CHAPTER 5

Implementation

In order to implement the system, all tools, which are involved in the system development, must be considered. It is including the main tool for system development and other related tool, which can help to create additional features such as tool for image editing and so on.

5.1 System Development

5.1.1 Software Requirement

Asymetrix ToolBook version 5.0

The study was developed using Asymetrix ToolBook II version 5.0. Asymetrix ToolBook II is one of the multimedia authoring tool which has several benefit in order to fulfill the needs for ITSs development. It is a software construction set that can be used to develop window application. A Tool Book II has a features of windows application such as a graphical user interface, event driven programming and the ability to interact with other windows application but doesn't require the time and effort of using a language such as C or C++.

ToolBook II is an interactive environment for both creating and running applications. For example we can create a graphics, buttons, fields and so forth. To define how elements in the application behave, we use OpenScript, a ToolBook II's programming language. ToolBook II handles all the tasks of communicating with windows to display elements onscreen, detect mouse clicks and keystrokes, and so on.

ToolBook is easier and quicker. Therefore it is ideal for prototyping applications. ToolBook is suitable for develop many types of software such as for entertainment and for courseware

application. It will fulfill the needs of computer-assisted instruction (CAI) and gaining popularity not only in educational institutions, but also in corporate training centers. For education software, for example the model of CAI such as Drill-and-Practice software, simulation software, Tutorial software and game software can also be developed using this tool.

Adobe PhotoShop 5.0

Another tool, which is used in developing this prototype system, is Adobe PhotoShop 5.0 as a drawing tool and image or graphic editor. In creating multimedia software, images are an important thing in order to avoid a system looks like "dull". In addition, a system with a graphics and other multimedia elements will increase the interest of student to use the system. Adobe PhotoShop is able to edit some pictures by adding an effect such as color, which was taken from Internet and Microsoft Clipart.

The features include:

- Editable text for creating high-quality typography
- Enhanced color management
- Spot-color channels for incorporating specialty colors into print jobs

5.2 Uses of Student Model

Student model is used to adapt the tutor's responses at a number of levels:

5.2.1 Topic Selection

A topic that describes the problem types must be selected. The topic which is selected consist of the basic knowledge of vector calculation such as addition, subtraction and multiplication of vector and the use of vector in determining the velocity and direction of vector.

Firstly, the content was designed by putting the introduction of vector with the description of basic knowledge of vector such as magnitude and direction. This is useful in order to give student a general overview of what the vector is. Secondly, the main arithmetic calculation such as the rule of vector addition, subtraction and multiplication either in geometric or algebraic method. In this section, system will teach student the way to calculate vector by showing an example and graphic animation. Thirdly, the use of vector real world was presented by showing the graph of vector direction and velocity.

5.2.2 Problem Generation

Once a topic has been selected, a specific problem must be generated. The problems can be generated by examining the students' levels of proficiency on the selected topic and its sub skills. For student who have higher level of proficiency on the topic, they will have more sub skill to apply to solve the problem. For example, for those who already have knowledge about vector addition, there will be no problem with the vector direction of a triangle even if the direction has been changed.
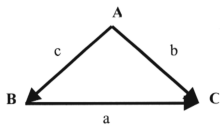

Figure 5.1: Triangle of Vector

Figure above shows vector of a triangle. For beginner, in order to get '**b**', there will be

$$c + a = b$$

But how about if they want to find a value of '**c**', may be some of them assumes that

$$b + a = c$$

The changing of vector direction will make them confused to visualize it. They didn't know or not aware that the changes of direction of '**a**' will lead the changes of '**a**' value i.e '**-a**'.

5.3 Applied Intelligent Tutor

An applied intelligent tutor is the simulation of domain knowledge and tutor for students. It is based in described shell and help student to interact with the system by choosing the units or contents of study. The main feature of multimedia system development is to provide an interaction between user and the system. This will allow a two-way communication rather than one-way communication, which will cause bored to the student. The examples are navigation button and hypertext. It will allow student to navigate to any page they want for example either they want to start with tutorial session first or jump to the question and answer session. It will save the time for those who are consider as an expert in vector.
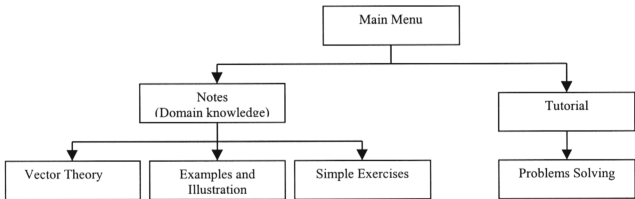
Figure 5.2: System Hierarchy

The hierarchy of the system is shown in Figure 5.2 above. The figure shows that system has been divided into two parts, which are Tutorial part and question part. In the tutorial part, the list of contents are provided with a hypertext 'facilities' in order to help student to go directly to the particular pages without navigate it page by page. This is useful for the student who has

been used the system more than once or the master who want to skip the topics which he expert most. The contents of tutorial are including the meaning of vector, vector arithmetic such as add, subtract and multiply and also the example of vector use in our real world such as how to calculate the velocity of two cars which are moving in the same direction.

In the problem solving part, questions are given to student in order to help them practice answering the question with the system guide. All of this part will be discussed in detail in Design Description.

