Section B: Findings from students’ survey

There are two parts in section B. Part one deals with the background of the students. Part two covers the use of CASE tools in their colleges and universities. Areas to be discussed include background of respondents, relevant subjects, the CASE tools applied in subjects, sufficiency of facilities and guidance, ease of using the CASE tools, time, and purposes of using the CASE tools and factors affecting the use of CASE tools.

Fifty students were involved in the survey. Figure 3.8 shows that the students were from six different universities and colleges. Sixteen students were from UM. One student was from UTM; ten were from APIIT; thirteen were from KDU; and three were from SYSTEMATIC. Seven students did not indicate the college or university they were from.

![Figure 3.8: Total Respondents from Universities and Colleges](image)

Figure 3.8: Total Respondents from Universities and Colleges
Responses for question 1: Are you a degree student or masters student?

![Pie chart showing the distribution of students among degree and masters students.](image)

**Figure 3.9: Levels of Students**

Figure 3.9 shows that thirty-three out of fifty participants were degree students, and seventeen were master students.

Responses for question 2: What subjects have you studied before?

![Bar chart showing the frequency of subjects studied by students.](image)

**Figure 3.10: Subjects Learnt by Students**

To give more CASE tools knowledge to IT students, many educational institutions offered subjects that involved the use of CASE tools. In this survey, the researcher wanted to
know what subjects the students learned. The researcher found that forty-five students have learnt OOT, forty-three students have learnt SAD, and only thirteen students have learnt User Requirements Engineering. Twenty out of fifty students learned Software Engineering. From the responses to this question the researcher concluded that most of the students have a basic understanding of OOT and SAD.

Responses for question 3: How well do you know the System Development Life Cycle (SDLC)?

![Figure 3.11: Knowing SDLC](image)

SDLC is a very important and common methodology in software development. IT students should have strong knowledge in SDLC. Figure3.11 shows that 98% of the students had different levels of knowledge in SDLC. Thirty percent of the respondents knew SDLC well. Eighteen percent of the respondents knew SDLC very much. Forty percent of the respondents knew SDLC much. Ten percent of the respondents knew only a little. Only 2% of students did not know SDLC at all. Therefore, conclusion is that most students knew SDLC.
Responses for question 4: How often do you use SDLC in your projects or assignments?

![Bar chart showing frequency of using SDLC](image)

**Figure 3.12: Frequency of Using SDLC**

To get a better understanding of SDLC, students must apply SDLC in their projects or assignments frequently. Figure 3.12 shows that seventeen students used SDLC in their assignments sometimes. Out of fifty students, twelve used SDLC often; seven used SDLC very often; nine seldom used SDLC; and five did not use SDLC at all. The finding of this question is that majority of students knew SDLC and fully applied SDLC in their assignments.

Responses for question 5: Are you familiar with Object-oriented Techniques?

![Bar chart showing degree of familiarity with OOT](image)

**Figure 3.13: Familiarity of OOT**
Figure 3.13 indicates that twenty-eight students out of fifty are familiar with OOT. Eleven students are very familiar with OOT. One student has extensive knowledge in OOT. Four students are familiar with little knowledge and six students out of fifty are not familiar with OOT at all. The conclusion is that the majority of respondents are familiar with OOT.

Responses for question 6: Did you learn how to use CASE tools?

![Pie chart showing 88% Yes and 12% No]

Figure 3.14: Whether Learnt CASE Tools Before

With reference to Figure 3.14, the researcher found that 88% of students said that they learned CASE tools before, and 12% of students did not. Therefore, most of the students have learned CASE tools before.
Responses for question 7: Do you think CASE tools are really useful to help you improve your skills in software development?

![Figure 3.15: Degree of Help in Improving Software Skill](image)

Figure 3.15 shows that nineteen students out of fifty felt that CASE tools could help them to improve software skills. Seventeen students felt that they could get much help for software skills. Six students felt that they got significant help. Four students felt they got little help in software skills and four students obtained a little help in software skills. The researcher concluded that most of them felt that CASE tools were helpful in improving software skills.
Responses for question 8: Which of the CASE tools have you learnt?

CASE tools must be applied in subjects teaching. Different subjects maybe used different tools.

![Bar chart showing students' use of RationalRose for different subjects](chart.png)

**Figure 3.16: Subjects Learnt Using RationalRose**

RationalRose is a very common tool. Figure 3.16 shows that out of fifty students, twenty-eight learned SAD using RationalRose. Twelve students learned Method of System Development using RationalRose. Two students learnt Software Engineering using RationalRose. One of the students did not indicate whether he/she used RationalRose. The researcher concluded that RationalRose is commonly used in SAD.
Figure 3.17: Subjects Learnt Using SystemArchitect

Figure 3.17 shows that there were nine students who learned SAD using SystemArchitect. Thirty-eight students did not use SystemArchitect at all. Nine students out of fifty learnt SAD using SystemArchitect.

