

CHAPTER 3

RESEARCH METHODOLOGY

This chapter demarcates methodological procedures employed throughout the research which comprises the research design, subject selection, data collection process and analysis. Figure 3.1 demonstrates a diagram on the overall work carried out in this research.

3.1 Introduction This study used quantitative means to determine whether reflective learning methods (blogs, reflective journals, e-portfolio, concept mapping and multimedia techniques) was deemed meaningful by the postgraduate students in the Faculty of Computer Science and Information Technology, University Malaya. The motivation of this study was based on comments from postgraduate students regarding the effectiveness of the reflective learning's components over their past years educational programme.

A “meaningful experience” is a relative term and may represent something different for each individual. For the purpose of this study, the term meaningful was defined by the students' participants through data collection strategies.

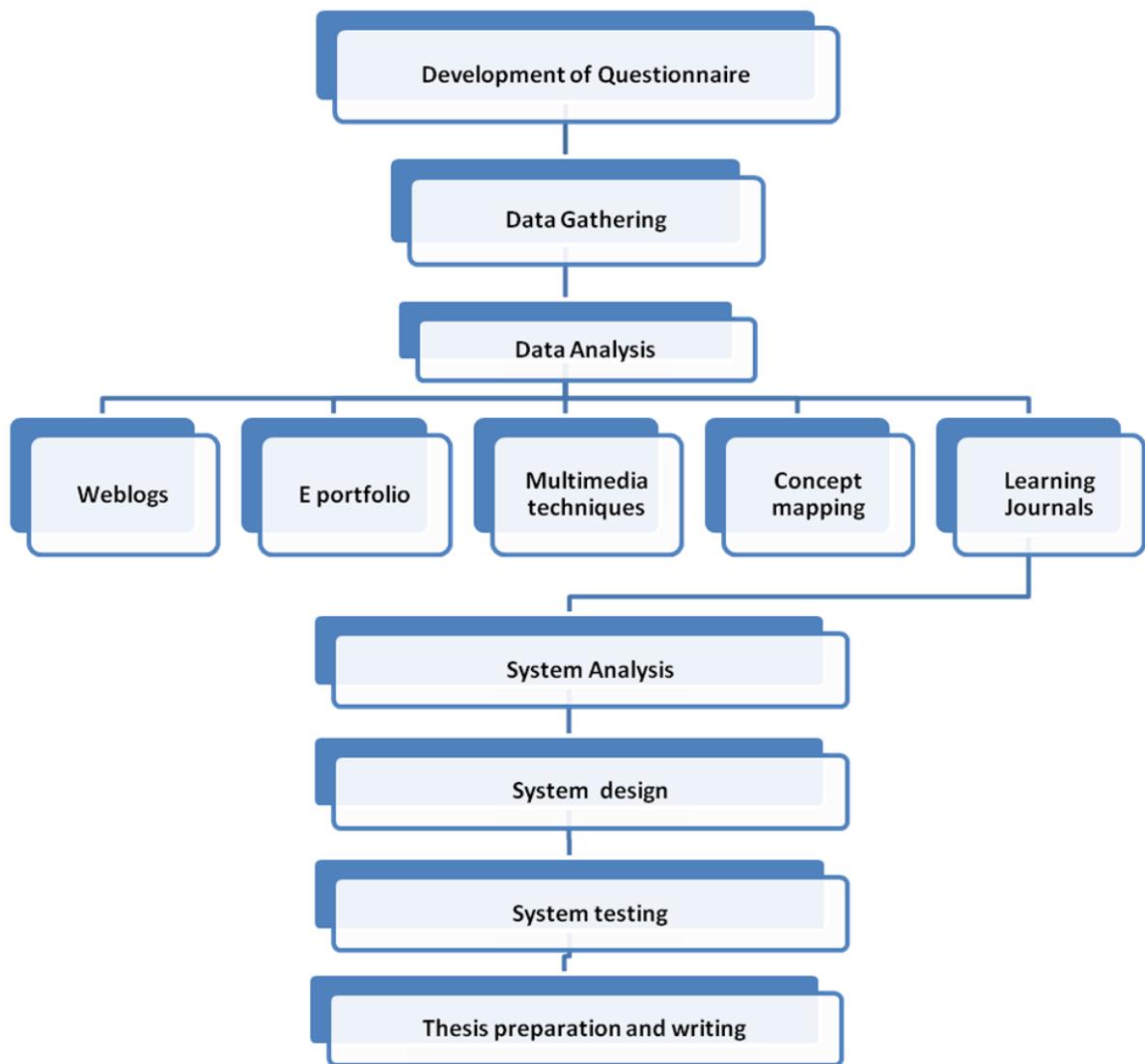


Figure 3.1
Overall view

3.2 Subject Selection

The subjects for the study were selected on a purposive fashion. The samples were taken from the students doing their Masters in University Malaya who were assigned to at least one course, among which postgraduate students in Faculty of Computer Science and Information Technology was focused due to the background of the researcher. The total number of students whose their products were evaluated was 35.

