

**A Selection of Higher Education Institutions by Using a Web-Based
System University-Information (U-Info)**

by

Nur Atikah binti Jamaluddin

A project dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
Information Communication Technology

MAY 2013

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CERTIFICATION OF APPROVAL

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Information & Communication Technology Programme
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in partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
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Approved by,

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TRONOH, PERAK
May 2013

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.

NUR ATIKAH BINTI JAMALUDDIN

ABSTRACT

The purpose of U-Info system is to build a web-based system in order to help secondary school leavers to choose the best programme or university that matched with their personality. Some oversea universities have applied the concept of personality to help their students to choose the best programme to enroll in. Unfortunately, universities in Malaysia have not used this concept. There are websites available which provided only information regarding the programme available in Malaysia but the website do not provided the methods to choose the best university or programme that match with their personality. Thus, it caused many secondary school leavers having difficulties to choose which programme or university to enroll in. This project provided the guideline for the students to choose the most suitable programme offered by universities in Malaysia that match with their personality. The secondary school leavers are required to do the Holland Code personality test in order to identify their personality type. Based on their Holland Code, the student will be given a list of universities and programmes that matched with their Holland Code. The students can narrowed down the choices of universities and programmes from the list based on three factors that affected them the most while making decision in choosing a university or a programme. As the final step, the student will make their own decision based on the final list of programmes and universities given. This project only focused on secondary school leavers who included Sijil Pendidikan Menengah (SPM) students, Sijil Tinggi Pendidikan Malaysia (STPM) students and matriculation students. Since there are so many personality tests, this project only used Holland Code personality test. The waterfall model will be used as the methodology for this project.

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CHAPTER 1

INTRODUCTION

1.0 Background of Study

The Ministry of Higher Education (MOHE) was established on 27 March, 2004 with the intention of developing and creating a higher education environment to encourage the establishment of centers of knowledge, and the development of competent, innovative and ethical individuals thus fulfilling national and international aspirations (Higher Education Portal, 2011). The higher education institutions or also known as the tertiary institutions in Malaysia involved Public and Private Institutions of Higher Education (PIHE and PVIHE respectively), Polytechnics and Community Colleges. In this project, the PIHE and PVIHE will be only discussed. There are three main departments for the management of Institutions of Higher Education which include Department of Higher Education (DHE) to oversee the PIHE and PVIHE, Department of Polytechnic Education (DPE) to oversee the Polytechnics and Department of Community College Education (DCCE) to oversee the Community Colleges.

The student enrolment in PIHE and PVIHE from 2005 until 2009 as table below:

Table 1: Student Enrolment in PIHE and PVIHE in Malaysia, 2005 – 2009

University	Year				
	2005	2006	2007	2008	2009
PIHE	415, 674	450, 493	507, 438	547, 931	566, 349
PVIHE	258, 825	323, 787	365, 800	399, 897	484, 377
Total	674, 499	774, 280	873, 238	947, 828	1, 050, 726

Source: An Exploratory Study of Factors Influencing the Decision of Students to Study at Universiti Sains Malaysia (2010)

In 2012, there are 20 universities under PIHE that can be categorized into three groups: Research Universities, Focussed Universities and Comprehensive Universities. Research Universities focus on research, Focussed Universities focus on specific fields related to its establishment and Comprehensive Universities concentrate on variety of courses and fields of study. To date, there are 5 research universities, 4 comprehensive universities and 11 focussed universities. The list of PIHE in Malaysia as table below:

Table 2: Public Institutions of Higher Education (PIHE) in Malaysia

University Category	University
Research University	<ol style="list-style-type: none"> 1. Universiti Malaysia (UM) 2. Universiti Sains Malaysia (USM) 3. Universiti Kebangsaan Malaysia (UKM) 4. Universiti Putra Malaysia (UPM) 5. Universiti Teknologi Malaysia (UTM)
Comprehensive University	<ol style="list-style-type: none"> 1. Universiti Teknologi MARA (UiTM) 2. Universiti Islam Antarabangsa Malaysia (UIA) 3. Universiti Malaysia Sabah (UMS) 4. Universiti Malaysia Sarawak (UNIMAS)
Focussed University	<ol style="list-style-type: none"> 1. Universiti Utara Malaysia (UUM) 2. Universiti Pendidikan Sultan Idris (UPSI) 3. Universiti Tun Hussein Onn Malaysia (UTHM) 4. Universiti Teknikal Malaysia Melaka (UTeM) 5. Universiti Malaysia Perlis (UniMAP) 6. Universiti Malaysia Terengganu (UMT) 7. Universiti Malaysia Pahang (UMP) 8. Universiti Sains Islam Malaysia (USIM) 9. Universiti Sultan Zainal Abidin (UniSZA) 10. Universiti Malaysia Kelantan (UMK) 11. Universiti Pertahanan Nasional Malaysia (UPNM)

Source: Official Portal Higher Education Sector (2011)

Based on Utusan Online, the latest figure showed that 85, 247 students were registered under PIHE in 2012. From the latest number of students who registered under PIHE, it can be proved that public universities still attract the majority of undergraduate students. There were several reasons that many undergraduate students prefer PIHE to pursue their first-degree programmes. The main reason is due to the cheaper study fees. The fees of public universities are much cheaper compare to the private universities because public universities are heavily subsidized by the government (Abdullah and Ahmad, 2007). Another reason that encouraged many students to choose public universities compared to private universities is public universities offered more places for professional critical courses such as medicine, dentistry, pharmaceutical studies, engineering, architecture, law and accounting that are recognized by the local professional bodies. Since the public universities' degree qualifications are recognized by the Public Services Department (PSD), a student who hold degree from public universities can work in the public sector. Public universities also offered a wider choice of programmes in various field of study which is one of the factors many students preferred to pursue their studies in public universities.

Due to high competitiveness and limited space offered by PIHE, there were students choose to pursue their studies in PVIHE (Kolej Unikop, 2013). Besides that, the complicated process to enter the PIHE and the long time to process the request to enter the PIHE also the reasons students choose to enter PVIHE (Subramaniam, 2012). Due to the study fees in PVIHE is more expensive compared to the PIHE, the Ministry of Education suggested the students to do the study loan from Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) to help the students to pay the study fees (Sinar Harian, 2013). The list of some PVIHE in Malaysia as table below:

Table 3: Some of Private Institutions of Higher Education (PVIHE) in Malaysia

	University
1	Universiti Teknologi PETRONAS (UTP)
2	Multimedia University (MMU)
3	Management and Science University (MSU)

4	Monash University
5	Asia Metropolitan University (AMU)
6	Taylor's University
7	Infrastructure University Kuala Lumpur
8	International Centre for Education in Islamic Finance (INCEIF)
9	INTI International University
10	Limkokwing University of Science and Technology
11	MAHSA University
12	Open University Malaysia (OUM)
13	SEGi University
14	Sunway University
15	UNITAR International University
16	Universiti Kuala Lumpur (UniKL)
17	Universiti Selangor (UNISEL)
18	Universiti Tun Abdul Razak (UNIRAZAK)
19	Universiti Tunku Abdul Rahman (UTAR)
20	University of Wales
21	Wawasan Open University

The tertiary education is differing from primary education and secondary education because tertiary education involves higher education system. Many students do not have the basic knowledge on how to choose the best institutions to do their degree. They also do not have a proper guideline to choose the best tertiary education institution except from their family, peers or the school counselor. In addition, the student tends to face difficulty to choose the best tertiary education institutions because there is tremendous number of higher education institutions offered in Malaysia. Thus, it is interesting to identify the factors that influenced the students' decision in choosing higher education institutions for pursuing their tertiary education.

1.1 Problem Statement

Due too many choices of programmes and universities (public and private universities) offered in Malaysia, many students especially secondary school leavers in having difficulties to choose which university to pursue their studies. There are three categories of students who are facing this problem. The first group is the group of students who are not having any aims or goals or directions to pursue their studies in any programmes or universities. They just follow the flow and just do their higher education in any universities or programmes. The second group is the students who are having difficulty to choose a programme or university because they are having too many interests in pursuing their studies. The last group or the third group is the students who are already have their own aims and goals to pursue their studies in specified area of study but having problem because they are unsure with their decision.

To solve these problems, a web-based system named U-Info (University-Information) is introduced. The purpose of U-Info system is to build a web-based system in order to help secondary school leavers to choose the best programme or university that matched with their personality through Holland Code personality test. The students will do the Holland Code personality test to identify their personality type or Holland Code. The Holland Code indicatesthe students' personality falls under which category of personality type. After knowing their Holland Code, U-info system will provided the students a list of universities and programmes that matched with their Holland Code. The list of universities and programmes can be narrowed down based on three factors which affected student's decision making which are employability, financial assistance and university's reputation. Finally, the students are able to make their final decision.

By having U-Info, the students who are do not have any ideas to pursue in which programme and university will get to know the best area of study that match with their personality. The students who are having too many interests also can choose the best interest that suits with their personality the most to pursue their higher education. Lastly, for the group of students that already have their own goal to pursue their studies in certain programme and university can strengthen their choice by using U-Info system.

1.2 Objectives

There are three main objectives for this project that are expected to be achieved at the end of this project. The objectives for this project are achievable and can be measured for better result analysis and further enhancement in future work. The objectives of this project are:

- 1) To identify secondary school leavers' personality type based on Holland Code personality test.
- 2) To develop a system in order to help users make decision to choose university and programme that match with their personality type.
- 3) To conduct a feasibility testing to evaluate and analyze the functionality of the web-based system.

1.3 Scope of Study

Basically, this project focused on three main scope of study. The first one is this project is a web-based system. This project uses a website as the interface of the overall system. A web-based system is chosen because users can use several of operating system such as Windows, Linux or Mac OS to browse this system. A web-based system can be accessed anywhere and anytime. Thus, users can access to U-Info system anywhere and anytime they like and no admin require accessing the U-Info system because a web-based can be simply access to without admin permission. In addition, the entire database is available all of the time.

This project is focused on secondary school leavers included Sijil Pendidikan Menengah (SPM) students, Sijil Tinggi Pendidikan Malaysia (STPM) students and also matriculation students. These categories of students are mostly age between 17 years old until 20 years old. These groups of students are chosen as the main users for U-Info system because most probably after they are finished their studies in SPM, STPM or matriculation, they will pursue their studies in higher education level either in diploma or degree. Thus, this system suits with them as an early preparation before they are made their decision to choose desired programme or university.

U-info system required the student to identify their personality test before deciding on which programme or university to choose in order to pursue their studies. For the personality test, this project used Holland Code personality test. Holland Code personality test is a theory of careers choice based upon personality type. Holland Code personality test consists of six different personality codes which are Realistic (R), Investigative (I), Artistic (A), Social (S), Entrepreneur (E) and Conventional (C). Holland Code personality test required a user to select several characteristics that appealed to them the most and the end result will show the user the most three or the most two code that suits with their personality. Holland Code will tell the user the most suitable future job career that matches with their personality. For this project, Holland Code was implemented as an early preparation which means that the students will choose the best programme and university in order to achieve their desired career in future that matched with their personality.

In this study, only the public and some private universities in Malaysia are being focused on. This is due to the time framework of the project. It takes longer time to collect all information about the programmes offered by public and private universities and compiled it into this project database. Furthermore, this project required long processes to match the programmes and universities with the Holland Code. All public universities are included in this project but due to the time constraints only certain private universities are selected to be in the list of universities as a sample in this project.

CHAPTER 2

LITERATURE REVIEW

2.0 Factors That Influencing The Students' Decision Making In Choosing Tertiary Education Institutions

2.0.1 Student's Characteristics

There are several factors that are affecting the student decisions' to choose the best tertiary education institution that suits the best with their interests and qualifications. Some of the factors are related to the characteristics of the students itself or the personality of the students. Based on research by Ming (2011), there were three main students' characteristics that affected the selection of universities for the higher education. The first characteristic is known as Aspiration. A study found that student educational aspirations are positively associated with post-secondary participation. In short, the prospective student's personal aspirations have an important impact on the decision to attend college. Aspirations and career plans of potential students are key indicators of college attendance.

The second characteristic is known as Aptitude. A student with aptitude characteristic is the students who are aware of their ability to achieve academic success in college tend to attempt post-secondary education. An individual self-reflection plays a critical role in the predisposition to attend college or university. The last main characteristic is high school performance. A study found that high school activities were a positive predictor of a student's predisposition to attend university. Successful participation in high school activities are related to the predisposition and achievement in university.

2.0.2 Student's Interest In Subject Area

Another factor that influences the students' selection on tertiary education institutions is students' interest in subject area. Al-Fattal (September 2010) stated that students decided to go university just to gain general knowledge in the subject area of their studies. Based on the survey created by Round (April 2005), subject interest is important in motivating

students to go to university in the first place. Students' interest affects their choice to pursue study leading to increased student satisfaction, academic achievement and personal growth (Price et.al, 2013). A study found that interest in subject area leads to increased effort and a higher mastery of skills (Torrey, n.d).

2.0.3 Programmes Offered by University

Students' selection of higher education institutions also affected by another element of institution characteristic which is the type of programmes or courses offered by the institution. Courses offered the most important variable (Price et al., 2013) and the diversity of courses offered become one of the factors that influencing the college choice decisions of graduate students (Kallio, 1995). Lee and Chatfield (n.d) mentioned in their research, the students choose the course in a university based on the reputation of the course among employers, graduate satisfaction from the course, graduate employment rates from the course, the quality of teaching in the course, approaches to teaching, learning and assessment from the course including opportunities for flexible study.

2.0.4 Reputation of University

Another element linked to students' choice of institution is the institutional characteristics. The reputation of an institution is one of the institutional characteristics. The reputation of an institution included the reputation for teaching and research reputation (Price, Matzdorf and Smith, n.d). Good institutional image and reputation has a tremendous effect on college choice and students value the reputation of an institutional and it rates as an influential factor by students in choosing process of tertiary education institutions (Ming, 2011). A previous research stated that high-achieving high school students consider academic reputation to be among the most important when deciding where to go to college (Schoenherr, 2009). Students' perceptions about the reputation and image of an institution are shaped by hearsay, past experience, and marketing activities that promote the institution (Fernandez, 2010).

2.0.5 Facilities Provided by University

The facilities provided by the institution also another university attributes which student considered in their decision-making. Price Et al. (2003) stated that various critical impacts of facilities on the business of a university depend on where a particular institution is positioned or aspires to position itself. Mostly students were preferred to have Information Technology (IT) in bedrooms and telephones in the accommodation. The research made by Price et al. also stated that learning and teaching facilities such as library facilities and the availability of computers plays important roles in students' decision to choose a university. University services on the adequacy and quality of library resources and services were rated as one of the top important influencing on the issue of university services (Kitsawad, 2013). Opportunity to play sports or sports facilities also has influence for students' choice of university (Noel-Levitz, 2012).

2.0.6 Location of University

Another factor that has bearing on students' university choice is the location of an institution. The university location, which has been described as strategic, attracts different students but the majority of the students are still from the region in which the university is located (Al-Fattal, 2010). Many students only seriously considered universities that are located relatively close or near to their homes and that do not present excessive academic or financial obstacles (Fernandez, 2010). Schoenherr (2009) stated that students are more likely to attend university outside of their local market area when they are male, when they belong to a higher socioeconomic status, when their parents have higher education levels, and when they have high academic abilities and educational aspirations. A convenient location would be considered by students as their priority of their choice of university (Kitsawad, 2013).

2.0.7 Cost of Study

The cost of the study also became the main factor of students' choice of university. A research by Population Change and Lifecourse Strategic Knowledge Cluster (January 2013) stated that students from high income neighborhood are more likely tends to attend university than other students. When net cost (tuition minus entry scholarship)

risers, more students from high-income neighborhoods were registered compared to the low to medium-income neighborhoods especially in Arts and Science programs. An article wrote by Garner (September 16, 2012) mentioned that the increased of study fees drop the total of applicants to enter university. Mostly students are preferred to choose university with cheap tuition fees because high tuition can force some students to look at sources for financial aid that may lead to debt after college (Dixon, April 2013).

2.0.8 Parental Choice or Friend's Influence

Mostly students consult with their parents or their relatives to help them making decision regarding which institution they should choose. A research by Fernandez (2010), parental influence takes two forms: motivational and proactive. At the motivational level, parents maintain high educational expectations for their children; at the proactive level, parents become involved in school matters and discussion of college plans .According to Tatar and Oktay (July 2006), parents and relatives have an important effect on students' attending an institution of higher education in enrollment decision. Parents and relatives are perceived as having the greatest degree of source credibility and their advice much more believable. For students who choose a university based on parental choice, the parents generally state that academic achievement and teaching quality is one of the characteristics to choose a university (Hastings, Kane and Staiger, November 2005).To some extent, friends or peers also influence students' college choice. A research showed that recommendations from friends as important influence as the push factors in motivating student destination choice for students from Taiwan, India, China and Indonesia (Wagner and Fard, 2009).

