Personal Risk Profiling System: Identifying right investment instrument of Personal Financial Management

By

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11311

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the requirements for the
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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Business Information System Programme
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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.

ZUHAILA ELMA BT ZULKEFLI

ABSTRACT

People are lack of financial literacy have very limited knowledge in managing their personal financial planning. One of the main part in the personal financial planning that involved activities to the cash flow of the asset owner is investment planning. However, risk tolerance is one important concept that has main implications in the investment. The study of the project addresses experimental questionnaire data method for measuring the risk profiling as well as the wealth allocation framework for individual investor according to the risk profiling The approach proposes a risk profiling system that has financial tools that can be (budget for ideal investment according to your income) understand directly by people who lack of financial literacy by using risk tolerance test score or profile that provides people with a good basis upon which to explore further in the managing their personal financial management(the type of investment that most likely to be acceptable.) The potential impact of the project is a risk profiling system that provides a platform for immature to obtain knowledge in personal financial planning.

This report shows the research in how the system was created, the different stages of the development in the process of getting the application to works correctly and the current results on the research. A comparison between the other risk profiling systems also discussed in this document. There are 5 chapters in this report. Chapter 1 will discussed the introduction of the project which includes project background, problem statement, objectives, and scope of study. Chapter 2 will be about the literature review, chapter 3 will explain more on the methodology used for this project and proposing the system architecture. Chapter 4 shows about results and discussion which discussed on analysis on survey result and project deliverables or prototype. Last but not least, the conclusion and recommendation of this project will be extracted in Chapter 5.

Keywords: Risk Profiling, Personal Financial Planning

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TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.1 Background

Risk profiling is the assumed level of risk that a client is willing to accept. Through gaining an accurate assessment of a client's risk profile, an adviser can develop a tailored financial plan that better reflect the client perception of the acceptable trade-off between risk and the compensation required for bearing risk. It has been reported that (Allfest, 2007) that some people think of it solely as a function of one's personality. [1] However, it can be influenced by many variables in addition to personality including upbringing, current circumstances, and the amount and type of current assets and future cash flow for the house hold.

The research focus on the three main parts:

1. **Risk Profiling Questionnaires**: There are few factors that influence the risk tolerance among the individual. The demographic factors are considered as the measurement to set up the questionnaires. Despite demographic factors (eg age, gender, education, marital status, number of dependant's gross income and combined gross income) psychological factors are much related such as Maslowian Portfolio Theory. The three main methods for measuring financial risk tolerance involve one or a combination of assessing actual behaviour. In the research article (Hallahan, Faff and McKenzie, 2003), find that portfolio allocation may be used to infer attitudes to risk, assessing responses to hypothetical scenarios and/or investment choices and subjective questions. [2] The use of the latter of these approaches – experimental questionnaire data remains the primary method for assessing financial risk tolerance. However, because of the complexity of the attitudinal construct, a sophisticated pscyological testing instrument is required to elucidate a person's attitude to financial risk. According to the study of Brouwer (2008), risk profiling covered also in the aspect of predictive theory rather than descriptive theory in order to fullfill the risk tolerance of individual.[3]

1.1 **Matching Concept**: Sheng and Gupta (2007) study showed that since a typical investment problem for individual investors is path dependant, the singular emphasis of the mean-variance theory on market risk, with the risk preference of a specific individual excluded from the analysis, is fundamentally unsatisfactory. [4] To address the investment problem for individual investors, he proposed a wealth allocation framework, which allows individual investors to allocate their financial resources among personal (low risk), market (medium risk), and aspirational risk components hence simultaneously meet their safety and aspirational goals while benefiting from efficient market.

2. **Investment Funds Selection:** The accounting type of financial planning in risk profiling system proposed by this project provides functions of budgeting, financial planning, monitoring and chart or diagram displays. As a financial planning tool, it enables users to select ideal investment first according to the risk tolerance result obtained by the risk profiling questionnaires. After obtained the person risk tolerance score (eg medium risk-taker), the system match it with suitable investment product by using the mean-variance analysis theory. As a financial planning tool, it enables users to select ideal investment patterns according to the spare money of the monthly balance sheet for maximum returns and achieve effective financial planning for the future expenditure. Users can keep track of the balance and manage their financial goals of the future. [5]

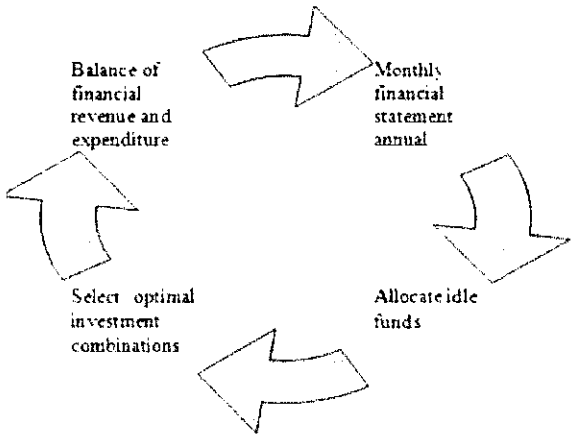


Figure 1: Investment Conceptual Recycling (Source:Design of a Personal Financial Planning Management Information System 2010)

1.2 Problem Statement

1.2.1People who lack of financial literacy are not good at verbalizing how they feel about money.

In other words, people sometimes think they know the risk they can accept, but their self-assessment is shaped by their very limited experience they've had especially for the beginner's investors. (fresh graduates) They would either go directly to invest in the stock market or seek consultancy from fund manager to determine the suitable financial instruments. Is there any available medium to give a basic platform for people who lack of financial literacy to transfer the knowledge of investment instrument in personal financial planning?

1.2.2 The existing system is only tailored designed for financial advisors.

There are few of risk profiling systems in the market. Most of the system available is tailored designed for the financial professional instead of provide direct understanding for the users. The result of the risk profiling score is difficult to be understood by people who lack of financial literacy. No matter how effective the risk profiling system is, the system still needs to be supervised by the financial experts for the need of their clients. The system does not give a good basic platform for the beginners' client especially immature who seek opportunity to look inside the investment world.

1.2.3 The existing system do not captured the root of client's behaviour

Besides that, many financial advisors found that they've tried risk profiling system and they find out it is not useful. Risk management is ultimately a deeply personal issue that should be based on sound informed decision. However, this may not be captured in the system. Drucker (2003) reported that we don't see other product in the marketplace that help advisors get to the root of client's behaviour. The risk questionnaires which are very analytical about number, but don't feel with attitudes and feeling. [6]

1.3 Objective

It will focuses on the process of participation of final year students who will upon graduating and entering the working life. A number of research questions are designed to meet those objectives:-

1. How far the knowledge level of UTP student in investment literacy and how the system can help them improved their knowledge?
2. What is relationship between risk profiling and recommending suitable investment instrument?
3. What is the relationship between personal investment literacy and gender, experiencing in investing as well as financial course taken?
4. Which technique is the most convenient to measure risk profile in the system?

The objectives of the project are:

- To analyze risk profiling of the users.
- To recommend investment portfolio alternatives based on the identified risk profile.
- To develop a system to capture data related to the risk and return profiles of the investment alternatives.
- To enable users to select ideal investment patterns according to the spare money of the monthly balance sheet for maximum return and achieve effective financial planning.
- To compare and benchmark the studies of this project with related works.

1.4 Scope of Study

The project is aimed to develop a system for people who lack of financial literacy and considered immature investors.

The scopes of the system are covered as the following:

i. The target end users of this system are immature beginner's investor.

ii. The system provides financial planning functions including accounting, budgeting, financial planning and monitoring.

iii. The system design includes user account, password settings, modification and deleting options and records displays of related income and expenses, assets and liabilities, profit and loss accounts.

iv. The ideal portfolio for the individual investors cover 3 capabilities: the certainty of protection from poverty(low risk), a high probability of keeping one's wealth with the market growth(medium risk) and the possibility of a significant increase in one's wealth. (high risk)

v. The recommendation of investment products will cover all types of assets from bonds, stocks, equities and unit trusts according to the risk dimension. eg persona(low risk), market(medium risk), inspirational (high risk).

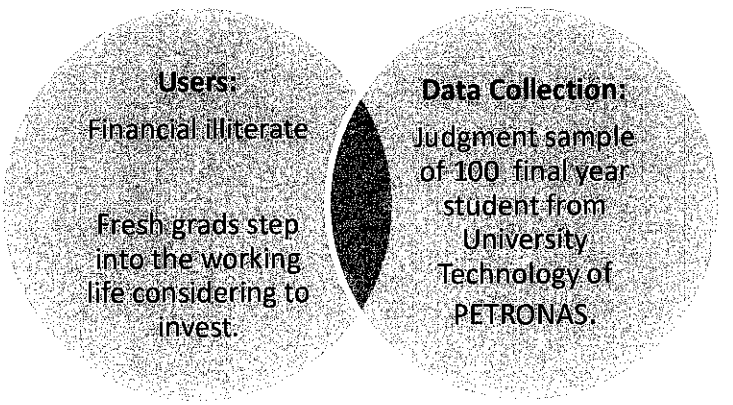


Figure 2: Scope of Study

CHAPTER 2
LITERATURE REVIEW

2.1 Existing Risk Profiling System

There are few risks profiling systems available in the market that can be readily accessed by the financial advisor. Financial advisors must check whether they are doing enough to assess and record suitability when recommending and matching financial product to retail customer needs. There are 2 questions to be address when looking for a suitable risk profiling system. Are we doing enough to identify, communicate and record a customer's attitude to risk? Do we have a system and controls in place to review a customer's changing appetite over time? Below are the three risks profiling system which considering how the practises can be implemented or improved.

ProQuest Risk Profiling System is an Australian company that uses such an approach to measure the preferred level of risk of an individual and have kindly provided the data to be analyzed in the study. [2] The study indicate the demographic factor such as age, gender, education, marital status, number of dependants gross income and combined gross income as a measurement for risk tolerance. (Jim and Austin, 2000).

The ProQuest Financial Risk Tolerance scale is a 25-item questionnaire designed to assess a client's level of financial risk tolerance. All of times have fixed choice response categories include yes/no, self-rating on a 0-100 scale, behaviourally-anchored rating scales and the scale items are designed to assess risk tolerance by asking for self assessment of risk tolerance and about financial behaviour.

In the research article by Davey (2000), the ProQuest system followed that process with these key differences[8]:

- The questions have been tested for validity and reliability and cover a broader range of topics than would typically be covered by an adviser.

