beginning of dimensional drawings.

2.3.5 Sculpting

Sculpting is, in some ways, the three-dimensional counterpart to sketching. More commonly, it may be referred to as modeling; but sculpting still has a looser connotation that is important to maintain. Many experienced AutoCAD veterans are still uncomfortable with entering the third dimension of this program. Using the top, front, side, and perspective views within AutoCAD seems to help navigation. Allowing these views to be set to automatic hidden line removal or shading would help viewers translate these images, as would tools including the grid ground plane and highlighted current 2D plane, favored by many other 3D programs. Incorporation of solid modeling brought new power to AutoCAD.

2.4 3D Overview

The concept of a 3D image or a 3D animation is one of the most important steps to obtain an excellent result. People often pay more attention to photo-realism or special effects but, these elements alone are not enough to achieve an image of great impact. A 3D image can be used for a wide range of uses. From technical illustration, across video titles, scientific visualisation, to simply "art", a good concept work really makes the difference from an "interesting" result and a "great" one. It's usual to write a storyboard for and animation, but it is less usual to write off one for a still image. I like to think that even a still 3D image, like a real snapshot, has a "story". When you are thinking about a new picture try to imagine what happened before the instant you are willing to "freeze" and what is going to happen after. If you take a look to still images and animation that have won 3D graphics contests you will discover that near all of them would represent something and are not simply a sterile demonstration of technique or special effects.

2.5 Third Dimension Studio Max

The use of 3D Studio Max for creating digital design has driven by the recognition that layout plays a significant role in making natural and enterprise data more accessible and useful too. Although 3D visualization generally delivers much valuable information, today's AutoCAD users partly still limited to the display of data in 2D representations. Rather, the problem lies in the 3D tools offered.

2.6 Why is HCI Important?

HCI in computing should not be taken lightly as it has been shown that a large percentage of the design and programming effort of projects goes to the user interface. The human-computer interface is a fundamental part of making the product more successful, safe, useful and pleasurable to the user. Without the study of HCI, system designs are likely to be poor and in the case of nuclear processing for instance, poor design can mean decreased safety (which in turn could lead to loss of lives). Downfalls of businesses are likely when office system designs fail and computer games will not sell if it does not excite or entertain users. Below are some examples of if HCI is taken neglected.

2.6.1 Some Consequences of Poor HCI.

Author have done some research on the Internet and found a number of quite spectacular examples of catastrophes, which were partly attributable to poor HCI. For example:

- Three Mile Island nuclear power plant meltdown in 1979
    - Attributed to poor control panel and alarm system design.

- Shooting down of Iranian Airbus, with loss of 290 lives, by USS Vincennes. In ships control room, position and heading shown on one screen, altitude on another where in fact this lead to faulty identification.

- London ambulance system - drivers and operators kept pushing wrong buttons, leading to eventual system overload and breakdown. System abandoned after a few days.

  In general, the following have been shown to result from poor interface design:

- Increased mistakes in data entry and system operation.
- Inaccessible functionality.
- User frustration: low productivity and/or under utilization.
- System failure because of user rejection.

Other consequences of poor design task might be:

Impaired task quality:

- Users spend time working out what is happening;
- Trying out inappropriate computer services;
- Starting work again etc.

Or

Excessive costs to users:

- Users feel machine forces them to do tasks in ways they prefer not to (no control)
- Users have to re-learn how to perform tasks

To avoid these shortcomings it is estimated that nowadays nearly a half of software development effort relates to the user interface. Thus it is clear that HCI plays a big role in the design and development of all kinds of systems.

2.7 What is the Aim of HCI?

The aim of HCI is to ***"To optimize the performance of human and computer together as a system."*** In HCI, consideration of users and their environment is given as much emphasis as the technical aspects of getting the machine such as a computer program for instance, to perform certain functions. Foremost is the idea that in a well-designed system, users should not have to adapt to the interface; it should be designed so that it is natural and intuitive for them to learn to use it, instead of all the effort we put in to making people 'computer literate', we should be trying harder to make computers 'people literate'.

2.8 The Goal of Good HCI design.

One of the most important goals of HCI is to achieve usability. Usability can be in the form of:

- Learnability
    - How easy is it to learn how to use the system?
    - How well are the learned skills retained over time?
- Throughput
    - How quickly can the tasks be performed (or, how many people might be needed to perform a task)?
    - What is the user error-rate? How easily can user/system recover from errors?

- Flexibility and
    - How suitable is the system for the expertise of the intended users?
    - Can the system be customized to suit different ways of working and/or different levels of expertise?
- Attitude
    - What is the users' subjective satisfaction with the system?

To begin with, usability- from a slightly more technical viewpoint- is a combination of the following user-oriented characteristics (Shneidermann, 1992):

- Ease of learning
- High speed of user task performance
- Low user error rate
- Subjective user satisfaction
- User retention overtime

From the research done, author has found out that usability is related to effectiveness and efficiency of the user interface and to the users reaction to that particular interface.

2.9 The Effects of HCI in User Interface Development

The importance of good User Interface Design can be the difference between product acceptance and rejection in the marketplace. If end-users feel it is not easy to learn, not easy to use, or too cumbersome, an otherwise excellent product could fail. Good User Interface Design can make a product easy to understand and use, which results in greater user acceptance.

2.10 CROwd Simulation System for Emergency Situations Project (CROSSES IST-1999-10510) by Fuchs et al., 1998

This project deals with Simulation and Training and intends to develop advanced simulation system for outdoor urban emergency situations. The three dimension environment is constructed using real imagery (aerial and on the ground) as well as virtual models. Acoustic simulation from sound samples and sound modelisation as well as graphic representation of people and crowd will guarantee a detailed realistic description of the situation. Specific developments on crowd representation, crowd behavior modeling and control connected to acoustic corresponding effects complete this dynamic simulation and training system. The application concerns the training through advanced simulation to emergency situations such as an incident on a Chemical Plant in a suburb, with rehearsing of an evacuation plan, or validation of any safety procedure.

The CROSSES project is used to provide Virtual Reality tools for training people to efficiently respond to urban emergency situations, given the need to be prepared and trained to these emergency situations to limit the side effects due to inappropriate behaviour and plans. We intend to demonstrate the use of a simulator to get prepared to these situations by recreating an actual area with high degree of realism (static 3D environment with dynamic smart objects, dynamic crowd and sounds) so that efficient and use off training to dynamic situations and scenarios can be performed (through global and immersive interaction).

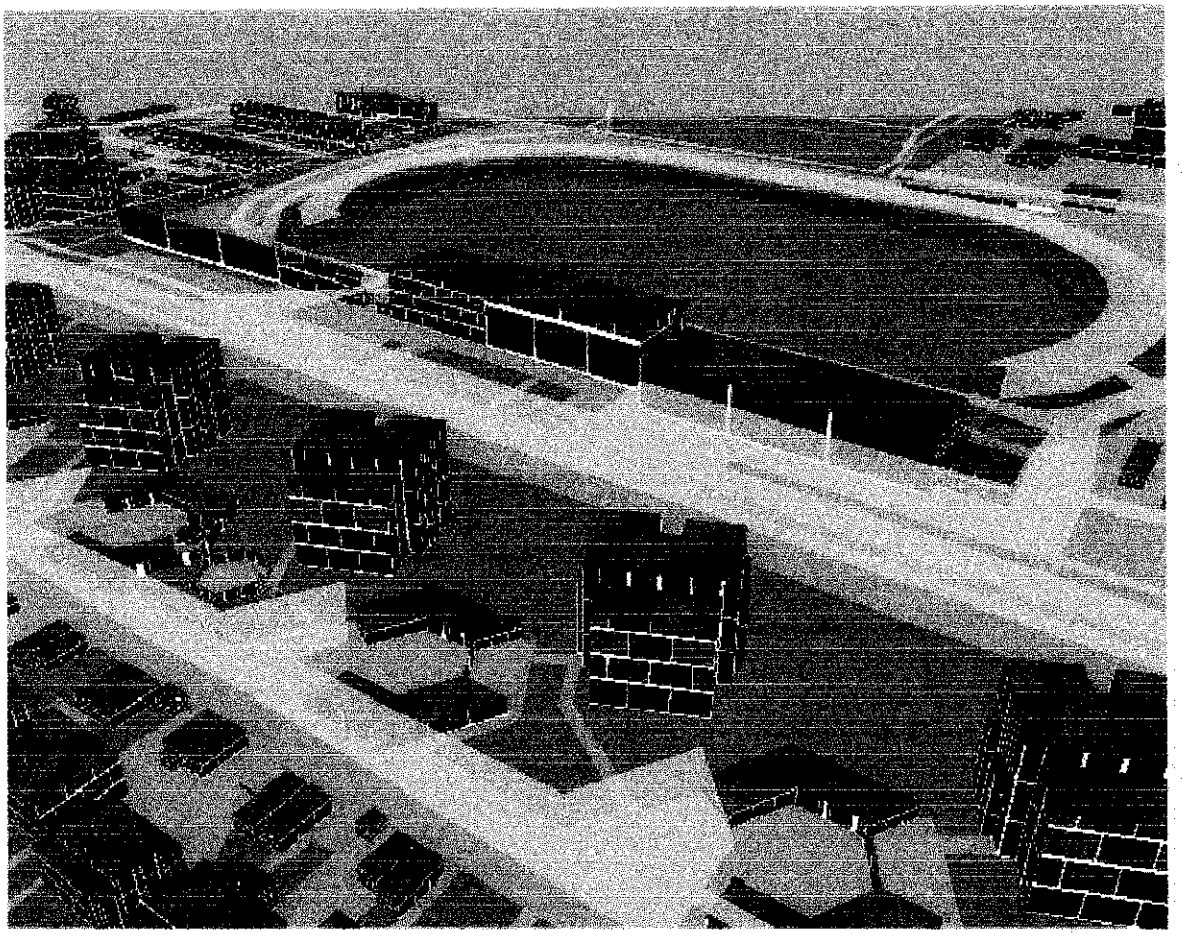

Figure 2.1: A VRML view

The technical challenge of CROSSES is then to provide non specialist users with an operational training system allowing real-time simulation scenarios including