In Malaysia, other than secondary school leavers, matriculation students and diploma students also qualified to pursue their studies for undergraduate program. Misran et al. (November 2012) reported that there are few factors that influencing the matriculation students; in choosing university and undergraduate program. The factors are the suitability of study program with their personalities, career opportunities and interest of the students. According to Sidin et al. (2003), they are several factors that influencing the college choice decision of undergraduate students in Malaysia. The students make their own choice to enroll in which college is depends on five components. The five

components are academic programs offered, leadership opportunities in college, perceived good job after graduation, financial aid and value for money.

2.1 Personality Test (The Holland Code Test)

Personality or characteristics of student is the main factor that influenced the student decision in choosing university to pursue their tertiary education. To identify the personality of the students, personality test can be conducted. Personality test can be defined as a test designed to assess a person's personality (Collins, n.d). There is a collection of interactive personality tests provide by many websites. Mostly the test is range from very serious and widely used scientific instruments popular psychology and self-produced quizzes. The student personality and behavioral style are measured through what is known as a self-report personality questionnaire (Institute of Psychometric Coaching, n.d). The self-report questionnaire that is being distribute to sample of the study is a test that's asks the sample through covert questions.

The students are required to answer several questions in a personality test. For this project, the Holland Code which is one of the personality tests will be used. Normally, the Holland Code is used as a guideline to choose a career. Thus, it is suitable for this project to help the secondary school leavers to choose their future career based on the area of study they are going to enroll in their tertiary education level as an initial step towards it. People were satisfied with their jobs if the career chosen have some degree of fit with their personality (MU Career Center, 1998). In the Holland Code, there are six elements involved which are:

- i. **R**ealistic (*Doers*)
- ii. **I**nvestigate (*Thinkers*)
- iii. **A**rtistic (*Creators*)
- iv. **S**ocial (*Helpers*)
- v. **E**nterprising (*Persuaders*)
- vi. **C**onventional (*Organizers*)

The result of the personality test will categorized the students based on the six elements of Holland Code. Each element will shows the suitable career possibilities or the area of

study that suitable with the students' result through matching process. The result of the personality test also shows the list of universities that offered the programme. There are many others example of personality test as shown in Table 4.

Table 4: Examples of Personality Test

Test	Description
Narcissistic Personality Inventory	This test focused on narcissism as a personality trait, the degree to which you love yourself to the exclusion of others.
Woodworth Psychoneurotic Inventory	This test is to measure emotional adjustment in military personnel for World War 1.
Jung Types Test	This test will score your personality into one of sixteen personality types.
Consideration of Future Consequences Scale	The test will score on how much you base your decision off of future, rather than immediate, consequences.
Harrower-Erickson Multiple Choice Rorschach Test	This test measures psychological disturbance and was created to screen military personnel.
Machiavellianism Test (MACH-IV)	This test scores you on Machiavellianism as a personality trait.
Experience in Close Relationships Scale	This test measures how a person structures their close bonds with others.
Emotional Intelligent Test	This test analyzes the understanding on the structures of people's personality by guessing the correlatives between pairs of statements.
IPIPNEO Personality Test	This test measures the big five personality traits in depth.
Self-Monitoring Scale	This test measures to what degree an individual will modify their behavior in social situations to meet the expectations of

	others.
Rosenberg Self-esteem Scale	To see your self-esteem compares to others.
Moral Foundations Questionnaire	To measures an individual's morality.
Four Temperaments Test	This test categorized an individual based on four temperaments.
Adult ADHD Self-Report Scale	This test is used to diagnose attention deficit hyperactivity disorder in adults.
A/B Personality Test	To diagnose heart disease based on blood Type A and blood Type B.
Cattell's 16 Personality Factors Test	This test measures the 16 personality traits that were hypothesized by Raymond Cattell.
Multidimensional Jealousy Scale	To measures romantic jealousy along three scales.
Interpersonal Attraction Scale	This test measures the components of an individual's attraction to a specific individual.
Dark Triad Personality Test	This test measures the dark triad, a group of three related but independent personality traits.

Source: Online Personality Tests (n.d)

Some universities have applied the Holland Code personality test as the guideline to help their students to choose the course or programme that match with their personality. For example, University of Missouri distributed a manual Holland Code personality test to their students and listed out all programmes that being offered in the university that match with several Holland Code results as shown in the Appendix(i).

Salisbury University also provided an online Holland Code personality test in their university main website under career services section. The students of the university are able to take an online Holland Code personality and get the result of the personality test. They can identify their Holland Code, the job title which suits with their personality and

also the best programmes offered by their university. The sample of results from the Holland Code personality test conducted by Salisbury University as shown in the Appendix (ii).

Unfortunately there is no university in Malaysia which applied Holland Code personality test but Ministry of Higher Education (MOHE) helps Malaysian students to gain knowledge about university and the field of study that available in Malaysia in their website. The website home page of MOHE is shown in the Figure 1. From the website, students can search according to course and institution that they are interested on. From course search engine, they can narrow down their search by choosing the field of study and also the level of study as shown in Figure 2. For the institution search engine, they can also narrow down their choice based on the name institutions, institution type (public university, private university, private college and foreign university campus branch) and location of the institution as shown in Figure 3. These options available will help the students a lot to have some information regarding higher institutions in Malaysia.



Figure 1: Ministry Of Higher Education (MOHE) Website.

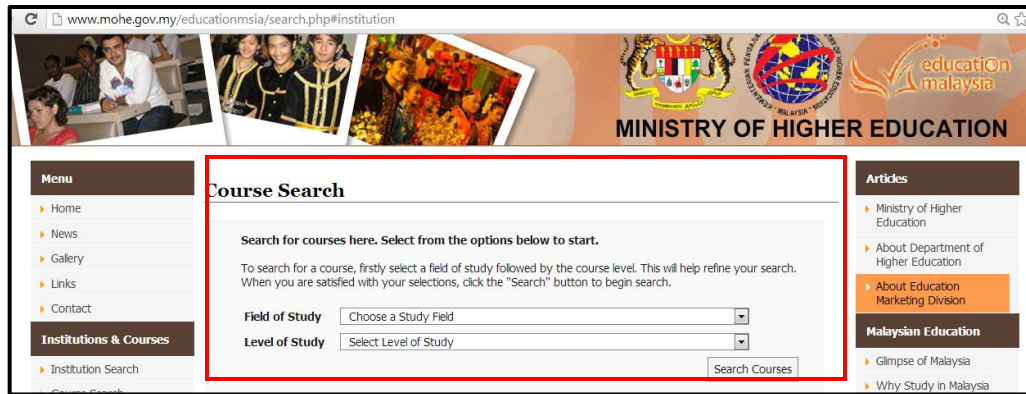


Figure 2: The Course Search Engine

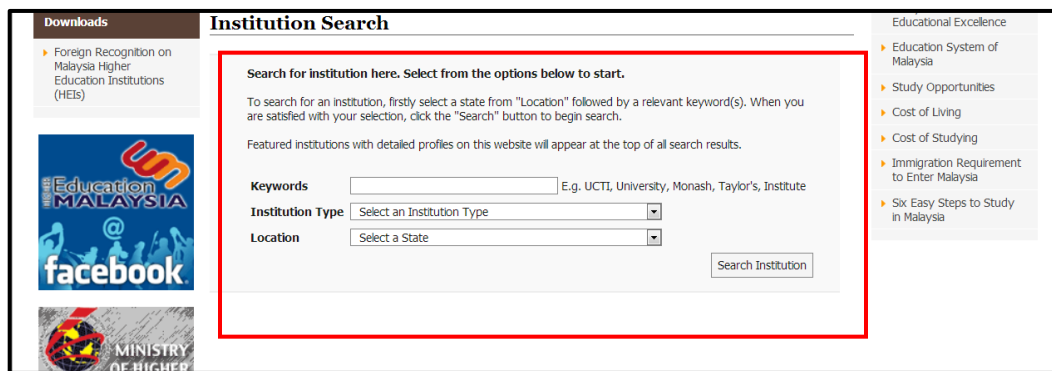


Figure 3: The Institution Search Engine

2.2 The Decision Support System (DSS)

U-Info is a web-based that applied the concept of decision support system (DSS). Decision support system can be defined as a specific class of computerized information system that supports business and organizational decision-making activities (Information Builders, 2013). According to Louw (2002), in 1960's, most DSS were fairly based on powerful and expensive mainframe computers which provide managers with structured, periodic reports. DSS also can be defined as an interactive computer based system that helps decision-makers use data and models to solve ill-structured, unstructured or semi-structured problems.

Based on a research written by Densham (n.d), decision makers faced with a complex spatial problem usually have multiple, conflicting objectives for its solution. According to Arnott and Pervan (June 2005), an early aim of DDS is to create an environment in

which the human decisive on maker and the IT-based system worked together in an interact fashion to solve problem. This project matched with the early aim of DSS because a user (student) will use an IT-based system (U-Info) to solve problem in order to make decision. In this project, the students are needed to make decision to choose which programme and university to pursue their studies.

To come out with a solution, the complex spatial problem should reconcile with these conflicting goals. The final solutions can be produced by using several techniques. A variety of analytical techniques have been developed to help decision makers solve problems with multiple criteria. Multi-Criteria Decision Making (MCDM) is one of the analytical techniques that is use in sustainable energy management (Pohekar and Ramachandran, 2003). According to Pohekar and Ramachandran, the MCDM techniques provide solutions to the problems involving conflicting and multiple objectives. The several methods are based on weighted average, priority setting, outranking, fuzzy principles and their combinations are employed for energy planning decisions.

For nanomaterial risk assessment and management, multi-criteria decision analysis (MCDA) is used to help decision makers to solve problem in that area. MCDA is a powerful and scientifically sound decision analytical framework (Linkov et al., 2007). MCDA can help decision makers to solve problems by provide a decision matrix of criteria and performance scores to provide an approach for integrating risk levels, uncertainty and valuation. This technique enables the decision makers to make an evaluation and ranking of many alternatives to solve the problems.

In real time, Clinical Decision Support Systems (CDSS) is one of the examples that applied the decision support systems. According to Coiera (October 2005), knowledge-based systems or also known as expert system are the commonest type of CDSS technology in routine clinical use. This system contains information about clinical knowledge with very specifically defined task. The expert system also able to reason with data from individual patients to come up with reasoned conclusions. This shows that CDSS can help decision makers in the clinical area to come out with solutions. CDSS also can be used to build a computer program that could simulate human thinking

(Berner and Lande, n.d). Nowadays, the aim of CDSS is no longer to assist the clinician in his or her decision making.

CHAPTER 3

METHODOLOGY

3.0 Methodology

3.1 The Waterfall Model

This project used The Waterfall Model as the methodology method. The Waterfall Model consists of five (5) main phases which are requirements phase, design phase, implementation phase, verification phase and deployment and maintenance phase. Since each phase has specific deliverables and a review process, the Waterfall Model is easy to manage. The phases are processed and completed one at a time. Thus, it is easy to understand and use. The Waterfall Model works well for smaller projects where the requirements needed are very well understood. Since this project only involved small area of study, the Waterfall Model suited for this project. The Waterfall Model is shown in the Figure 4 below.

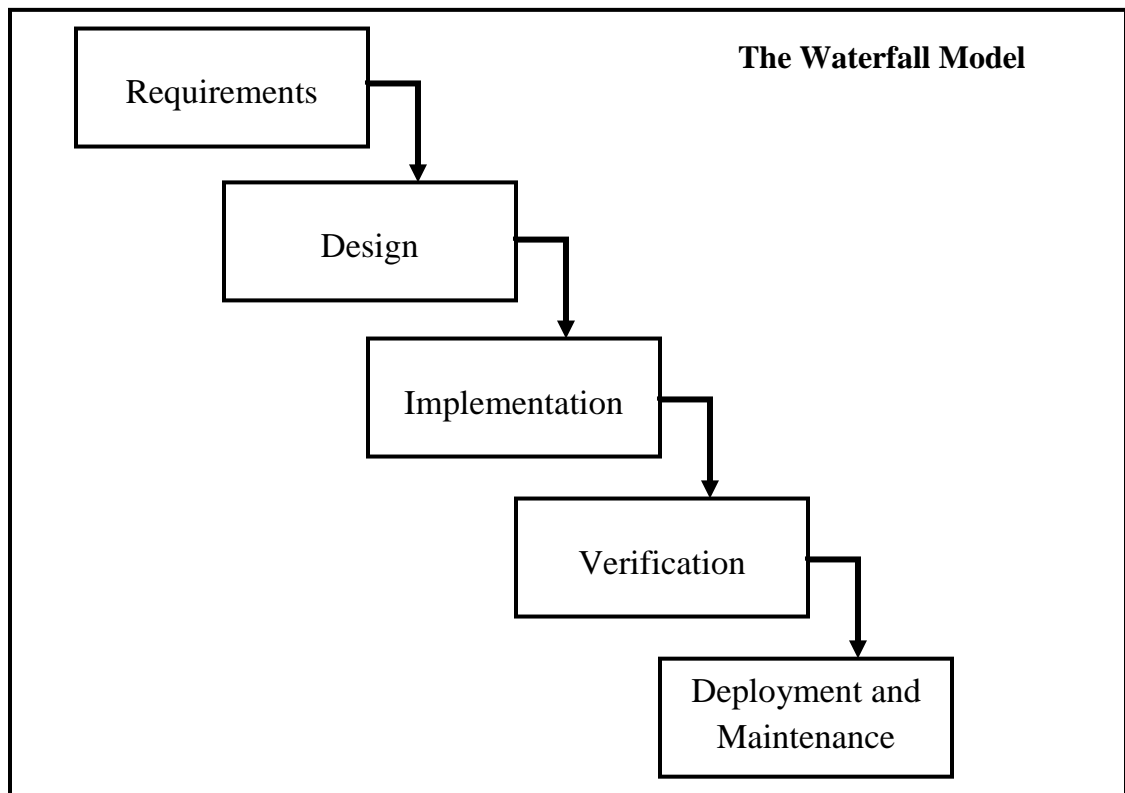


Figure 4: The Waterfall Model

The first phase of The Waterfall Model is Requirement Phase.

3.1.1 Phase 1: Requirement Phase

In this phase all possible requirements to develop U-Infoare documented. The functionality of the system of the system are identified. All information about universities and programmes offered in Malaysia, information about Holland Code and information to identify the factors affected students' decision are gathered. This project used an online questionnaire-based approach to obtain data on students' preferences towards studying in which programmes and universities as shown in Appendix (iii). The questionnaire is mainly distributed to all Universiti Teknologi PETRONAS's students and also to other students in various universities in Malaysia. The questionnaire is design to ascertain:

1. The demographic profile of the students;
2. The reasons students pursue a higher education;
3. The sources of information used in choosing a university or college;
4. The factors that influence students' choice between public and private tertiary institutions; and
5. The reasons students chose particular university to pursue tertiary education.

The results from the questionnaire are analyzed and the requirements of the system also being documented. To discuss the research findings, descriptive analysis is use. The importance of factors influencing students' decisions was ranked as Very Emphasized, Emphasized, Average, Less Emphasized and Not Emphasized. The pattern matching technique is also use to discuss the research findings. The pattern matching technique involves an attempt to link two patterns where one is a theoretical pattern and the other is operational one. The result of the research findings based on the operational process (through questionnaire) will be linked with the theoretical process to get the exact result. The pattern matching technique diagram is shown as the Figure 5 below.