- The questions are in jargon-free, plain English that has been tested for understandability and answerability, and hence explanation or clarification by the planner is unnecessary.
- Because the questions are asked in the controlled manner without the planner being involved, interaction with the planner cannot unintentionally influence the outcome.
- The summary is produced automatically in a structured format by a way of plain English risk profile report
- The norms-referenced rating is calculated statistically with a known, high level of accuracy against an Australian adult population sample.

One limitation of the system is ProQuest risk profiling does not replace discussion between planner and client. Therefore, the completed questionnaire and the risk profile report became input to that discussion. As a result, the system needs assistance from financial advisor to assist the client where it cannot function alone. It does not provide financial tools.

The FinaMetrica Risk Profiling System is made up of three parts which are psychometric test of personal risk tolerance, a method for taking the result of the test into account in the financial planning process and educational material designed to personalise the explanation of investment risk and return to help investors better understand how their investment might perform in the future. (Copyright FinaMetrica Pty Limited)

A scientific risk profile mirrors what many advisers aim to do, either intuitively or by using industry-standard questionnaires, namely (http://www.riskprofiling.com/oursystem)

- form a view as to the client's risk tolerance by conducting a question-and-answer discussion about the client's attitudes, values, preferences and experiences in matters involving financial risk,
- present the client with a written summary of this view and, if required, amend the summary to reflect the client's feedback (in order to obtain the client's

confirmation that the adviser's understanding is accurate and that the adviser may rely on it.)

- consciously or sub-consciously, make a norms-referenced rating of the client's risk tolerance using as norms those derived from the adviser's experience, viz "This client is Low/High/Average, etc. compared to my other clients."

One limitation of the system it is also does not provide any financial tool. Due to different salaries and expenditures, the system do not display the most appropriate type if investment for the user in order to facilitate financial planning.

"Any time you start dealing with individuals and their financial situations, it gets to be emotional. Moneymax gives them a common language."[9] According to (https://www.financialpsychology.com/Products/monmax.asp), **the Moneymax Profiling System** provides consultant and advisors with significant and critical information about their clients' individual money management styles – information about their spoken and unspoken needs. Moneymax helps you translate and maximise your clients' financial attitudes into confident and successful financial decisions. It reveals certain personality traits so they can advise them properly much of it is psychological-what's going to be comfortable for the clients.

In the research article by (David, 2005), MoneyMax although thought of by many advisors as a risk profiling system, is somewhat different from FinaMetrica. MoneyMax can determine your client's 'financial personality' and give you insight into their investment preferences. Moneymax is excels at is producing for the advisor s "client interaction strategy".

Each profile consists of 28 questions client can answer online, followed by a report to the advisor. The report categorizes the client into one of nine types, such as Entrepreneur, Optimist or Perfectionist. Each report describes the money management style of the client, including the kind of risk-taker he is. In additional, the report provides a detailed "money action plan" for the advisor to use with the client.

2.2 Similarities and differences between the existing Risk Profiling Systems

For most of the risk profiling system mentioned above, all of these have designed this portfolio questionnaires scoring system to help investor identify a suitable portfolio, based on their responses to few simple questions.

For ProQuest and FinaMetrica, both of the systems use the demographic factor such as age, gender, education, marital status, number of dependant's gross income and combined gross income as measurement to measure the risk tolerance in the questionnaires. They have the similarities in using the method for measuring financial risk tolerance. The use of the latter of these approaches-experimental questionnaires data using the demographic factors remains the primary method for accessing the financial risk tolerance. However, because of the complexity of the attitudinal construct a sophisticated psychological testing instrument is required to elucidate a person's attitude to financial risk.[2]

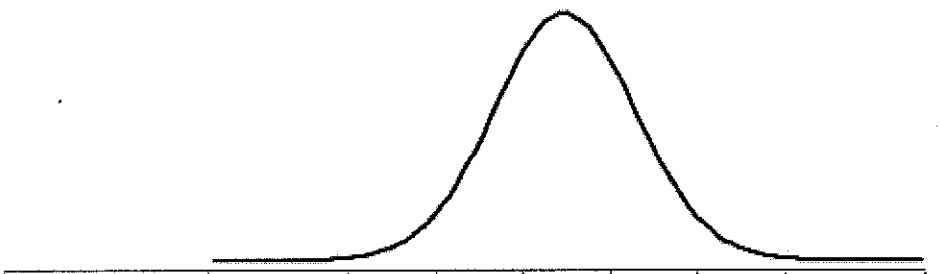
For FinaMetrica and to be compared with Moneymax, in the research article by David(2003), the purpose of FinaMetrica system is to clearly delineate a client's risk vs return measures, which is helpful for a client voluntarily takes more risk than he normally would for economic gain while Moneymax is more to determine your client's 'financial personality' and give you insight into their investment preferences.

All of the systems above mentioned are tailored designed for the financial professional instead of provide understanding for the client. After they completed the questionnaires, they still need the financial advisors to assist them on how to illustrate the result of the questionnaire into something that can be understood in investment. The system do not give a good basic platform for the beginner's client who lacks of financial literacy. They have the system but still they need to rely on the financial advisors to assist. Furthermore, risk management is ultimately a deeply personal issue that should be based on sound informed decision. We don't see other products in the marketplace that help advisors get to the root of client's behaviour. We see risk questionnaires are very analytical about numbers but don't feel with attitudes and feeling.

2.3 Techniques for effective Risk Profiling System

The first topic attachment in relation to risk profiling is the **risk profiling in the financial planning process**. The topic attachment emphasizes how can me measures risk tolerance in questionnaire and why do we need the questionnaire. In the research article by Victor and Malcolm (2002), two questions have been addresses. How is risk tolerance defined in the questionnaires test? How and when the test to be used? [7] A risk tolerance test scores of profiles provides the adviser with a good basis upon which to explore further in the interview type of investment that a client is most likely to find to be acceptable. Working from this profile, the planner is able to help the client better understand any mismatches between their psychological and financial needs, and then to assist the client in making the trade-offs that might required. A sample data for these studies are from American Colleges Survey of Financial Risk Tolerance and the ProQuest Risk Profiling System.

The result in the study emphasizes the research done by Geoff(2000) during the development of ProQuest system and analytical done since mean that there is now a far better understanding of risk tolerance. [8] Risk tolerance is normally distributed. The ProQuest system measures risk tolerance on a 0-100 scale, divided into seven risk groups as shown Figure 2.



Risk Group	1	2	3	4	5	6	7
Score Range	0-24	25-34	35-44	45-54	55-64	65-74	75-100

Figure 3 Normal distribution risk tolerance: (Source: Risk Profiling and Gearing, 2000)

For each group, a narrative description of attitudes, values, motivations, preferences, and experiences has been developed by analysing how those with scores in that

group's score range typically answer the questionnaire. These analyses are now based on a sample size of more than 4000 completed profiles.

Meaning of "Risk"	81% say "Uncertainty"
Past risk-taking	59% say "<=Small"
Present risk-taking	98% say "<=Medium"
Borrowed to invest	64% say "No"
Invested for "Thrill"	79% say "No"
Preferred Portfolio[a]	86% say "<=50% Growth Assets"
10 yr Returns	61% say "<=2.0 x Term Deposits"
"Discomfort" level	77% say "Fall <=20%"

Figure 4 detailed highlights of the statistical analysis for Risk Group 4: ((Source: Risk Profiling and Gearing, 2000)

In the domain identification, [14] defines each of the four risk factors as they relate to financial risk tolerance. Domain identification is to define the domain of the construct being measured in the risk profiling questionnaires. The domain identifications are which are risk propensity, risk attitude, risk capacity, risk knowledge as well as others (demographic and certain personality types). Risk propensity refers to the investor's financial decisions. Risk attitude is the amount of risk one chooses to incur, while risk capacity is how much risk one can afford to incur. Lastly, risk knowledge measures how well an investor understands both risk and the risk/return tradeoffs.

After the domain had been identified in the questionnaires as the method, the answer choices were converted to a 5-point liker scale not only to control for the certainty affect, but also for consistency among the questions and for factor analysis. In addition, buy using Likert scale; considerations for future research can be made for using data envelopment analysis for scoring the risk tolerance questionnaires. [12]

The second topic attachment in relation to risk profiling is the **Categorization of Investment Fund to Risk Involved**. The topic attachment emphasizes how can the risk profiling scores in the questionnaires can be match with the types of investment fund. The asset allocation model proposed here focuses in six generic categories of investment assets; money market fund, bond fund, balanced fund, equity fund and specialized fund. The six generic categories of investment offer differing types of investment risk-return trade-offs and meet different investor needs and objectives based on the risk profiling.

EXHIBIT 3

Global Portfolio Allocation Scoring System (PASS) for Individual Investors

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Earning a high long-term total return that will allow my capital to grow faster than the inflation rate is one of my most important investment objectives.	5	4	3	2	1
2. I would like an investment that provides me with an opportunity to defer taxation of capital gains to future years.	5	4	3	2	1
3. I do not require a high level of current income from my investments.	5	4	3	2	1
4. I am willing to tolerate some sharp down swi... my investments in order to seek a potentially higher return than would normally be expected from more stable investments.	5	4	3	2	1
5. I am willing to risk a short-term loss in return for a potentially higher long-run rate of return.	5	4	3	2	1
6. I am financially able to accept a low level of liquidity in my investment portfolio.	5	4	3	2	1

Exhibit 3: Global Portfolio Allocation Scoring System (PASS) for Individual Investors

Over what period of time do you expect to remain invested in this portfolio?		
Three years or less		(short-term horizon)
Four to seven years		(intermediate-term horizon)
More than seven years		(long-term horizon)

Figure 5 Global Portfolio Allocation Scoring System (Source: Assessing Risk Tolerance for Asset Allocation, 2003)