- A highly "real" representation of the whole geographical environment (buildings, streets, etc.). Therefore to provide efficient tools to perform the "real" reconstruction of an actual urban environment.
- A realistic dynamic modeling of the crowd, including graphical rendering and behavioral simulation. To provide a methodology and a set of tools for the simulation of a realistic, dynamically evolving, virtual population (crowd) living in this city environment.
- A precise modeling of all the sound parameters of a real situation. To mix sound and graphical visualization for real immersive simulation.

CHAPTER 3
METHODOLOGY

3.1 What is simulation?

Simulation is the deliberate making of certain condition that could exist in reality. As for the project, ERP for the New Residential College simulator has been developed to simulate the steps that should be taken by the residents whenever a disaster strikes their residential college. The simulation provides a clear view for the residents to understand the emergency procedure that has been approved by the UTP Health, Safety and Environment Department.

The simulation methodology chosen after a detailed studied been conducted on it advantages:

- Choose correctly
- Compress and expand time
- Diagnose problems
- Develop understanding
- Visualize the plan

Simulation provides a test on every aspect of a proposal change or addition without resources to their acquisition. This is critical because once the decisions have been made; changes and corrections can be extremely expensive. Simulation allows testing the design without committing resources to acquisition. By compressing or expanding time, simulation allows to speed up or slow down phenomena so that it can be investigated thoroughly.

Simulation allows the author to have better understand the interactions among the variables that make up such a complex prototype. Diagnosing problem and gaining insight into the importance of these variables increases the author understanding of the important effects on the performance of the overall prototype. Many people operate with philosophy that talking loudly using computerized layouts and writing complex report convinces others that the prototype is valid. In many cases these designs are based on someone's thoughts about the way the prototype operates rather than on analysis. Simulation studies aid in providing understanding about how a system really operates rather than indicating someone's predictions about how a prototype will operate.

Taking the designs beyond CAD drawings by using the animation features offered by many simulation packages allows the author to see the prototype actually running. Using the 3D Max, the author is able to view the operations from various angles and levels of magnification even in 3D. This allows the author to detect designs flaws that appear credible when seen just on paper or in 2D CAD drawing.

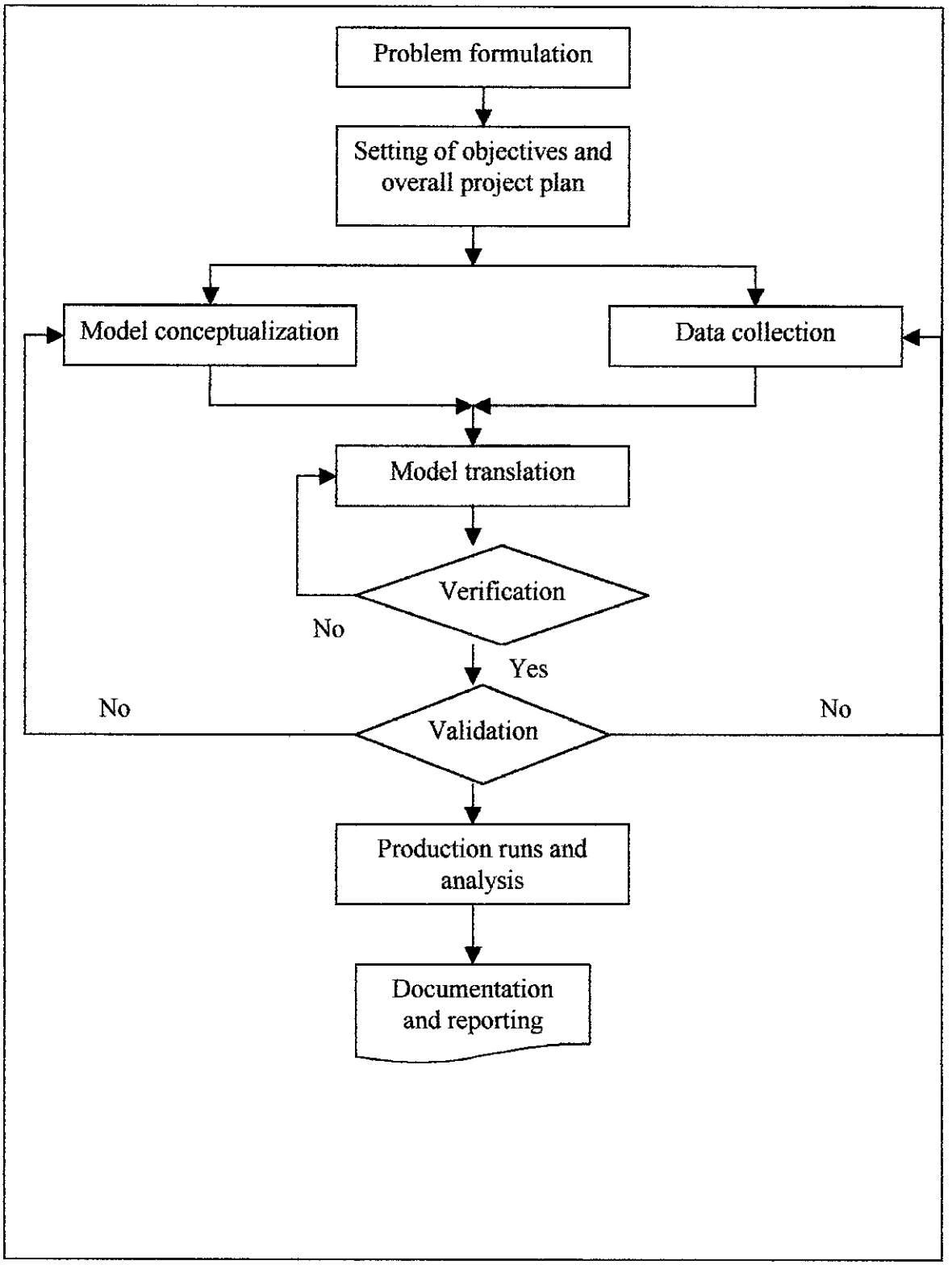

Figure 3.1: Steps in Simulation Study

3.2 Steps in simulation

3.2.1: Problem formulation

Every simulation begins with a statement of the problem. As for the Emergency Response Procedure for the New Residential College simulation, the problems that currently confront by the new residents are:

- Depends on the hardcopy sources
- No interactive learning medium
- Awareness of the new residents
- Lack of training and drill

The university community really depends on hardcopy materials in order to conduct training for the student. Hardcopy materials are usually easy to gets damaged or soaked if they not carefully taken of. Usage of hardcopy materials is undesirable as current practice is learning towards paperless environment. Apart from that, hardcopy materials would be also difficult to be distributed to the large number of students of the campus community.

At present, the emergency escape exit plan being displayed at only certain places of a building. Usually, most people tend to ignore that kind of plan. It is because of its unattractiveness and non-interactivity.

Besides that, the students of the new residential college must be aware of the emergency procedure if an emergency strikes. As for now, there is no simulation procedure for student to learn and know about the steps that should be taken for the emergency situation.

Some problems faced by the new resident are no training or drill for residents who are not experts, of which will consume a lot of time to think during the critical situation. Residents are unsure of the responsibility and task of the emergency procedure. There is no written documentation for the residents as the guidance on how to react if there is a critical situation.

3.2.2: Setting of objectives and overall project plan

The main objective for the Emergency Response Procedure for the New Residential College is to educate the residents on how to react when there is a disaster strike in their residential college using a simulation method.

Besides that, the simulation will identify and compile a procedure to assist in developing user-friendly prototype and usability of the interface through product and process. Usability in this project will cover in terms of:

- Ease of learning
- High speed of new resident task performance
- Minimal error by the new residents when emergency occurs
- Subjective new resident satisfaction

The simulation is also aim to aware the residents about the emergency procedure that been approved by the UTP Health, Safety and Environment Department. The procedure must be followed by the residents when there is an emergency at their respective residential college. Continuous procedure exercise is integral in ensuring the procedure flow is smooth and flawless during emergency situation.