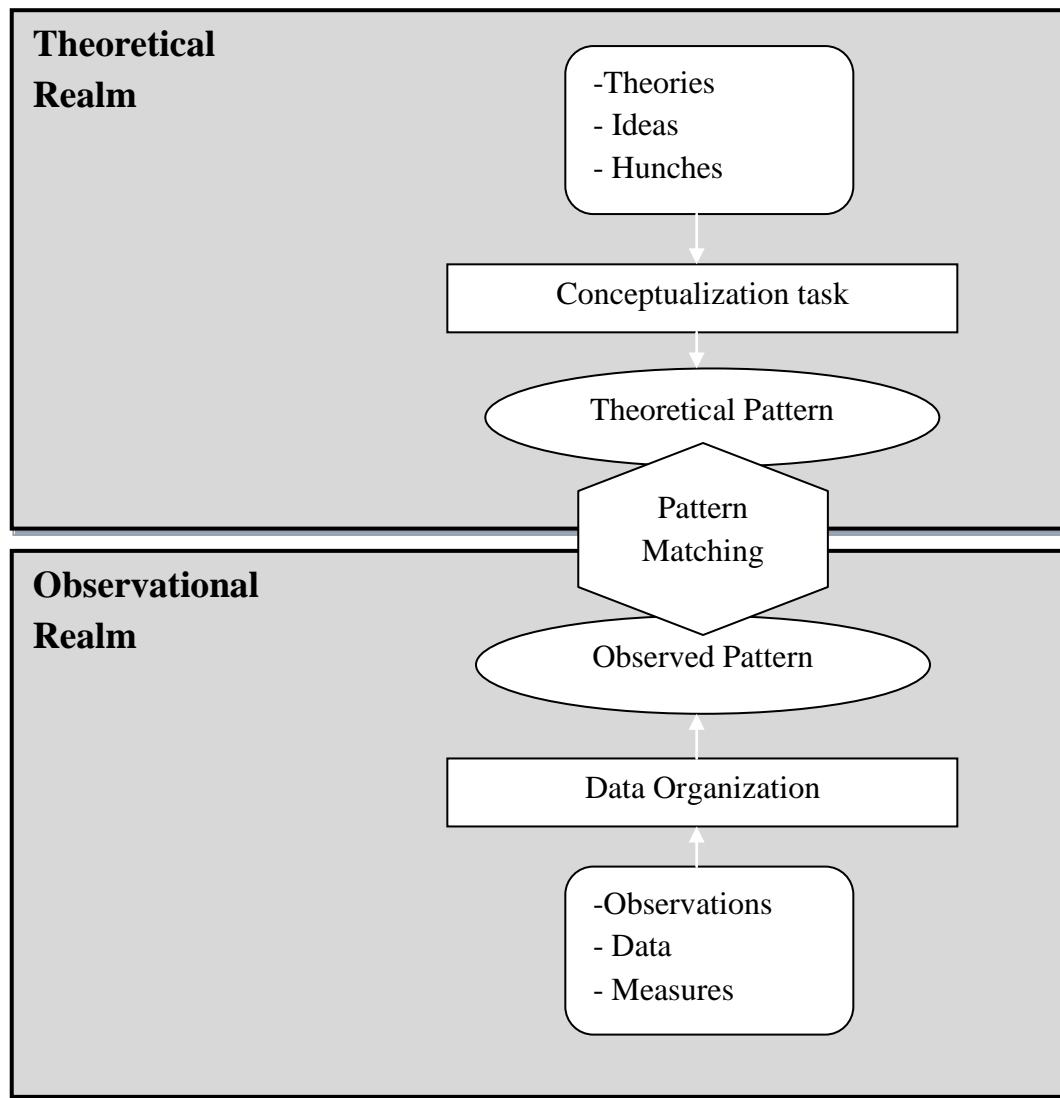


Figure 5: Pattern Matching Diagram

As summary, the project activities involved for requirement phase are:

- Identify the requirements required to develop U-Info system.
- Identify the functionality of the system.
- Gather information about programmes and universities offered in Malaysia, information about Holland Code and information on factors affected students' decision to choose a programme or university
- Broadcast a set of questionnaire to students in various universities.
- Analyze and documented the result of the questionnaire.

The second phase of The Waterfall Model is Design Phase.

3.1.2 Phase 2: Design Phase

In this phase, the U-info system architecture is created. This phase helps in specifying the needed hardware and software in order to develop the system which defining overall system architecture. The system architecture as shown in the Figure 6 is created to have better view on how U-Info system works.

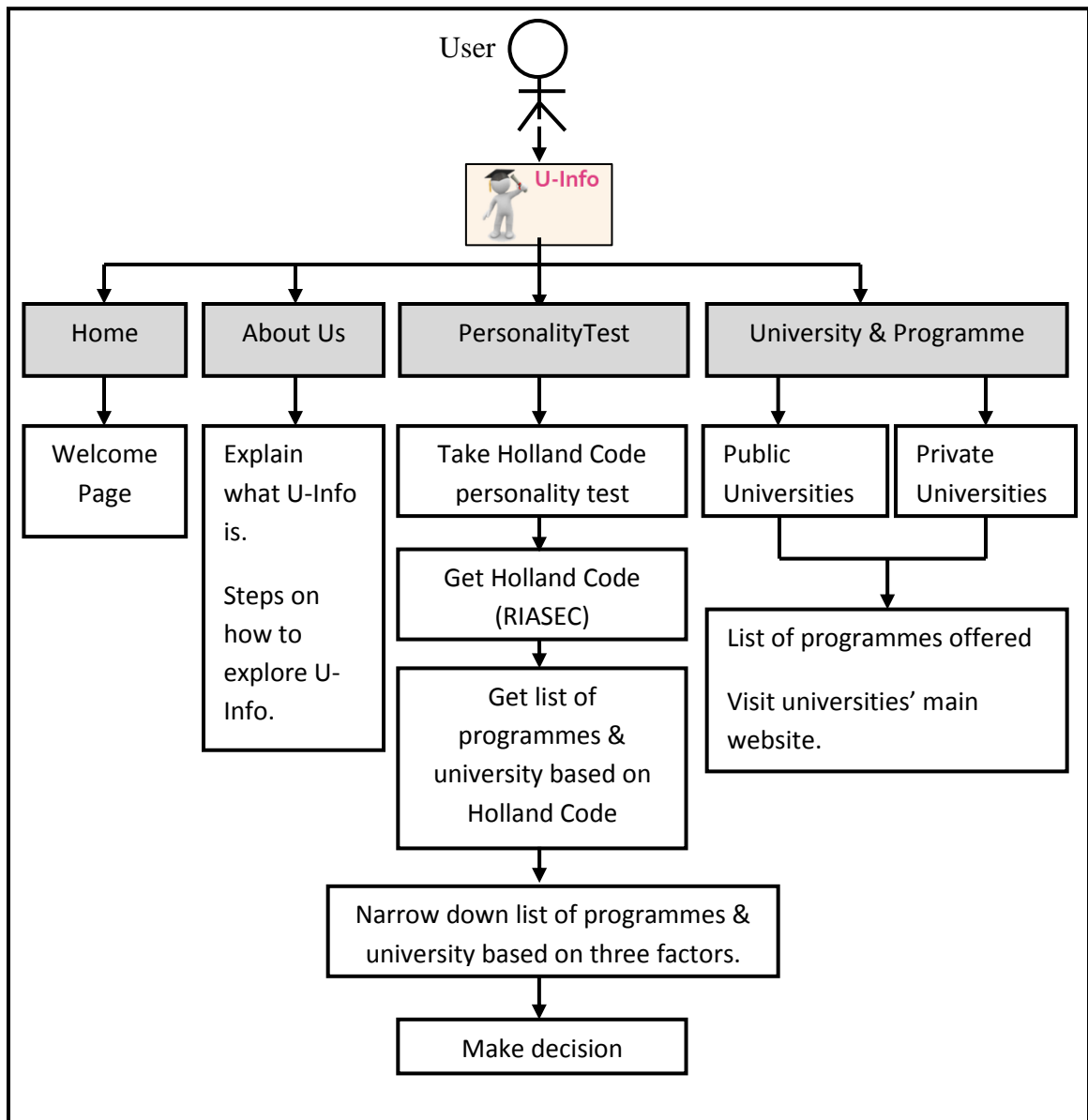


Figure 6: System Architecture

Based on Figure 6 above, U-info system consisted of four main tabs. The first tab is the Home page of U-info system. Home page plays role as a welcome note to the students who act as the users of this system. The second tab is the About Us page. About us page is a section to tell the students what is U-Info system is all about and in this section the students will get to know the steps on how to explore the U-Info system.

The third tab is the Personality Test. In this page, the students are required to take Holland Code personality test and get their Holland Code from the personality test result. Then, the students will view the list of programmes and universities which suits with their Holland Code. To narrow down the list of universities and programmes, the students are required to choose only one out of three factors that affected them the most to make decision making on choose the best programme and university. Lastly, the student will make their decisions based on the narrowed down list of programmes and universities provided by the U-Info system.

The last tab is the University & Programme. In this section, the students can view all programmes from selected public and private universities. The students also can know more about the selected universities by click the link provided which directly linked to the main website of the universities.

After the system architecture has been created, the prototype of U-Info is developed. The prototype is developed to give an overview on how U-Info website will looked like which will be discussed further in discussion part. In this system, the tools required to design the prototype of U-Info system are:

- Laptop – Windows acts as the operating system to implement U-Info system
- Google Data Drive – To create questionnaire
- Microsoft Word and Microsoft Excel – To document the report
- Paint – To design and edit the image required in the system
- HTML and JavaScript - To do the programming of the system

As summary, the project activities involved in this phase are:

- Create the system flow or system architecture.
- Identify the software and hardware needed to create the system.
- Create prototype of U-Info system.

The third phase in The Waterfall Model is Implementation Phase.

3.1.3 Phase 3: Implementation Phase

The system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing. Basically, this is the software process in which actual coding takes place. In this phase, the coding activities are started. The coding activities involved are to develop the interface of the system. For the coding part, HTML and JavaScript language is used. All information related to universities and programmes and also information regarding Holland Code personality testis filled into the system database.

As summary, the activities involved for this phase are:

- Do the coding by units to create the system.
- Test the coding for each unit after it have been created for improvement.

The fourth phase in The Waterfall Model is Verification Phase.

3.1.4 Phase 4: Verification Phase

In this phase, the programmatically of the system implemented software module is tested for the correct output. In this stage, any error or bugs are removed. There are series of tests and test cases are performed to check module for errors, bugs and other faults. Erroneous codes are rewritten and tested again until desired output is achieved. At the same time, the system interface or the prototype is been reviewed by supervisor to produce the desired output.

As summary, the activities involved in this phase are:

- Implemented the fully coding into the system.
- Remove any bugs, errors or other defaults.

- Rewrite the coding to get the desired output needed.
- Improve system interface.

The fifth phase in The Waterfall Model is Maintenance Phase

3.1.5 Phase 5: Deployment and Maintenance Phase

This is the final phase of The Waterfall Model. In this phase, the completed system product in which the system is handed over to the students as the user after testing is made. A feasibility testing is conducted to get the feedback from the user as future improvement or enhancement. The system developer has to ensure the U-Info system can run smoothly as the maintenance process.

As summary, the activities involved in this phase are:

- Handed over the completed system to students as the users of this project.
- Conduct a feasibility testing for improvement or enhancement process.
- Do the maintenance work by ensure the system is run smoothly.
- Any errors, bugs or defaults found are recovered.

3.2 Gantt Chart

To ensure all the project activities involved to create this system can be achieved within the time framework, a Gantt Chart is created. A Gantt Chart illustrates a project schedule which shows the start and finish dates of each units in the system. A Gantt Chart also acts a guideline to the system developer so that the system developer is always keep in track with the planned project activities as a Gantt Chart shows the current schedule to the system developer. The Gantt Chart for this project is included for Final Year Project (FYP) 1 and Final Year Project (FYP) 2 as shown in Appendix (iii) and Appendix (iv).

3.3 Key Milestones

Key milestones is a sub-objectives or stages into which a program or project is divided for monitoring and measurement of work performance. The Key Milestones for this system is shown in Table 5.

Table 5: Key Milestones

Activities/ Weeks	Week 6	Week 13	Week 14	Week 21	Week 25	Week 26	Week 27	Week 28	Week 29
Submission of Extended Proposal	●								
Submission of Interim Draft Report		●							
Submission of Interim Report			●						
Submission of Progress Report				●					
Pre-SEDEX					●				
Submission of Draft Final Report						●			
Submission of Dissertation (Soft Bound)							●		
Submission of Technical Report							●		
Oral Presentation								●	
Submission of Dissertation (Hard Bound)									●

Indicator:

● Key Milestones

CHAPTER 4

RESULT AND DISCUSSION

4.0 Result and Discussion

4.1 Questionnaire Result

As stated in the first phase of the waterfall model, the requirement phase is made by distribute a set of questionnaire to students in several universities in Malaysia. The sample of questionnaire is attached in the Appendix (v). The objectives of the questionnaire are:

1. To identify the difficulty level students had experienced during the decision making process.
2. To determine the factors that influenced the decision making.
3. To identify the satisfaction level once the students enrolled in the programme and the university chosen.

The questionnaire is divided into four main sections which are Section A relates to the students' demography, Section B is to identify the decision making process, Section C is to identify the decision making factors and the last section which is Section D to know the decision satisfaction of the students.

4.1.1 Section A: Demography

The demography variables used in this study are age, gender, university, programme of study and year of study. 54 respondents involved in this questionnaire. The age profile of the students shows that 58% are between 21-23 years old, 28% are between 18-20 years old and 13% between 24-26 years old. The sample of respondents is 65% female and 35% male. Some of the students' universities involved for this sample are Universiti Pertanian Malaysia (UPM), Universiti Teknologi PETRONAS (UTP), Universiti Tenaga Nasional (UNiTEN), Universiti Selangor (UNISEL), International Islamic University Malaysia (IIUM), Universiti Teknologi Malaysia (UiTM), German Malaysian Institute and Moscow Medical Academy. Most of the students in the sample

are in their fourth year of study or final year which contributed of 43%. 32% of the respondents are in their first year of study, 19% of the students are in their third year of study and only 6% in their second year of study.

4.1.2 Section B: Decision Making Process

For section B, the students are asked about the process of making decision to select a university to pursue their studies. In the Figure 7, the students thought that the process of selecting the undergraduate programme and the university to enroll in is difficult and average which contributed 42% and 36% respectively. 17% of the students thought the process of selecting a university is very difficult and 6% of the students thought it is very easy to make the decision to choose the university to pursue the tertiary education and the programme they interested to. From this result, it can be concluded that most students having difficulty in selecting undergraduate programme and university.

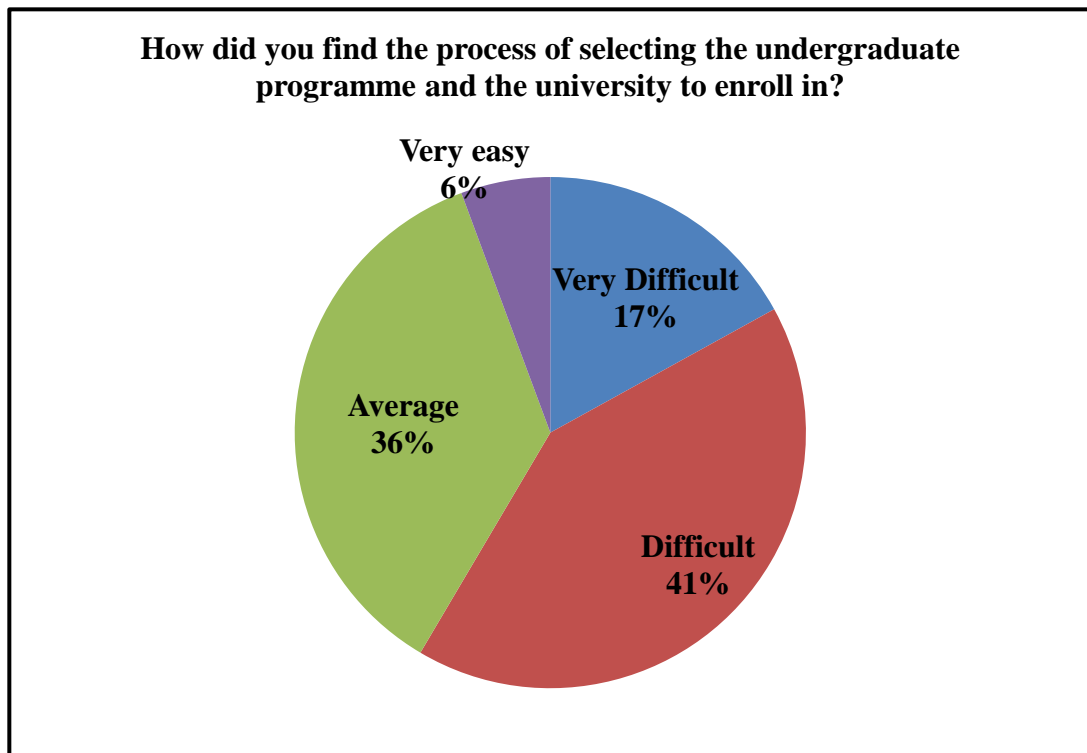


Figure 7: How did you find the process of selecting the undergraduate programme and the university to enroll in?

The students are asked on how much they required help from someone in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in. From Figure 8, out of 52 respondents, 32% said average and dependent, 19% said they are very dependent, 13% said they are independent and only 4% said they are very independent. From this result, it can be concluded that mostly the students are dependent and average in require help from others to make decision.