EXHIBIT 4

Risk Tolerance Profiles

	Short-Term Horizon				Intermediate-Term Horizon				Long-Term Horizon			
	RT1 Target	RT2 Target	RT3 Target	RT4 Target	RT1 Target	RT2 Target	RT3 Target	RT4 Target	RT1 Target	RT2 Target	RT3 Target	RT4 Target
PASS Score	6-12	13-18	19-24	25-30	6-12	13-18	19-24	25-30	6-12	13-18	19-24	25-30
Cash and Money Market Funds	40.0%	30.0%	20.0%	10.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	3.0%	2.0%
Treasury Bonds/ Bond Funds	40.0%	30.0%	30.0%	20.0%	60.0%	35.0%	20.0%	10.0%	30.0%	20.0%	12.0%	8.0%
Corporate Bonds/ Bond Funds	20.0%	30.0%	30.0%	40.0%	15.0%	15.0%	15.0%	10.0%	15.0%	10.0%	10.0%	4.0%
Subtotal	100.0%	90.0%	80.0%	70.0%	80.0%	55.0%	40.0%	25.0%	50.0%	35.0%	25.0%	6.0%
International Bond Funds	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	0.0%	5.0%	5.0%	4.0%
Subtotal	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	0.0%	5.0%	5.0%	4.0%
Index Fund	0.0%	10.0%	10.0%	10.0%	10.0%	15.0%	15.0%	20.0%	20.0%	20.0%	20.0%	25.0%
Large Cap Value Funds/ Stocks	0.0%	0.0%	5.0%	5.0%	5.0%	5.0%	10.0%	10.0%	10.0%	10.0%	5.0%	5.0%
Large Cap Growth Funds/ Stocks	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	5.0%	10.0%	15.0%	10.0%	10.0%	5.0%
Mid/Small Growth Funds/ Stocks	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	0.0%	0.0%	5.0%	10.0%
Mid/Small Value Funds/ Stocks	0.0%	0.0%	0.0%	5.0%	0.0%	5.0%	5.0%	5.0%	0.0%	5.0%	5.0%	10.0%
Subtotal	0.0%	10.0%	15.0%	20.0%	20.0%	30.0%	40.0%	50.0%	45.0%	45.0%	45.0%	55.0%
International Stock Funds	0.0%	0.0%	0.0%	5.0%	0.0%	5.0%	5.0%	10.0%	0.0%	5.0%	10.0%	15.0%
Subtotal	0.0%	0.0%	0.0%	5.0%	0.0%	5.0%	5.0%	10.0%	0.0%	5.0%	10.0%	15.0%
Real Estate Funds	0.0%	0.0%	5.0%	5.0%	0.0%	5.0%	5.0%	10.0%	5.0%	10.0%	15.0%	20.0%
Subtotal	0.0%	0.0%	5.0%	5.0%	0.0%	5.0%	5.0%	10.0%	5.0%	10.0%	15.0%	20.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Risk Tolerance Profiles Discretionary Advisers Inc. Copyright ©2002

Figure 6 Global Portfolio Allocation Scoring System (Source: Assessing Risk Tolerance for Asset Allocation, 2003)

The risk tolerance profiles correspond to the PASS questionnaire results and show the client that one way to mitigate risk is to diversify across asset categories. Four risk tolerance profiles are listed to correspond to the questionnaire score and the client's time horizon. For example, the recommended allocation for a moderately conservative investor (RT2 profile, PASS score of 13–18) with a short-term time horizon is 90 percent in money market and fixed income securities, and 10 percent in an index fund. The same profile for an investor with a long-term time horizon is 35 percent in money market and fixed income securities, 5 percent in international bond funds, 45 percent equities (20 percent indexed, 10 percent large-cap growth, 10 percent large-cap value, 5 percent small- or mid-cap value), 5 percent in international funds and 10 percent in REIT funds. In all cases, for any given risk tolerance level, the relative aggressiveness of the portfolio increases as the time horizon increases. [13]

The third topic attachment in relation to risk profiling is the **Explanation System using mean-variance analysis**. The topic attachment emphasizes the mean-variance theory is an important model of investments based on decision theory. It is the simplest model of investments that sufficiently rick to be directly useful in the applied problem. Mean-variance is a tool for financial calculator been used in the system to calculate expected return and risk involved. It involves:

- Mean (Expected Return)
- Variance (Measurement of Risk)
- Standard Deviation (Risk)

Therefore, the user can know how to calculate the expected return and risk for the funds been selected according to the risk involved.

CHAPTER 3 METHODOLOGY

3.1 Research Methodology

This project adopted a number of different techniques and data sources. The research methodology is the process of inquest that starts from the base line of philosophical assumptions and data collection to design research. Firstly, the research technique been used is by performing literature review. The objective of literature review is to find existing method and perform evaluation on similarities' and differences on existing system. Secondly, the research techniques been used is performing survey using questionnaires. The objective of questionnaires is to find the relationship between personal investment literacy and age, gender, investment experience as well as financial course taken. Thirdly, the research technique been used is semi-structured open ended interview. The objective of semi-structured open ended interview is to capture knowledge from the expert.

3.1.1 Questionnaires'

A questionnaire is a research technique to reach more final year students in Universiti Teknologi Petronas including engineering field and technology field. Depending upon the mode of distribution, this can be quickly done and data analysis can begin right away. The questionnaire avoids interviewer bias, guiding, and cues that can impact the validity and reliability of the data collection. It is close-ended questionnaires where it includes all possible answers/prewritten response categories and respondents are asked to choose among them. (Multiple choice questions)The questionnaires have 10 questions which to find the relationship between personal investment literacy among UTP students and age, gender, investment experience and financial course taken. It is been distributed in classes as well as posted the questionnaires online and send it to the final year students' email.

3.1.2 Semi-structured open ended interview

Semi-structured open ended interview is used to collect qualitative data by setting up a situation (the interview) that allows a respondent the time and scope to talk about

their opinions on a particular subject. The objective is to understand the respondent's point of view rather than make generalisations about behaviour. It uses open-ended questions. The respondents are senior lecturer of Finance, Mr Lai Fong Woon and public bank unit trust fund manager, Ms Nadira Nasir. The context of the interview is to know how the investment process flow, how the system implemented in the bank as well as any expert knowledge in investment area. Furthermore, to build a rapport with the respondent and the interview is like a conversation.

3.2 System Methodology

Developing a first-class project that meets the expected requirements need to be manage phase by phase so that it follows the basic cycle of development. Basically, it is important to understand and develop the project with the best practice in order to successfully design and implement new information systems or application. The project adopts throwaway prototyping-based methodologies. The throwaway prototyping-based methodologies have a relatively thorough analysis phase that is used to gather information and to develop ideas for the system concept.

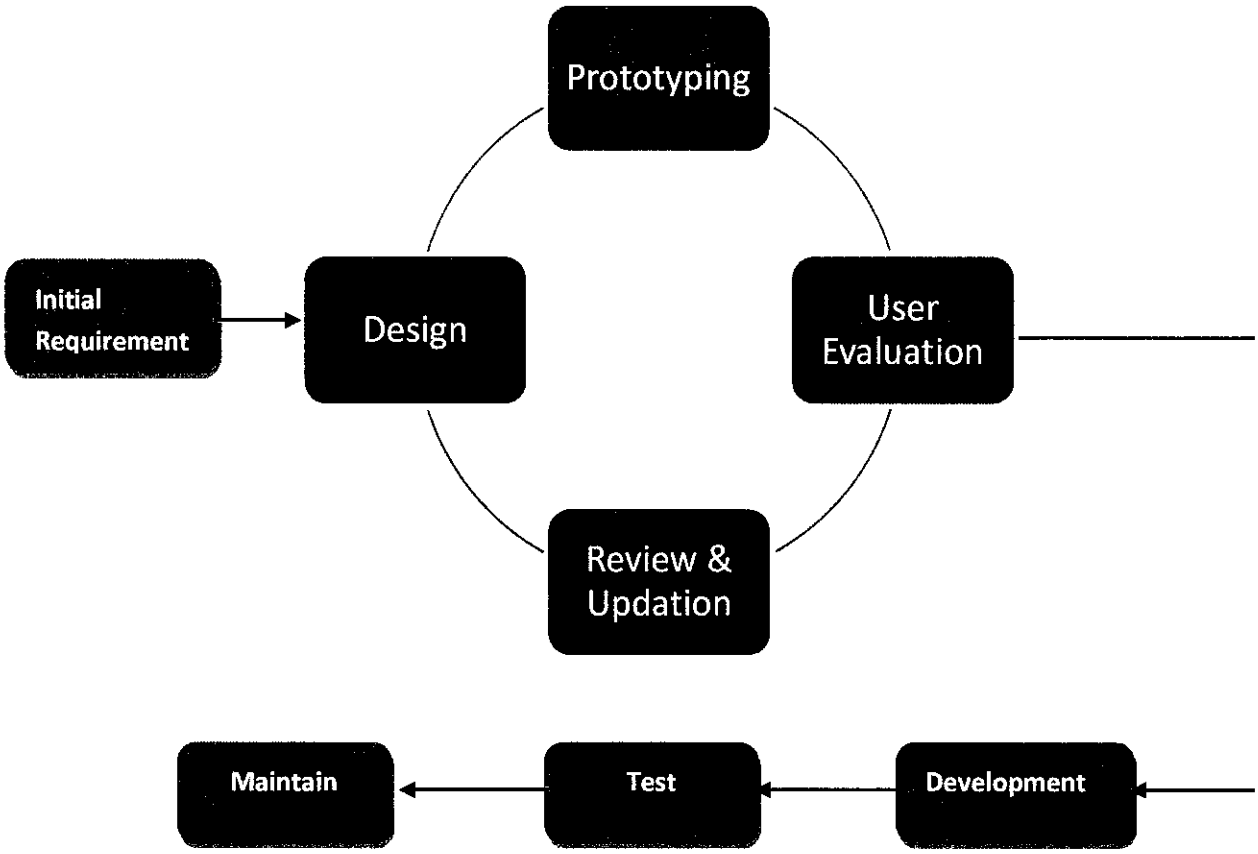


Figure 7: The throwaway prototyping-based methodologies

Throw-away prototypes are a useful way of exploring ideas, and gaining feedback from the client and/or end-user. Interface design, layout and interaction styles are another area which can be explored using throw-away prototypes. These are sometimes referred to as 'mock-ups' or 'click dummies' because they look realistic but contain little or no code to provide the functionality expected. They also provide a useful and meaningful way for a developer to *walk* the client and/or end-user through the system requirements as interpreted by the developer. Feedback from the client and/or end-user should aid in allowing misinterpretations or unnecessary complexities to be picked up and addressed at an early stage.

Prototype 1: Personal Profile and Risk Profile Questionnaires Page

Prototype 2: Asset Allocation Page

Prototype 3: Explanation System Page

3.3 Project Work

3.31 Planning

Everything needs planning. The **planning phase** is the first normal base thing that is needed in every-whole-world project. The first thing that needed to be identified during this phase is the business value. In order to find what the business values of this project are, the research about background of the project is conducted. Besides that, to make sure the project always sticks in the right track, a work plan has to be developed. The work plan is done based on the scope of study that will determine on the development of the project. At the end of planning phase, the output of the project can be identified based on the feasibility analysis and project plan.

3.32 Analysis

The second phase is the **analysis phase**. During this phase, the project is going to be conducted first with analyzing what strategy to use in the project. In other words, the work analyze involve such as what the system will looks like and on what situation the system will have to be design and implement. Next is the gathering of all project requirements. This project aims to be done according to the objectives that are arranged by its precedence. It means this project focus on the developing of the panoramic view function first before moving on to the next task.