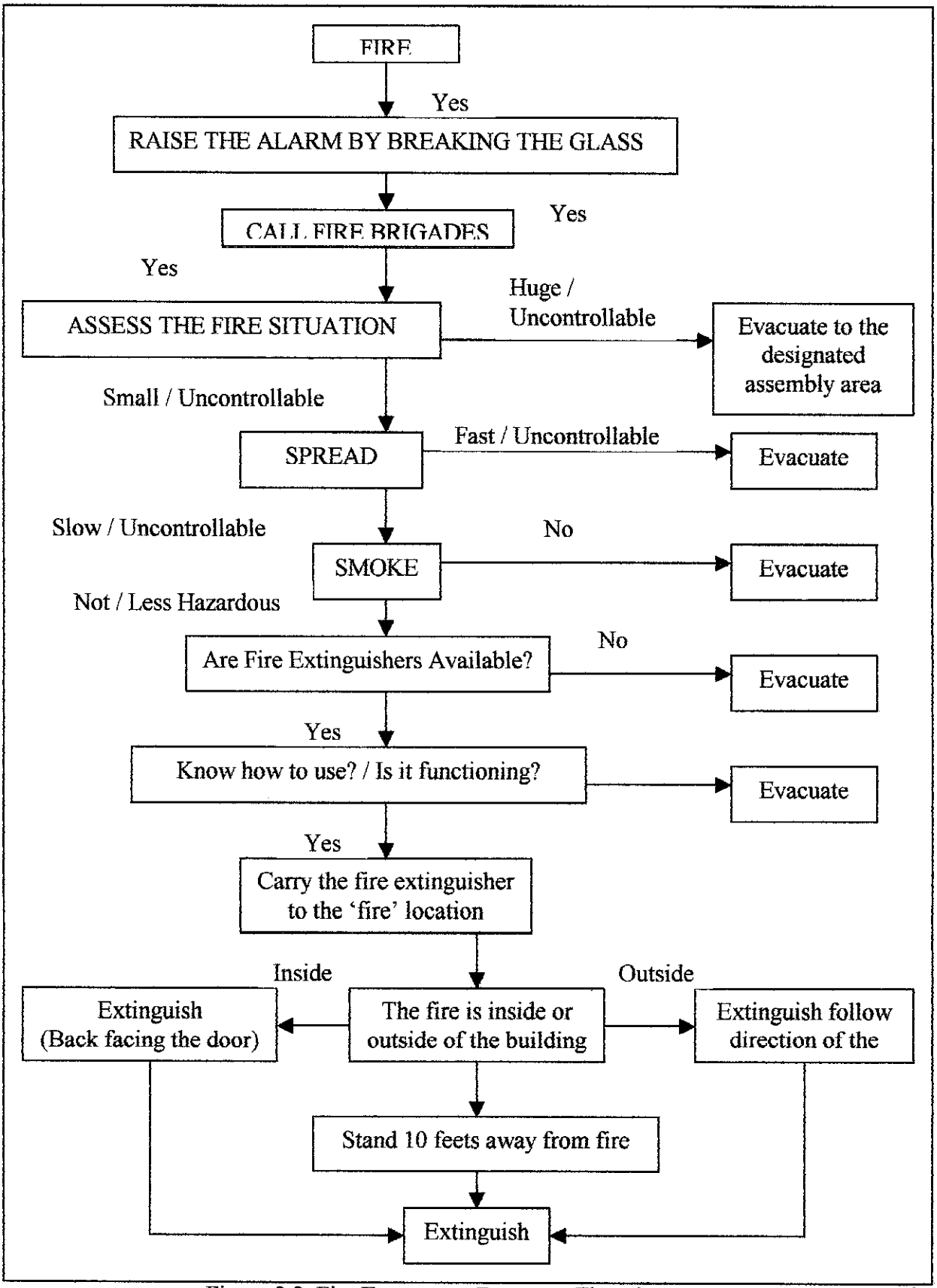

Figure 3.2: Fire Emergency Response Flowchart

3.2.3: Model conceptualization

Nowadays people only will have interest to learn new things by using visual aid such as simulation. Emergency Response Procedure for the New Residential College concept is to convert from the hardcopy material into simulation.

Conversion from 2D CAD architectural drawing into 3D CAD simulation will assist the residents to aware about the emergency procedure. The 2D CAD architectural drawing that been obtained will be converted into 3D simulation in order to be user oriented product. The simulation also will help the residents to have better understanding and clearer view on how to react during the emergency situation.

The emergency procedure that been approved by the UTP Health Safety and Environment Department will be part of the project content. The procedure and the precaution steps will be included in the simulation as interactive learning purposes. The residents will be fully equipping with the emergency procedure knowledge and precaution steps as their preparation if there is emergency situation.

3.2.4: Data collection

During this stage, all the data will be gathered in order to translate the findings into a workable simulation. The data gathering had been done using several methods:

- Research study via books
- Research study via internet
- Interview with Head of UTP Health Safety and Environment Department
- Interview with KLCC Berhad officer that handles the architectural drawing
- Self observation

A detailed study had been conducted in order to gather all the information that related and can contribute to the project proposed. Detailed research using books and internet been used to obtain information about the emergency procedure. The research also will help the author to gain deeper knowledge not only about the topic but other area that related to the project.

Other method that been used to gain information is by using interview. The interview had been done to collect the information for the project. An interview with the Head of UTP Health Safety and Environment Department gives the author a clear view about the emergency procedure and precaution steps to be taken if there is an emergency situation. The Head of UTP Health Safety and Environment Department had briefly explained about the department itself.

From the interview, the author has obtained Village 3 and Village 4 emergency flowchart. The flowchart will be included in the prototype to give the residents a clear understanding the Village 3 and Village 4 emergency workflow.

Besides interviewing the Head of UTP Health Safety and Environment Department, the author also had interviewed the KLCC Berhad officer that handles the architectural drawing. The purpose of the interview is to gather all the architectural drawing for the Village 3 and Village 4. The information of the architectural drawing will be used in the development phase of 3D for the project.

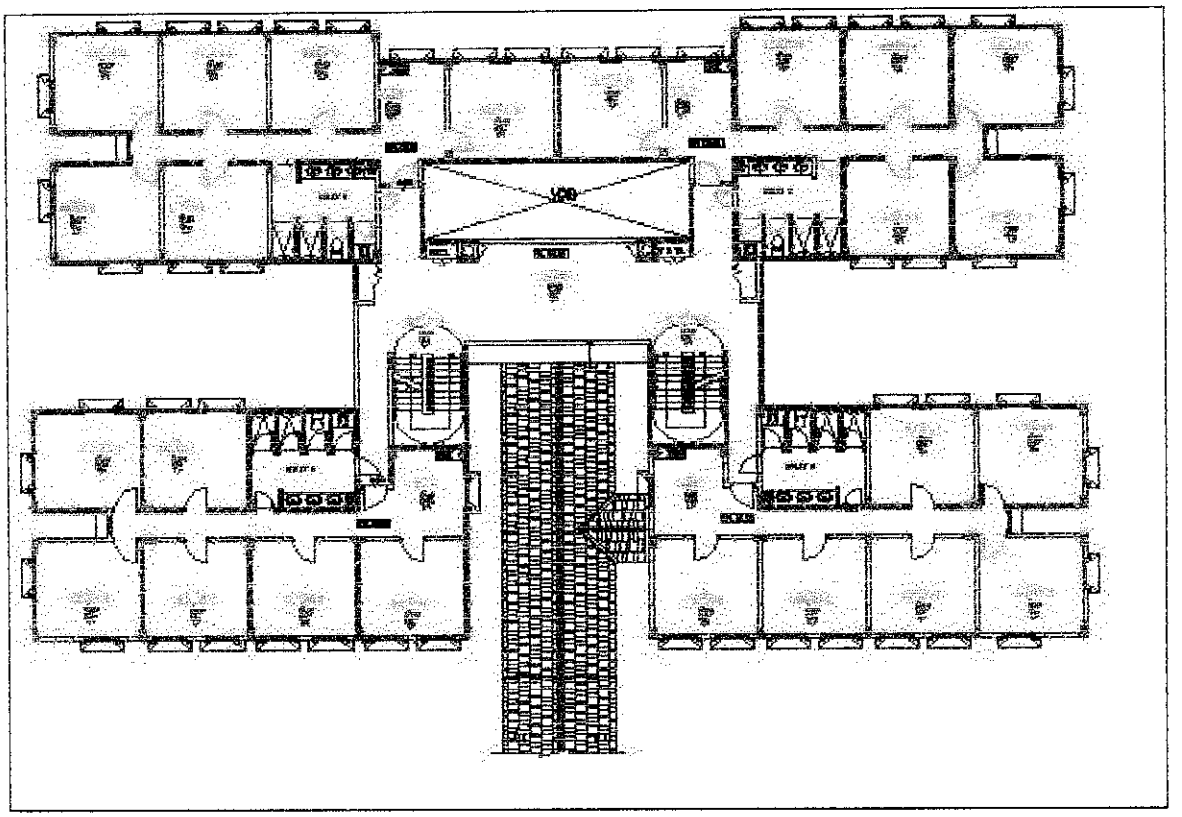

Figure 3.3: 2D Drawing for Village 3 and 4 College

Self observation method also been used to gather the information about the project. Several points had been observed that can be enhanced by the UTP Health Safety and Environment Department. The entire observation finding will be included in the prototype. From the self observation, it foresees that the residents have a minimal knowledge about the Emergency Response Plan. By this, a brief explanation about the Emergency Response Plan and precaution steps to be taken to avoid the emergency situation will be included in the prototype.

