Chapter Three - Survey and Data Analysis

3.1 Introduction

In this chapter, the researcher will discuss the survey methodologies applied for data collection, followed by design of the survey, and the pilot test. Finally, the researcher will analyze the data collected from IT organizations, universities and colleges.

3.2 Survey Methodologies

The researcher administered questionnaires to lecturers and students in some colleges and universities in Malaysia. The researcher spent about one month to distribute the questionnaires randomly and collect the questionnaires from colleges and universities. The target lecturers were those teaching some subjects that involve using CASE tools such as System Analysis and Design, Software Engineering and Object-Oriented Techniques. The researcher went to most of the public universities and many private colleges around Kuala Lumpur and Selangor and distributed a hundred and twenty-one questionnaires personally among eight public universities as shown in Figure 3.1. The researcher also sent E-Mails to lecturers in USM and UMS because the two universities are not located around KL.

![Figure 3.1: Total Questionnaires Distributed among Public Universities](image-url)
The researcher distributed questionnaires among private universities and colleges as shown in Figure 3.2. One hundred and twenty-one copies were distributed to lecturers.

![Figure 3.2 Total Questionnaires Distributed among Private Universities and Colleges](image)

In order to get good response, usually before distributing the questionnaires, the researcher sent e-mails to them with the softcopy of the questionnaire. Then the researcher made appointments with them and distributed the printed questionnaires to them and some lecturers asked for a softcopy rather than hardcopy of questionnaires. The researcher distributed about two hundred questionnaires among colleges and universities. However, the researcher only got fifty-three completed sets back. The questionnaires covered the following areas:

1) Background and experiences of lecturers

These questions ask about the lecturer’s experience in teaching certain subjects.
2) Some subjects taught that include CASE tools
   These questions are to define how much experience the lectures have in the subjects they teach using CASE tools.

3) Awareness of teaching CASE tools
   The question is about the lecturer’s exposure to CASE tools.

4) The time spent on teaching CASE tools for each subject

5) The lecturers were asked about the teaching time for each subject related with CASE tools.

6) Ease of teaching CASE tools

7) The lecturers were asked about how the lecturers feel about teaching the CASE tools.

8) Having sufficient time and infrastructure for teaching CASE tools
   These questions are to define whether the time and infrastructure are adequate for teaching CASE tools.

9) Problems faced in teaching CASE tools and suggestions to improve student’s skills in CASE tools
   These questions are to investigate the issues and problems faced by lecturers during the time they teach the subjects that involve the use of CASE tools.

The target students include degree students and masters students in public universities and private educational colleges. The researcher sent out the questionnaires to students from UM, APIIT, KDU, SYSTEMATIC. The questionnaires covered the following areas:
1) Understanding on the background of CASE tools and methodologies

These questions are to investigate the students’ level of understanding of CASE tools concepts and methodologies. From the answers given by the students, the researcher can know whether the students have solid fundamental knowledge about using CASE tools and methodologies.

2) Usage of CASE tools to these students

These questions are to ask the students on type of tools they are using, and which features they use.

3) Kinds of CASE tools being used in their colleges and universities

This question is to ask the students to give the name of CASE tools used in colleges and universities.

4) Feedback from students

By asking this question, the researcher will be able to get students’ responses such as the acceptance of CASE tools, the benefits of using CASE tools and the problems in using CASE tools.

3.3 Design of Survey

Section A describes the survey results for IT organizations. The researcher sent eighty request letters for interviews. Twenty-five companies agreed to participate in the interviews. The researcher spent about one hour to conduct an interview in each IT organization. There were fourteen questions to be asked and these questions covered all research objectives. Through interviewing the IT professionals, the researcher got a better understanding of the kind of CASE tools utilized in Malaysia.
Section B describes the survey results for students. The students are either from public universities or private colleges. There were eighteen questions to be asked to the students. These questions try to find out all the objectives described in chapter one.

Section C describes the survey results for lecturers in universities and colleges. The researcher estimated the sample size in each university or college, and tried to cover all target people. There were thirteen questions to be asked. These questions covered many areas that were required for the research objectives in chapter one.

The researcher used the SPSS tool to analyze the data. The version of SPSS is 9.0 for Windows. It was used to create the frequency information as well as the charts.

3.4 Pilot Test for the Surveys

Before the administering the survey, the researcher did pilot tests with selected lecturers and students. The researcher gave five sets of questions to lecturers, and asked them give feedback about the survey. One of the lecturers from UM pointed out a problem on how the period of teaching CASE tools was to be defined. Five students were involved in the pilot test. The majority of the students agreed on the format of the survey. Two masters students from UM suggested giving specific names of the products of CASE tools.