Questionnaire /Survey / Interview

Risk profiling analysis will be used to examine the data produced through the interviews and questionnaires. In the questionnaires, the elements of the relationship between the participants personal investment literacy that will be analyzed include age, gender, investment experience as well as financial course taken. Results will be both qualitative and quantitative.

Questionnaires Objectives

This study examines UTP students' knowledge of personal investment and the relationship between the level of investment literacy and gender, financial courses taken and investment experience. The findings suggest that college students have inadequate knowledge of personal investments. The problem spreads across a broad spectrum of college students of gender, financial courses taken and investment experience. Consistent with previous studies, the results have shown that female students are more knowledgeable about investing than male students. Non-financial majors are less knowledgeable than business majors. The differences between these groups are statistically significant. The findings suggest that illiteracy of personal investment exists among college students and the issue needs to be addressed by proposing risk profiling system.

System Requirement Specification

An analysis of the problem using object-oriented techniques is been performed, An external view of the enterprise model of the risk profiling system using user personal profile, risk profiling questionnaires result, investment products as well as asset allocation requirement will be developed using Unified Modelling Language. (UML). This System Requirements Specifications document will form part of the documentation for the project.

Some desired features of the new system include:

- Allow user to fill out the personal profile and store in the database. The personal profile can be updated from time to time.
- There are 4 components in Risk Profiling engine:
  (a) Risk Questions
  (b) Risk Tolerance Score
  (c) Risk Profile Report
- List down the top 5 banks offering investment product in the recent market from each types of investment product and the user can select which one is desired
- Explanation System – explain the suggested portfolio using mean-variance analysis.

Analysis methodology will involve business analysis, requirement analysis, data analysis, process analysis(web) and application architecture: [ ]

- Business analysis – State the business rules, business system interfaces, business function, business ownership, sponsorship and associated project budget requirement.
- Requirement analysis – System I/O description, user requirement definition, functional and security requirement.
- Data analysis – Involve data collection process, data validation, data storage, manipulation and retrieval.

- Process analysis – Data/process flow analysis, process decomposition and system interfaces.
- Application architecture – Analyze application information structure, usability, user interface design, interaction and application implementation.

3.33 Design

The third phase of this project is the **design phase**, which would require the technical skills instead of management ability. For this project, the first approach is by trying to design the interface view of the related place. During this phase, all data and information about the risk profiling and investment product should already be ready in hand and just need to develop on it. The interface design also need to be sketched and must surely meet the user requirements.

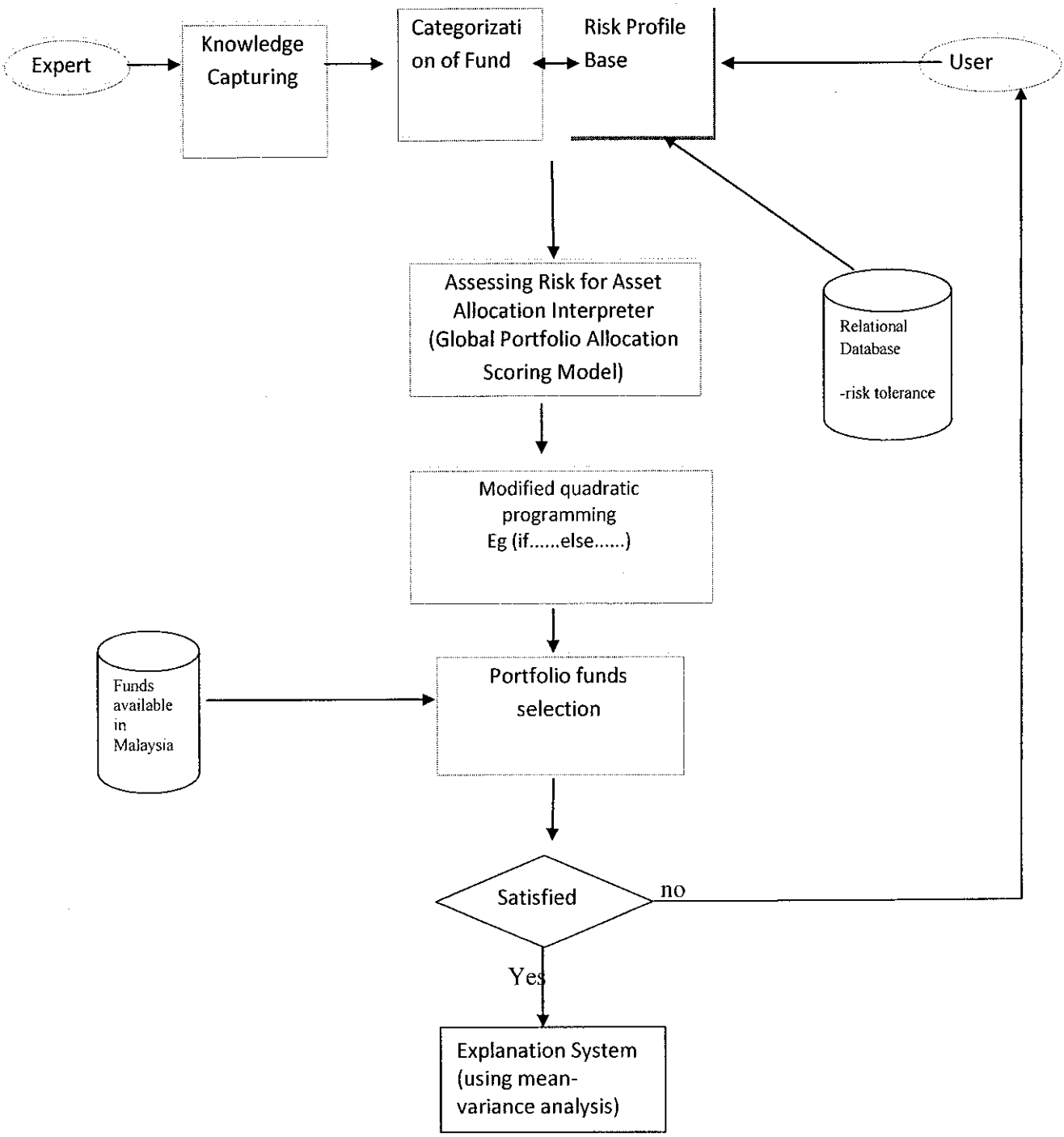


Figure 13: Architecture of proposed system

Explanation about the architecture framework proposed system

The key components of the proposed system are the following:

- There are two independent external relational databases.

  The first database provides information about factors to consider in investment which are firstly is time horizon for eg "how long can my money stay invested?" or "What is the time frame to achieve my goal?" Secondly, the expected ROR (Risk & Return) for eg "What are the risks involved?" or "What is the realistic rate of return from my investment?"

  The second database provides information which captured from the risk profiling questionnaires which may update to reflect any changes in the user profiling.
- The knowledge base of the system is constructed based on the advice of an expert in investment through the knowledge acquisition system.
- The risk profiling system is used to capture the risk tolerance of the user.
- The explanation system. An explanation can increase user acceptance of a recommendation by providing assurance that the recommendation is logical, or it can persuade a user that an unexpected recommendation is appropriate. [11]

Information Architecture and Content

Information architecture is the foundation open which websites are built. You can think of it as the blue prints for a website. It defines a website's structure, hierarchy, and navigation. Information architecture (IA) refers to the structure or organization of the website. It describes the ways in which the different pages of your site relate to one another and ensures information is organized in a consistent and predictable way on each page. It involves steps such as:

• assessing existing and needed content,
• organizing the pages,
• providing clues to help use the site efficiently, and
• developing navigational structure.

Through the process of developing information architecture, it will create a site map of your content and will develop a wireframe sketch that designers and developers will use as a guide for building the system.

Information Architecture and Content

Step 1: Creating the site map

The objective is to create and validate the site map (a visual representation of the content areas). See the illustration below for an example of how to organize a site in a hierarchical way. In this type of structure pages have a parent/child relationship. Not every page has a child, but all pages have a parent. Once the site map has finished, testing this site map will be performed by asking users from the target audiences whether they find the structure is logical.

