TITLE : THE EFFECTIVENESS IN USING PACKET TRACER SIMULATION SOFTWARE IN IMPROVING THE SKILLS AMONG COMPUTER SYSTEM AND NETWORKS PROGRAMME STUDENTS

1st Author
Mohd Aznan Bin Janal[1]
Kolej Komuniti Jasin
60127553570
aznan_kktj@yahoo.com.my

2nd Author
Zarulrizam Bin Ab. Jalil[2]
Kolej Komuniti Segamat 2
60137684300
zarulrizam@yahoo.com

3rd Author
Zaini Bin Ahmad[3]
Kolej Komuniti Jasin
60196262240
zainiahmad25@yahoo.com

Abstract

Simulation is an abstract description of a situation or the actual situation with the help of visual technology to solve a problem or issue. Research was being done from the teaching and learning (PdP) sessions in Computer Systems and Networks Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College focuses on Network Administration course. According to the syllabus, students need to generate network design plan using a proper software identified by their lecturer. Lecturers at Jasin Community College, Selandar Community College and Masjid Tanah Community College chose to use Packet Tracer version 7.0 simulation software in the classroom, where students are not only able to produce a visual sketch plan network design in detail according to the network connection as in true event but students can also insert network hardware such as computers, switches and routers in the design plan and perform computer configuration using Command Line Interface (CLI). The purpose of this survey is to examine the effectiveness in using Packet Tracer simulation software version 7.0 in improving the skills of students in teaching and learning (PdP) sessions. The sample consisted of fourty students from 3rd semester Computer Systems and Networking Programme. The results were obtained using a questionnaire and analyzed using descriptive and inferential statistics. The results showed that the respondents agree that the use of Packet Tracer software version 7.0 helps improve students' skills in the process of teaching and learning (PdP) for Network Administration course focuses Community College in Melaka.

Keywords: Software Packet Tracer 7.0, PdP, student skills

1.   Introduction

Network administration is one of the courses offered in 3rd semester for Computer Systems and Networks programme. Students need to design a network in target to produce a complete network design plan using sketches and computer software. The process of teaching and learning (PdP) for the course is to create a complete and detail network plan using a computerized simulation software Packet Tracer version 7.0. Softwares are used to attract students in visualization network plan without the need to use real equipment. Attractive interface, clear and user-friendly software makes it easy to use Packet Tracer (Figure 1). This statement is supported by Krulik & Weise [9] which states that learning is more effective when students are interested in what you do and this will motivate students so diligently to achieve anything for itself.

Various types of computerized simulation software and free can be used for such purposes. Lecturer of Computer Systems and Networks programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College decided to use Packet Tracer simulation software version 7.0 because students can produce a complete network design plan and implement network hardware configuration such as switches and routers. This software allows students to practice configuration and network design simulation without the need to use the real devices that costly thus saving operating costs for Jasin Community College, Selandar Community College and Masjid Tanah Community College. This software is used to engage students and increase student proficiency, especially in terms of flexibility, interactive and self-paced learning style by Thomas [16]. Simulations have been shown to act as a catalyst to enhance the potential of students through the process of delivering content for formal education [1], stimulating active learning students by Dori & Belcher, [4], to prepare students to apply learning, skills and knowledge they have learned by Gredler [6] even simulation is able to provide an understanding of the content of the abstract learning in the classroom by Janitor, Jakab, and Kniewald, [8]. The use of this kind of simulation software in hope to help improve the process of teaching and learning (PdP) in classroom, especially at Jasin Community College, Selandar Community College and Masjid Tanah Community College.

Although the use of simulation software in the market is now increasingly used and expanded rapidly, the effectiveness of the software is very subjective. The effectiveness of such a simulation-aided learning is not only dependent on the design of simulation it alone, but also based on the implementation of the simulation itself (Bell & Smetana,[3]. However, for skilled and competent using Packet Tracer software version 7.0, the student should be focused and committed to practice using the instructions Command Line Interface (CLI). The functions available in the software simulation, Packet Tracer version 7.0 is a complete and meet the needs of network administration course syllabus topics.

2.   Literature Review

Azizan Abdul Razak Rashidi and Habib [12] states that computer assisted learning can provide advantages in planned teaching, individual teaching, teaching enrichment and remedial teaching. Through the planned teaching, teachers can build Programmes that are specially designed for the needs of students according to their level of knowledge and ability in

