

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter discusses the research methodology, population, sampling method and instrumentation used for this research. It also discusses the procedure used for data collection and analysis.

3.1 Introduction

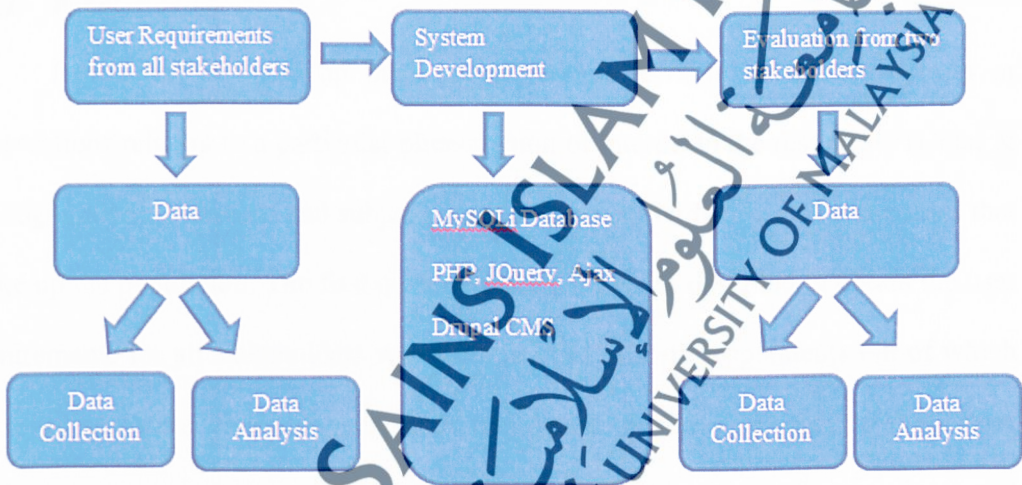
The purpose of this research is to develop an Integrated Graduate Portal (IGP) for graduate marketability. The IGP is a portal proposed by the author to assist graduates in facilitating their marketability to prospective employers and create an online environment with integrated features through which the university management, the graduates, the lecturers of the university and the employers can relate with one another. This is important as the industry plays an important role in assisting the university to equip graduates with the necessary skills needed in any workplace they find themselves in.

3.2 Research Methodology

The methodology used for this research is based on the research objectives. There are three phases involved in this research. The first phase is the user requirement analysis which is done to identify the user requirements of all the stakeholders of the IGP. After the first phase was completed, the research continued to the second phase which is the system development phase. In this phase, the implementation of IGP prototype was carried out through the use of tools such as the Drupal content management system, MySQL database and PHP programming

language. The completion of the second phase leads to the final phase which is the evaluation phase. This involves evaluation of the usability of the portal prototype by two groups of stakeholders of the IGP. More explanations are provided in the subsequent sections on the three phases. The research methodology is shown in the figure below.

Figure 3.1: Overview of Research Methodology



3.2.1 Quantitative Research Method

As the use of qualitative and quantitative research methods are common methods used in researches based on information system (Mansourvar, 2011), the researcher made use of quantitative research method. Quantitative research method can involve the use of laboratory experiments, surveys or numerical methods. The use of surveys was selected for this research to find out the user requirements of the different stakeholders of the IGP and subsequently evaluating the IGP. Similar studies have been carried out by Sarris et al (2006) and Sergeant et al (2004) in which Sarris et al (2006) sought to get the *user requirements of the Multimedia Semantic*

Syndication for Enhanced news services (MESH) projects using the MESH users and Sergeant et al sought to get the *user requirements for the development of a virtual search environment for staff based around portal technology*. Notable reference is made to their research methods as it is similar to the methods used in this research which involves the use of surveys or questionnaires to get the user requirements and to evaluate the proposed portal from stakeholders. Respondents were asked to make use of the IGP by carrying out tasks that are available for them before completing the evaluation questionnaires.

3.2.2 Population

Population is made up made up of all conceivable elements, subjects or observations relating to a particular phenomenon of interest to the researcher (Umar & Madugu, 2015). Elements and subjects refer to those individual items or variables that make up the population. The first questionnaire which was designed to obtain the user requirements for all stakeholders was administered to forty respondents out of which 33 responses were obtained back. This population size was selected as the author made use of purposive sampling and also have different groups of respondents and cannot administer questionnaires to all the groups involved due to time and resources constraints. Babbie (2013) opined that a researcher can make use of a small subset of a larger population if it is impossible to make use of a large population and the size is judgemental based on the researcher.