5.4 System Description

5.4.1 System Feature

As stated in system's objectives in 1.2, system is trying to lead and give a guide to student to solve a vector problem. The main feature of this system is attempted to diagnose the answer given by the student. Besides of diagnosing, system also tries to give a guide and hint to student in order to give him a clue or main idea of what they have to do in the first step, second step and so on. In other words, the system will guide each step what the student have to do and control the answer with an immediate feedback either the answer is right or wrong.

System is intended to provide opportunity for practice. Student can use the system more than once in order to be more understand of the topic. The practice is provided in the form of two parts which one part in the tutorial session and another part is in the question session. In tutorial session, student can try to input the answer in order to let system draw the graph of vector direction. Besides that they can input the coordinates of x-axis and y-axis to let the system to calculate the velocity of vector and their direction.

In the question session, the practice can be done in answering a given question with a provided hints and tutors. Questions are started with the simple question, which can give student

familiarities to answer the questions. Student is not compulsory to answer all the given questions because as stated above, the aim of the system is to provide a practice tool for student. So that, they can answer the question which they prefer and can skip any question which is not interested to him. The other reason is that, system is not provided any assessment marks. A mark is trivial in this system because the system will guide a student to answer the question until he gets the correct answer. If the first step is incorrect, he can't go to the second step and so on. Thus, there is no incorrect answer and no mark is needed here.

The primary feature to distinguish between a tutor and a tester is that the tutor is not merely set a task for the student and simply register whether the student did or did not perform correctly. A tutor leads the student to discover the correct answer. If there are any mistakes done by the student, the system gives an appropriate feedback on any mistakes so the student can try to correct them.

5.4.2 Design description

As mentioned in 5.1.1, VECITS was developed using Asymetrix ToolBook II with the supported tool for drawing graphic, Adobe PhotoShop 5.0. The system was developed with the various types of features, which can help student to navigate and use the system successfully.

Button

Button provided in the system could be divided in to three functions, which are

1) Navigation Button

Figure 5.3 : Navigation Button

Figure above shows the navigation button for student used either to navigate to the next page or previous page. There are four types of button which provides here where, the first button means that student may go to the first page of system, the second button means student may go to the previous page, the third button means student may go the next page and the forth button means student may go the last page of the system. The details are shown in the appendix.

2) Hint and Note Button

Hint and Note button is used for student to get help in case they need some clue in order to solve a given problem. Hint and Note button already shows in Figure 3.9 and Figure 3.11. The Hint button is used for student to get a clue of how to solve a given problem. Note button is used for student to refer to a particular page which is related to the given problem. The pop-up screen will be shown after the student click these buttons. Figure 3.10 and Figure 3.12 shows the pop-up screen for Hint and Note buttons.

3) Tutor Button

Tutor button is used for student to get help of what they have to do in each step. It is provided at each level together with the answer field for student to enter his answer and only activated when it is requested by him. It is hidden when it reaches at the next level. Figure below shows the Tutor button, which is provided in VECITS.

<div align="center">

Tutor

</div>

Figure 5.4: Tutor button
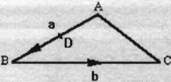
Step by Step Guideline

Step-by-step guideline used to help student get an idea of what they should do and how to do it. The guideline is provided until students get a correct answer. System will not allow student go to the next step if the stages in each step is incorrect. Student may get the response either

the answer is correct or not by pressing 'enter' key. If the answer is correct, student may press 'tab' key to go to the next step. Figure below shows the example of step-by-step guideline in VECITS.


Figure 5.5: Incorrect feedback at the middle of step.

Figure 5.5 shows step-by-step answers which having done by student. We can see that for the first four steps, student gives the correct answers. So that the correct answers is automatically deactivated in order to avoid any changes or corrections and the tutor button is hidden. At the fifth step, student did a wrong answer. A pop-up message appears to tell the answer is incorrect and why it is incorrect. Thus, from this message, student will know why the answer is incorrect and may get some idea to solve it.

Figure 5.6: A final answer with acknowledgement
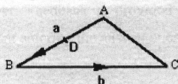
Figure 5.6 above shows the final step with the correct answer. If the system detect the correct answer at the final step, a pop-up message will congratulated and tells student that he had finished answering the question. So that student may continue answering the next question by pressing the navigation button.

5.5 System Strength

5.5.1 Feedback

Feedback is important to acknowledge student either their answer is correct or wrong. Student will know that currently they are doing a wrong job and this will guide them to put a correct answer. Feedback is provided using a pop-up message, which appear automatically after student entering the answer at each step.

5.5.2 Animation

In VECITS, animation is used for describing the direction of arrow and the calculation of velocity of vector. Using animation will help to attract student attention and can also show the flow of how vector calculation is made step by step. Another animation used to describe the relativity of velocity is showing the movement of car in the same direction and in the different direction.

5.5.3 Help Button

Help button, which is, includes in this system likes Hint, Note and Tutor button. The advantage of these help button is to help and guide student to solve the problem.

5.5.4 Guideline

In contrast with traditional CAI system, ITS provide a guideline for student to solve the problem. It is including give a response of the answer either the answer is correct or not and if

the incorrect answer was detected, system will response of what type of error it is and how to solve it.

5.5.5 No Assessment

VECITS is not providing any assessment methods because the aim of the system is to be like a tutor. The system will guide the student to solve the problem until he gets the right answer. Thus, at the end of the session, there is no incorrect answer has been done.

5.6 System Weakness

5.6.1 Spacing Detection

During answering the question, student cannot input the answer with spacing between the answer. For example if student would like to input 'a + b', they have to put it as 'a+b'. If not system will detect it as an incorrect answer. This statement is already told at the top of the answer's field.