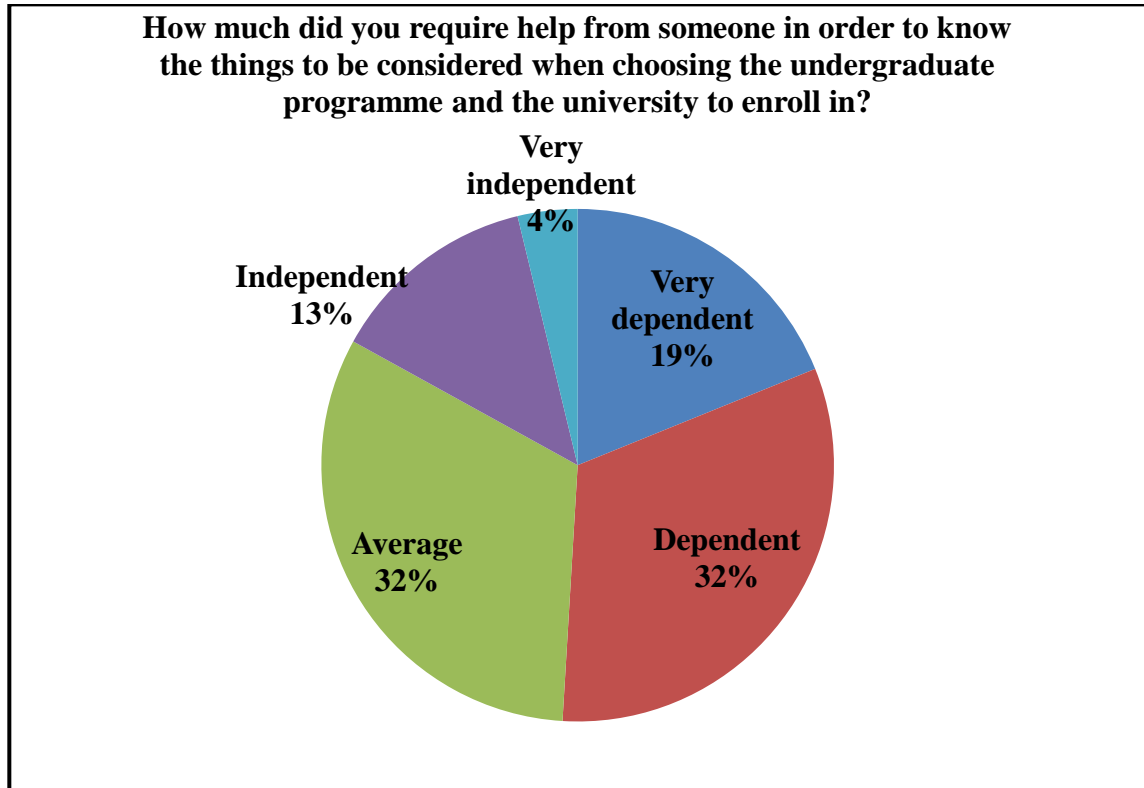


Figure 8: How much did you require help from someone in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in?

Figure 9 showed how much did the students depend on resources such as the Internet, magazines and etc. in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in? 31% of the students said they depended on the resource averagely. 27% and 23% of the students said that they are dependent and very dependent on the resources while 17% of students said they are independent on the resources and only 2% said they are very independent to use the resource such as Internet, magazines, etc.

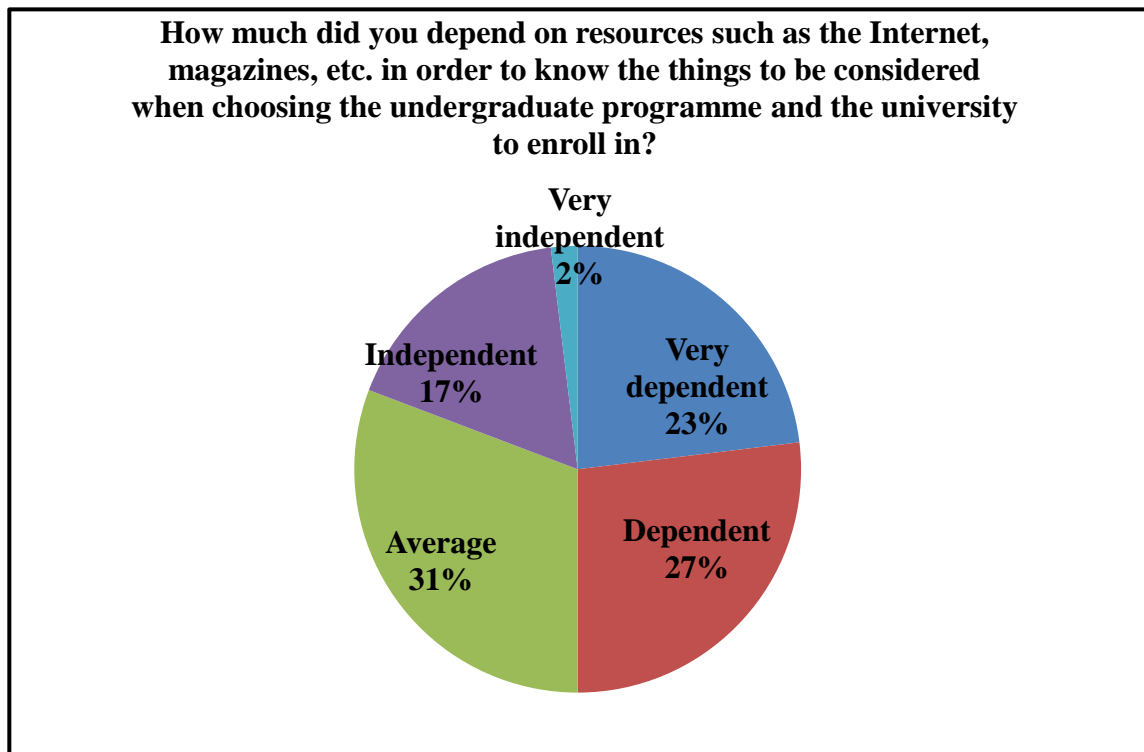


Figure 9: How much did you depend on resources such as the Internet, magazines, etc. in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in?

The students also were asked on how long it took the students to make the decision regarding the undergraduate programme and the university to enroll in. Based on Figure 10, 38% of the students required one week or more to make the decision and 28% of the students' needs 3 to 4 days to make the decision. 17% of the students are required 1 to 2 days and 5-6 days to make the decision to choose programme and a university. The result showed that many students are required one week or more to make decision.

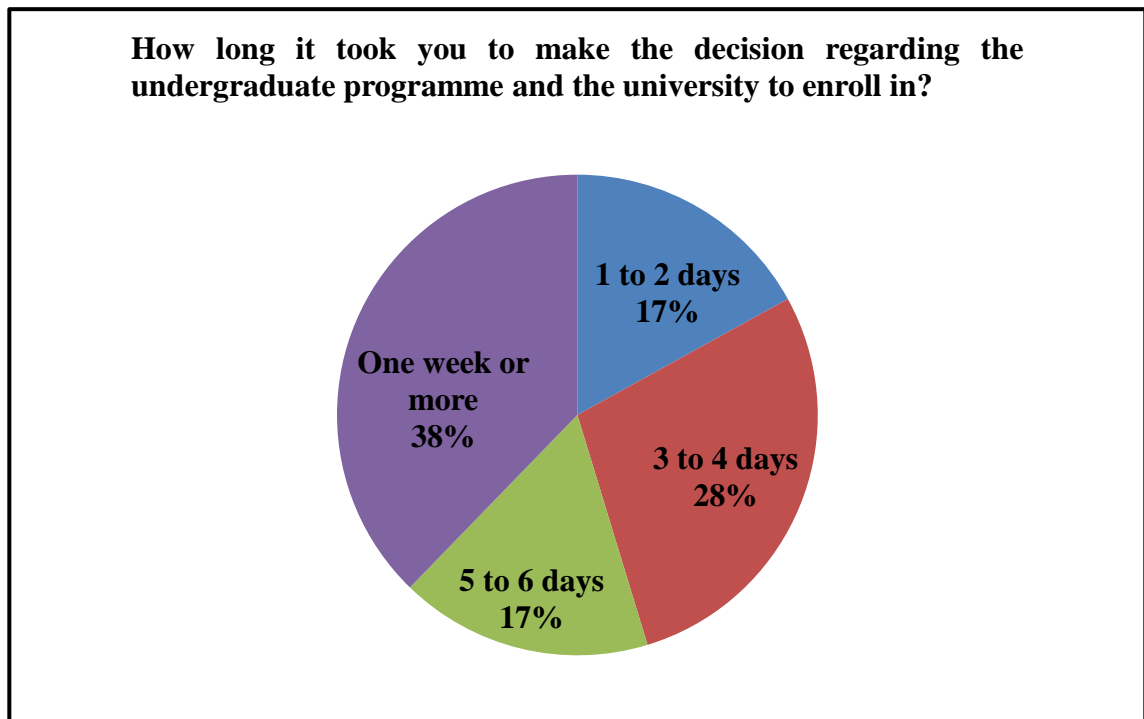


Figure 10: How long it took you to make the decision regarding the undergraduate programme and the university to enroll in?

4.1.3 Section C: Decision Making Factors

In the Section C of the questionnaire, the students are being asked the factors that influenced them to decide on the programme and university they want to pursue their tertiary education. Firstly, they are being asked the sequence of their decisions either university first, then programme or programme first, then university or no sequence at all. Based on the result shown in the Figure 11, 43% students choose university first,

then programme. In contrast, 42% of the students choose programme first, then university. About 15% of the students make their decisions with no sequence.

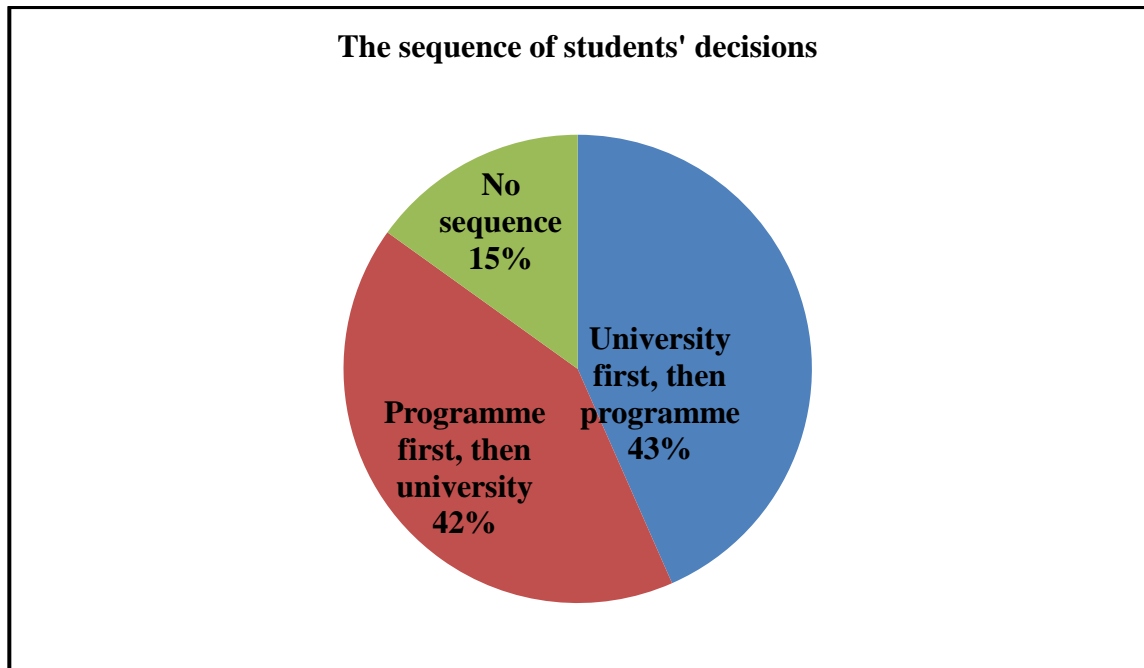


Figure 11: The sequence of students' decisions

There are several factors that are commonly affecting the students' decision in choosing programme and university that suits with them. The factors are area of interest, programme's popularity, employability, programme's difficulty level, others' feedbacks such as friends or Internet, cost of study, financial assistance or scholarship offered, reputation of university and also the location and facilities of the university. Thus, for each factors, how much emphasis is determined based on the Table 6.

Table 6: Factors That Influencing The Students' Decision Making In Choosing Programme And University To Pursue Tertiary Education.

Factors/ Emphasized	Very emphasized	Emphasized	Average	Less emphasized	Not emphasized
Area of interest	14 (26%)	22 (42%)	15 (28%)	2 (4%)	0 (0%)
Programme's	12 (23%)	18 (35%)	17 (33%)	3 (6%)	2 (4%)

popularity					
Employability	22 (43%)	17 (33%)	8 (16%)	3 (6%)	1 (2%)
Programme's difficulty	8 (15%)	17 (33%)	22 (42%)	4 (8%)	1 (2%)
Others' feedbacks	11 (22%)	14 (27%)	16 (31%)	8 (16%)	2 (4%)
Cost of study	15 (29%)	16 (31%)	13 (25%)	4 (8%)	4 (8%)
Financial assistance /Scholarship	18 (34%)	16 (30%)	13 (25%)	6 (11%)	0 (0%)
Reputation of university	17 (33%)	23 (45%)	6 (12%)	5 (10%)	0 (0%)
Location and facilities of university	11 (21%)	14 (27%)	18 (35%)	6 (12%)	3 (6%)

Based on Table 6, the area of interest when choosing the undergraduate programme to enroll in is 42% emphasized. 35% of the students emphasized on programme's popularity when to choose a university and a programme to enroll in. When choosing the undergraduate programme to enroll in, 43% of the students put employability as one of the factors to make decision making. The data also indicate that 42% of the students emphasized averagely on the programme's difficulty level. 31% of the students said that they put on the others' feedbacks, friends, Internet, etc. averagely. For the financial assistance or scholarship offered by the university, 34% of the students highly emphasized on this factor. 41% of the students emphasized on the reputation of the university when making decision. 45% of students emphasize on the reputation of university when making decision. There are 35% students who are averagely emphasized on the location and facilities of the university as the factors to choose a programme and a university.

The students were also asked to state on how they make the final decision to choose the programme and the university to enroll in. Based on Figure 12, 66% students were make the final decision based on their own but with the help from parents, friends and counselor, 21% of the students make the final decision by their own, 9% of the students make the final decision based on request by parents or others and only 4% using other source such as through reading or internet and only 4% of the students.

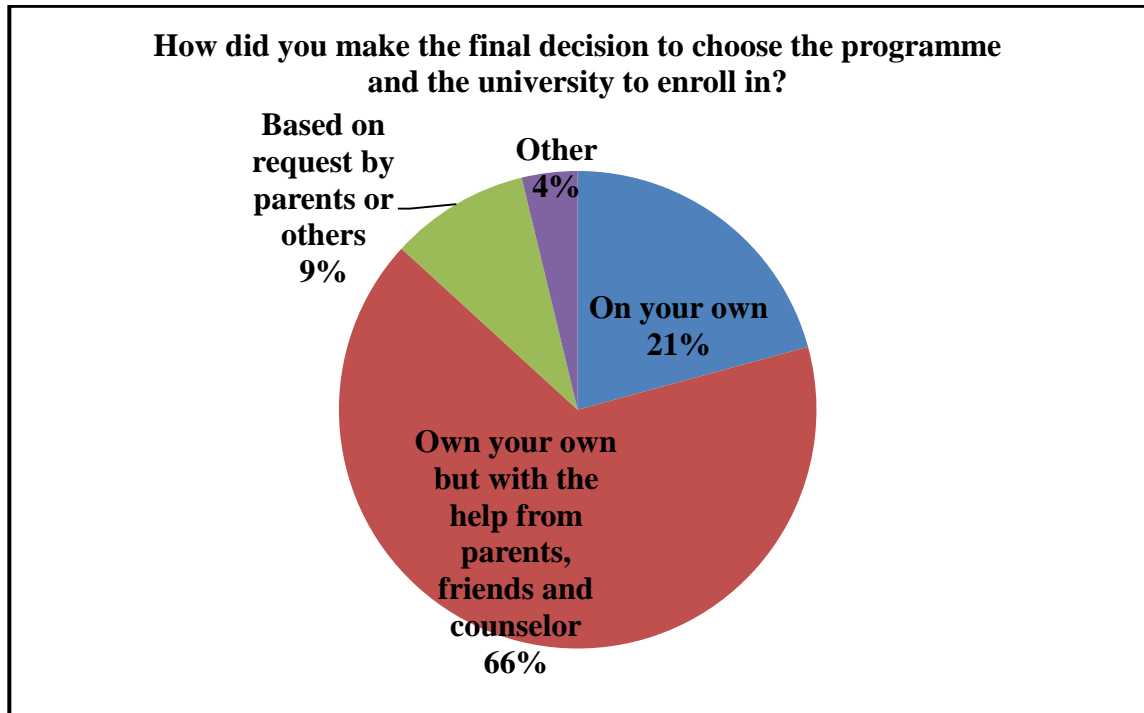


Figure 12: How did you make the final decision to choose the programme and the university to enroll in?

4.1.4 Section D: Decision Satisfaction

After knowing all the factors that influenced the students' decision making to choose a programme and a university to enroll in, this section is to evaluate the students' decision satisfaction. According to the data in Figure 13, 66% of the students said that the programme that they are currently enrolled in is their first choice while 34% of the student said the opposite.