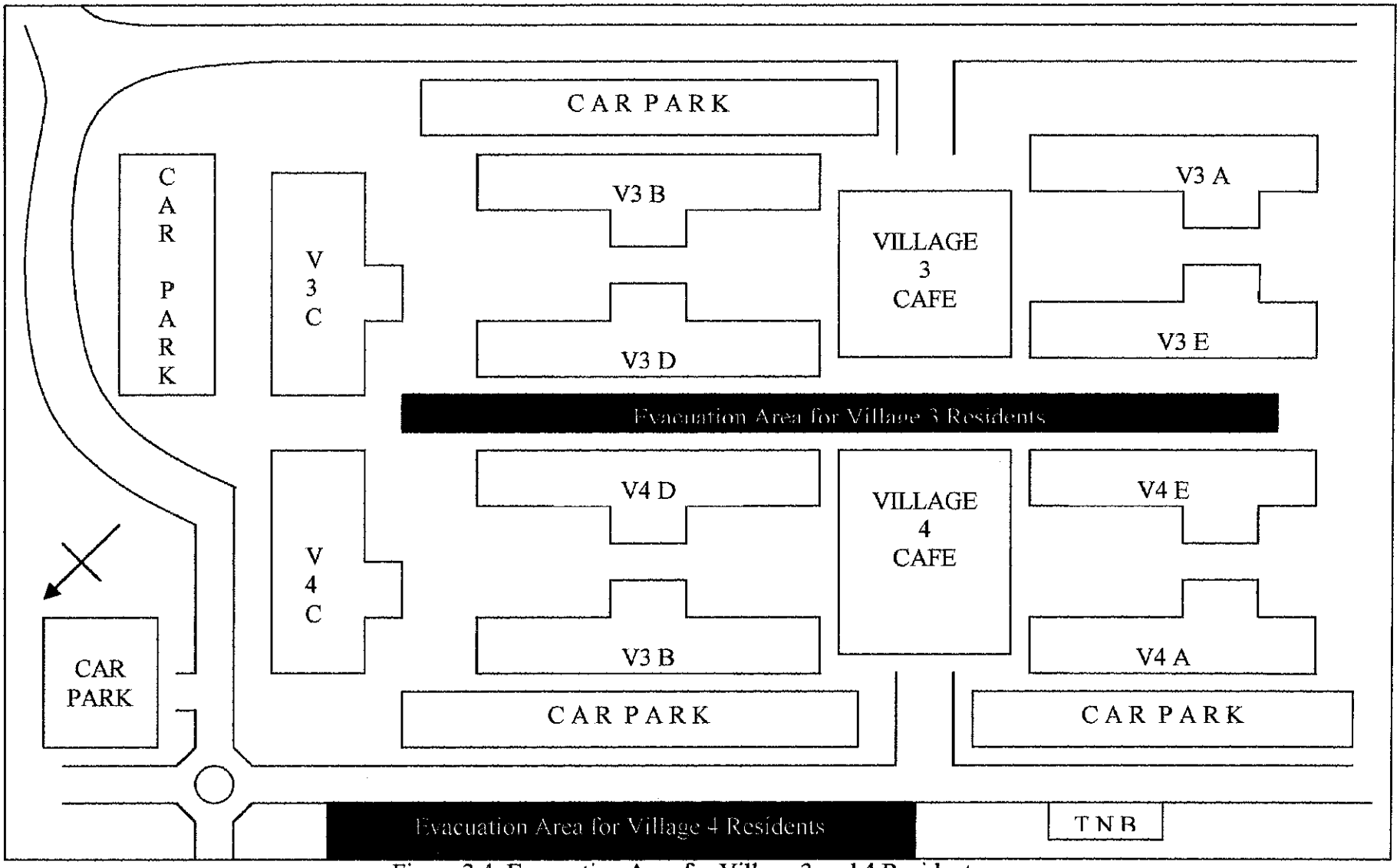

Figure 3.4: Evacuation Area for Village 3 and 4 Residents

3.2.5: Model translation

In model translation stage, the model conceptualization and data collecting will be combined to complete the stage. The entire 2D CAD drawing from AutoCAD will be converted to 3D CAD drawing by using 3D MAX software. The conversion is crucial to develop 3D simulation. The 3D CAD drawing will make the simulation looks realistic.

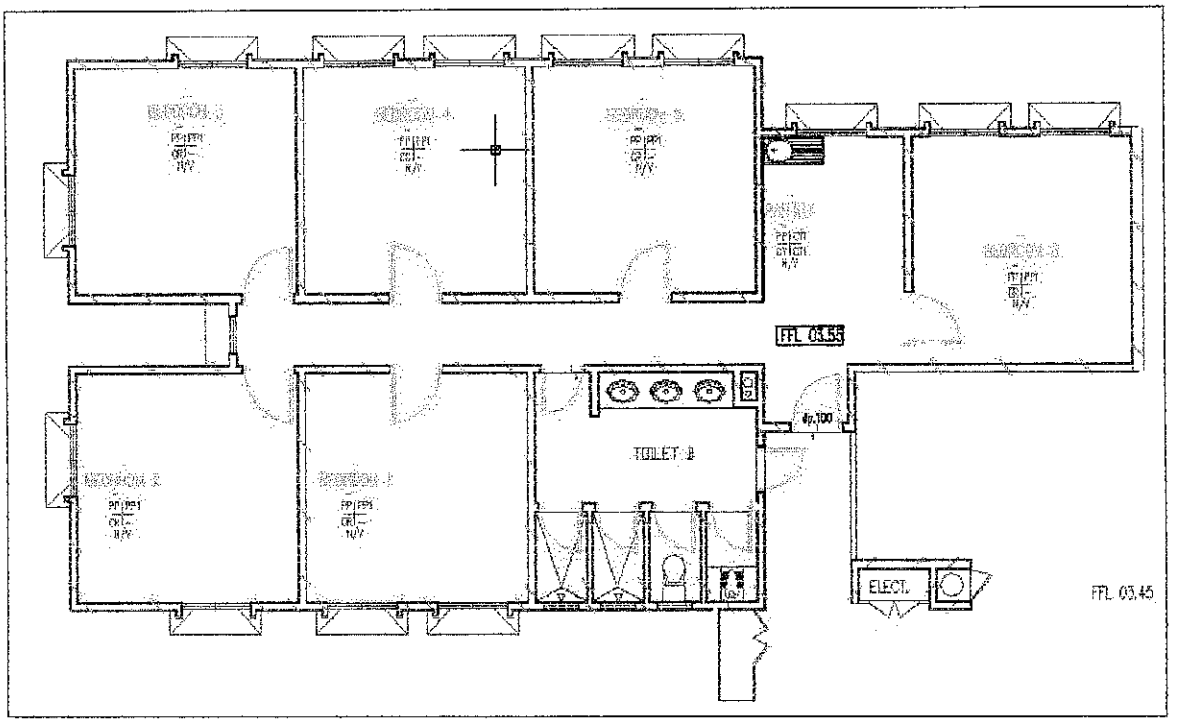

Figure 3.5: 2D Drawing of the Residential College

To make the simulation looks realistic, the author need to develop the model by extruding the wall from 2D CAD drawing. Same goes to the floor, it needs to be extruded in order to look more practical. For the project, the furniture will be not emphasizing extremely. Only the important features will be develop and extrude.