3.5 Analysis of Data

Section A: Findings from IT organizations

The researcher interviewed twenty-five organizations for the research. After interviewing these organizations, the researcher found some facts for using CASE tools in software development. The facts covered most of problems and issues faced by IT organizations. All the interview questions are discussed below:
Responses for question 1: What is your organization’s main business?

![Pie chart showing percentages of sectors](image)

**Figure 3.3: Percentages of Sectors**

Figure 3.3 shows that over 80% of IT organizations are software companies. The rest of IT organizations are from banking, education and insurance.

Responses for question 2: Could you describe the level of computerization in your organization in detail?

The interviewees described that these companies are highly computerized. They further described that 90% of jobs is processed by using computers.
Responses for question 3: How about the utilization of CASE tools in your organization?

These companies used different kinds of CASE tools for different purposes in software development phases. Mr. Darren Heng, Senior System Analyst in Ingenuity MicroSystems, explained that his company used Visio Professional for design and reverse engineering and also developed a tool named Test CASE and Bugs Log for testing purposes.

![Figure 3.4: Tools Used in Software Development among these IT Organizations](image)

The IT organizations selected tools based on real situations in their companies. Figure 3.4 shows that the most often used tool is Visio Professional. Eleven out of fifty-three companies used Visio Professional; ten companies used RationalRose, and three companies used Microsoft Project. Therefore, the conclusion can be made that the Visio Professional and RationalRose are the commonly used CASE tools in IT organizations in this study.
Responses for question 4: What skills and ability in using CASE tools do you expect from a fresh IT graduate before entering your company?

Through interviewing the IT professionals, most of them said that as professionals, they expected that fresh graduates have basic skills in software development.

1) Know methodologies in software development

   Most of the interviewees pointed out that it is very important for fresh graduates to understand the system methodologies. For example, they must know SDLC in software development. If the students do not know the SDLC, they would have no idea about each step in SDLC.

2) Know how to use CASE tools in real business

   Some interviewees said that fresh graduates should know how to use CASE tools like RationalRose. Mr. Cheah, Senior System Analyst in eGENTING, explained that if the students knew how to use CASE tools, the students would be competitive and could handle more work and tasks with minimum training for using CASE tools. Only a few interviewees said that they did not expect too much from fresh students since they just left school and they did not know much about real business.

3) In-depth understanding of UML and software modeling

   Some interviewees pointed out that the students should know UML, and be able to design simple models because UML is becoming very important for communication among team members. Having knowledge in Software modeling is very necessary for IT graduates. Mr. Cheah, Senior System Analyst in eGENTING, said that students should know the models in software development. For example in eGENTING, they usually use RationalRose to
design database first. Therefore, the students must know UML as it is used to represent the models.

From the IT professional’s comments, the researcher concluded that SDLC, usage of CASE tool and UML are very important skills for the student.

**Responses for question 5: Do you think that the vendor can provide adequate training for using a CASE tool after your company bought the CASE tool?**

More than 84% of respondents agreed that the vendors provided enough training. However, 16% of interviewees said that the vendors did not give enough help to customers. The data is showed in Figure 3.5.

![Figure 3.5: Percentage of Respondent for Vendor Training](image)

The interviewees further explained that it depended on the skill level of users. If the users are new to CASE tools, then the vendor training is enough for basic level. However, if the users are in intermediate or advanced level of using the CASE tools, then the vendors cannot give much help to them because they expect much more knowledge in real business than using the basic features. The rest of interviewees agreed that the vendors did not give sufficient support for using CASE tools. One of the reasons is that the vendors
only gave few examples of using the features of the CASE tools, and these examples were not really relevant to real business situations. Another reason is that most projects are team-based projects. Before starting a project, the team must make sure that all members in this team must know how to use the CASE tools. Sometimes, a company sends one or two staffs for training, and the rest of the staff did not get the opportunity to learn the tools. They will have different understanding about the CASE tools in this team, and eventually they will have a gap within them. With regards to vendor training, it can be concluded that the vendors provide sufficient basic training for IT professionals.

Responses for question 6: How long will employees spend on learning how to use a CASE tool?

Most of the interviewees said that one or two weeks were enough to learn the CASE tools. The time required for learning CASE tools depends on staff’s experience in using the CASE tools.

Responses for question 7: Do you think that the universities and colleges are teaching students the CASE tools that the industry requires?