Initially, questionnaires were distributed to some of the postgraduate students in the Faculty of Computer Science and Information Technology. Furthermore, the weblogs and forums of some of students were scrutinized to find out more about their learning experience. Hence, as much as sought information was comprehensively gained from the questionnaires, web logs and forums of the intended group, further interview with the students did not seem to be necessary.

3.3 Data Collection Techniques

Data were collected mainly from questionnaire spread through the postgraduate students of faculty of Computer Science and Information Technology. Other means of data collection such as weblogs and forums were employed in order to help the researcher ascertain on the reliability and validity of the findings through triangulation of the data collected from the various sources. As stated by Gee (1999), the validity of a research project is determined not by the effectiveness of a single method of data collection and analysis, but rather how various methods are employed in harmony to arrive at findings that are valid and trustworthy. Meanwhile, in the evaluation process apart from the questionnaires, and weblogs, forums, journals and reference books, existing online discussion systems were also adapted and used when evaluating the products. All and all, the use of various methods to collect data would provide a precise insight into the required constructs of software evaluation and learning experience of the postgraduate students in this study.

3.3.1 Questionnaire

A questionnaire was developed in the first step in this study and was conducting among the postgraduate students. The questionnaire was designed to determine knowledge and perceptions of them regarding the reflective learning methods. It was

also to gain information about the reflective learning criteria which would enable the researchers to shed more light on the required research questions. The purpose of conducting an interview with the apprentice was merely to find out more about the principles and approaches behind the use of weblogs, learning portfolios, reflective journals, concept mapping and multimedia techniques in educational program.

In fact, methodology wise, the questionnaire was conducted to validate triangulation of the data. As noted by Creswell (2005), qualitative enquirers triangulate among different data sources to enhance the accuracy of a study and this ensures that the study is accurate because the information draws on multiple sources of information, individuals, or processes. Besides, it was suggested by Cohen *et al.* (2007), that exclusive reliance on one method may bias or distort the researcher's picture of the particular slice of reality he is investigating.

The intended information was collected for this study, inasmuch as the interaction and cooperation among interviewees yielded the best information sought based on the research questions. A focus group interview with the postgraduate students was opted owing to the fact that there was limited time to collect information from the participants, since the end of their semester was coming up and both the researchers and participants had time constraint to have individual sessions for the interview. The major constructs to be measured in the questionnaire were learning experience of the postgraduate students along with their skills in using reflective learning methods.

3.3.2 Content Analysis of Weblogs & Forums

Another tool applied in this study was content analysis which according to Krippendorff (2004) is potentially one of the most important research techniques in the

social sciences. In which, it views data as representations of non-physical events such as texts, images, and expressions that are created to be seen, read, interpreted, and acted on for their meanings. Thus, they must be analyzed with such applications in mind. Therefore, out of different types of content analysis, conceptual analysis seemed to be most appropriate for this study applied both to interview, web logs, and forums. The in-depth scrutiny helped the researcher obtain more information worthwhile for the issues mentioned in the research questions.

After reading and analyzing information in the weblogs, the essential information elicited from the weblogs and forums were categorized with respect to the research questions. Data analysis was done based on the themes of each category. In keeping with quantitative research approach, data analysis for this study began with the first data collection and continued for a week. Analysis required continues data organization, identification of emerging categories, labeling, searching for patterns, creation of typologies to classify the categories into themes, testing emerging hypotheses, exploring explanation for patterns, supporting the most logical explanations, and writing the report. This inductive approach was aimed at examining the phenomena of reflective learning from the perspective of the post graduate student and to explore ways of describing and explaining students' perspectives.

3.3.3 Journals and Reference Books

Information was obtained from journals and reference books on related topics. The information derived was used for the design of the system.

3.3.4 Existing Online Discussion Systems

Research was done based on existing online discussion systems to get some idea on how an online discussion is carried out and to analyze the functionalities of their system.

3.4 Data Collection Strategy

Students were interviewed individually using close-ended questionnaire as identified in Patton's categorization of interviews. The questions were the same for all participants. Patton's typologies are based on the theory that data obtained is dependent upon the questions use to solicit the answer. Attempts to get participants to define the term meaningful required question that elicited answers related to emotions, experiences, perception and knowledge. Patton's topologies reflect the themes including questions related to:

- Experience and behavior that elicit what respondents do or have done;
- How respondents think about their behaviors and experiences;
- How they emotionally react or feel about their experiences and opinions;
- What respondents know about reflective learning;
- Background and demographic information.