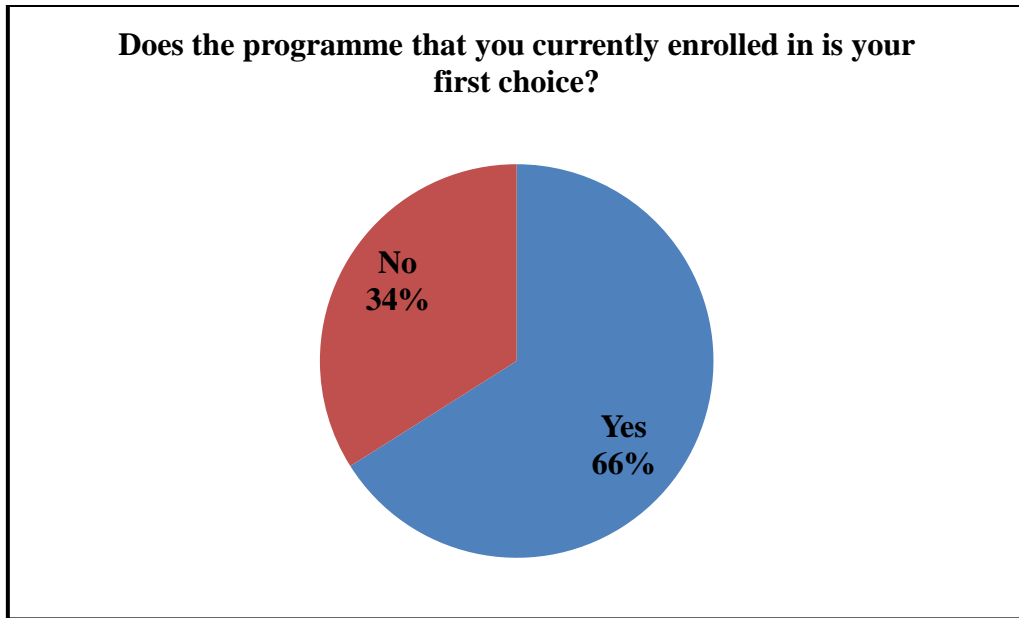


Figure 13: Does the programme that you are currently enrolled in is your first choice?

According to Figure 14, 85% of students mentioned that the programme they are currently enrolled in is among their choices while the other 15% said that the programme they are currently enrolled in is not among their choices.

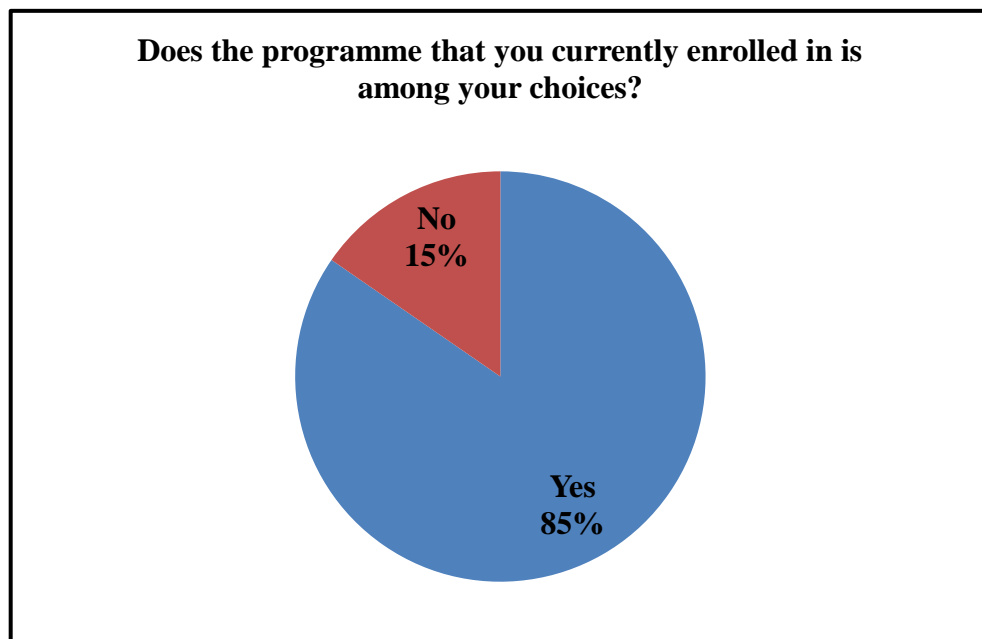


Figure 14: Does the programme that you are currently enrolled in is among your choices?

The students were asked either the university that they are currently attended is their first choice or not. Based on Figure 15, 61% of the students answered no while the other 39% of the students answered yes.

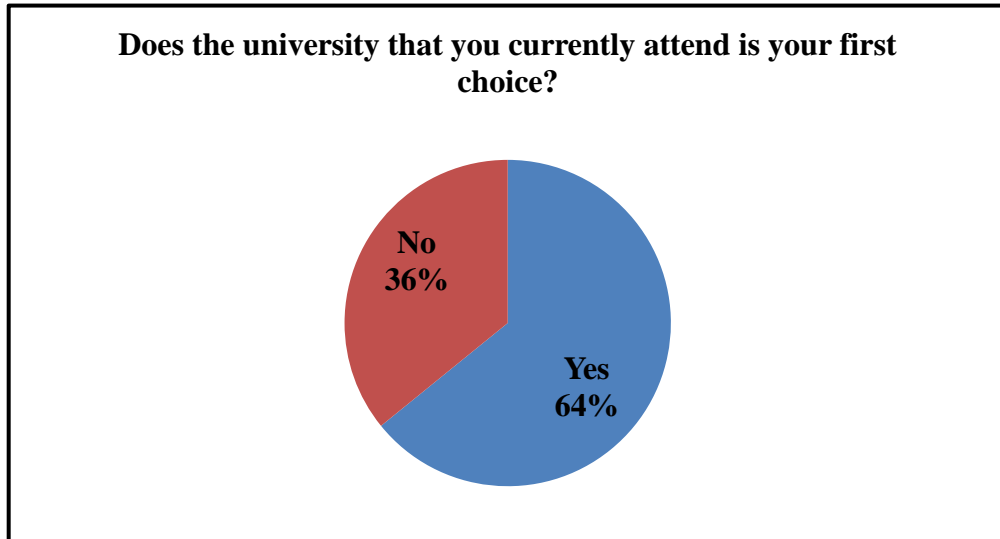


Figure 15: Does the university that you are currently attends is your first choice?

The result also stated that 91% of the students mentioned that the university they are currently attend is among their choices while the other 9% said that the university is not among their choices as shown in the Figure 16.

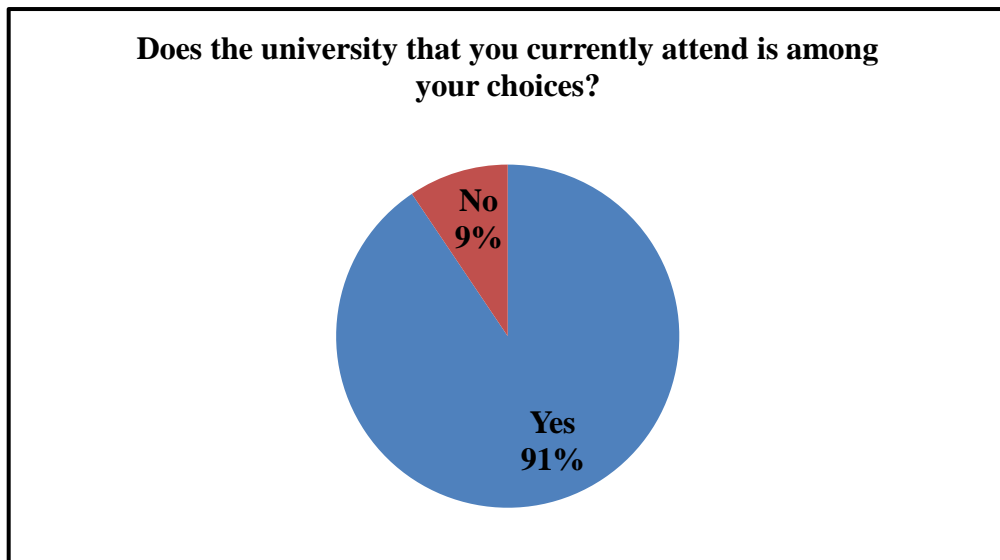


Figure 16: Does the university you currently attend is among your choices?

The Figure 17 shows how the students rate the satisfaction level regarding the programme that they have chosen. Among the total of the students who answered the questionnaire, 39% of the students were satisfied with their choices while 30% of the students were very satisfied with their choice.

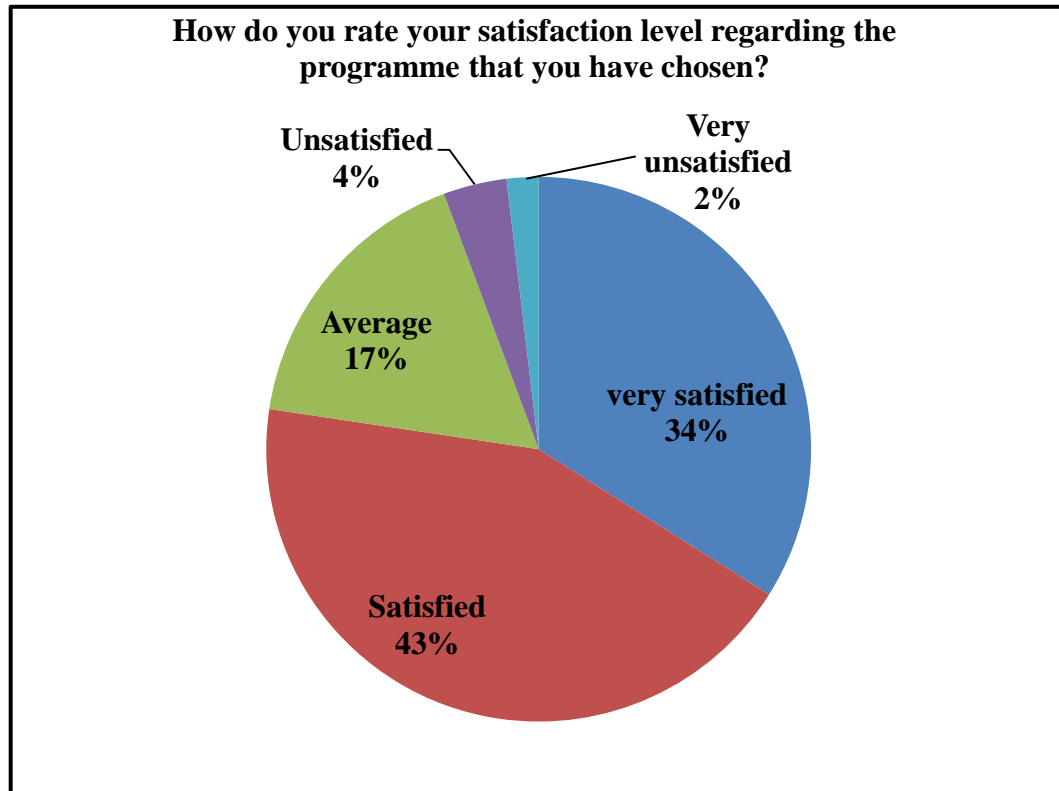


Figure 17: How do you rate your satisfaction level regarding the programme that you have chosen?

Lastly, the students were asked to rate their level of satisfaction regarding the university that they have chosen. Based on the data in Figure 18, the highest percentage which is 39% of the students were satisfied with their choice, 26% of the students were very satisfied and averagely satisfied with their choice while only 9% of the students were unsatisfied with their choice.

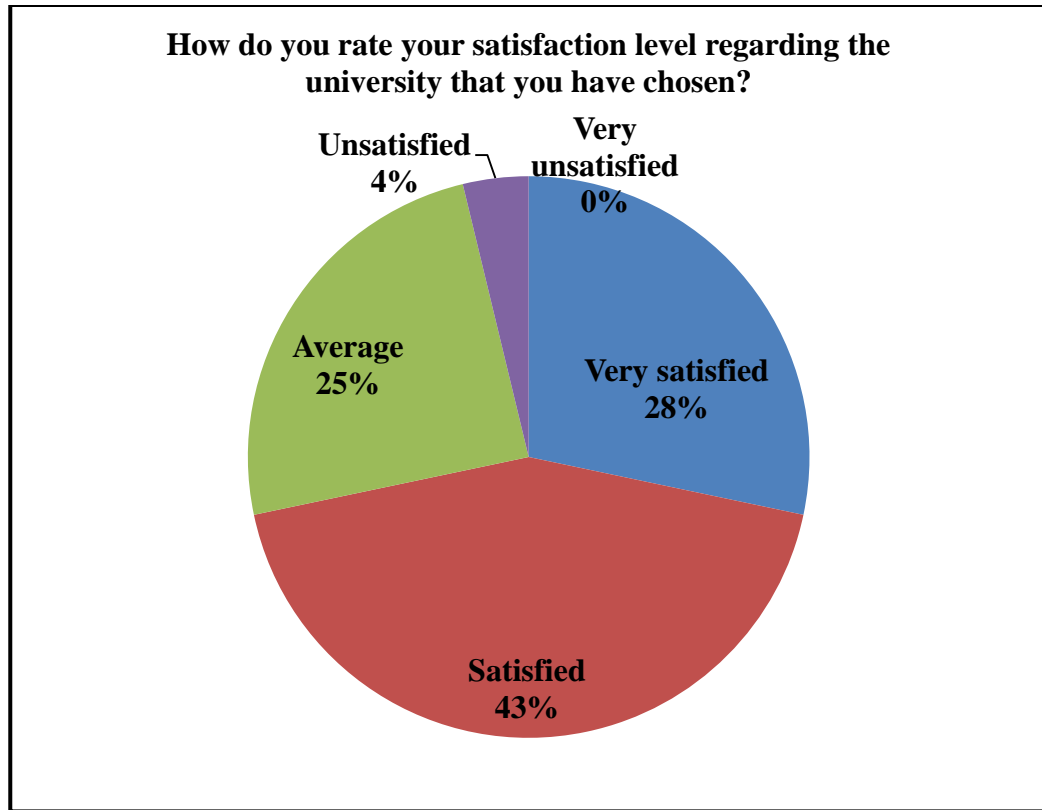


Figure 18: How do you rate your satisfaction level regarding the university that you have chosen?

4.2 Holland Code

In this system, a Holland Code personality test is conducted to identify and match the personality type of students with the area of study they are suited in. The example of Holland Code test as in Appendix (vi). The result of the Holland Code test will categorize the students based on six (6) categories which are:

- (i) **R**ealistic (*Doers*)
- (ii) **I**nvestigate (*Thinkers*)
- (iii) **A**rtistic (*Creators*)
- (iv) **S**ocial (*Helpers*)
- (v) **E**nterprising (*Persuaders*)
- (vi) **C**onventional (*Organizers*).

Table 7: Holland Code Characteristics and Career Possibilities

Category	Characteristics	Career Possibilities
<u>R</u> ealistic (<i>Doers</i>)	People who have athletic ability, prefer to work with objects, machines, plants or animals or to be outdoors.	<ul style="list-style-type: none"> • Petroleum Geologist • Practical Nurse • Consultant • Mechanical Engineer
<u>I</u> nvestigate (<i>Thinkers</i>)	People who like to observe, learn, investigative, analyze, evaluate or solve problems.	<ul style="list-style-type: none"> • Chemical Engineer • Dentist • Psychologist • Physician
<u>A</u> rtistic (<i>Creators</i>)	People who have artistic, innovating or intuitional abilities and like to work in unstructured situations using their imagination and creativity.	<ul style="list-style-type: none"> • Actor • Fashion illustrator • Landscape Architect • Graphic Designer
Social (<i>Helpers</i>)	People who like to work with people to enlighten, inform, help, train or cure them or are skilled with words.	<ul style="list-style-type: none"> • Medical Assistant • City Manager • Physical Therapist • Teacher
<u>E</u> nterprising (<i>Persuaders</i>)	People who like to work with people, influencing, persuading, leading or managing for organizational goals or economic gain.	<ul style="list-style-type: none"> • Lawyer • Entrepreneur • Office Manager • Politician
<u>C</u> onventional (<i>Organizers</i>).	People who like to work with data, have clerical or numerical ability, carry out tasks in detail or follow through on others' instructions.	<ul style="list-style-type: none"> • Cost Accountant • Business Programmer • Business Teacher • Internal Auditor

Source: MU Career Center (1998)

Based on Table 7, the students will fall under the two top categories or the top three categories of Holland Code after did the Holland Code personality test. For example, if the result of the Holland Code personality test of a student is RI, this indicates the student’s personality resembled the most with the Holland Code, R (Realistic) and less resembled with I (Investigative). Thus, it showed that the student loved to work with objects based on R’s characteristics and also love to solve problem based on I’s characteristics. After that, the student will know the best future careers that resemble Holland Code, RI. From the data in Table 7, the student’s personality suited the most to be mechanical engineer compared than chemical engineer as future career.

The Holland Code used several questions to identify the personality type of a person. For this project, several questions are being used to identify the personality type of secondary school leavers as shown in the Figure 19 below.