The second questionnaire which was designed to evaluate whether the developed portal satisfies the users' requirements was administered to thirty respondents out of which twenty-five response were obtained. Nielson (2012) suggested the sample size of five for representative of each target group when

evaluating a system as he stated that this sample size is suitable enough to identify any problems that can be found. He, however also mentioned that a researcher can make use of more than that if he thinks it is needed. As a result, the author decided to use a sample size of thirty for the evaluation survey (i.e. fifteen respondents each for graduates and fifteen respondents for employers).

3.2.3 Sampling

Byrne (2002) defined sampling as taking a part of a population and using them to represent the whole population. This research work likewise involves surveying of a particular population and as a result, the author made use of purposive sampling whereby participants who did not meet the criteria were rejected. This sampling technique allows the study of a specific group of people and eliminates those who do not belong to the group.

Past researches have shown that during dealings with survey of human elements, human beings have different characteristics and so may react quickly while some may not (Sekaran, 2007). Purposive sampling method is selected as the sampling method of population from which the sample is to be taken consists of known and relevant affected groups or categories. In addition, it helps in the identification and differentiation of one or more relevant groups as the groups that are included in a sample are selected based on specific characteristics which are considered to be important in relation to any research work (ACaps better assessment aid, 2011). Den Hengst et al (2004) and Palinkas et al (2015) stated the importance of choosing participants through purposive sampling during the process of requirements elicitation.

3.3 Surveys

Surveys are used in system development as tools for acquiring opinion of users about predefined questions (Owoseni & Imhanyehor, 2011) and it is one of the significant methods that are used in quantitative research. The use of the survey will also give students room to share their opinions. Determining of stakeholders requirements is a known factor of success achievement in the design of proposed systems (Mansourvar, 2011). Surveys can be carried out through the use of interviews or questionnaires. However, in this research, questionnaires were used to get the stakeholders requirements and finally for the prototype evaluation. This is because questionnaires provide respondents with flexibility that allows the best chance of uncovering real important information. Since it is often difficult to find the right way of communicating with users during the system development process, the author decided to make use of the questionnaire to identify the user requirements of all stakeholders and in order to make it easier for the users to be able to understand what the author wants to know thereby making it easy for them to provide the answers.

3.4 Instrumentation

An instrument can be defined as a tool that is used for gathering information from subjects. The instrument used for this study is a questionnaire. Questionnaires were used as (Bryman, 2001; Mansourvar, 2011) opined that respondents prefer questionnaire to interview because they can set the pace they want to complete it. Due to the fact that the questionnaires can be used to collect data about the components and the performance of a system, the validity of the questionnaire outcomes is dependent on the honesty of the respondents (Mansourvar, 2011).

Six questionnaires were developed for this research. The user questionnaires were designed by using two particular questionnaires which are: Embedding a VRE in an Institutional Environment (EVIE) requirement questionnaire (Sergeant et al, 2004) and Multimedia Semantic Syndication for Enhanced news services (MESH) requirements questionnaire (Sarris et al, 2006). These two questionnaires were used as a template and then modified to meet the needs of this research.

For the first phase of survey which was conducted to identify the user requirements of all stakeholders, four questionnaires were developed for the four stakeholders of the proposed IGP which are the graduates, employers, lecturers and administrators. The design of four different user requirements questionnaires was as a result of the different groups of stakeholders that will be making use of the portal, hence, the differences that can be found in the different user requirements questionnaires. The four user requirements questionnaires can be found in Appendix A to D. For the second phase of the survey which was conducted to evaluate the IGP prototype to find out if the portal is useful to facilitate graduate marketability, two different questionnaires were developed. These two evaluation questionnaires were developed for two different stakeholders involved in the portal which are graduates and employers. The questionnaires were created online through the use of Google Form and sent to potential users through e-mail. Appendix E and F shows the evaluation questionnaires for the graduates and employers.

The questionnaire also allowed the respondents the opportunity for further audience by giving them the opportunity to give comments on proposed functionality. The author tried to keep the survey questions as short as possible because long questionnaires are mostly inclined to have less response rate (Sarris et al, 2006). Clear

and concise instructions were also given on how the questionnaires should be completed.

3.4.1 Questionnaire Design

Questionnaires were developed to identify the user requirements from all IGP stakeholders and the evaluation of the use of IGP to facilitate graduate marketability from graduates and employers. The design of each type of questionnaire will be discussed in the following sections.

3.4.1.1 User Requirements Questionnaire Design

Four user requirements questionnaires were designed to find the user requirements of all stakeholders of the IGP which are graduates, employers, lecturers and administrators. Some of the questions in some sections allowed the respondents to prioritize a list of requirements they have options to be included on the portal. The questions have a ranking of 1st, 2nd, 3rd, 4th or 5th based on the listed requirement options. Each section of the questionnaire included a textual comment area for the respondents which they can use to indicate key resources or information they will like to have in the proposed IGP. User requirements questions were developed from the methods stated in the literature review in chapter two which can be used in facilitating graduate marketability such as the development of e-portfolios and collaboration of graduates, employers, lecturers and university. The design of the four user requirements questionnaires are discussed in the following sections.