Figure 3.18: Subjects Learnt Using Other Tools

Figure 3.18 shows that some other tools were used in teaching. Three students out of fifty used Visual paradigm to learn OOT. One used Together to learn OOT and one respondent used ERWin to learn SAD. One respondent used CASE diagram to learn Computer Programming. These tools were rarely used in the learning environment. Most of students did not specify the selection. The researcher concluded that most of the students used RationalRose and SystemArchitect in SAD.
Responses for question 9: Do you think your university or college provides sufficient facilities to use CASE tools?

Figure 3.19: Sufficiency of Facilities

Figure 3.19 shows that 42% respondents said that the facilities were not sufficient. 14% respondents agreed that the facilities were not sufficient at all. 28% respondents commented that the facilities were sufficient. 14% respondents said that the facilities were very sufficient. Only 2% respondent said that the facilities were extremely sufficient. Therefore, the results of this finding is that only 44% respondents agreed that the facilities are sufficient and more than 56% respondents indicated that the facilities are not sufficient for students to learn the CASE tools. The conclusion in this question is that the facilities are not sufficient for student’s learning.

Responses for question 10: How do you find learning to use the following CASE tools?

Ease of using CASE tools is very important for students to master the CASE tools. In this question, the researcher wanted to find out which tool was the easiest to use.
Figure 3.20: Degree of Ease of Using RationalRose and SystemArchitect

Figure 3.20 shows that thirty-six respondents evaluated RationalRose and fourteen respondents did not evaluate RationalRose. Among thirty-six respondents, twenty-six respondents said that RationalRose is fairly easy to use for their studies. Eighty-one percent of the respondents felt that RationalRose was fairly easy to use. Eighteen respondents participated in the evaluation of SystemArchitect. Out of these, ten respondents commented that SystemArchitect is fairly easy to use. Generally, RationalRose is more acceptable than SystemArchitect in terms of the degree of the ease of use.
Figure 3.21 shows some other tools used by students. Out of fifty students, three said that it is fairly easy to use Together. One of the students said that ERWin is difficult to use. Three of the students said that ERWin is fairly easy to use. Two students said that Visual paradigm is fairly easy to use. Compared with Rational and SystemArchitect, the conclusion is that the main tools that are accepted by students are RationalRose and SystemArchitect.

Responses for question 11: How long did you spend learning the CASE tools?

There are two sub-questions in this question for each CASE tool. One was to ask students how many hours they actually spent and another one was to ask how many hours they thought they should have spent.
Figure 3.22 shows there were seventeen respondents who did not specify any values, which probably means they did not use RationalRose in their studies. More than thirty-three respondents used RationalRose in their studies. Eight students spent three hours each learning RationalRose. Three students or fewer than three students spent between one to sixty hours each to study RationalRose. Figure 3.22 shows that the majority of the students did not define a general duration of learning the CASE tools. From this figure, the possible explanation is that the students did not know how many hours they spent learning the CASE tools.
Regarding the hours expected in learning RationalRose, there were many students who spent different hours as shown in Figure 3.23. Perhaps, because the students did not know how many hours they actually spent in RationalRose, they would not know how many hours they expected to spend. There is not much different between hours spent and hours spent in learning RationalRose.

Figure 3.23: Hours Expected in RationalRose

Figure 3.24: Hours Spent in SystemArchitect
Ten respondents said that they spent one or two hours learning SystemArchitect. Forty students did not learn SystemArchitect. In Figure 3.24, forty students did not specify any time duration.

Probably, the respondents commonly used RationalRose rather than SystemArchitect. One student out of ten spent one hour to learn SystemArchitect. One of the students spent seventy-two hours to learn SystemArchitect. The similarity of the hours spent in RationalRose and SystemArchitect is that most students spent three or less than three hours to learn the two tools with wide ranges from one hour to seventy-two hours. The respondents were not sure how many hours they should spend learning the two tools.

In Figure 3.25, forty-one respondents did not specify any time duration. Only nine students had expectation on the time of learning SystemArchitect. The hours expected in SystemArchitect ranged from three hours to seventy hours. Compared to hours spent in SystemArchitect, the nine expected two or less than two hours to learn SystemArchitect. On the average, the time durations of learning SystemArchitect are comparatively short. Probably, the respondents felt that SystemArchitect is easy to use for them, and they did not need three hours to learn SystemArchitect. Regarding this question, the researcher found that only few respondents spent one or two hours learning RationalRose and SystemArchitect. Other respondents gave different time durations. Generally, the respondents did not really know how many hours they should spend learning the CASE tools.
Responses for question 12: So far, what can you do by using the CASE tools in your assignments?