Figure 3.6: Agreement of Educators Providing Courses Using CASE Tools
The data in Figure 3.6 shows that 68% of the interviewees said that educators should provide some courses using CASE tools whilst 32% of the interviewees said that the educators did not really need to offer any subjects using the CASE tools. From the above, most interviewees felt that educators should teach and encourage students to learn the CASE tools. They advised lecturers to give more projects and assignments, which closely resembles the real world, and not just theory-based. The lecturers should teach the students the principles of using the CASE tools, and not just how to draw diagrams. The researcher concluded that most IT professionals agreed that it is really necessary to teach CASE tools for students in colleges and universities.

**Responses for question 8: Do you think that it is necessary to use CASE tools to develop software?**

![Figure 3.7: Necessity of Using CASE Tools](image)

According to the interviews as shown in Figure 3.7, 92% of companies agreed that using CASE tools is very necessary. They listed out some benefits of using CASE tools. CASE tools could promote better communication among a team; CASE tools enforced standardization on software development. Only 8% of interviewees said that it is not really
necessary to use CASE tools in software development. They argued that the cost of using CASE tools would be a burden for companies since the costs of CASE tools are very high.

Responses for question 9: what are the main purposes of using CASE tools in software development?

After the interviews, the researcher found that the main purposes of using CASE tools were: visualization of applications, analysis of risks, cost estimation of projects and documentation. Some companies used CASE tools in the design stage and to draw diagrams. They did not use the full features of CASE tools.

Responses for question 10: Do you think there will be a growing trend of CASE tools utilizing in IT organizations in future?

Over 90% of the interviewees believed that there would be a growing trend in the use of CASE tools in IT organizations but this would take time. The majority of the interviewees agreed that obstacles of using CASE tools were the cost and complexity of the CASE tools. Some big companies experienced the benefits of using the CASE tools, so they do believe that there will be a growing trend of using CASE tools. Mr. Tengku Omar, Analyst Programmer in Teras Teknology Sdn Bhd, has been using RationalRose for few years. He explained that some designs could be re-used for other projects and it would be easy to manage the documentation. This would speed up the development process. He is very confident that the use of CASE Tools will increase significantly in the future.
Responses for question 11: Do you think it is very important that companies send their employees to get training for using the CASE tools?

More than half of the interviewees said that it was necessary that companies should send employees for training. However, they also said that the training period was too short for the students to master the CASE Tools.

Responses for question 12: In your opinion, what benefits can be obtained from using CASE tools?

Most of the interviewees strongly agreed that they obtained much benefit from using CASE tools. The tools helped them to generate documentation, improve communication within team members and promote knowledge sharing in their working places. Mr. Kan Chow Keat, Technical Consultant of Silverlake System Sdn. Bhd. added that the CASE tools could help the management to measure the maturity of software development in his company. He gave an example of how RationalRose enforces developers to follow certain standards.

Responses for question 13: What are the problems and issues in CASE tools’ utilization that needs to be considered if you want to use CASE tools?

Interviewees have some problems and issues in using CASE tools. The main problems are:

1) Cost of CASE tools

The cost of CASE tools is a big problem in implementing the CASE tools. The companies could not afford the tools. They did not invest on it with a big amount of money. They were interested in seeing reliable or tangible results.
2) Complexity of CASE tools

Most of the interviewees agreed that the complexity of tools is an issue for developers. They felt the interfaces of the tools and some terms in CASE tools are quite difficult to understand. They hoped that the tools would have better interface designs in future.

3) Integration with different tools

According to Mr. Zarrella, “Some vendors have developed import/export tools extensions to deal with the problems of data dictionaries that could not be shared by different tools or among multiple users”. Integration with different tools is a problem. Some companies used different tools for different purposes. Mr. Kan Chow Keat suggested that there should be more consolidated CASE environments instead of too many specific purpose independent CASE tools, which did not provide an integrated environment. In such CASE environment, the tools could not be fully utilized and maybe have negative effects in software development.

Responses for question 14: What are your suggestions on promoting the usage of CASE tools?

To promote the usage of CASE tools, some interviewees suggested using Open-Source tools in the work place and thereby improve the utilization of CASE tools in organizations. Mr. Kelvin Yap explained that using Open-source tools would significantly reduce the cost of the tools as Open-source tools are free. The management should realize the benefits of using the tools on long-term, and not on short-term because implementing the CASE tools takes longer time. Probably, after implementing for two or three years, the management would be able to see the benefits of using the tools.