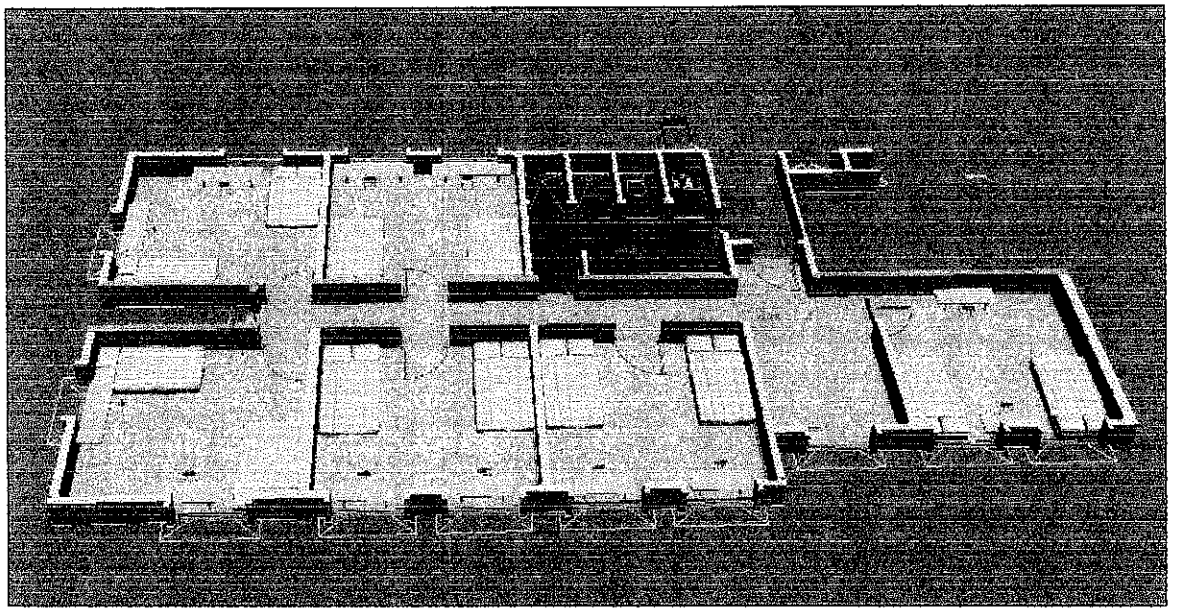

Figure 3.6: 3D Drawing for one of the resident house

Besides the architectural drawing, the emergency procedure and precaution steps also will be converting into the interactive medium. The entire finding information will be coded using Macromedia Director to create an executable prototype. The design of the executable project will strictly have the user friendly criteria's and follows the user interface guidelines.

3.2.6: Verification

Verification concerns with the operational simulation model. Is it performing properly? As for the Emergency Response Procedure for the New Residential College simulation, it had performed properly according to what been plan. To perform the verification, the author had to complete the entire simulation. And the author had the verification as the continuing process.

3.2.7: Validation

Validation is the determination that the prototype is an accurate representation of the real Emergency Response Procedure application. During this stage, the author had to validate that the prototype is appropriately presented to user. Several factors had been studied in order for the prototype is well presented. The most priorities factor that been briefly studied is the content of the prototype. Research had been conducted in order to gather the information for the content.

3.2.8: Production Runs and Analysis

For this stage, the author had to undergo the production runs and its subsequent analysis. This stage is to estimate the measures of performance for the scenarios that are being simulated. Several runs had been done to measure the performance of the simulation. Each run will be analyzed in order to gain great performance for the simulation. A continuous production helps the author to overcome the simulation lack ness.

3.2.9: Documentation and Reporting

Documentation is necessary for numerous reasons. In the future, the simulation will be used by the same or different analysts, it may be necessary to understand how the simulation operates. This will stimulate confidence in the simulation model so that the end-users can make decisions based on the analysis.

Besides that, if the simulation is to be modified, this can be greatly facilitated by adequate documentation. An experience with an inadequate documented model is usually enough to convince a simulation analyst of the necessity of this step.

CHAPTER 4
RESULT AND DISCUSSION

4.1 Results

All the research and product are presented in this section. Since the target audience for the product is the end-user, the product must meet the requirement to fulfill their expectation of a system. The sources of collecting data information including the interview, the internet, the reference books, newspaper articles, journals and research paper. These are activities done about project together with findings explained.

The final product for the project is a prototype of Emergency Response Procedure for the New Residential College simulation. It is a simulation that helps educate the Village 3 and Village 4 about the emergency procedure that should be taken during emergency situation. The simulation focuses on steps that should be taken in order to educate the residents about the emergency procedure.

Questionnaires were given to randomly selected users to perform testing for this product. Based on the questionnaires, all the findings were summarized and will be briefly discussed below.

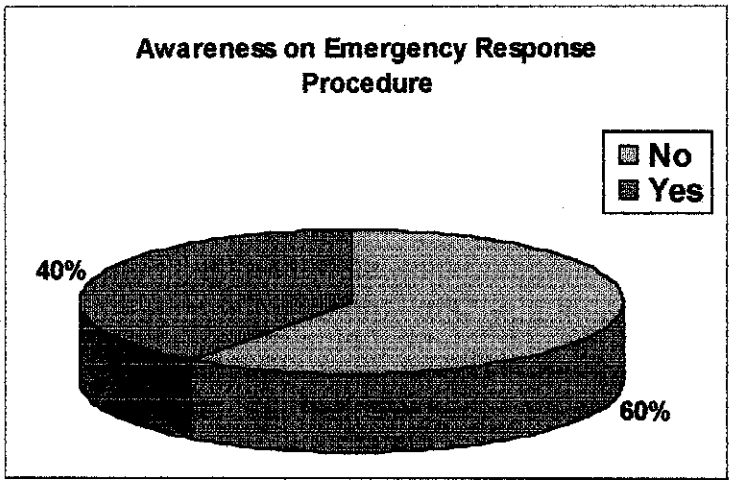

Figure 4.1: Residents Awareness on Emergency Response Procedure

Based on the findings, it shows that the majority of the residents having zero awareness about the Emergency Response Procedure for their respective residential college. Therefore, it can be concluded that the residents need a medium that can alert them about the Emergency Response Procedure. Developed simulation portrays the real picture for their residential college.

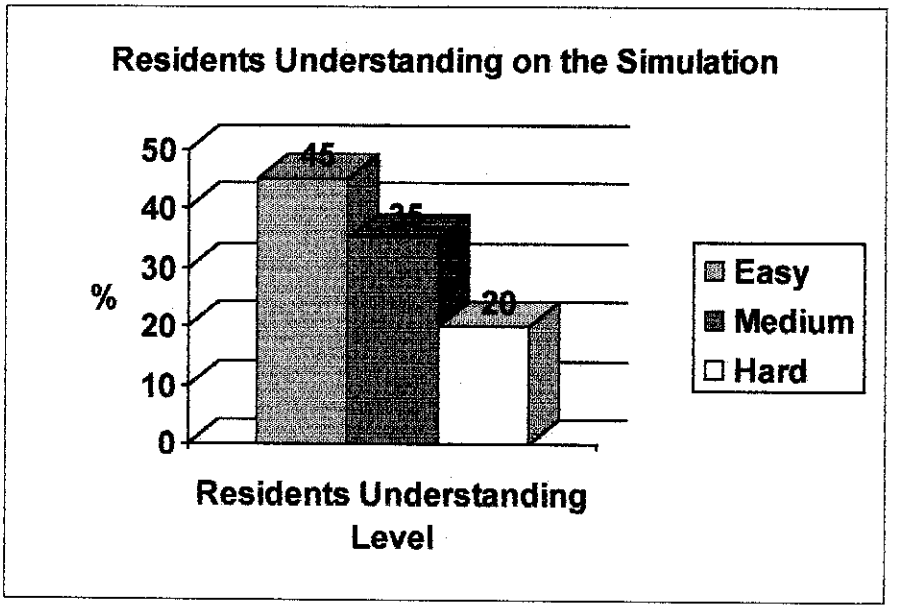

Figure 4.2: Residents Understanding on the Simulation

The simulation of the Emergency Response Procedure for the New Residential College simulation is a simple user interface where resident could easily understand on how to react during emergency situation. The design of the simulation makes its easy to be used by the residents for the learning process. With the simple design, the simulation easily can navigate the residents during the emergency situation.

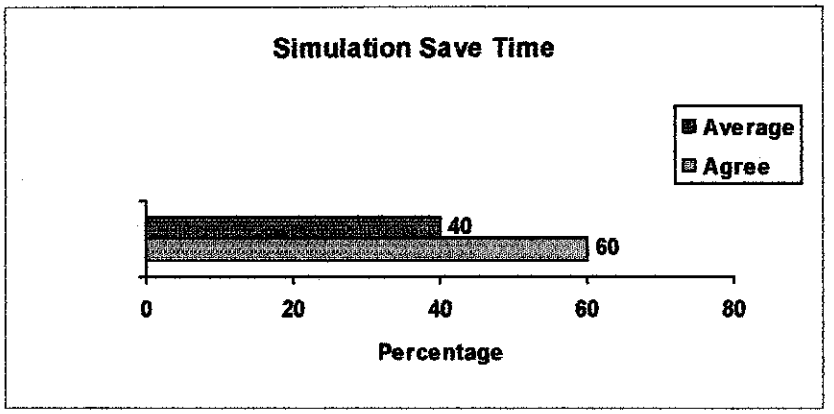

Figure 4.3: Time save Using the Simulation

The findings, it could be determined that almost all residents agreed that the simulation developed will save time in term of learning process compared to the manual learning process. The simulation development is a necessity that strongly agreed by the residents which can help them to react during the emergency situation.