Site Map of the proposed system

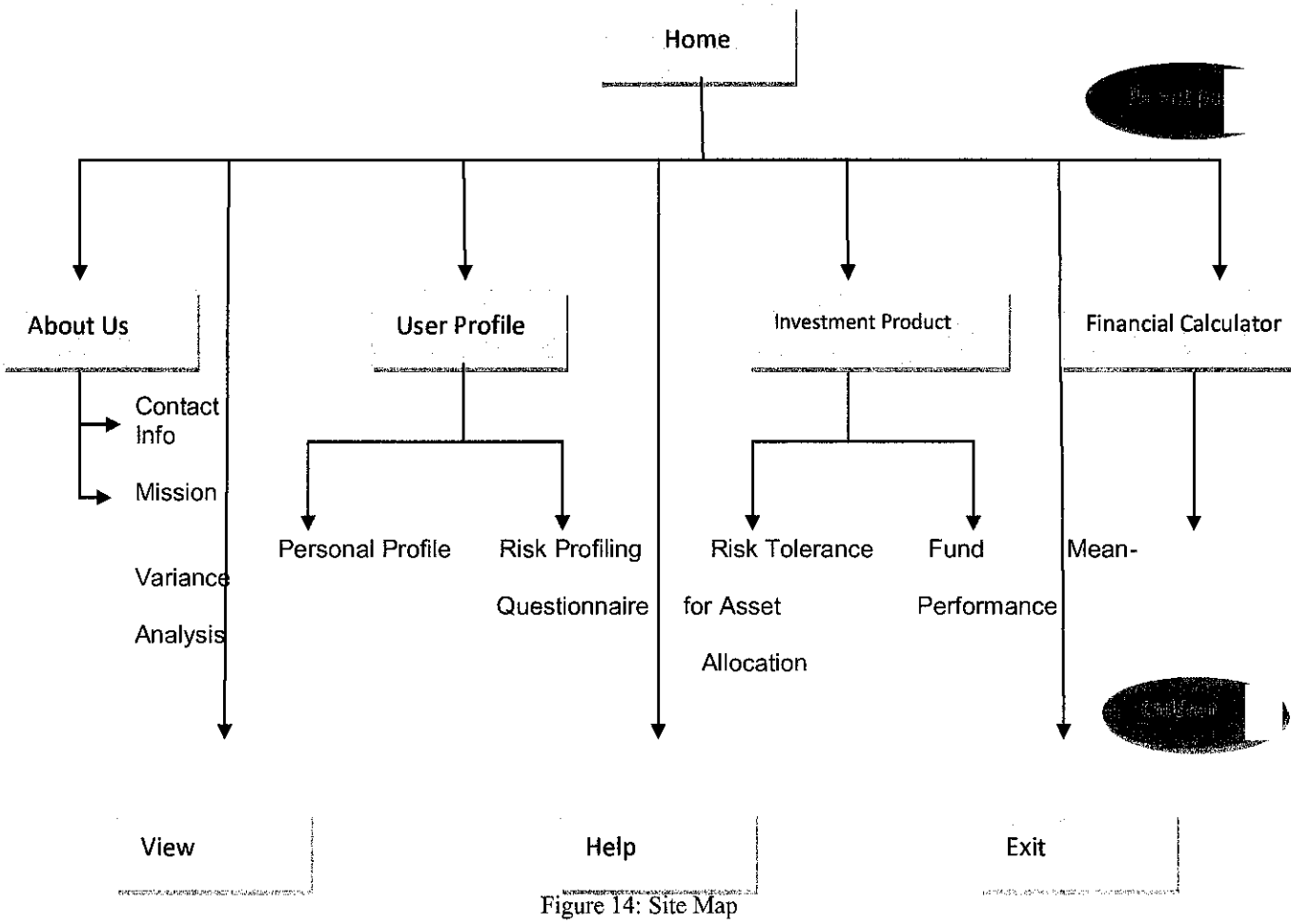


Figure 14: Site Map

Step 2: Outlining navigational structure

Take the site map has created and draws it to emulate the navigation scheme. The navigational items of the system should not point to other sites, nor should they point to Acrobat (.pdf) files, Microsoft Office documents or other non-HTML files. Doing this can be disorienting for the site visitor and can be problematic for those with slow connections.

Links to other sites and documents should be placed in your central content area. Alternatively, they can be placed in "highlights" or "related links" areas of the page. A helpful analogy for good navigation is to think of the menus/submenus of the site as if they were the table of contents of a textbook. The table of contents should not be cluttered with items that do not describe the main content areas of the book. Therefore, the main navigation of your site should not include links to pages outside of your site, downloadable documents or e-mail addresses.

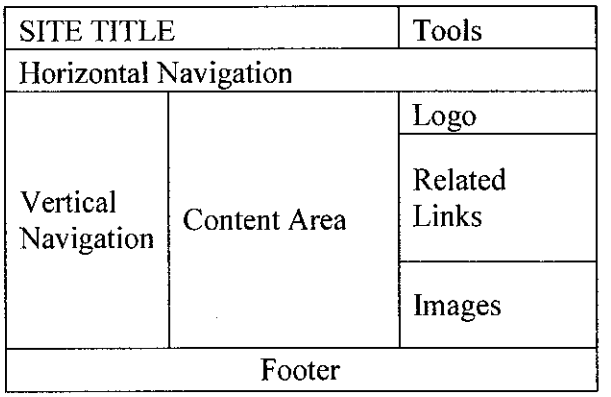
Horizontal Navigation – About Us, View, Help, Exit

Vertical Navigation – User Profile, Investment Product, Financial Calculator

Step 3: Creating wireframe

A wireframe is a sketch or blueprint that closely represents how the areas of a page will be organized. Below you can see how a simple, hand-drawn wireframe sketch can be used as a guide for incorporating all of the necessary page elements in a well-organized and functional way. It is important that you use your wireframes as guides when you collaborate with your designers and developers. This will help ensure that your information architecture is not inadvertently revised or obscured later during the design and development processes.

Figure 15 Wireframe of the proposed system



Finally during the **implementation phase**, it will focus more on the installation of the project. For this project, the application will be test based on the functionality of the application. Besides that, the implementation phase is the time to make sure the application is fully function without any errors and requires some feedback from the test session that needs to be conducted. It is important to conduct a support plan in order to make sure the application can be use in the future.

CHAPTER 4 RESULT AND DISCUSSION

4.1 Survey/Questionnaires' Result Analysis

This study examines the following questions: What is UTP students' knowledge of personal investment? In what areas is investment illiteracy most evident among college students? What is the relationship between illiteracy and gender, financial courses taken and investment experience? The questionnaire covers a variety of personal investment topics such as risk tolerance, risk-return profile, diversification, investment product, measurement of fund performance. Each question is worth 10 points. Anyone knowledgeable about the basics of personal investment should receive an IQ score of 70 or higher. A failing score is 40 or lower. A copy of the survey is attached in the Appendix for interested readers.

The survey was conducted in online survey sending to email of final year students. The final sample of 53 students consists of 22 male and 32 female, 29 students majoring in finance, 24 in non-finance field; and 17 students with prior investment experience and 36 without experience.

Figure 8. Personal Investment Literacy Survey and Testing results for the Total Sample

Panel A. Number and Percentage of Correct Responses for Each Question					
	Q1	Q2	Q3	Q4	Q5
	Risk Tolerance	Risk_Return Profile	Diversification	Investment Product	Measurement of Fund Performance
Number	16	11	20	42	15
Percentage	30%	20%	37%	79%	28%
Total participation		54			

Figure 9. Personal Investment Literacy Survey and Testing results according to Gender

Panel A. Number and Percentage of Correct Responses for Each Question according to gender (MALE)					
	Q1	Q2	Q3	Q4	Q5
	Risk Tolerance	Risk_Return Profile	Diversification	Investment Product	Measurement of Fund Performance
Number	8	7	6	18	7
Percentage	36%	32%	28%	80%	30%
Total participation		22			

Figure 10 Personal Investment Literacy Survey and Testing results according to Gender

Panel A. Number and Percentage of Correct Responses for Each Question according to gender (FEMALE)					
	Q1	Q2	Q3	Q4	Q5
	Risk Tolerance	Risk_Return Profile	Diversification	Investment Product	Measurement of Fund Performance
Number	19	12	11	23	14
Percentage	60%	40%	35%	75%	45%
Total participation		32			

Figure 11. Personal Investment Literacy Survey and Testing results with Investment experience

Panel A. Number and Percentage of Correct Responses for Each Question WITH Investment Experience					
	Q1	Q2	Q3	Q4	Q5
	Risk Tolerance	Risk_Return Profile	Diversification	Investment Product	Measurement of Fund Performance
Number	10	13	9	11	5
Percentage	60%	75%	55%	65%	30%
Total participation		17			

Figure 12 Personal Investment Literacy Survey and Testing results without Investment experience

Panel A. Number and Percentage of Correct Responses for Each Question WITHOUT Investment Experience					
	Q1	Q2	Q3	Q4	Q5
	Risk Tolerance	Risk_Return Profile	Diversification	Investment Product	Measurement of Fund Performance
Number	11	16	18	10	4
Percentage	30%	44%	50%	28%	10%
Total participation		37			

The objectives of this study are to assess college students' knowledge of personal investment and the relationship between investment literacy and gender, financial course taken, and experience. The results suggest that college students have inadequate knowledge of personal investment basics. The problem cuts across a broad spectrum ofthe participating students with women and non-business majors earning the lowest scores. The findings suggest that the investment illiteracy among college students must be addressed. Caution should be exercised when generalizing the results because the sample was drawn from one university. Although many important topics of personal investments are covered in the questionnaire and we have achieved modest objectives of detecting investment illiteracy among college students, more questions may help to provide additional information. In spite of the limitations, the study is the first to examine college students' personal investment literacy and provides evidence that an investment illiteracy problem exists. The focus of the proposed system would be based on the knowledge on risk tolerance, risk return profile, diversification, investment product and measurement of fund performance.

4.2 User Interface Design

Interface design is the process of defining how a system will interact with external entities. For the system proposed, the external entities are the users. The users are specified to people who are financial illiterate.

Principle of User Interface Design

(1) Layout – The layout designed for personal computers follows the standard Windows or Macintosh approach for screen design. The screen is divided in two boxes, The top box is the navigation area, which user the navigation area to navigate through the system. The middle and it covers most of the home page display report and present forms for data entry.

Figure above shows the homepage for Personal Risk Profiling System. User can click every button in the homepage to know about the description of the system as well ass what tools are we provided, however, the users cannot access the tools provided if

they not register in the system. Therefore, this home page can only be viewed if they do not register as the users. Therefore, it provides security.

(2) Content Awareness - Content awareness refers to the ability of an interface to make the user aware of the information contains with the least amount of effort on the user's part. For example, in the system when the users want to input their details in the registration page, the interface provided are simple but clear in order for the users do not spend longer time to understand what field is required. The field labels that identify on the interface should be short and specific – objectives that do not conflict.

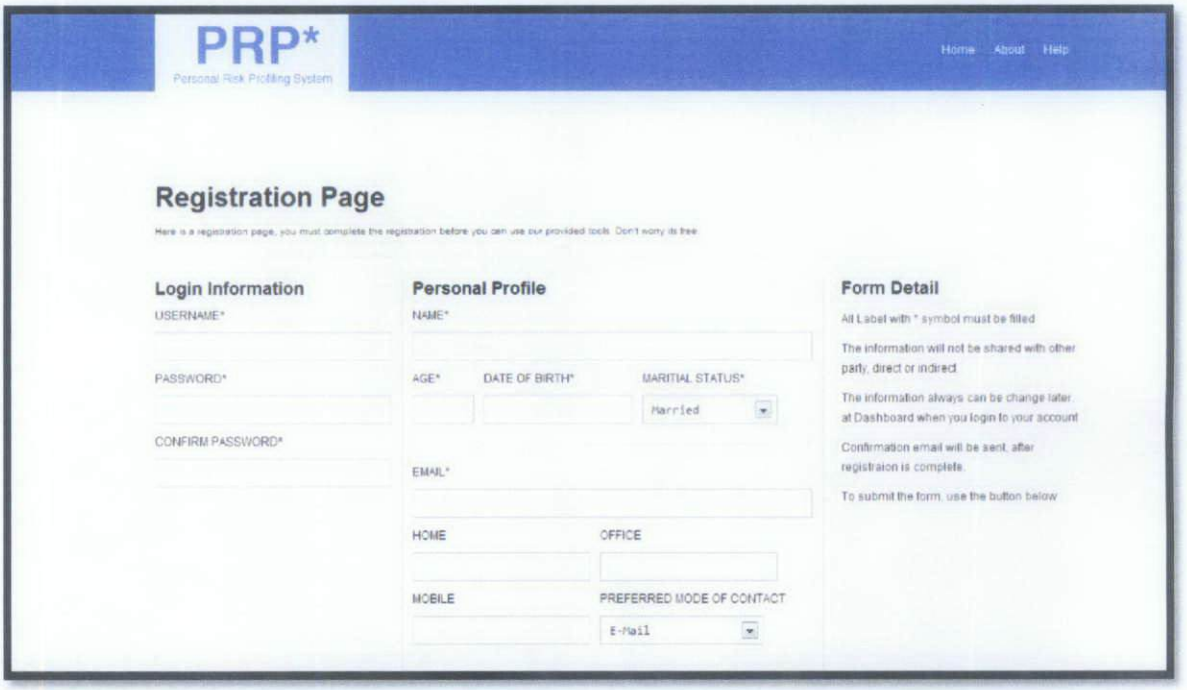
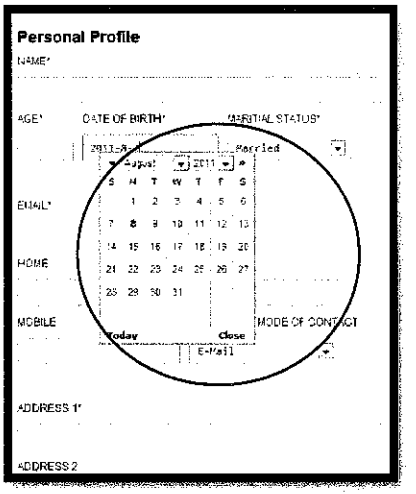


Figure above shows the registration page. This form illustrates the important information side on the the left while the leat important information on the right side. The address fields within the address area follow a clear, natural order is need to prevent misinterpretation. For example in date of birth, user may key in the month in number (18-11-1989) or in month (18-nov-1989). Therefore, to make it convenient for the user they just select the date in the calendar provided.