3.4.1.1.1 Graduates Survey

The graduates are one of the important stakeholders of the proposed Integrated Graduated Portal as they are the ones that need their marketability to be facilitated. Graduates user requirements questionnaire can be found in Appendix A. The survey

was divided into eleven sections. All selected participants just completed their final year in the university. The sections included in the survey are stated below:

Table 3.1: Sections in the Graduates User Requirements Survey

Personal Information
ICT Skills
Tasks the Integrated Graduate Portal should support
General behavior of the Integrated Graduate Portal
Required skills to be possessed by Graduates
Graduates' E-portfolio Content
Data sharing among all users
Functionality to assist collaboration
Setting up collaboration
Mechanisms for being kept up to date
Their perception of the requirements set

3.4.1.1.2 Employers Survey

The employers are also important in the Integrated Graduate Portal as they are the ones that need to be able to see the achievements of the graduates and to determine if they meet up with their requirements in order for them to be able to employ them. Employers' user requirements questionnaire can be found in Appendix B. The survey was divided into twelve sections. Required content/documents from lecturers section was added to the employers' survey. The sections included in the survey are stated below:

Table 3.2: Sections in the Employers User Requirements Survey

Personal Information
ICT Skills
Tasks the Integrated Graduate Portal should support
General behavior of the Integrated Graduate Portal
Required skills to be possessed by Graduates
Graduates’ E-portfolio Content
Required Content/Documents from Lecturers
Data sharing among all users
Functionality to assist collaboration
Setting up collaboration
Mechanisms for being kept up to date
Their perception of the requirements set

3.4.1.1.3 Lecturers Survey

The lecturers are one of the important stakeholders of the proposed IGP as they are the ones that may assist in boosting their graduates’ marketability. Questions were designed on the verification of graduates’ content by lecturers and the rating of graduates’ content by lecturers so as to assist graduates in making sure their uploaded contents are good enough to market themselves to prospective employers. Lecturers’ user requirements questionnaire can be found in Appendix C. The survey was divided into eleven sections. The focus of the questionnaire was to get the user requirements of the proposed IGP from the lecturers as one of the groups’ stakeholders. The sections included in the survey are stated below:

Table 3.3: Sections in the Lecturers User Requirements Survey

Personal Information
ICT Skills
Tasks the Integrated Graduate Portal should support
General behavior of the Integrated Graduate Portal
Required skills to be possessed by Graduates
Graduates’ E-portfolio Content
Data sharing among all users
Functionality to assist collaboration
Setting up collaboration
Mechanisms for being kept up to date
Their perception of the requirements set

3.4.1.1.4 Administrator Survey

The administrator will be in charge of running the IGP and so they are part of the important stakeholders, hence the need to include them in the survey for the user requirements of the portal. The verification of all stakeholders’ registrations and permission grants will be carried out by the administrators. Administrators’ user requirements questionnaire can be found in Appendix D. The seven sections included in the survey are stated below:

Table 3.4: Sections in the Administrators User Requirements Survey

Personal Information
ICT Skills
Tasks the Integrated Graduate Portal should support
General behavior of the Integrated Graduate Portal
Functionality to assist collaboration
Mechanisms for being kept up to date
Their perception of the requirements set

3.5 System Development Methodology

Mansourvar (2011) defined system development methodology as the process which involves planning, designing, and implementing an information system. System development methodologies can be categorized into waterfall, spiral, prototyping, Rapid Application Development. However, nowadays, the use of a new system development methodology called Web Information Systems Development Methodology (WISDM) is becoming a norm because it considers that organization, people, and technology are related to system design and analysis (Thalheim, 2006; Shaffi & Al-Obaidy, 2013). The system development methodology used in this research is WISDM. WISDM was developed by Richard Vidgen, David Avison and Trevor Wood-Harper (Vidgen, 2002) and is focused on satisfying customer expectations and technical skills. The framework of WISDM is derived for Multitier.

Multitier methodology is a type of methodology which involves user participative approach such as the stakeholders who will make use of the system or who will develop the system being involved in the system development (Mansourvar, 2011). WISDM is selected because it allows the involvement of the stakeholders that will make use of the portal to be involved in the development of a system.

3.6 Evaluation Questionnaire Design

Two evaluation questionnaires were designed to evaluate the usability of the IGP by graduates and employers. The two groups of stakeholders were selected as they are the most important stakeholders in the IGP, for instance, the graduates are the ones that require their marketability to be facilitated and the employers are the ones the graduates want to market themselves to. The evaluation questionnaires were designed using Powell's (2000) standard evaluation test questions and other questions constructed according to the objectives of this thesis and literature review. Each set of questionnaire consist of ten questions to be completed by respondents. However, the two questionnaires have some different questions as each user's access to the features in the IGP is different from the other.