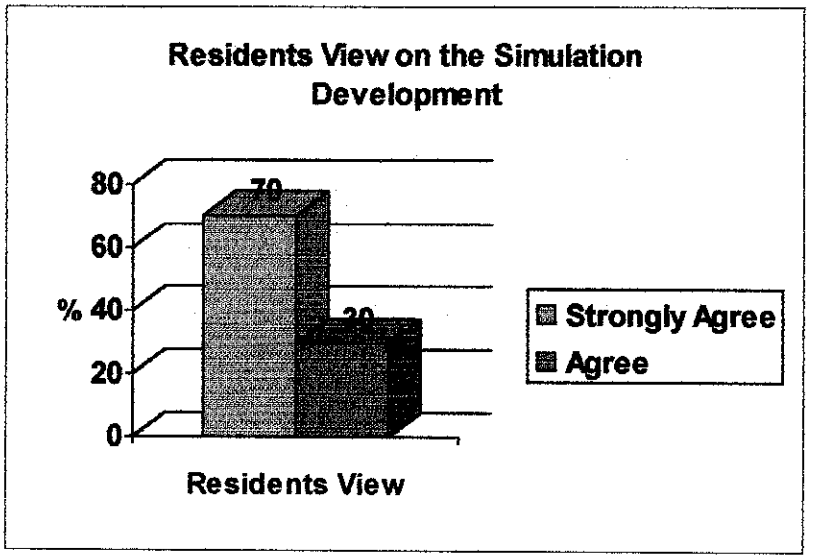

Figure 4.4: Residents view on the Simulation Development

4.2 Discussion

The result that had been obtained in previous section will lead to the discussion that will be explained further in this section. The discussion will be based on the summarization of the questionnaires that were answered during the testing process.

Analysis done shows that 60% of the residents still have zero awareness on the Emergency Response Procedure for their respective residential college. This can lead to the increasing of injury or fatality during emergency situation. Each resident must know the basic steps or procedures that can save their life. The simulation will educate the residents on how to react during emergency situation such as fire.

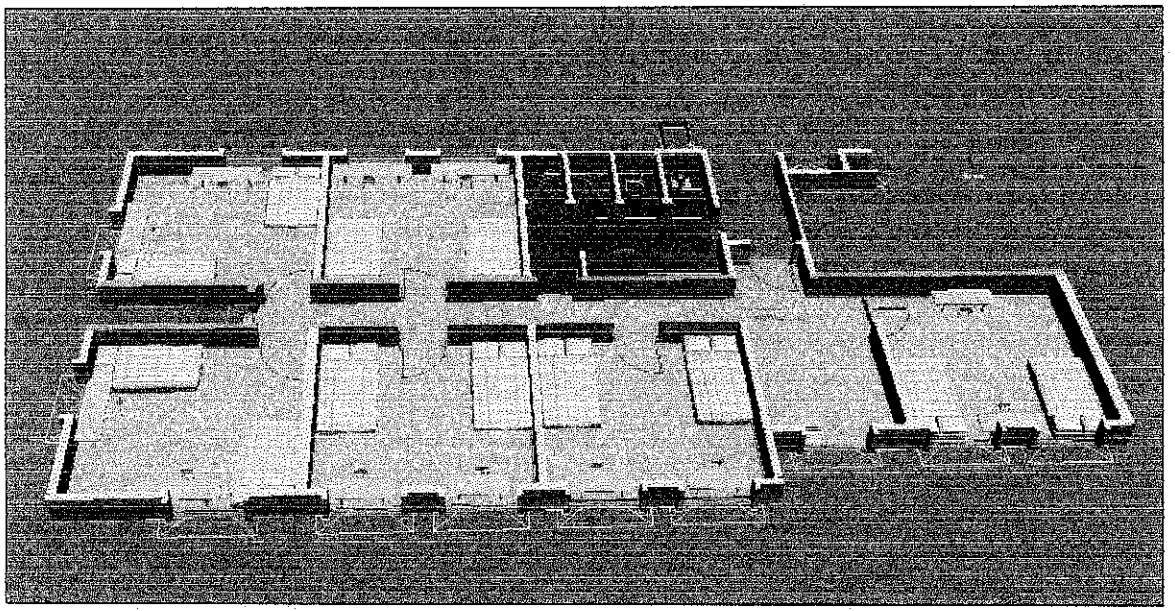

Figure 4.5: Prototype Layout

Based on the figure above the simulation is simple, direct and easy to understand requires less training for new resident. According to the analysis, 45% of the residents have a clear understanding after using the simulation. The design layout of simulation interface is straightforward, and has no complex graphic or picture. Only 30% of the residents having a difficulty to understand the simulation that been developed.

The analysis proved 60% of the residents agreed that the simulation helps the residents to learn the emergency procedure for their respective college in shorter time compare to the manual learning method. The simulation provide interactive learning method that can give easy understand on the emergency procedure. Meanwhile 40% of the residents still need to learn using the manual learning method that is emergency manual.

It is important not to overdo the design. Of course it may look nice and attractive but end user wants a simulation that the resident feels in charge at all times, rather than the feeling as if the computer is in charge. It makes resident have the impression that the computer is prepared to respond whenever the resident is ready to issues a command. It avoids burdening resident memory and uses direct selection techniques for common functions.

The simulation helps the resident to gain the knowledge and awareness about the Emergency Response Procedure and steps to be taken if there is emergency situation strike at their own respective village. Besides that, the simulation helps the resident save their time on reading the Emergency Response Procedure manually compares to interactive learning simulation. Majority of the residents agreed that the simulation development is a necessity. The residents need something that is interactive that can attract their intention to learn about the emergency procedure.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Relevancies to the Objectives

There are three objectives of the project mentioned earlier in the report. The first objective is to alert the new resident about the emergency procedure by using 3D simulation. Author had done the research and documented it in the literature review of the report. The result was good and author gained a lot from it.

The second objective is to identify and compile a procedure to assist in developing user-friendly prototype and usability of the interface through product and process. Usability in terms of:

- Ease of learning
- High speed of new resident task performance
- Low new resident error rate
- Subjective new resident satisfaction

The prototype has been developed by using HCI guidelines gained from the research works.

The project objective also is to develop working 3D ERP based on research findings. The guidelines are obtained from a various sources such as the Internet, books and research paper. There also several guidelines that author added later resulting from the experienced gained when developing the prototype.

5.2 Recommendation/Future Enhancements

This simulation is a first step toward recognizing the importance of the resident's safety. Therefore, future improvement and enhancement are encouraged in order to exploiting the benefits of safety living environment. Hopefully later the interface and its designers could cater or consider the design for user-friendliness design for all types of residents.

For this project, it focuses on the simulation content, the usage of user-friendly system and the design constraints. Means, it is hopes that in future, the interface designers or programmers could include some 3D modeling which been embedded in their simulation and enhance the 3D modeling in their simulation.

The project content is limited to the Village 3 and Village 4 residential college. The simulation only caters for the residents from this respective residential college. In the future, it is hope that the simulation will cover not only the UTP residential college but all the building that in the UTP area.

In conclusion, this project will meets the expectation and successful in achieving the objective of the project. The exposure and experience gained throughout the project will be a very good base for working environment. Hopefully, the knowledge and benefits gained must not be kept in mind but to be implied in daily life.

5.3 Conclusion

The usage of information technology and multimedia become more popular. Generally, this Emergency Response Procedure for the New Residential College with a 3D modeling is a simulation that provides residents to the emergency procedure for their respective residential college. It is very useful to the residents as it will be able to educate the residents interactively. In Malaysia most organizations do not implement the simulation yet. ERP for the New Residential College provides an emergency procedure to residents. Residents do not have to read from printed material that has been produced by the UTP Health Safety Environment Department. The residents just have to browse the simulation and learn about the emergency procedure. The residents also can use the ERP for the New Residential College in order to get the precaution steps to be taken during emergency situation regarding their safety for the residential college. The simulation can be implemented for the residential college of Village 3 and Village 4 to educate and gain the awareness of the residents about their safety.