accordance with the intervals themselves. In the individual lessons, students are able to interact with your computer without feeling embarrassed or afraid to state their surroundings because they only involve computer environment and individual students. According to Amir Hasan [2], in a classroom, each individual has a psychological and intellectual abilities different from each other. Because the lesson is designed to be suitable, prepared (by the students) and supported with appropriate teaching aids to stimulate the development of individual potential to the maximum level. Teaching aids are important in teaching and education because they can stimulate interest in students to learn. Kulik, Bergert and William [10] studied the effectiveness of using computer-aided instruction to 48 students. The results of the study showed that 39 students who use computers have obtained higher scores than students who use traditional methods. The study also states that computer-aided teaching has the advantage of 0.5 percent compared with traditional learning methods. The study conducted by Lee Tien Tien and Kasimah Osman [15] found that the use of ICT in education brings many benefits in class especially in subjects based on various abstract concepts. The use of ICT is able to demonstrate abstract concepts visually and help students understand abstract concepts such as models, simulations, games, videos and browsing multimedia. Computers capable of creating a learning environment that helps students master abstract concepts through the use of multimedia such as animations and simulations. According to the findings Mathis, Smith and Hansen [11] on the students attitude of the Institution of Higher Education, it was found that the students have a positive attitude towards computer-aided teaching because students do not have difficulty in computer literacy and vice versa. They assume that the computer-aided teaching is better. Thus, the presence of multimedia in the teaching and learning (PdP) process are very useful. In another study shows the process of learning and teaching with computers can reduce most of the problems faced by students during the learning process by Hannaford [7]. The findings of his research found:

i. Students take a shorter time to learn something.
ii. Increase student focus on a given task.
iii. Students have a positive attitude towards the use of computers in the classroom.
iv. The computer does not restrict the creativity of students.
v. The computer successfully teach students who previously could not be taught and not interested in learning.

3.   Problem Statement

Students in 3rd semester Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College has the ability and potential to vary. Students who are smart will learn quickly in completing the training according to their level of understanding. Students who are weak tend to have difficulties in the some of the topics . The focus on learning methods that can help weak students and their interest should be implemented. Computer-aided method in teaching and learning (PdP) can be used to address the problem of students who have different abilities and potential.

Computer assisted learning can provide opportunities for students to learn and understand a scientific concept according to their own ability. According to Rashid [12], teaching and learning (PdP) process using computer can create a new learning environment

and healthy learning environment for students to enjoy. However, Rashid [12] stated the actual computer can not replace teachers in teaching and learning (PdP). The role of the teacher as a facilitator or mentors who are responsible for deploying and revives the discussion and exploration of knowledge among students. Students are required to interpret itself through the guidelines given by the teacher , Thomas [16]

Through the use of a variety computer aided tools nowadays , learning simulations will be interesting to create attention from the students in classroom. Therefore, it is the duty of a lecturer to use the appropriate tools to deliver a clear understanding of what students are learning. Ford [5], states that experience directly experienced by a person allows words and symbols to give meaning to it. An ingredient by itself can not produce any change in learning, but lecturers who are adept at using the material can give a lasting impression. He also noted that a skilled lecturer using teaching materials not only a painter who can create exciting teaching material but also is a painter who can understand individual differences. Students can also understand a concept clearly and precisely because they can see directly into the abstract matters.

4.   Objectives

The objectives of the study are as follows:

i.   Identify the level of student interest using Packet Tracer software in Network Administration course for Computer Systems and Networking Programme students at Jasin Community College, Selandar Community College and Masjid Tanah Community College

ii.   Identify the skill level of students using Packet Tracer software in Network Administration course for Computer Systems and Networking Programme students at Jasin Community College, Selandar Community College and Masjid Tanah Community College

iii.   Identify the effect of using Packet Tracer software in Network Administration course for Computer Systems and Networking Programme students at Jasin Community College, Selandar Community College and Masjid Tanah Community College

iv.   Identify gender differences in the effects of using Packet Tracer software in Network Administration course for Computer Systems and Networking Programme students at Jasin Community College, Selandar Community College and Masjid Tanah Community College

5.   Research Methodology

Descriptive and inferential methods are used in reviewing the sample surveys of the effectiveness in using Packet Tracer software to improve students' skills of Computer Systems and Networks Programme. According to Sabitha Marican [13], The questionnaire is a tool designed specifically to gather information for analytical purposes to be able to answer the research questions. Even Sherri L. Jackson [14] also said it is also an in-depth study of one or more individuals in the hope of revealing things that are true. The respondents are comprised

of 3rd semester student of Computer Systems and Networks Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College in total of 40 students. The sample was taken due to 3rd semester student of Computer Systems and Networking Programme is currently undergoing the Network Administration course which is using Packet Tracer software. Because this study in the form of social studies, the type of instrument chosen was a questionnaire designed by the researchers. The questionnaire has two parts: Part A contains information of respondents and Part B contains items on 3 aspects which were attitudes towards the use of Packet Tracer software, understanding of students using Packet Tracer software and compatibility of using Packet Tracer software. Likert scale was suitable to conduct this review. This is because the Likert scale allows researchers to control the feedback bias. This scale will declare Strongly Disagree, Disagree, Less Agree, Agree and Strongly Agree. Scale will be given starting from number 1 to 5 (refer Table 1). All respondents have filled in the questionnaire using google form after all the training and practice using Packet Tracer software were implemented. Descriptive statistics were used to obtain the mean using SPSS. In this study, researchers used the interpretation mean to answer questions using a questionnaire as an instrument to that question. Interpretation of the results from the questionnaire is in such analysis (refer Table 2).