STEP 1: Based on the all items below, tick the numbers of the items which appealed to you			
R= REALISTIC			
1. Planting and growing crops	2. Working on cars or lawnmowers	3. Carpentry	4. Setting type for a printing job
5. Driving a truck	6. Fixing electrical appliances	7. Building things	8. Wildlife biology
I= INVESTIGATIVE			
9. Solving math problems	10. Astronomy	11. Physics	12. Using a chemistry set
13. Working in a lab	14. Building rocket models	15. Doing puzzles	16. Using science to get answers
A= ARTISTIC			
17. Being in a play	18. Drawing or painting	19. Foreign language	20. Reading fiction or plays
21. Playing a musical instrument	22. Writing stories or poetry	23. Fashion design	24. Going to concerts or the theater
S= SOCIAL			
25. Studying other cultures	26. Going to church	27. Working with youth	28. Helping people with problems
29. Making new friends	30. Attending sports events	31. Belonging to a club	32. Working with the elderly
E= ENTERPRISING			
33. Talking to people at a party	34. Working on a sales campaign	35. Buying clothes for a store	36. Selling life insurance
37. Leading a group	38. Working in a lab	39. Keeping detailed records	40. Keeping detailed records
C= CONVENTIONAL			
41. Working with computers	42. Using a cash register	43. Working from nine to five	44. Typing reports
45. Following a budget	46. Using business machines	47. Keeping detailed records	48. Filing letters and reports

Figure 19: List of Question for Holland Code in the U-Info System

The U-Info system is implemented a step earlier before the students can decide to choose what future career for their selves. Before the students make a final decision what they wanted to be in future, it is better for the student to set an early preparation in their higher education level. This means, by having U-Info system the students can choose a programme of study that resembled their personality which matched with their future careers. The students will become more satisfied with their career choice in future by choosing a programme and university that suited with their personality which will help them to achieve the desired future career.

4.3 Prototype

4.3.1 First Prototype

The prototype of the system is created as an early system design before the final system is being implemented. The prototype of this project is designed, created, reviewed, modified and reimplemented for several times. The reimplementation process is needed in order to produce desired interface which willsatisfied users and also to produce the best output in order to achieve the desired objectives of this project. The first prototype of this project is as shown in the Figure 20 below.

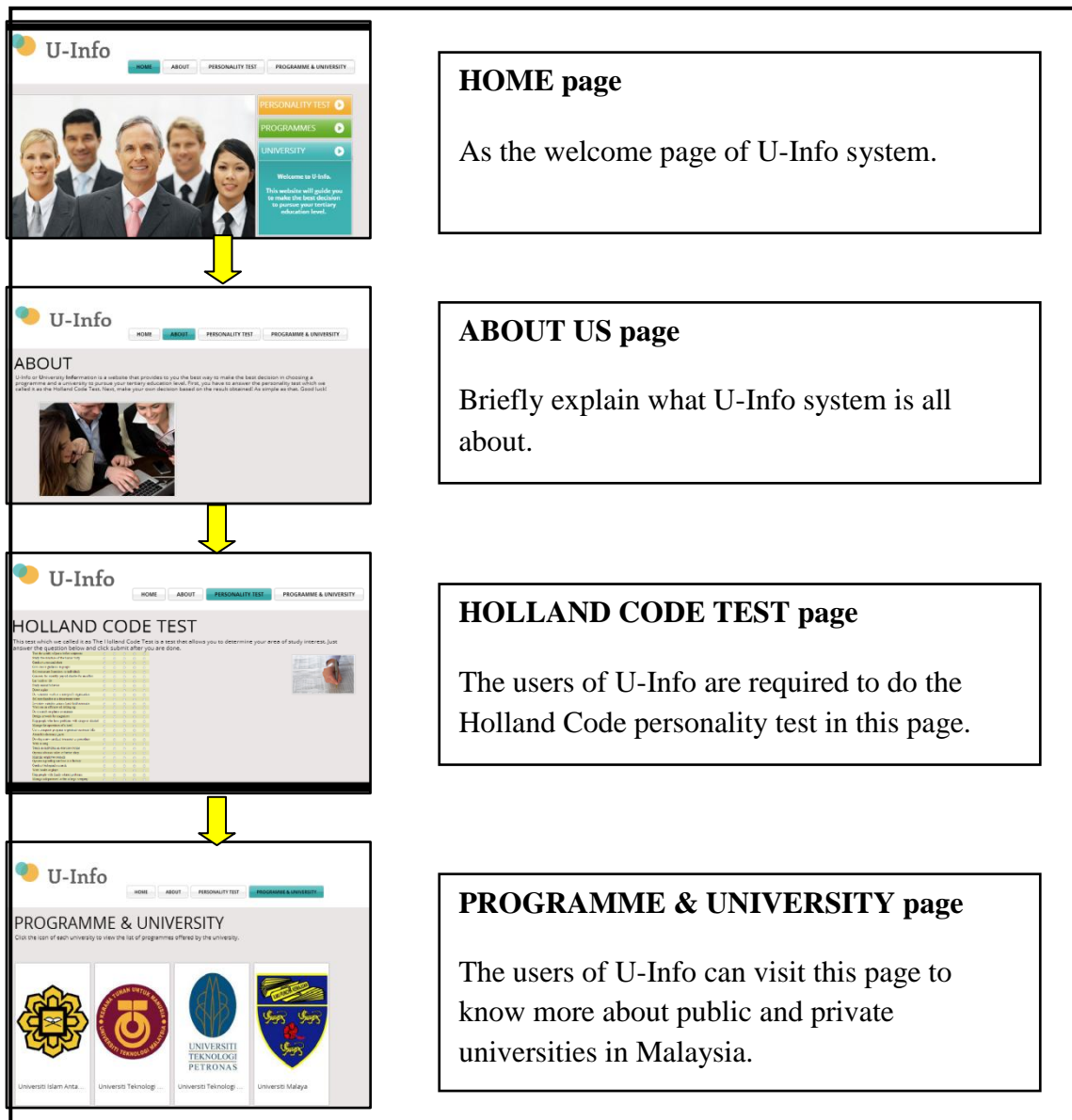


Figure 20: First Prototype of U-Info System

4.3.2 Second Prototype

For second prototype as shown in the Figure 21 below, the interfaces of the system have been improvised to be more user-friendly and the programme & university page have been divided into public or private universities to help students view information about all the universities easier.

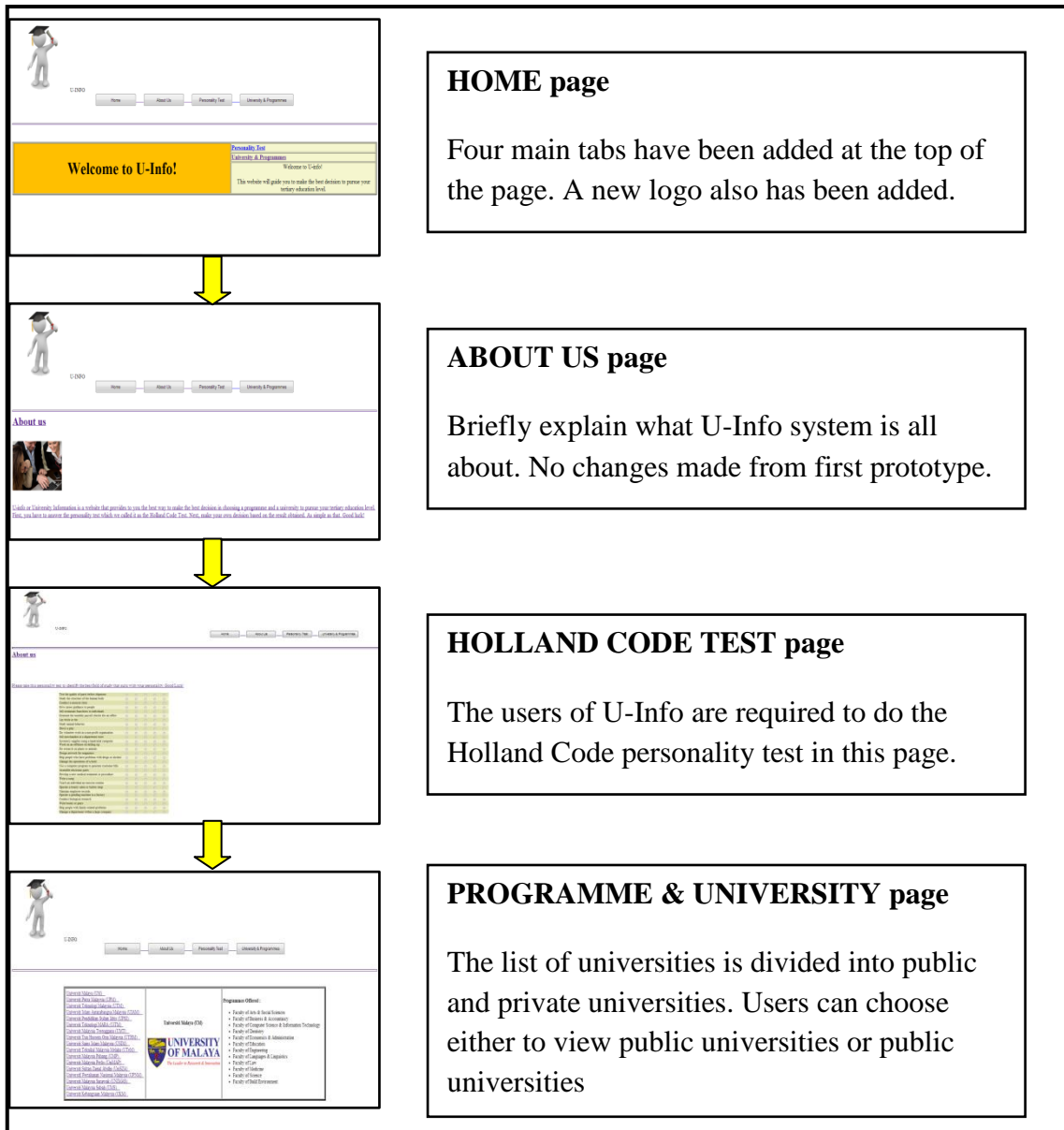


Figure 21: Second Prototype of U-Info System

4.3.3 Final Prototype

After the second prototype has been created, the prototype is reviewed and improvised. The final prototype of U-info system is much simpler compared to the first prototype and the second prototype. The final prototype applied user-friendly interface since the users can view Home page, About Us page, Personality Test page and also Programme & University page by just click the main tabs at the top of the system on each page in the system.

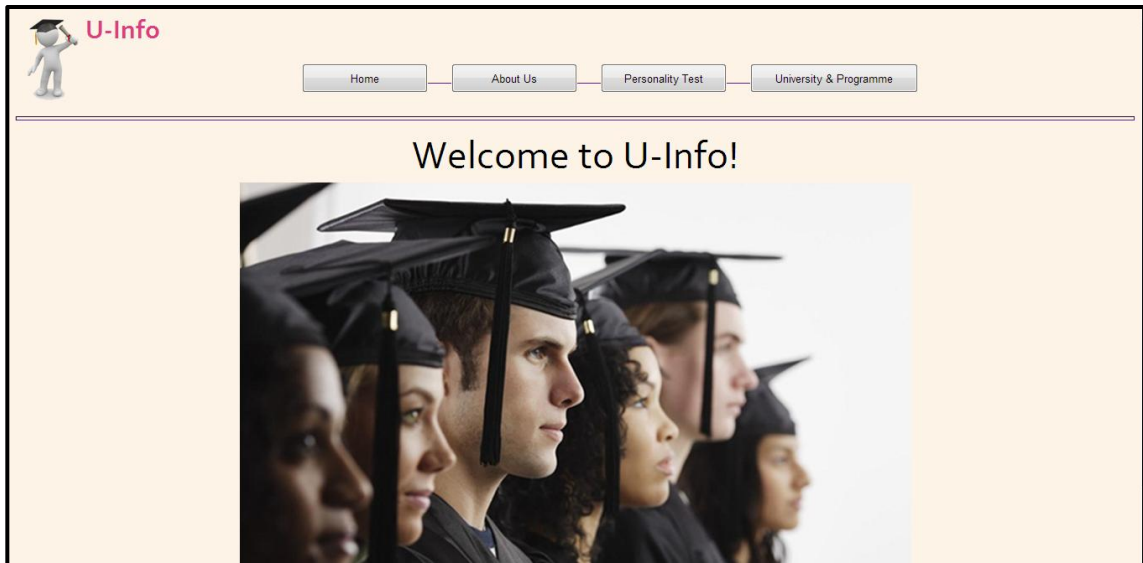


Figure 22: HOME page of U-Info system

Figure 22 showed the final HOME page of U-Info system. Basically this page acts as a welcome note to the users of U-Info system. There are four main tabs on the top page which are Home tab, About Us tab, Personality Test tab and University & Programme tab. All these tabs will be appeared on every page in this system. Thus, the students can move from one page to another page easier.

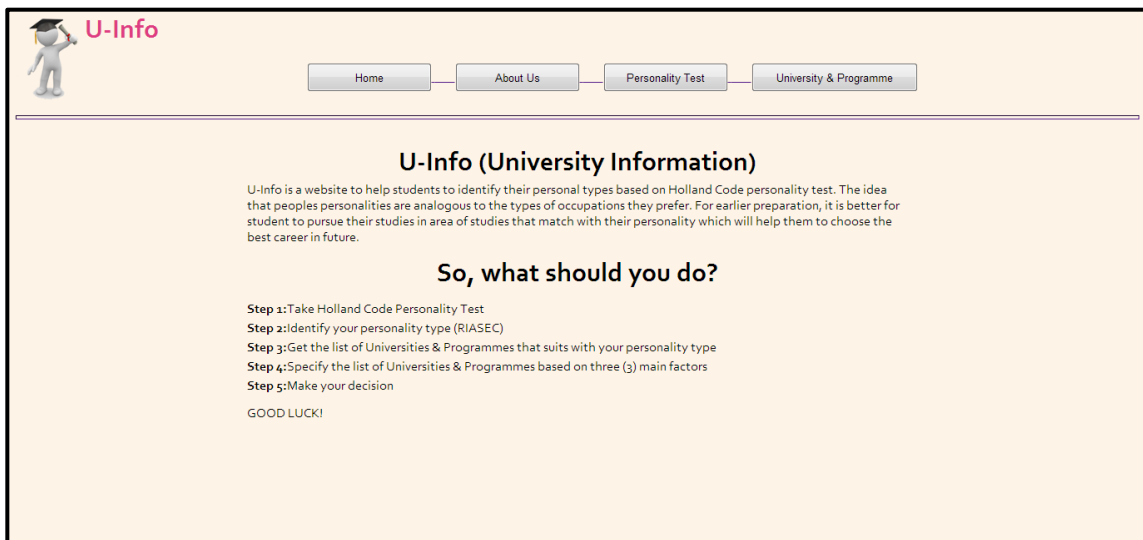


Figure 23: About UsPage of U-Info System

Based on Figure 23, About Us page basically is a page to tell the users what U-Info system or acts as introductory page to the users about U-Info system. In this page also including the steps on how to do Holland Code personality test and the steps on how to analyze the Holland Code personality test until the users can make the final decision to choose a programme or a university.

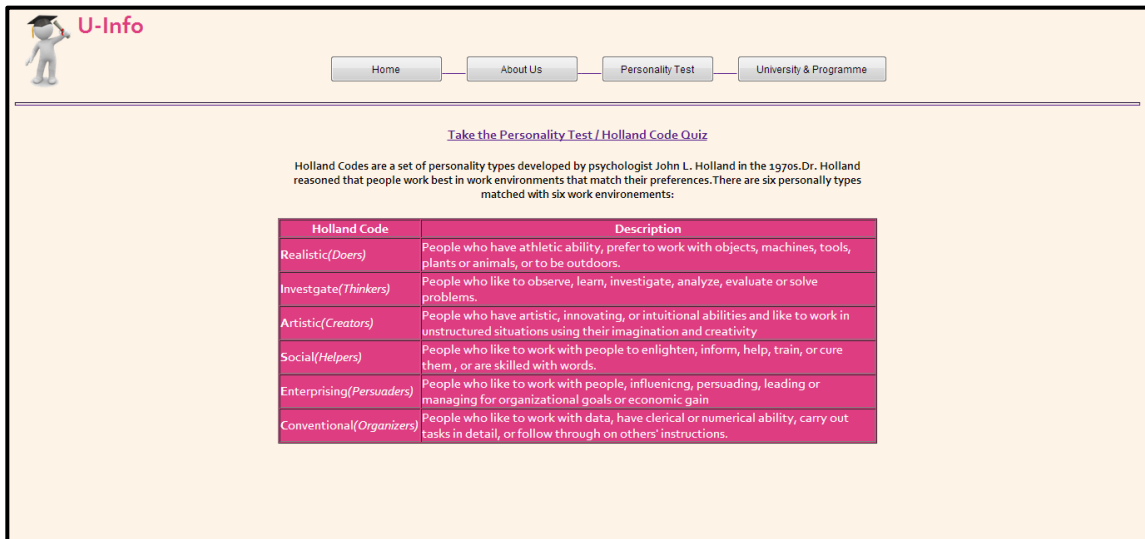


Figure 24: Personality Test Page of U-Info System

The Personality Test page as shown in Figure 24 above is a page where the students as the users of this system are required to do the Holland Code personality test by click the link provided. In this page, the Holland Code is briefly explained and the list of six personality types of Holland Code is also briefly explained. When the student clicked the link provided to take the Holland Code personality test, the interface as in Figure 25 will show up. The users are required to tick characteristics that appealed to them the most and the result of the Personality Test will be shown. The top two most Holland Code resembled their personality type. Later, the students have to click on the link provided based on their Holland Code in order to get the list of universities and programmes in Malaysia. The list of universities and programmes that matched with the students' Holland Code will be shown as in Figure 26.