The interview questions focus on these issues to gain and understanding of what and how the participants viewed the reflective learning. Based on this topology the questionnaire was designed to find out about participants experiences and behaviors, opinions and values, feeling about their experiences and opinions, knowledge, description and demographic as presented in appendix 1. Careful consideration was

taken to avoid leading questions to ensure that answers were not reflective of what the participant thought was the right answer.

3.5 Data Analysis Techniques

Data collected from the questionnaires were analyzed and tabulated using frequency and percentages. Data were analyzed according to the criteria set for evaluation. Obtained data from the content analysis of the weblogs, interviews, and forums were analyzed in a manner that allowed the researcher to respond to the research questions posed in this study. Finally, data collected from these instruments were triangulated and interpreted. This was to reduce the chance of systematic bias and enhance the reliability and validity of the findings for this study.

3.6 System Development Methodology

The system methodology was chosen for the design was the waterfall model with prototyping. The main reason on choosing this model is system can change at earlier stage if it does not comply with what expected. Besides, it also helps developer to lie out project planning before the design is made and to get the high level view of the system.

As the primary goal of modified waterfall model approach is rapid development, the design of the system can sometimes suffer. This can be attributed to the fact that the system is built in a series of layers without a global consideration of the integration of all other components. The prototyping method helps to gain users' requirements from the users and waterfall model support interactive design.

The modified waterfall uses the same phases as the pure waterfall, but is not applied on a discontinuous basis. This enables the phases to overlap when necessary.

Prototyping uses multiple iterations of requirements gathering and analysis, design and prototype development. After each iteration, the result is analyzed by the customer. Their response creates the next level of requirements and defines the next iteration. This causes the customers to access steady progress. Also, it is useful when requirements are changing rapidly, when the customer is reluctant to commit to a set of requirements, or when no one fully understands the application area.

In development of this project, the waterfall model served as the base for the whole development. This is because; the steps in it are very similar to the generic steps of software development process that are applicable to all software engineering paradigms. It also provides the template in which each method of analysis, design, coding, testing and maintenance can be placed. Prototyping is on trying out and experimenting with ideas, elicit and experiment with user interface requirements and usability factors as well as providing assumptions about requirements not on system completeness. It is not feasible for developers to journey through the entire waterfall model to make enhancement. The Water fall model with prototyping is shown in Figure 3.2.

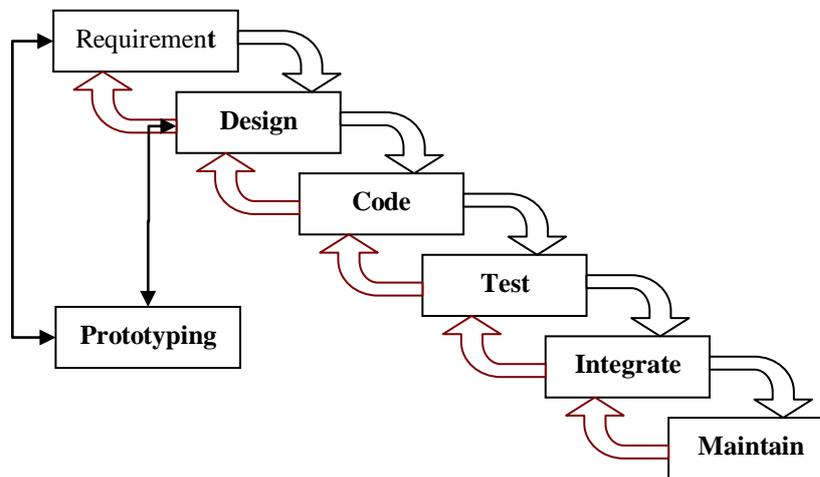


Figure 3.2
Water fall model with prototyping

The principal stages of the model map which shows the fundamental development activities are as follow:

3.6.1 Requirements

The functional requirements, constraints and goals of the reflective learning were established from the survey in literature review. More user requirements were noted through observation.

3.6.2 Design

The design process partitions the requirement to either hardware or software system. It establishes overall system architecture. Software design involves representing the software functions in to one or more executable programs.

3.6.3 Coding

During this stage, reflective learning is realized as a set of programs or program unit.

3.6.4 Testing

The individual program units or programs are integrated and tested as a complete website to ensure that the software requirements have been met.

3.6.5 Evaluation

The evaluation part in the water fall model consists of two parts including integration and maintenance. Basically this is the longest life cycle phase. The system is put in to practical use which covers the integration part. In the integration part all the substances of the system should accompany too evaluate the progress. Maintenance involves correcting errors which were not discovered in the early stages of the life cycle and improving the implementation of system units. These 2 phases show that whether the process used to determine the system or its components is suitable for operational use and satisfies specified requirements.