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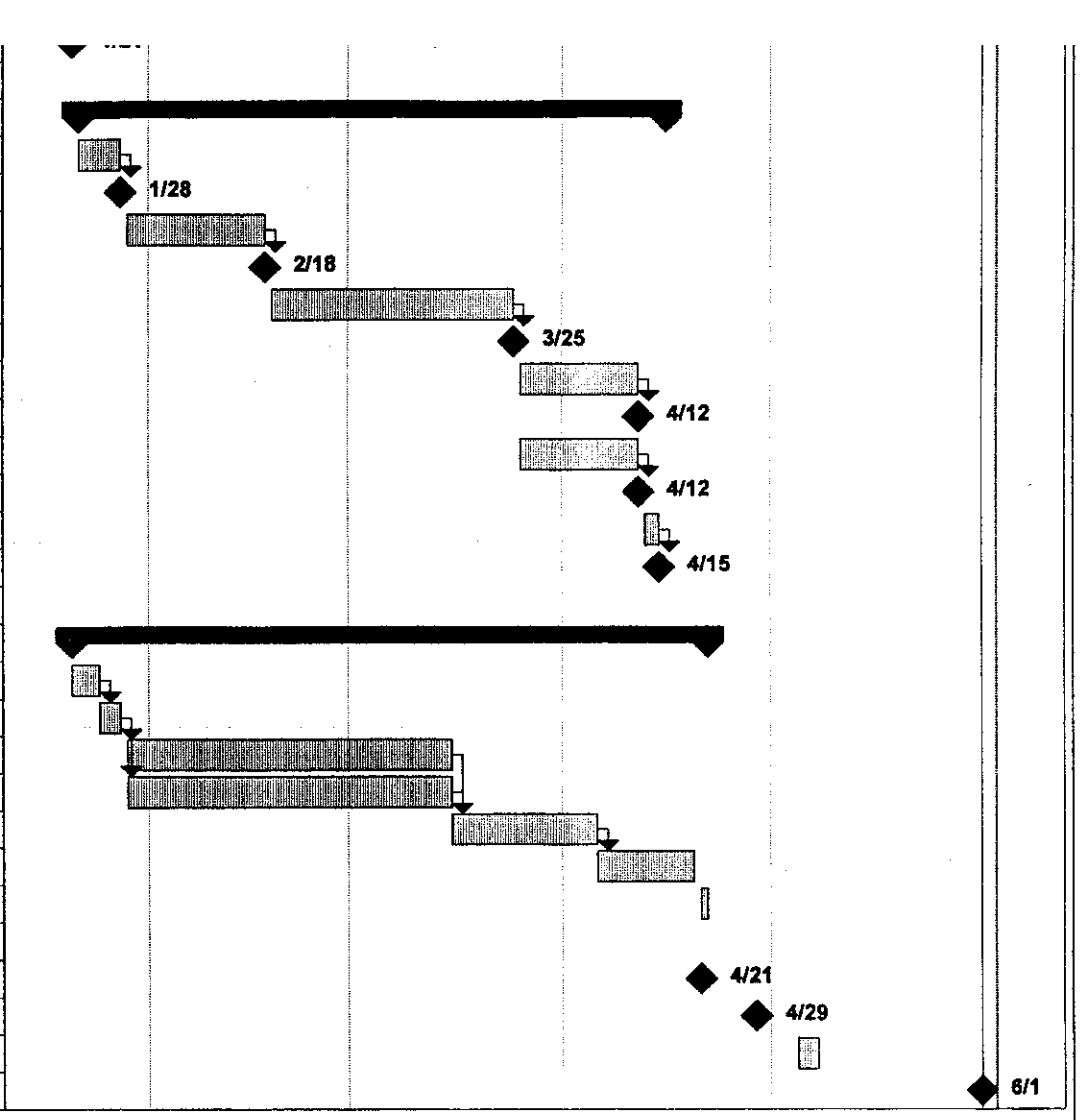
APPENDICES

List of Appendices

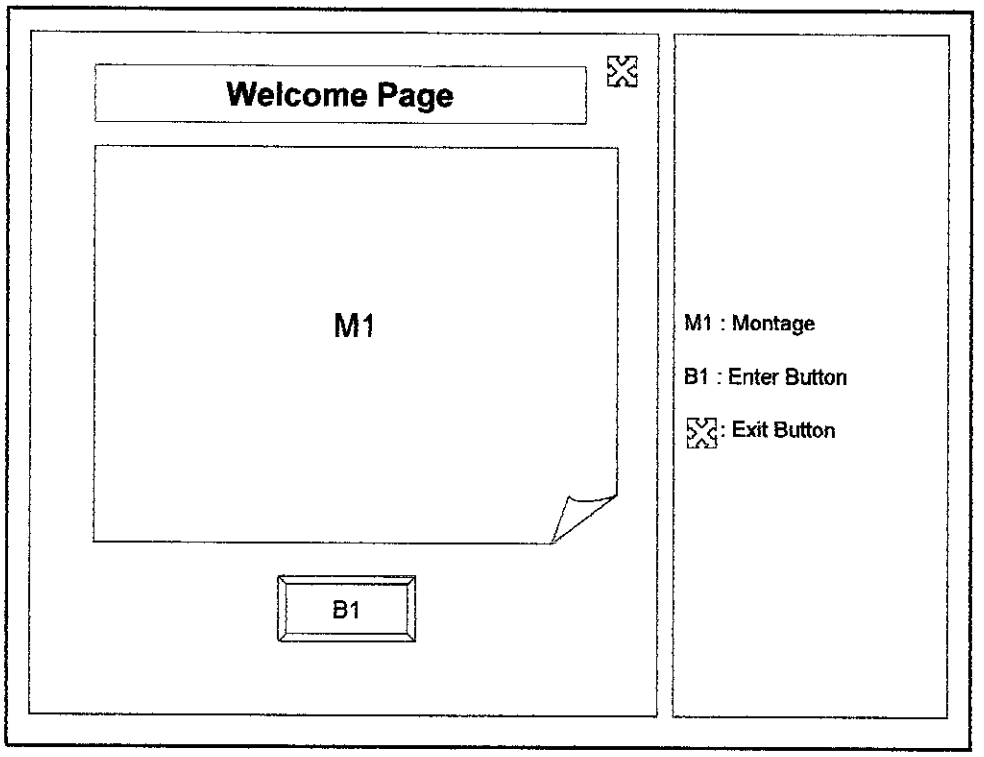
1. Project Gantt Chart
2. Storyboard of the product
3. Questionnaires for Testing Phase

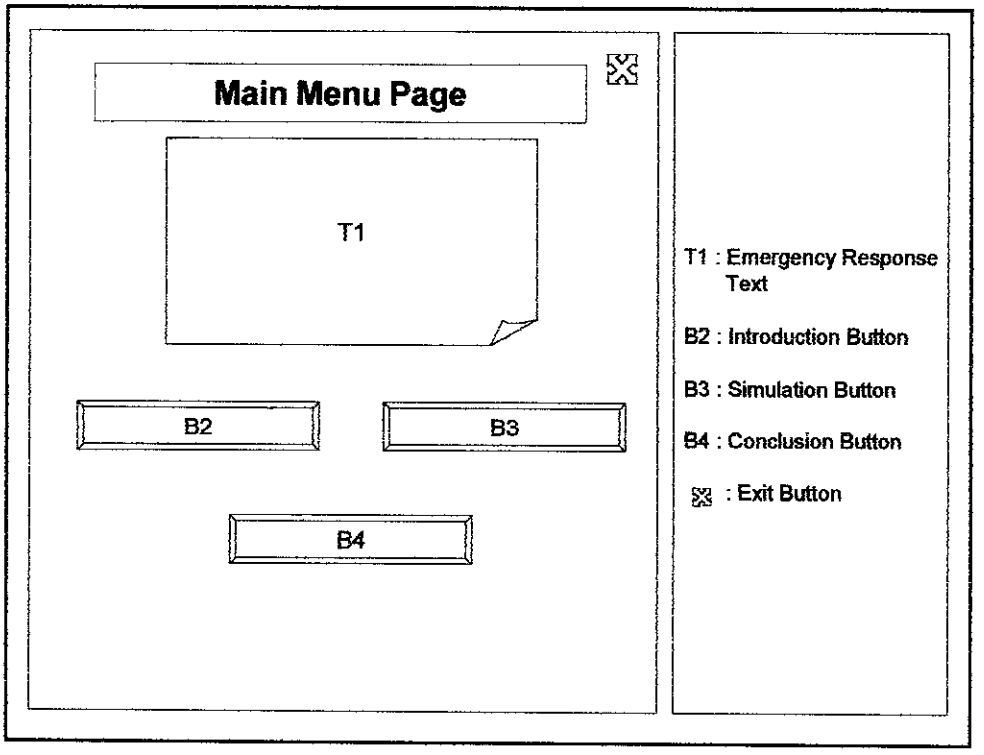
2				
3		**Report Writing**	**62 days**	**Thu 1/22/04**
4		Chapter 1: Introduction	5 days	Thu 1/22/04
5		Submission of Chapter 1	1 day	Wed 1/28/04
6		Chapter 2: Literature Review	14 days	Thu 1/29/04
7		Submission of Chapter 2	1 day	Wed 2/18/04
8		Chapter 3: Methodology	25 days	Thu 2/19/04
9		Submission of Chapter 3	1 day	Thu 3/25/04
10		Chapter 4: Result and Disscussion	11 days	Fri 3/26/04
11		Submission of Chapter 4	1 day	Mon 4/12/04
12		Chapter 5: Conclusion and Recommendation	11 days	Fri 3/26/04
13		Submission of Chapter 5	1 day	Mon 4/12/04
14		Final Draft	2 days	Tue 4/13/04
15		Submission of Final Draft	1 day	Thu 4/15/04
16				
17		**Product Development**	**67 days**	**Wed 1/21/04**
18		Problem formulation	3 days	Wed 1/21/04
19		Setting of objectives	3 days	Sun 1/25/04
20		Model conceptualization	33 days	Thu 1/29/04
21		Data collection	33 days	Thu 1/29/04
22		Model translation	15 days	Tue 3/16/04
23		Production runs and analysis	10 days	Tue 4/6/04
24		Implementation	1 day	Wed 4/21/04
25				
26		Internal Exhibition	1 day	Wed 4/21/04
27		EDX	1 day	Thu 4/29/04
28		Oral Presentation	3 days	Wed 5/5/04
29		Submission of Disertation	4 days	Tue 6/1/04