STEP 1: Based on the all items below, tick the numbers of the items which appealed to you

R= REALISTIC			
1. Planting and growing crops	2. Working on cars or lawnmowers	3. Carpentry	4. Setting type for a printing job
5. Driving a truck	6. Fixing electrical appliances	7. Building things	8. Wildlife biology
I= INVESTIGATIVE			
9. Solving math problems	10. Astronomy	11. Physics	12. Using a chemistry set
13. Working in a lab	14. Building rocket models	15. Doing puzzles	16. Using science to get answers
A= ARTISTIC			
17. Being in a play	18. Drawing or painting	19. Foreign language	20. Reading fiction or plays
21. Playing a musical instrument	22. Writing stories or poetry	23. Fashion design	24. Going to concerts or the theater
S= SOCIAL			
25. Studying other cultures	26. Going to church	27. Working with youth	28. Helping people with problems
29. Making new friends	30. Attending sports events	31. Belonging to a club	32. Working with the elderly
E= ENTERPRISING			
33. Talking to people at a party	34. Working on a sales campaign	35. Buying clothes for a store	36. Selling life insurance
37. Leading a group	38. Working in a lab	39. Keeping detailed records	40. Keeping detailed records
C= CONVENTIONAL			
41. Working with computers	42. Using a cash register	43. Working from nine to five	44. Typing reports
45. Following a budget	46. Using business machines	47. Keeping detailed records	48. Filing letters and reports

R=REALISTIC 1 2 3 4 5 6 7 8
I=INVESTIGATIVE 9 10 11 12 13 14 15 16
A=ARTISTIC 17 18 19 20 21 22 23 24
S=SOCIAL 25 26 27 28 29 30 31 32
E=ENTERPRISING 33 34 35 36 37 38 39 40
C=CONVENTIONAL 41 42 43 44 45 46 47 48

STEP 2: Based on the result above, the two highest categories are the clusters in which you have the most interest, and their corresponding labels are your Holland Code. For example, if you scored highest in Social, and second highest in Artistic, your Holland Code would be "SA". Thus, choose your Holland Code below to know the area of study that suits with your personality.

R or IR	RA or AR	RS or SR	RC or CR	RE or ER
AS or SA	AI or IA	SC or CS	IA or AI	IS or SI
IE or EI	IC or CI	AE or EA	SE or ES	SE or ES

Figure 25: Holland Code Personality Test

U-Info

Home About Us **Personality Test** University & Programmes

So, your Holland Code is the combinations of **Realistic (R) & Artistic (A)**.
The area of study that suits with your personality based on your Holland Code are:

- Architecture
- Mass Communication
- Landscape Architecture
- Art & Design

Below are the list of universities (public & private universities) that offered the area of study which suits with RA or AR Holland Code.

- Architecture
 - Taylor's University
 - Infrastructure University Kuala Lumpur
 - Limkokwing University Science & Technology
 - Universiti Malaysia
 - Universiti Islam Antarabangsa Malaysia
 - Universiti Teknologi Malaysia
- Mass Communication
 - Taylor's University
 - Infrastructure University Kuala Lumpur
 - INTI International University
 - Limkokwing University Science & Technology
 - SEGI University
 - Universiti Teknologi MARA
- Landscape Architecture
 - Taylor's University
 - Infrastructure University Kuala Lumpur
 - Limkokwing University Science & Technology
 - Universiti Malaysia
 - Universiti Islam Antarabangsa Malaysia
- Art & Design
 - Multimedia University
 - Taylor's University
 - INTI International University
 - Limkokwing University Science & Technology
 - SEGI University

[Click HERE to specify the best programme & university for you](#)

Figure 26: List of Universities and Programmes

In the Figure 26 above, there is a blue button at the bottom of the page. The function of the blue button is to narrow down the students' choices. The students can narrow down their choices based on three main factors which are employability, financial assistance or scholarship and university's reputation. These three factors are based on the result of the questionnaire made in requirements phase of this project. From these factors, the students have to choose only one factor that affected them the most when they make decision to choose a university or programme as shown in Figure 27 below.

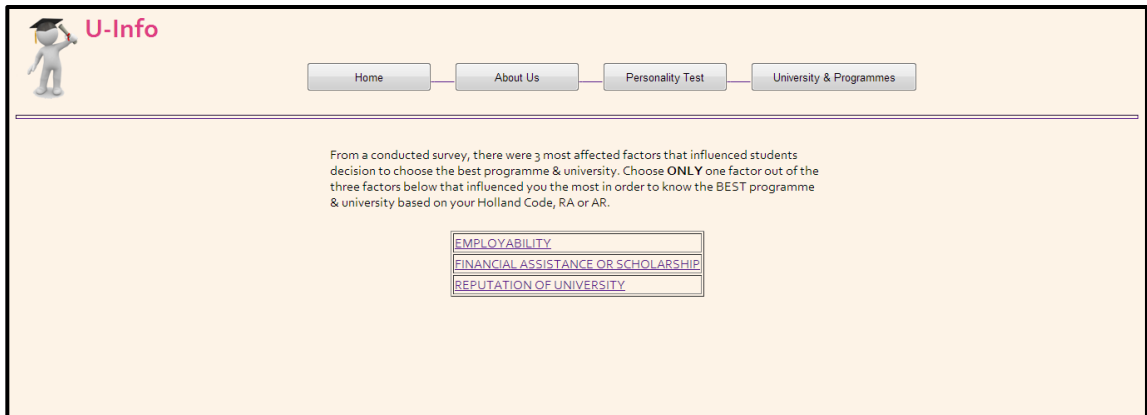


Figure 27: Narrowed Down List of Universities and Programmes

The last main tab is University & Programme tab. This tab enables the students gain knowledge about public and private universities in Malaysia. The universities selected are divided into two categories: public universities and private universities as shown in the Figure 28 below.

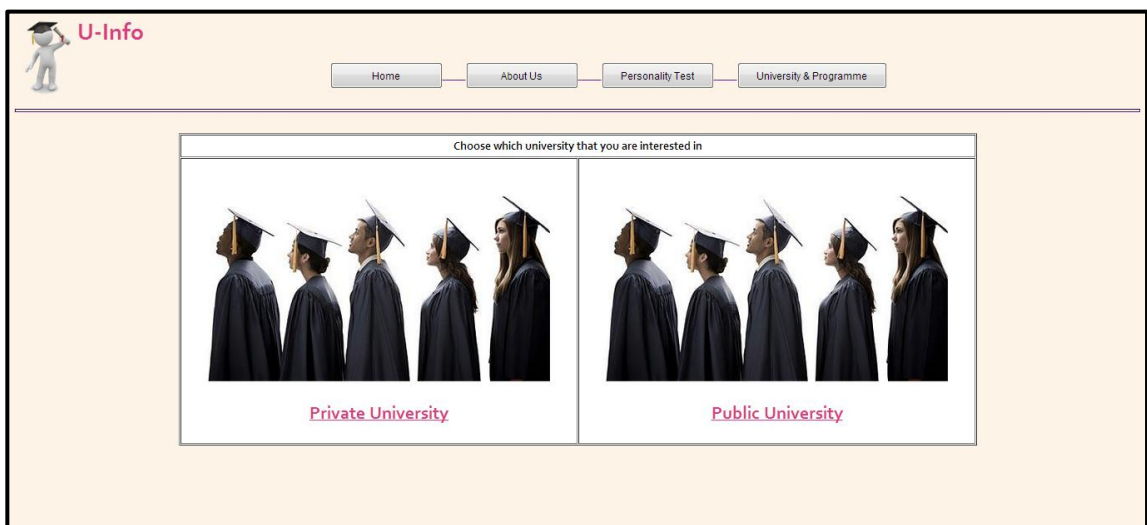


Figure 28: University & Programme Page of U-Info System

For example, if a student clicked Universiti Teknologi PETRONAS's link in the list of private universities, the interface will look like in Figure 29. The user can view all the programmes offered by Universiti Teknologi PETRONAS and visit the main website by click the link provided below the university's logo.

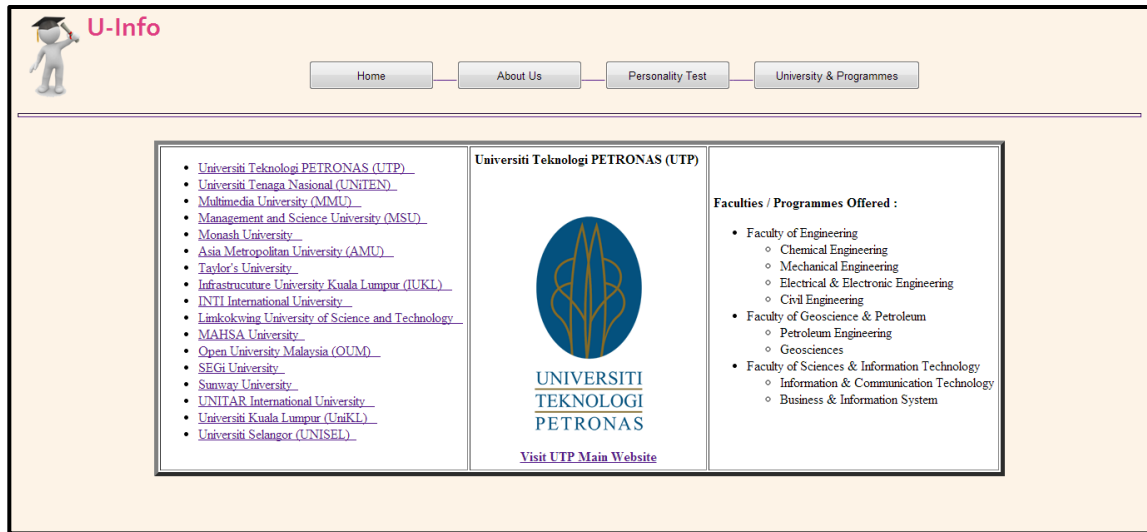


Figure 29: The List of Programmes of Universiti Teknologi PETRONAS

4.4 Feasibility testing

Feasibility testing is conducted to get feedbacks from the users of U-Info system. The feedbacks from the users are very important as a future enhancement to improve the U-Info system interface and usability in order to satisfy the users when using U-Info system. A feasibility testing has been conducted which involved 24 respondents. The list of questions asked as in Appendix (vii).

The feasibility testing involved 24 respondents which is 13 female users and 11 male users. The first question that has been asked to the users is either the interface of U-Info system is user-friendly or via versa. Based on the Figure 30, 11 users agreed the interface of the system is user-friendly and 10 users strongly agree the system's interface is user-friendly. The remaining 3 users are being neutral about the system's interface.

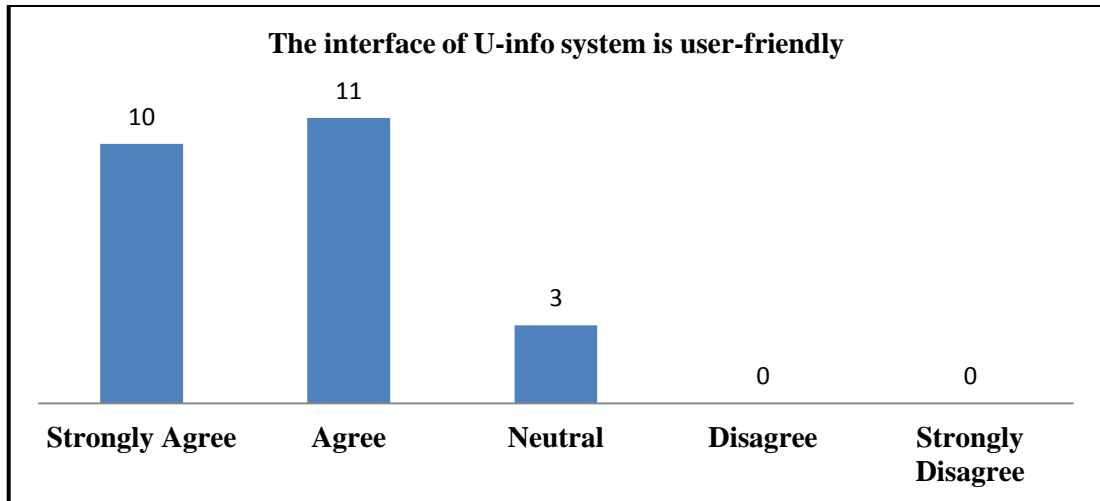


Figure 30: The Interface of U-Info System is User-Friendly

The users also being asked either the information provided in U-Info system is beneficial and helpful or not. Based on Figure 31, 16 users strongly agree that all information provided in U-Info system is beneficial and helpful. 8 users also agree the information provided is beneficial and helpful. Only a user being neutral, not agree or disagree about the information provided is beneficial and helpful.

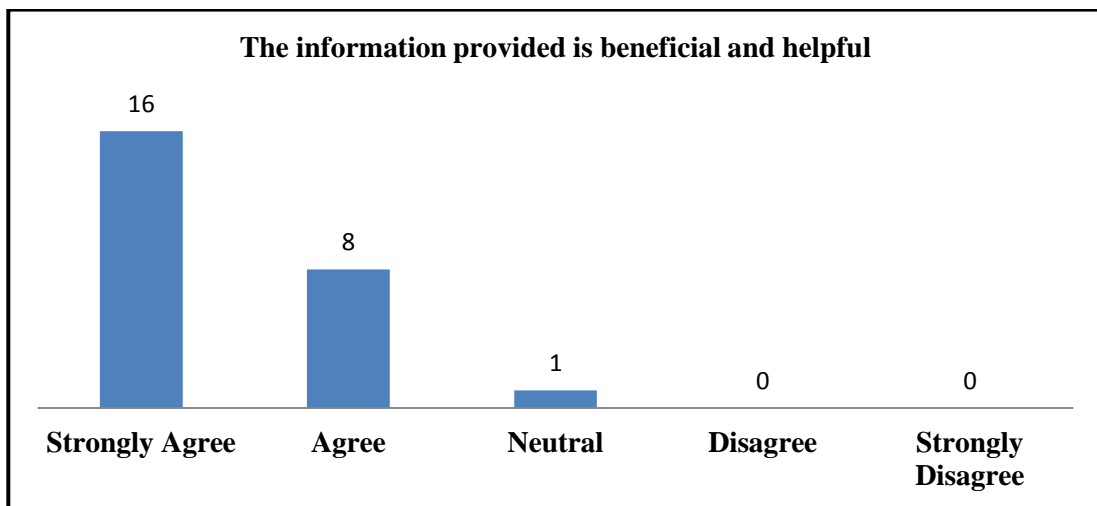


Figure 31: The Information is Beneficial and Helpful

Next, the users are asked either the U-Info system helped them to choose the best programme and university much easier. Based on Figure 32, 11 out of 24 users agree the U-Info system help them to choose the best programme and university much easier. 9 users are strongly agree the U-Info help them to make decision much easier and 4 users are being neutral either this system help them to make decision easier.

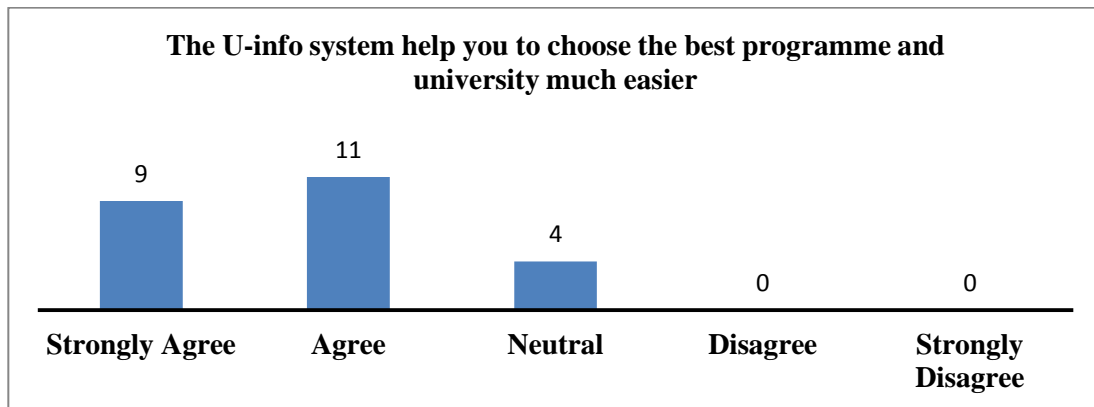


Figure 32: The U-Info System Helped You to Choose the Best Programme and University Much Easier

Based on Figure 33, the users are asked either they will recommend this system to their relatives and family member or not. 14 users strongly agree they will recommend this system to their relatives and friends. Another 10 users are agreed they will also recommend this system to their relatives or friends.