The evaluation questionnaire for the graduates (see Appendix E) included questions aiming to evaluate integrated functionalities available for graduates such as creating e-portfolio for graduates, searching job vacancies and their requirements and others, usability and use of IGP for graduate marketability while the evaluation questionnaire for employers (see Appendix F) included questions aiming to evaluate integrated functionalities available for employers like viewing graduate's e-portfolios, creating and managing jobs, viewing reference and attestation letters from lecturers, usability and use of IGP for graduate marketability.

3.7 Procedure for Data Collection

Data was collected through questionnaires. The questionnaire was prepared for all stakeholders of the proposed IGP. The six questionnaires were distributed through online method. The online questionnaire was created through the use of Google Doc and the link to the questionnaire was sent to the e-mails of all the respondents for completion. Data was collected from the online questionnaire through the use of Google excel spreadsheet. All collected questionnaires were collated and cleaned up by checking if all questions had been fully responded to.

Questionnaires that were not 25% responded to were dropped for the purpose of better and adequate analysis (Sekaran, 2007). Coding was then carried out through the use of SPSS. Sekaran (2007) likewise stated that if a sizeable number of responses have been received by a researcher, the researcher can continue with the analysis. In order to capture the user requirements of all stakeholders of the portal, a survey was carried out from August 2015 to September 2015. The last survey was carried in December 2015.

3.8 Procedure of Data Analysis

Data analysis and interpretation is important as there is a need to determine what the data obtained from the questionnaire mean and how the data can be used to define the user requirements (Samsi et al, 2006). For the four user requirements questionnaires, a five-point scale and ranking from 1st to 5th was used by the author for grading responses obtained from the questionnaires. This is shown in the table below:

Table 3.5: 5-point Likert Scale

Not Important	1 point
Somewhat Important	2 points
Important	3 points
Very Important	4 points
Essential	5 points

The responses and demographic data collected were analyzed for analysis. The identical user requirements questions for the different groups of stakeholders were used to group responses together and provide a categorized breakdown of the questions in order to see whether there were any differences between the requirements of the graduates, employers, lecturers and administrators roles or not. Chart that shows the percentages of the different groups of respondents that rated the different aspects of the user requirements as essential, very important, important, somewhat important, or not important are provided in the user requirement result and analysis in Chapter 4. These are shown in order to make it easy to understand the overall response according to the different respondents' groupings. Also, prioritizing according to the aspects rated as either essential or very important is likely to meet the requirements of more respondents. As a result, requirements with the most percentages that fall under the essential, very important and important options are chosen as part of the requirements.

Ranked questions were also made use of to find out the participants' ranking selections on some aspects of the user requirements such as general behaviour of the portal; data sharing among all users and functionality to assist collaboration (see Appendix A). Demographic data collected was also coded for analysis. Statistical frequency distributions for the data were obtained by the author which was followed by analytical interpretation. Data from the questionnaire collected was analyzed using

the IBM Statistical Package 21.0 (IBM SPSS). Descriptive statistics analysis using a simple percentage was used to analyze the data.

In the ranking questions with the 1st to 5th choice, the frequency of the options ranked as 1st were calculated, and used to compare which options were considered top priority. The author selected the first three ranked requirements (1st, 2nd and 3rd) with the highest percentages according to responses obtained from each group of respondents (graduates, employers, lecturers and administrators). The free textual comments obtained from the different groups of respondents were analyzed manually, and have been summarized in the relevant section.

In the two evaluation questionnaires, three options (yes, no, not at all) were used by the author for grading responses obtained from questionnaires. Statistical frequency distributions for the evaluation data was then obtained by the author. The third objective of this research which is to evaluate if the proposed IGP might facilitate marketability will be achieved based on the evaluation result. The portal will be considered successful if it has been able to incorporate the user requirements and functions required by the stakeholders into the portal i.e. functionalities available for graduates such as creating e-portfolio, searching job vacancies and their requirements and others, functionalities available for employers like viewing graduate's e-portfolios and resumes, creating and managing jobs, collaborations among others. As a result, it will be assumed that the portal is successful if it gets 50% positive feedback or more from the users.

3.9 Conclusion

This chapter discusses the methodology used in this study. Quantitative research method was used in this research. This was done through the use of

questionnaires. Six questionnaires were developed for this research and distributed to all stakeholders of the IGP in order to obtain the user requirements for developing the proposed portal. The system development methodology made use of in this research is the Web Information Systems Development Methodology (WISDM). Chapter four presents the findings and data analysis obtained from data collected.