(3) User experience – User experience can be essentially be broken down into two levels: those with experience and those without. In terms of knowledge in financial, the system is designed for people who is financial illiterate. Therefore, the word and terms used in the system is simple so that it can be directly understood.

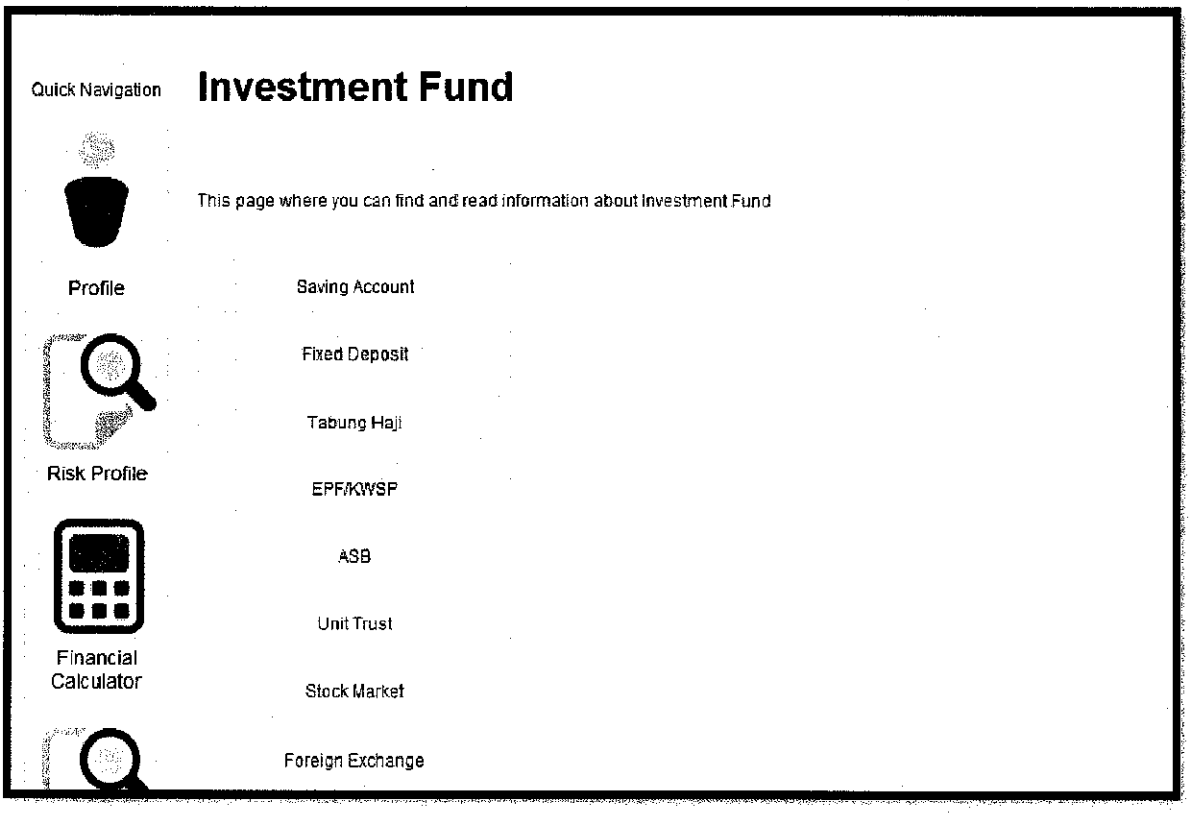


Figure above shows page of investment fund available in Malaysia. When we click the button saving account, it will appear all the information about saving account in Malaysia. So do other button who will works and function the same with button as Saving Account. When interfaces are consistent, users can interact with one part of the system and then know how to interact with the rest, aside, of course, from element unique to those parts.

4.3 Development

In the development phase, the functionalities of the system have been built. The main function of the system is to analyze the risk profiling of the users and then suggested suitable portfolio to the users. There are few other functions also have been built as the tools that can be used in the system.

(a) To analyze risk profiling of the users.

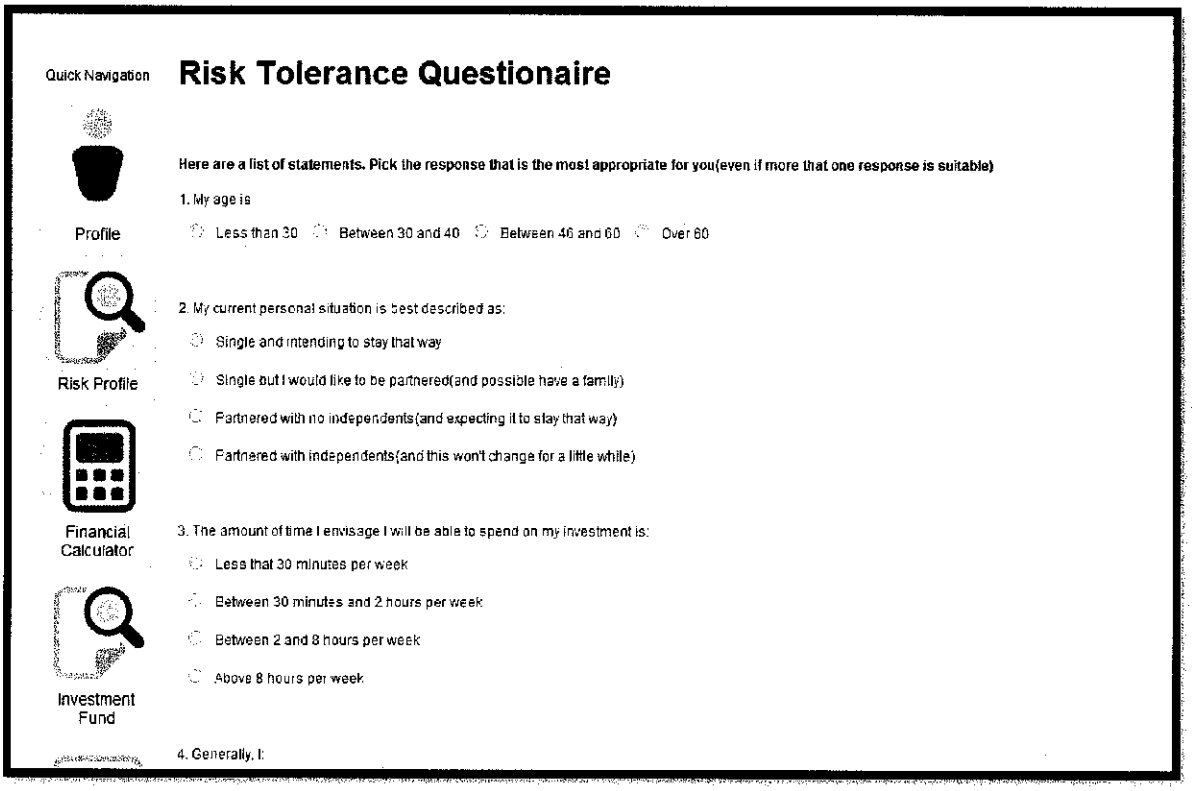
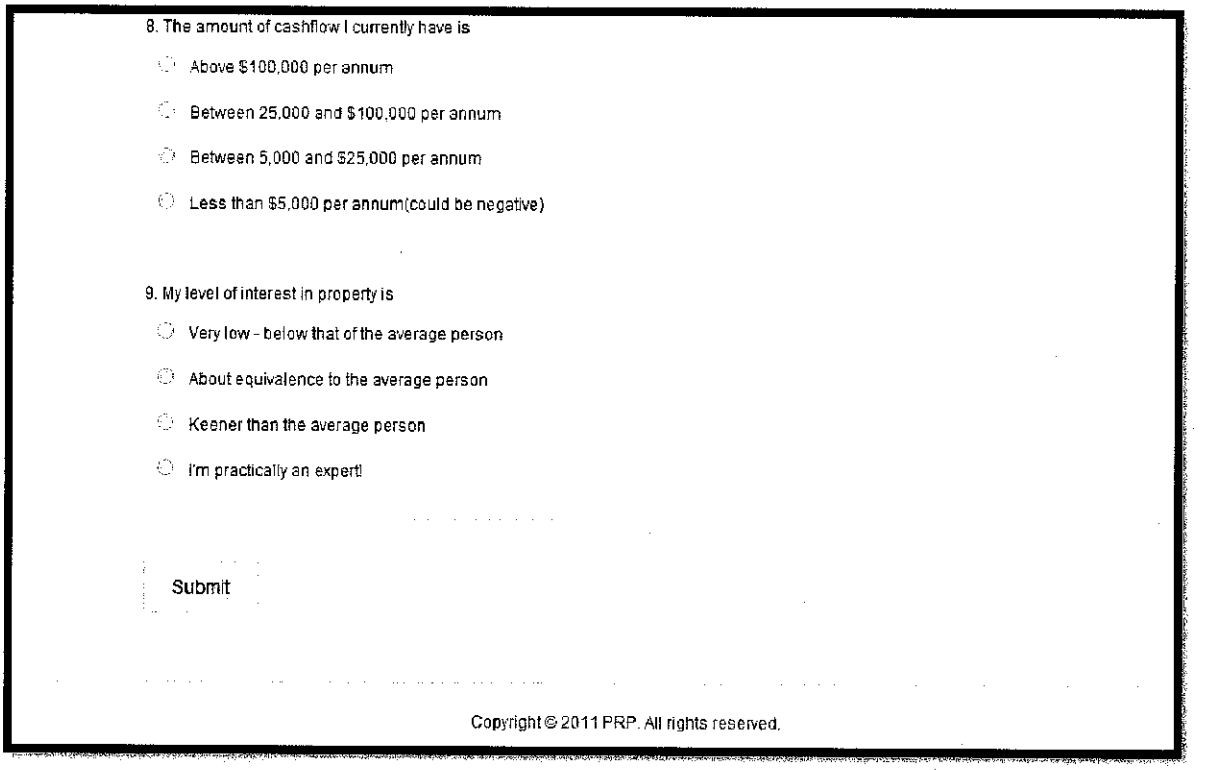


Figure above contains 9 questions that need to be answered carefully by the users. The user only can choose one radio box as the answer. Every each answer has a

different points that will contribute to your final score, Your final score will then be categorized into three category : Low risk, Medium risk, High risk.