CASE tools can be used for different purposes in software development. More than forty-four respondents out of fifty used the CASE tools to draw diagrams; twenty-six respondents used the CASE tools for the purposes of analyzing user requirements and generating code; twenty of them used the tools to generate documentations. One of the respondents specified the tools for other purpose. This respondent defined the purpose of
using the tools is to plan projects. From Figure 3.26, the researcher found that the respondents used the main functions of the CASE tools such as drawing diagrams, analyzing user requirements and generating code and documentation in software development process. According to a study done by Augustin (1999), more than 74.66% of companies used CASE tools to draw diagrams; more than 66.44% of companies used CASE tools for code generation and 76.71% of companies used CASE tools for documentation. In this study, 88% of respondents commented that the main purpose was to draw diagrams. 56% of respondents used CASE tools for analyzing user requirements and generating code. 20% of respondents used CASE tools for generating documentation. Basically, the purposes of using the CASE tools in this survey met the usage of the CASE tools in Software companies.

Responses for question 13: Do you think that your lecturers have given you sufficient guidance or assistance in using CASE tools?

![Figure 3.27: Sufficient Guidance](image)

In Figure 3.27, 20% of respondents said that the lecturer’s support was insufficient for learning CASE tools. 42% of respondents agreed that the lecturer’s support was not very
sufficient. 32% of students in this survey commented that the lecturer’s guidance was sufficient to teach CASE tools. Only 4% of respondents said that the lecturer’s support was very sufficient and 2% of respondents said that the lecturer’s guidance was extremely sufficient to teach CASE tools. The general finding is that 62% of respondents agreed the guidance was not sufficient and 38% of respondents said that the lecturers gave sufficient guidance in using CASE tools.

Responses for question 14: Please elaborate on your response to question 13.
Based on the result in Figure 3.27, the possible reasons are that lecturers did not give them much help in learning the CASE tools and the lecturers did not have experience in the CASE tools. Most of the respondents explained that lecturers did not give much help in using the CASE tools, and some lecturers did not have much knowledge in CASE tools.

Responses for question 15: In your opinion, what prerequisite knowledge is necessary before you learn how to use CASE tools?

Figure 3.28: the Necessary Knowledge for Learning CASE Tools
Learning CASE tools needs some knowledge from different areas. Generally, some subjects are required for students to learn CASE tools. In Figure 3.28, more than forty-three respondents out of fifty said that having the concept of OOT was the most important knowledge. Twenty-five respondents agreed that SDLC was a necessary subject to learn CASE tools. Sixteen respondents commented that knowledge on Software Engineering was necessary before learning the CASE tools. Only thirteen respondents said that Project Management was a necessary subject to learn the CASE tools. Generally the knowledge in OOT and SDLC followed by Software Engineering and Project Management were necessary for learning CASE tools.

Responses for question 16: What are the limitations you experienced in learning and using CASE tools in your university or college?

![Bar graph showing factors affecting learning CASE tools](image)

**Figure 3.29: Factors Affecting Learning CASE Tools**

Some factors affected the students on learning CASE tools. The researcher listed out some possible factors of using the CASE tools in universities and colleges. In Figure 3.29, more
than thirty-two of respondents said that they did not have enough time to learn the CASE tools. The respondents further said that the lecturers did not give much time to learn the CASE tools and there were no specified time periods in syllabuses. Twenty-six respondents agreed that there were no appropriate learning approaches to learn the CASE tools. Most of the respondents explained that the lecturers were not helpful. They further said that the lecturers gave assignments and projects to them, and asked them to learn the CASE tools themselves. Therefore, they had to learn themselves the use of CASE tools for completing their assignments and projects. Eventually, the students came out with too many versions of assignments and different diagrams with different notations. Most of the students did not know which one was right or most suitable in their assignments. Furthermore, the lecturers did not give back the assignments to them. The students did not know the results of assignments. Twenty-two respondents thought they spent too much time thinking how to draw diagrams. Subsequently, because respondents did not learn much about the CASE tools, they would spend much time trying out functions of the tools. The students would spend half an hour to find right the function for the basic diagrams. Thirteen students commented on the cost of CASE tools. Only eight respondents considered the factor of installation of CASE tools in PCs. Four respondents concerned about the complexity of the tools. Five respondents defined other reasons for limitation of using CASE tools. The researcher concluded based on the finding in Figure 3.29 more than half of the respondents have limitations such as time and learning approach.
Responses for question 17: Please elaborate on your responses to question 16.

Most of the respondents argued that they did not have enough time to learn CASE tools. Most of the students spent one hour per week learning CASE tools. Sometimes, there was inadequate time for the students to try CASE tools. Some students also explained that lecturers should give them right learning approaches.

Responses for question 18: What is your suggestion to improve the ease of learning CASE tools for you?

Most of the students in this study suggested that the lecturers should update themselves with CASE tools knowledge before teaching the students. They further said that there should be more PCs in labs and they should be given a longer time for mastering the CASE tools.