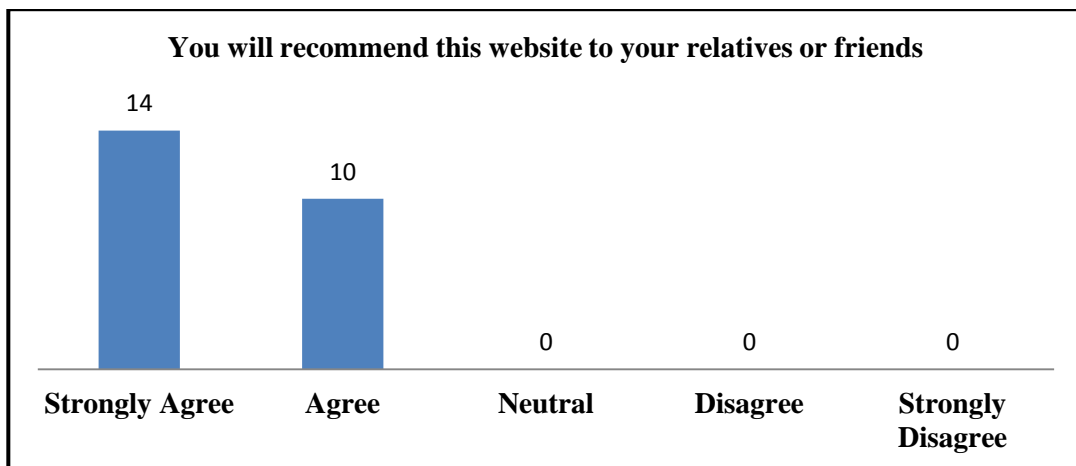


Figure 33: You Will Recommend This Website to Your Relatives or Friends

The last question in the feasibility testing questionnaire is to ask the users to comment about U-Info system as future enhancement and improvement. The users recommended the background color of the system should you used brighter color to enlighten the mood while exploring the system. Another user suggested that a medium for discussion and sharing opinions about their universities should be provided in this system. Another user recommended that the information about universities should be added and the list of universities not only focused on universities in Malaysia only but should include universities in oversea. These recommendations or comments from the users will be used for further recommendations and system's enhancement.

CHAPTER 5

CONCLUSION

5.0 Conclusion

U-Info system is a web-based application system. This system is created to identify students' interested area of study by doing a personality test known as the Holland Code personality test. From the result of the Holland Code personality test, the students will get Holland Code (RIASEC) which resembled their personality type. The system will list out all universities that offered the programmed that matched with their Holland Code. The students will make final decision to choose which programme and university to pursue their undergraduate programme based on three factors that affected them the most when making decision. From the users' feedbacks in the feasibility testing, it can be concluded that the U-Info system helped secondary school leavers in making decision to choose a programme and a university to enroll in for their higher education level. Thus, all objectives of this project are achieved.

5.1 Recommendations

Future recommendations are needed in order to improve the U-Info system for future enhancement. The improvement process will allow the system to have better design interfaces, improve user-system interactions and also to ensure the system can run smoothly without any interferences. Some of future recommendations for this system are providing a medium for discussion and exchange opinion among students in all universities in Malaysia. The discussion medium will help many students to gain knowledge about universities or programmes offered in Malaysia. Basically, by having a discussion medium, many students will have the basic view on what their desired programme is all about.

Another recommendation is to add the list of programmes and universities for overseas universities in the U-Info system. This is due to some students who are interested to further their studies overseas. At this moment, the U-Info system only listed out

programmes and universities offered by private and public universities in Malaysia only. For future improvement, the list of oversea universities will be added in this system.

All information about the programmes and universities provided in this system is only focused on the programmes offered by the university and the U-Info also provided a directed link to the universities for further information. For future enhancement, more information about the universities will be added such as information about the academic qualification criteria for each programme in each university and also a directed contact to apply to each university will be provided to the users of the U-Info system.

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APPENDICES

Appendix (i): Holland Codes for University of Missouri Majors

Holland Codes for University of Missouri Majors

COLLEGE OF AGRICULTURE, FOOD & NATURAL
RESOURCES

Agricultural Econ. (EAS)
Agricultural Education (RUE)
Agricultural Journalism (ESR)
Animal Sciences (IRS)
Biochemistry (IRE)
Entomology (IRS)
Food Science & Nutrition (SEI)
General Agriculture (RIS)
Horticulture (IRS)
Hotel & Restaurant Mgmt. (ESR)
Plant Pathology (IRS)
Plant Sciences (IRS)
Rural Sociology (IES)

COLLEGE OF ARTS & SCIENCE

Anthropology (IRE)
Art History & Archaeology (EAS/IRE)
Biological Sci. (IRE)
Chemistry (IRE)
Classics: Classical Humanities (AIS)
Classics: Greek (ASE)
Classics: Latin (ASE)
Communication (EAS)
Computer Science (IEC)
Economics (IAS)
English (AES)
French (ASE)
Geography (IRE)
Geological Sci. (IRS)
German (ASE)
History (SEI)
Intl. Studies: East Asian Studies (SEI)
Intl. Studies: Environmental Studies (IRE)
Intl. Studies: European Studies (SEI)
Intl. Studies: Intl. Agri/Comm. Dev. (SEI/IRS)
Intl. Studies: International Business (ESR)
Intl. Studies: Latin Amer. Studies (SEI)
Intl. Studies: Russian Studies (SEI)
Intl. Studies: South Asian Studies (SEI)
Mathematics (IRE)
Microbiology (IRS)
Peace Studies (SEI)
Philosophy (SAI)
Political Science (SEI)
Psychology (SIE/ASE)
Physics (IRE)
Religious Studies (SAI)
Romance Languages (ASE)
Russian (ASE)
Sociology (IES)
Spanish (ASE)
Statistics (IRE)

COLLEGE OF BUSINESS

Business Administration (ESC)
Business Administration: Finance & Banking (ESR)
Business Administration: Intl. Business (ESR)
Business Administration: Mgmt (ESR)
Business Administration: Real Estate (ESR)
Public Administration (ESR)

COLLEGE OF EDUCATION

Early Childhood Education (SEC)
Educational Studies (SEC)
Curriculum & Instruction, Interdepartmental,
Practical Arts & Voc-Tech Educ, Special Educ.
Elementary Education (SEC)
Elementary Education: School Art (ASE); School
Music (AES)
Practical Arts & Vocational-Technical Education
(RIE)
Secondary Education (SAE/ASE)
Art Educ, Behavioral Science, Biology, Chemistry,
Earth Science, French, Gen. Science, German,
Italian, Language Arts, Latin, Mathematics Educ,
Music Educ, Physics, Social Studies, Spanish,
Speech, Technical Educ (Agri Busn, Home Ec, Ind/
Tech & Mktg Educ).
Special Education (SEC)
Behavior Disorders, Learning Disabilities, Mild/
Moderate Mental Retardation, Severe
Developmental Disabilities, Curriculum Dev for
Exceptional Students, Mental Retardation, Early
Childhood Special Educ., Admin & Supv of Special
Educ.

COLLEGE OF ENGINEERING

Agricultural Engineering (IRE)
Chemical Engineering (IRS) (Biochem & Chem
Environmental Options)
Civil Engineering (IRE) (Environmental Option)
Comp. Engineering (IRE)
Elec. Engineering (IRE)
Industrial Engineering (EIR)
Mechanical Engineering (RIS/IRE)

COLLEGE OF HUMAN ENVIRONMENTAL SCIENCES

Architectural Studies (IRE)
Communication Science & Disorders: Speech -
Language Pathology (SAI)/Audiology (ISR)
Human Devel. & Family Studies (SEA)
Personal Financial Planning (SEA)
Radiologic Sci.: Radiography (IRS)
Textile & Apparel Management (ESA)

COLLEGE OF VETERINARY MEDICINE

Veterinary Biomedical Science (IRS)
Veterinary Pathobiology (IRS)

SCHOOL OF ACCOUNTANCY

Accountancy (CRS)

SCHOOL OF FINE ARTS

Art (AEI)
Music (ASI)
Theatre (ASE)

SCHOOL OF HEALTH PROFESSIONS

Clinical Laboratory Sciences: Cytotechnology (ICR)
Comm. Science & Disorders (SAI)
Nuclear Medicine (RIS)
Occupational Therapy (SRE)
Physical Therapy (SIE)
Radiography (RIS)
Respiratory Therapy (SIR)

SCHOOL OF JOURNALISM

Journalism (EAS)
Journalism: Advertising (ESA)
Journalism: Broadcast News (AES)
Journalism: Magazine (AES)
Journalism: News Editorial (ESA)
Journalism: Photojournalism (AES)

SCHOOL OF NATURAL RESOURCES

Fisheries & Wildlife (RUE)
Forestry (RIS)
Soil, Atmospheric Sci. (IRS)
Parks, Rec & Tourism (ESA)

SCHOOL OF NURSING

Nursing (SIA)

SCHOOL OF SOCIAL WORK

Social Work (SEC)

HONORS COLLEGE

Pre-med (IRS)

SCHOOL OF LAW

Law (ESA)

SCHOOL OF MEDICINE

Health Services Mgmt. (ESC)


Appendix (ii): Salisbury University Majors/Minors and Their Three Digit Holland Code


SU MAJORS/MINORS AND THEIR THREE DIGIT HOLLAND CODE	
SU Majors	Holland Code
<ul style="list-style-type: none"> • ACCOUNTING • ANTHROPOLOGY 	<ul style="list-style-type: none"> • CRS • IRE
<ul style="list-style-type: none"> • ART <ul style="list-style-type: none"> -Art Education -Art History -Graphic Design 	<ul style="list-style-type: none"> • ASI • ASE • AES • AES
<ul style="list-style-type: none"> • ATHLETIC TRAINING 	<ul style="list-style-type: none"> • SRE
<ul style="list-style-type: none"> • BIOLOGY <ul style="list-style-type: none"> -Biology Education -Botany -Microbiology -Zoology 	<ul style="list-style-type: none"> • IRE • SAE • IRS • IRS • IRE
<ul style="list-style-type: none"> • BUSINESS <ul style="list-style-type: none"> -Business Education 	<ul style="list-style-type: none"> • ESC • ESR
<ul style="list-style-type: none"> • CHEMISTRY <ul style="list-style-type: none"> -Biochemistry -Chemistry Education 	<ul style="list-style-type: none"> • IRE • IRE • SAI
<ul style="list-style-type: none"> • CLINICAL LAB SCIENCE/MEDICAL TECHNOLOGY • COMMUNICATION ARTS <ul style="list-style-type: none"> -Human Communication Studies -Journalism/Public Relations -Media Production -Media Studies 	<ul style="list-style-type: none"> • ISA • EAS • EAS • EAS • AIR • AES

Appendix (iii): Gantt Chart for Final Year Project I

Activities/Week(s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Selection of Project Topic	■	■												
Doing Basic Research Work		■	■	■	■	■	■	■	■	■	■			
Submission of Extended Proposal						●								
Proposal Defense												■		
Requirement Phase														
Identify the Requirement Specification of the System										■	■	■		
Designing Phase														
Create the Logical Design of the System												■	■	
Submission of Interim Draft Report													●	
Submission of Interim Report														●

LEGEND



 Estimated Time of Completion

 Milestone

Appendix (iv): Gantt Chart For Final Year Project II

Activities/ Week (s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Implementation Phase															
Create the Physical Design of the System	█	█	█	█	█	█									
Verification Phase															
Testing the System						█									
Maintenance Phase															
Upgrade the System						█	█	█	█	█					
Submission of Progress Report							●								
Pre-SEDEX											●				
Submission of Draft Final Report												●			
Submission of Dissertation (Soft Bound)													●		
Submission of Technical Report													●		
Oral Presentation														●	
Submission of Dissertation (Hard Bound)															●

LEGEND

 Estimated Time of Completion
 Milestone

Appendix (v): Sample of Questionnaire

Questionnaire

The aim of this questionnaire is to study the problems or issues (if any) encountered by secondary school leavers (SPM, etc.) when deciding which undergraduate programme(s) and higher education institution(s) to join in pursuit of a higher certificate. From the feedbacks collected, we intend to develop a web-based application named **U-Info** (**U**niversity-**I**nformation), which can assist the students to make the above decision.

Below are the detail objectives of this questionnaire:

1. To identify the difficulty level students had experienced during the decision making process.
2. To determine the factors that influenced the decision making.
3. To identify the satisfaction level once the students enrolled in the programme and the university chosen.

Should you have any queries, please do not hesitate to contact the following:

NUR ATIKAH JAMALUDIN

ICT Final Year Student

UTP, Tronoh, Perak

Email: atikahj91@gmail.com

Section A: Demography

1. Age

18 – 20 21 – 23 24 – 26 27 – 29 Other :

2. Gender

Female Male

3. University: _____

4. Programme of Study: _____

5. Year of Study

- 1st Year 2nd Year 3rd Year 4thYear

Section B: Decision making process

1. How did you find the process of selecting the undergraduate programme and the university to enroll in?

- Very difficult
- Difficult
- Average
- Easy
- Very Easy

2. How much did you require help from someone in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in?

- Very dependent
- Dependent
- Average
- Independent
- Very independent

3. How much did you depend on resources such as the Internet, magazines, etc. in order to know the things to be considered when choosing the undergraduate programme and the university to enroll in?

- Very dependent
- Dependent
- Average
- Independent
- Very independent

4. How long did it take you to make the decision regarding the undergraduate programme and the university to enroll in?

- 1 to 2 days
- 3 to 4 days
- 5 to 6 days
- One week or more

Section C: Decision making factors

5. What was the sequence of your decisions?

- University first, then programme
- Programme first, then university
- No sequence

6. How much emphasis did you put on your own area of interest when choosing the undergraduate programme to enroll in?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

7. How much emphasis did you put on the programme's popularity when choosing the undergraduate programme to enroll in?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

8. How much emphasis did you put on employability when choosing the undergraduate programme to enroll in?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

9. How much emphasis did you put on the programme's difficulty level when choosing the undergraduate programme to enroll in?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

10. How much emphasis did you put on the others' feedbacks, friends, Internet, etc., when choosing the undergraduate programme to enroll in?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

11. How much emphasis did you put on the cost of the study when choosing the university?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

12. How much emphasis did you put on the financial assistance or scholarship offered by the university when making decision?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

13. How much emphasis did you put on the reputation of the university when making decision?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

14. How much emphasis did you put on the location and facilities of the university when making decision?

- Very emphasized
- Emphasized
- Average
- Less emphasized
- Not emphasized

15. How did you make the final decision to choose the programme and the university to enroll in?

- On your own
- On your own but with the help from parents, friends and counselor.
- Based on request by parents or others
- Other: _____

Section D: Decision satisfaction

16. Does the programme that you currently enrolled in is your first choice?

Yes

No

17. Does the programme that you currently enrolled in is among your choices?

Yes

No

18. Does the university that you currently attend is your first choice?

Yes

No

19. Does the university that you currently attend is among your choices?

Yes

No

20. How do you rate your satisfaction level regarding the programme that you have chosen?

Very satisfied

Satisfied

Average

Unsatisfied

Very unsatisfied Why? _____

21. How do you rate your satisfaction level regarding the university that you have chosen?

Very satisfied

Satisfied

Average

Unsatisfied

Very unsatisfied Why? _____

Thank you for your time in answering this questionnaire.

This questionnaire can be answered online at

https://docs.google.com/forms/d/1MyFkm_MUeX6yhtP_GTz5PChEvpuOow1NB-e_s_oqME0/viewform

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Appendix (vi): Example of Holland Code Test

	Dislike		Neutral		Enjoy
Test the quality of parts before shipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study the structure of the human body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct a musical choir	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give career guidance to people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sell restaurant franchises to individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generate the monthly payroll checks for an office	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lay brick or tile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study animal behavior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Direct a play	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do volunteer work at a non-profit organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sell merchandise at a department store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inventory supplies using a hand-held computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work on an offshore oil-drilling rig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do research on plants or animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design artwork for magazines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Help people who have problems with drugs or alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manage the operations of a hotel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use a computer program to generate customer bills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assemble electronic parts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a new medical treatment or procedure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Write a song	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teach an individual an exercise routine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operate a beauty salon or barber shop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain employee records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operate a grinding machine in a factory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct biological research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Write books or plays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Help people with family-related problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manage a department within a large company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix (vii): U-Info Feasibility Testing Questionnaire

U-Info Feasibility Testing Questionnaire

The main objective of this questionnaire is to get feedbacks from the users of U-Info system after they used the system for future improvement and enhancement.

1. Gender
 - Male
 - Female

2. The interface of U-Info system is user-friendly.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

3. The information provided in U-Info system is beneficial and helpful.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

4. The U-Info system helps you to choose the best programme and university to enroll in much easier.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

5. You will recommend this website to your relatives/friends.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

6. Leave your comment about U-Info system for future enhancement.

Thank You