The figure above shows the Submit button. After finish completing the risk tolerance questionnaires, press the Submit button.

(b) Categorizing which types of investor the user is

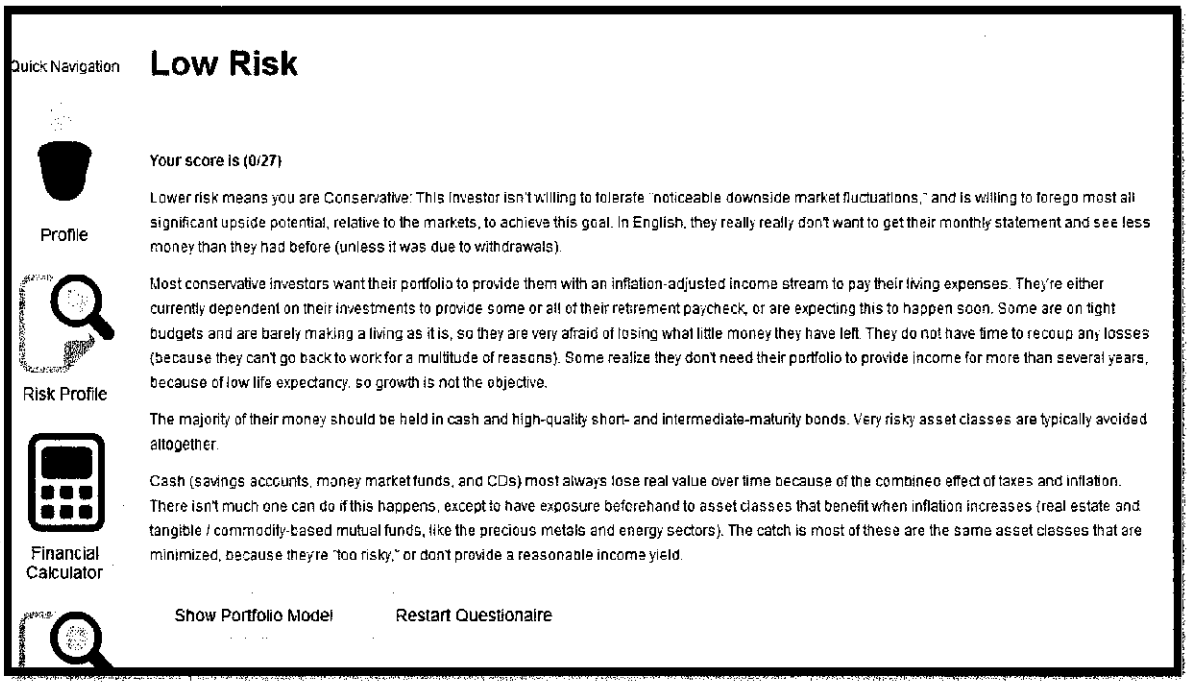


Figure above shows the result of completing the previous 9 questions on your risk profile. For example above the score is (0/27), you are low risk. The page will define what low risk is and which types of category investor you are.

If the user is not satisfied with output given, press Restart Questionnaires button to redo the questionnaires. It will go back to the previous page and all the answers will be empty and new score will recalculate. The final score will be saved and store in the database consequently when the users logout from the system and then log in the system on the next time, the score will be remains the same till the user decide to restart the questionnaires. This is for the purpose of consistency and relevancy of the system.

If the user is satisfied with the output given, press Show Portfolio Model button to proceed to the next page to gain information.

© Suggesting appropriate portfolio model to the users

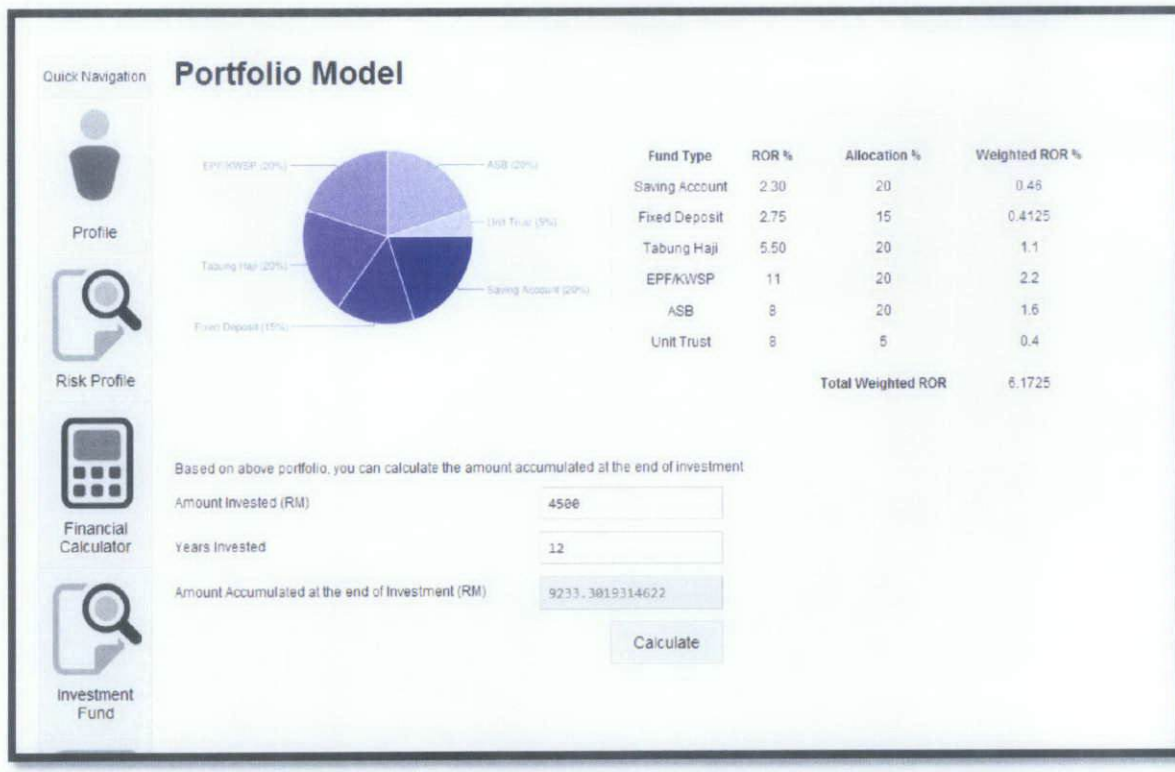


Figure above shows the suggested portfolio model page to the user. A portfolio is made from a combination of securities. We can combine different stocks to make a portfolio, or we can combine stocks and bonds to make a portfolio. In other words, we can combine different asset classes to make a portfolio. This is because combining these asset classes into a portfolio may be a good idea in reducing risk.

Generally, when we combine different stocks into a portfolio, we are likely to reduce the combined risk or portfolio risk. The risk of a portfolio is measured by its standard deviation. How can we explain this matter? For example, let's say a person invests his monies in two stocks, one in a plantation sector and another one in construction sector for a two-year period. How can the concept of diversification work in portfolio investment? In a hypothetical case, let's say, in that period, the plantation sector is performing extremely well because palm oil is found to be useful as bio-fuel. At the same time during that period, as construction material is getting expensive, and in the environment of high interest rates, construction activities are slow. Hence, the good returns from the investment in the plantation sector will be able to offset the not-so-

good returns from construction sector. So the investor ends up with a fair return as he diversifies his investment in two sectors.