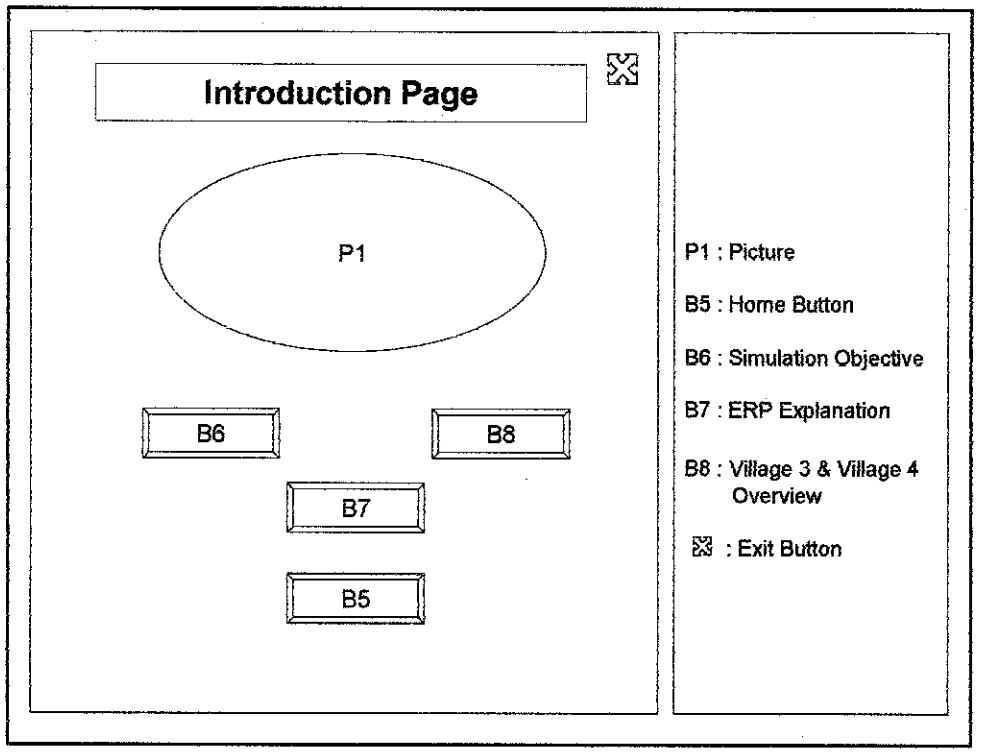


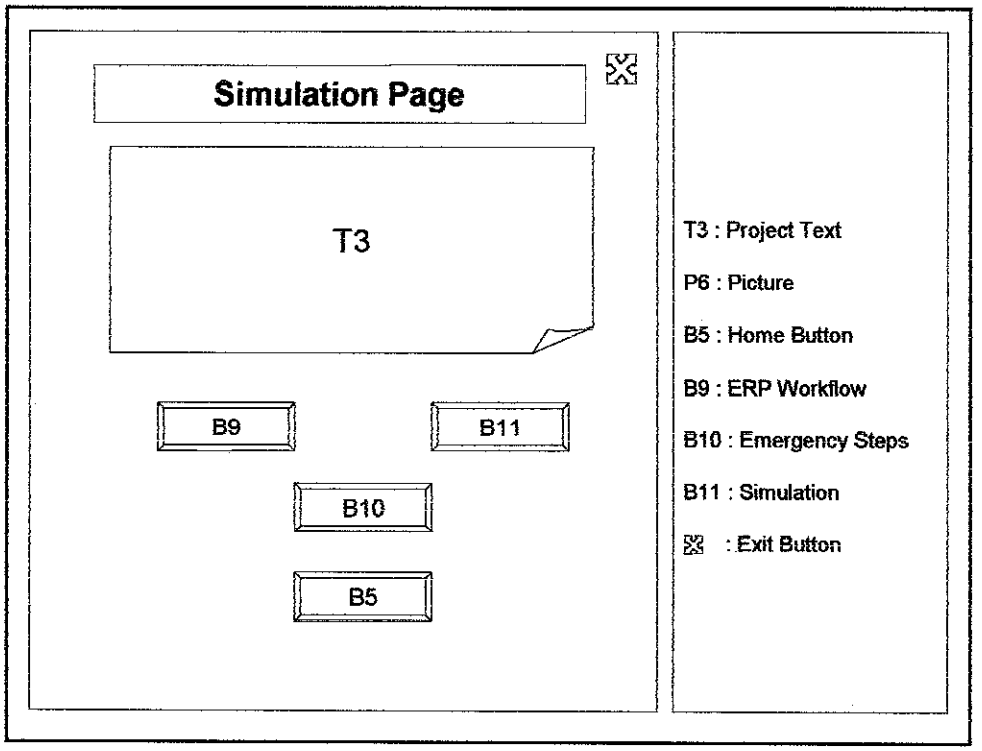
Project: FYP Gantt Chart

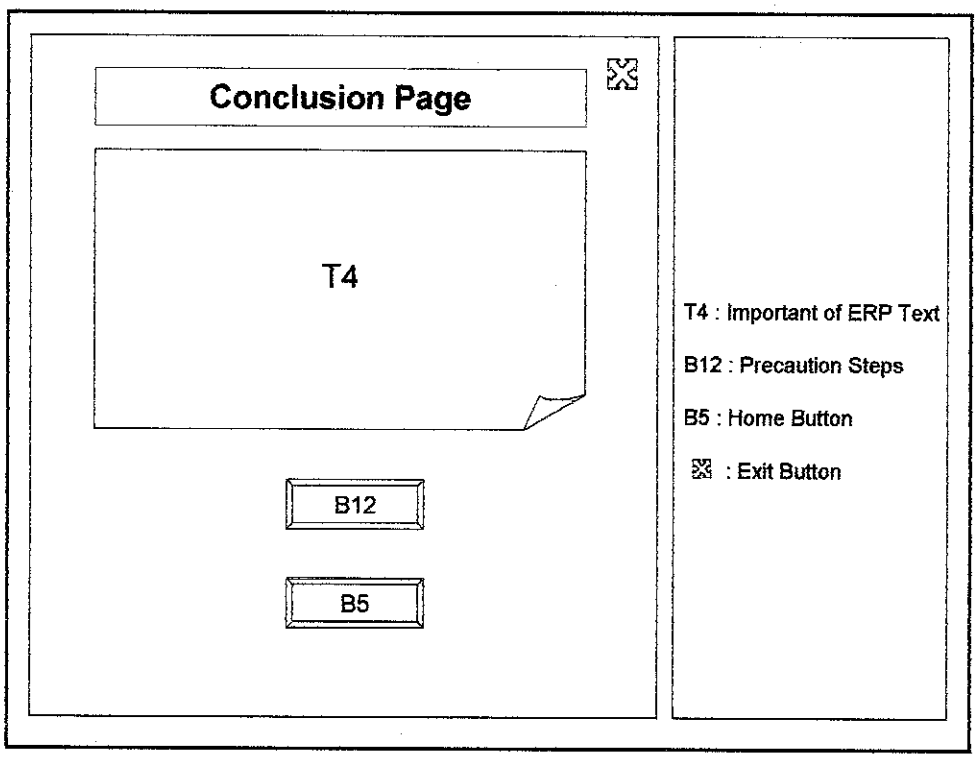
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline


Welcome Page
M1
B1
M1 : Montage
B1 : Enter Button
: Exit Button


Main Menu Page
T1
B2
B3
B4
T1 : Emergency Response Text
B2 : Introduction Button
B3 : Simulation Button
B4 : Conclusion Button
: Exit Button


Introduction Page
P1
B6
B8
B7
B5
P1 : Picture
B5 : Home Button
B6 : Simulation Objective
B7 : ERP Explanation
B8 : Village 3 & Village 4 Overview
: Exit Button


Simulation Page
T3
B9
B11
B10
B5
T3 : Project Text
P6 : Picture
B5 : Home Button
B9 : ERP Workflow
B10 : Emergency Steps
B11 : Simulation
: Exit Button


Conclusion Page
T4
B12
B5
T4 : Important of ERP Text
B12 : Precaution Steps
B5 : Home Button
: Exit Button

Usability Testing (1:Poor 3:Average 5:Excellent)
Circle where appropriate.

1. Do you know about Emergency Response Procedure?

   1: Yes 2: No

2. Do you know the Emergency Response Procedure for your Residential Village?

   1 2 3 4 5

3. Does the simulation portray the real world?

   1 2 3 4 5

4. Does the simulation easy to be understood?

   1 2 3 4 5

5. Does the simulation easy to be used?

   1 2 3 4 5

6. Does the Emergency Response Procedure simulation help to navigate you during the emergency situation?

   1 2 3 4 5

7. Does it save your time? (in going through Emergency Response Procedure simulation compared to hardcopy medium)

   1 2 3 4 5

8. Do you feel that Emergency Response Procedure simulation is necessary to be developed?

   1 2 3 4 5

9. Do you recommend the simulation to be viewed by outsiders?

   1 2 3 4 5

10. comment (optional)

_____

_____