(d) To calculate the amount accumulated in the of investment

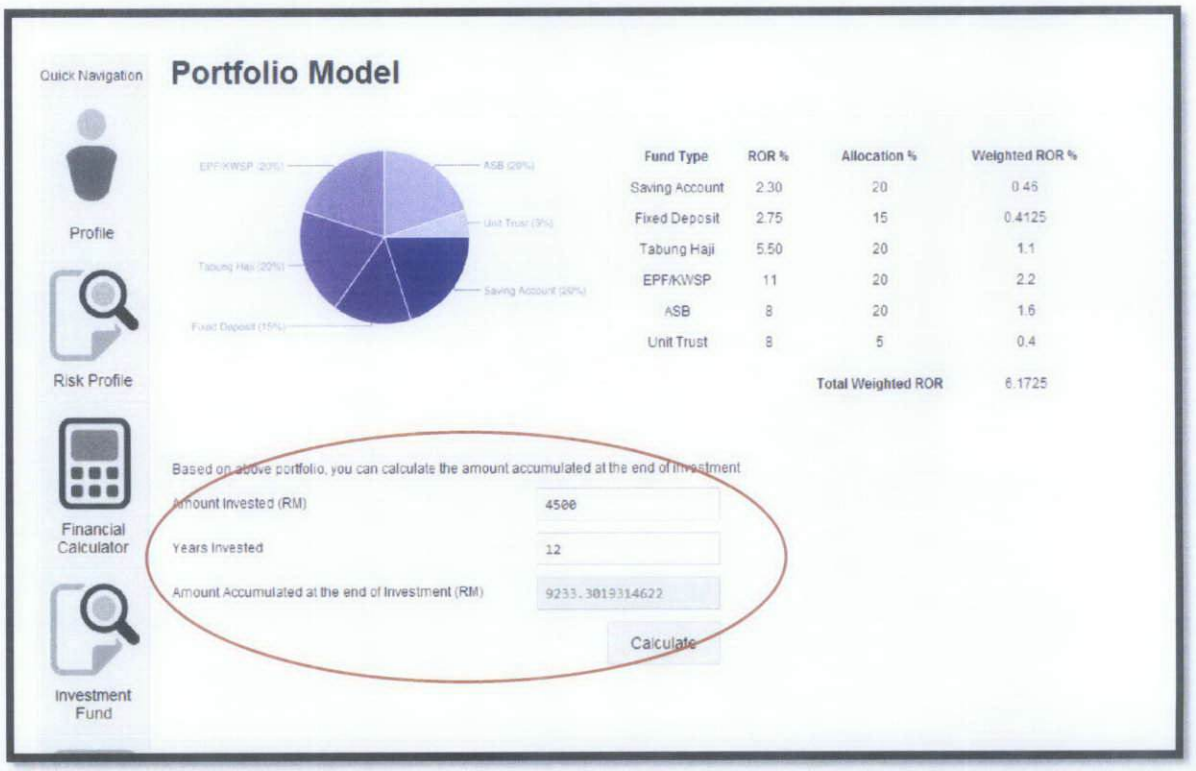


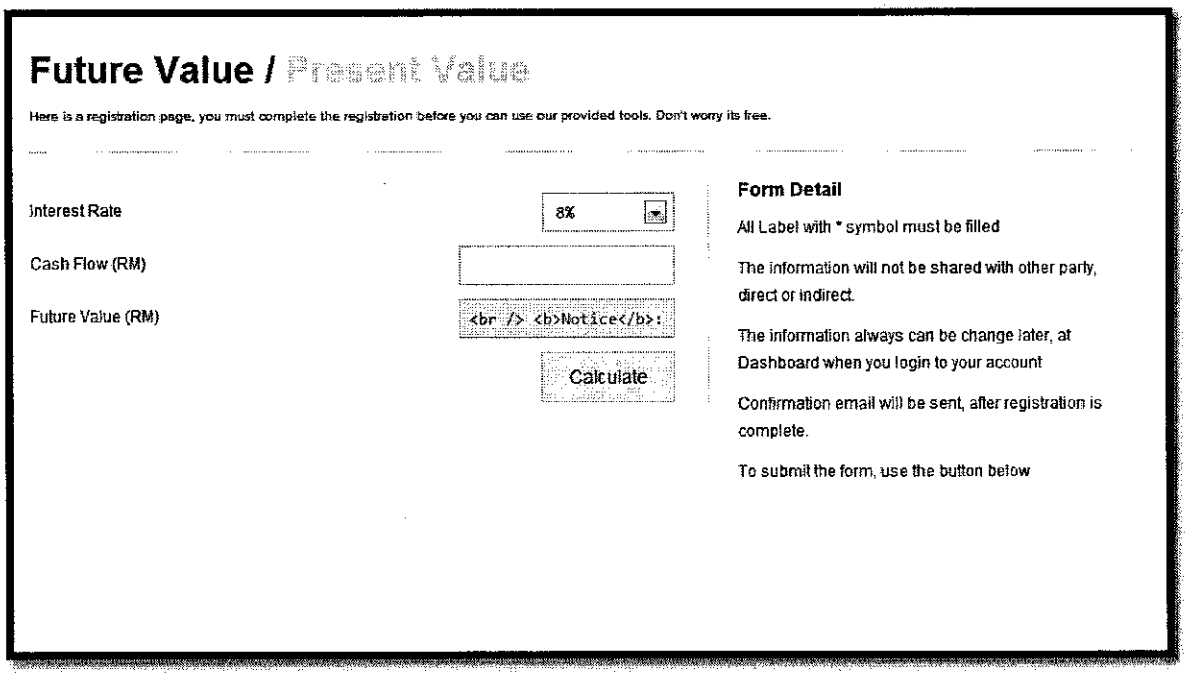
Figure above (the circle one) is the function of calculating the amount accumulated in the end of the investment. User need to input the amount of money they would like to invest (Lump Sum) and then how many years they want to see their money accumulated in the end of investment. After that, user press calculate button to know the amount money accumulated in the end of investment.

So, using formula $FV = PV(1+I)^n$ which pv = amount investewd

I = ROR

N= years (kuasa n)

(e) Financial Calculator



4.4 System Testing

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black box testing, and as such, should require no knowledge of the inner design of the code or logic.

User Acceptance Testing (UAT) is a process to obtain confirmation that a system meets mutually agreed-upon requirements. In software development, UAT is one of the final stages of a project and often occurs before a client or customer accepts the new system. The objective of performing UAT for the proposed risk profiling system is to know either the system do meet the requirement and do it brings value to the users.

Due to the time constraints, user acceptance testing is only performed on 6 users. The 6 users are targeted for people who are financial illiterate who is Final Year Student who two of them are taking financial courses while four of them do not take any financial courses.

The users said they were attracted to the simple layout of the home page and it makes they feel want to register as the users because the wording and the layout of the homepage delivers what the risk profiling system is all about. The users first were not sure what is risk profiling system is all about by reading the name itself. However, the users need to read the caption and its content so that they can conceptualize the function of the system.

Furthermore, the users said the concept of only the registered users can use the system brings security-secured to the data input in the system. Security is one of the main issues nowadays. Not all users can actually use the system directly. Therefore, the users said it is easy convenient that the data inout in the system can be update from time to time.

Stage	Types of Tests	Test Plan Source	When to use	Notes
Acceptance Testing	Alpha Testing Conducted by the users to ensure they accept the system	System Test	For normal acceptance testing	The targeted user is final year students. They tests the system repeatedly to ensure they accept the system
	Beta Testing Uses real data, not test data	System Requirements	When the system is important	Users closely monitor system for errors or useful improvements.

Alpha Testing – Firstly, the system been tested with the system using made-up data. This is where users only test the interface of the system, all the datas in the system is not real. The users understood the direction in the system and the financial tools can be understood directly.

Beta Testing – Secondly, the system been tested by the user using real data but carefully monitored for errors. This is where the users test all the functionalities of the system involved for example the financial calculator (real data).

Discussions

The challenging part of this project and problems encountered would be designing the suggested portfolio model for the users. The allocation of percentage for every each asset supposes not to be fixed by the developer itself. The percentage of allocation asset should be changes according the risk level of the users. For example two user been categorized under same type of investors but Person A has lower score than the Person B. Therefore, allocation percentage for every each asset for Person A should be different from Person B even though they both are categorized under the same type of investor eg Low Risk. To perform this interpretation, human intelligence needed to be use in the system.

Other than that, a problem encountered is to get large amount of data from different sources of investment fund available in Malaysia.

Due to the time constraint, data cannot be collected from appropriate resources completely for the system.

CHAPTER 5 CONCLUSION AND RECOMENDATION

The aim of this project is to access suitability of investment instrument with different profile of individual towards risk. The system developed in this project provides people who lack of financial literacy with personal financial planning tool to select ideal investment instruments according to the risk tolerance result obtained by the risk profiling questionnaires. Risk profiling provides a better balance between hope for poverty protection and high affluence through allocating wealth allocation. What I have learned while developing the system is to design the system that meets the user's requirements as it is one of the most of the important part that main implication in developing the system. People who is financial illiterate use this system can explore and further their knowledge in investing and provides good basis platform for them.

Recommendation for future wise is to develop a system that has a better interface that would look more professional and established websites. Furthermore, to have more financial tools that can provide additional value to the system where it can focus more on financial planning such as retirement planning, education planning and home ownership planning.

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Appendices

Response Summary

Total Started Survey: 54
Total Completed Survey: 54 (100%)

PAGE: 1

1. Please tick your gender

Create Chart | Download

	Response Percent	Response Count
Male	40.7%	22
Female	59.3%	32
answered question		54
skipped question		0

2. Have you taking any Finance Subject?

Create Chart | Download

	Response Percent	Response Count
Yes	55.6%	30
No	44.4%	24
answered question		54
skipped question		0

3. Do you have any experience in investing/financial investment?

Create Chart | Download

	Response Percent	Response Count
Yes	31.5%	17
No	68.5%	37
answered question		54
skipped question		0

4. Once you starting working, have you ever considered to start investment to expand your personal financial planning?

Create Chart | Download

	Response Percent	Response Count
Yes	85.2%	46
No	1.9%	1
Not Sure	13.0%	7
answered question		54
skipped question		0

5. If you considered seeking basic knowledge in investment as a platform, which medium do you prefer?

Create Chart Download

	Response Percent	Response Count
Websites	40.7%	22
Financial Advisor	51.9%	28
Newspaper	1.9%	1
Magazines	5.6%	3
answered question		54
skipped question		0

6. If you are consider starting investing once you are working, do you know which type of investor you are? (eg conservative investor, moderate investor, aggressive investor)

Create Chart Download

	Response Percent	Response Count
Yes	31.5%	17
No	29.6%	16
Not sure	38.9%	21
answered question		54
skipped question		0

7. Common stocks always provide higher returns than bonds or money market investments.

Create Chart Download

	Response Percent	Response Count
True	22.2%	12
False	18.5%	10
Not Sure	59.3%	32
answered question		54
skipped question		0

8. Investing in mutual fund that holds a diversified portfolio or stocks protect your investment against market declines.

Create Chart Download

	Response Percent	Response Count
True	40.4%	21
False	7.7%	4
Not Sure	51.9%	27
answered question		52
skipped question		2

9. - Money Market Fund - Fixed Income Fund - Balanced Fund - Syariah Fund What types of fund as stated above?

Create Chart Download

	Response Percent	Response Count
Stock	13.0%	7
Bond	7.4%	4
Unit trust	79.6%	43
answered question		54
skipped question		0

10. The figure that best reflects a mutual fund's performance over a period of years is

Create Chart Download

	Response Percent	Response Count
Its current yield	16.7%	9
The total of dividends and capital gains it has paid	53.7%	29
Its total return	29.6%	16
answered question		54
skipped question		0

APPENDIX 1
GANTT CHART FOR FYP 1

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17
Proposal																	
Approved Proposal																	
Extended Proposal																	
Proposal Defense & Progress Evaluation																	
Interim Report																	
Technicl Report																	
Study Week																	
Final Exam (Jan 11)																	
Semester Break																	

Dateline
Progress

GANTT CHART FOR FYP 2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Start of May '11 Semester														
Project Work Continue														
Start developing the system (Planning)														
Progress Report 1														
Project Work Continue														
Continue developing the system (Analysis & Design)														
Progress Report 2														
Seminar														
Project Work Continue														
Continue developing the system (Design & Implementation)														
Testing the system and get feedback														
Continue developing the system (Solved issue, Design & Implementation)														
Submission of Dissertation (soft bound)														
Oral Presentation														
Submission of Dissertation (hard bound)														

Dateline

Progress