6. The importance of research

The study only focused on the effectiveness of using Packet Tracer software in 3rd semester students taking Network Administration course for Computer Systems and Networks Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College. This study is concerned to:

i. Assessing the suitability and usability of the Packet Tracer software in teaching and learning (PdP) Network Administration courses.
ii. Producing highly skilled graduate student of Computer Systems and Networks Programme using Packet Tracer software.
iii. Assisting management of Jasin Community College, Selandar Community College and Masjid Tanah Community College in order to improve the effectiveness of teaching and learning (PdP) in Computer Systems and Networks Programme.

7. Research Scope

In carrying out this study, the researchers only focus on the scope of the study that were identified as follows:

i. The study focuses on the effective use of simulation software Packet Tracer version 7.0 towards students' interest and skills in Network Administration course.
ii. The study is conducted in three Community College in Melaka offering Computer Systems and Networks Programme which is Jasin Community College, Selandar Community College and Masjid Tanah Community College, focuses on 3rd semester students.

iii.   The study is quantitative, namely through the collection of data based on the questionnaire produced by the researcher.

8.   Results Findings

The discussion will revolve around the results of the study that were analyzed using SPSS. Items questions was formed by code to facilitate the process of analyzing. Data analysis was performed by descriptive and inferential that shows the level of interest, skills, and the effect of using Packet Tracer software and gender differences on the use of Packet Tracer software. The researchers found a total of 40 students selected sample consisted of 14 (35%) men and 26 (65%) women where they berkuturunan of Malays (87.5%), Chinese (5%), Indians (7.5%). As for the level of student interest in the use of software Packet Tracer on Network Administration course among students refer to item 1 (I enjoy learning using Packet Tracer) has a mean score the highest number of 4.18 which is at the level of a tendency to high, followed item 2 (My focus increased during learning) with a mean score of 4.15. While the lowest score was for item 5 (I'm easy to learn) with a mean score of 3.95. Overall the level of student interest in the use of the software on a Packet Tracer Network Administration courses among students is high tendency with a total value of 4.082 (Table 3). Referring to item 1 (easy for me to understand the topics studied) had the highest mean score of 4.10 which is at the high tendency, followed by items 3 (to improve performance) with a mean score of 3.95. While the lowest score was for item 4 (Facilitating me answer tests given) with a mean score of 3.50. Overall, the level of use of the software on a Packet Tracer Network Administration course among students is high tendency with a total value of 3.846 (Table 4). Referring to item 5 (It should be used by community college) have the highest mean score of 4.38 which is at the level of high-biased, followed item 2 (Suitable for teaching network configuration) with a mean score of 4.25. While the lowest score was for item 3 (Presenting the content of teaching effectively) with a mean score of 4.00. The overall level of the effects of using Packet Tracer software in Network Administration course among students is high tendency with a total value of 4.176 (Table 5).

9.   Analysis Inference

Analysis of T - test.

T test method is used to test the hypothesis that involves the difference between the mean scores for the development of the independent variables with the dependent variable towards motivation for Packet Tracer software usage among the sexes. T test was used to test the following hypothesis.

H01: There was no significant difference in the effect of using Packet Tracer software in Network Administration courses between male and female students for learning purposes. The results of t-test showed that this difference was not significant ($p > 0.05$).

Therefore, the null hypothesis that says that there was no significant difference on the impact of the use of software Packet Tracer on courses Network Administration among students in Computer Systems and Networks Programme at Jasin Community College, Selandar

Community College and Masjid Tanah Community College between boys and girls for the purpose of learning is rejected (Table 6) , The results of T-test indicated that they were no difference of gender impact on Packet Tracer simulation software usage in Network Administration course.

10.   Discussion

Overall, the level of usage in Packet Tracer simulation software among students of Computer Systems and Networks Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College are high. The result of the analysis shows that the level of student interest in using Packet Tracer software were high. Teaching aids is important in teaching and education because they can stimulate interest in students to learn. The results of the analysis made also indicates the level of use for Packet Tracer software were high. This fact is also supported by Kulik, Bergert and William [10], which examined the effectiveness of using computer-aided instruction to 48 students. The results of the study showed that 39 students who use computers have obtained higher scores than students who use traditional methods. Effects of Packet Tracer software use in the classroom also showed a high result. This assertion is supported by Hannaford [7] found that students take a shorter time to learn something, to add focus students on a given task, the students have a positive attitude towards the use of computers in the classroom, the computer does not restrict the creativity of students and computers would teach the earlier students can not learn and do not like to study. The results also shows that there is no significant difference on the effect of using Packet Tracer software on network administration course in the 3rd semester students of Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College between male and female students

11.   Conclusion

The results showed that the level of enthusiasm, skill and the effect of using Packet Tracer software for Network Administration course students is on a high level. Results from the analysis of a survey conducted found that the Packet Tracer software were practically used for students taking Network Administration Course. Teaching quality and practical sheet which is implemented in teaching and learning (PdP) is also an important foundation for the promotion for the use of this software. Therefore, it is important for the management to ensure that all lecturers who will be teaching this course is competent and proficient to use Packet Tracer software. This efforts will lead to highly skills students in developing network plans using software. Through this study, it was concluded that the students of Computer Systems and Networks Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College support the use of Packet Tracer software and they are positive about its effectiveness in the process of teaching and learning (PdP).

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Appendix
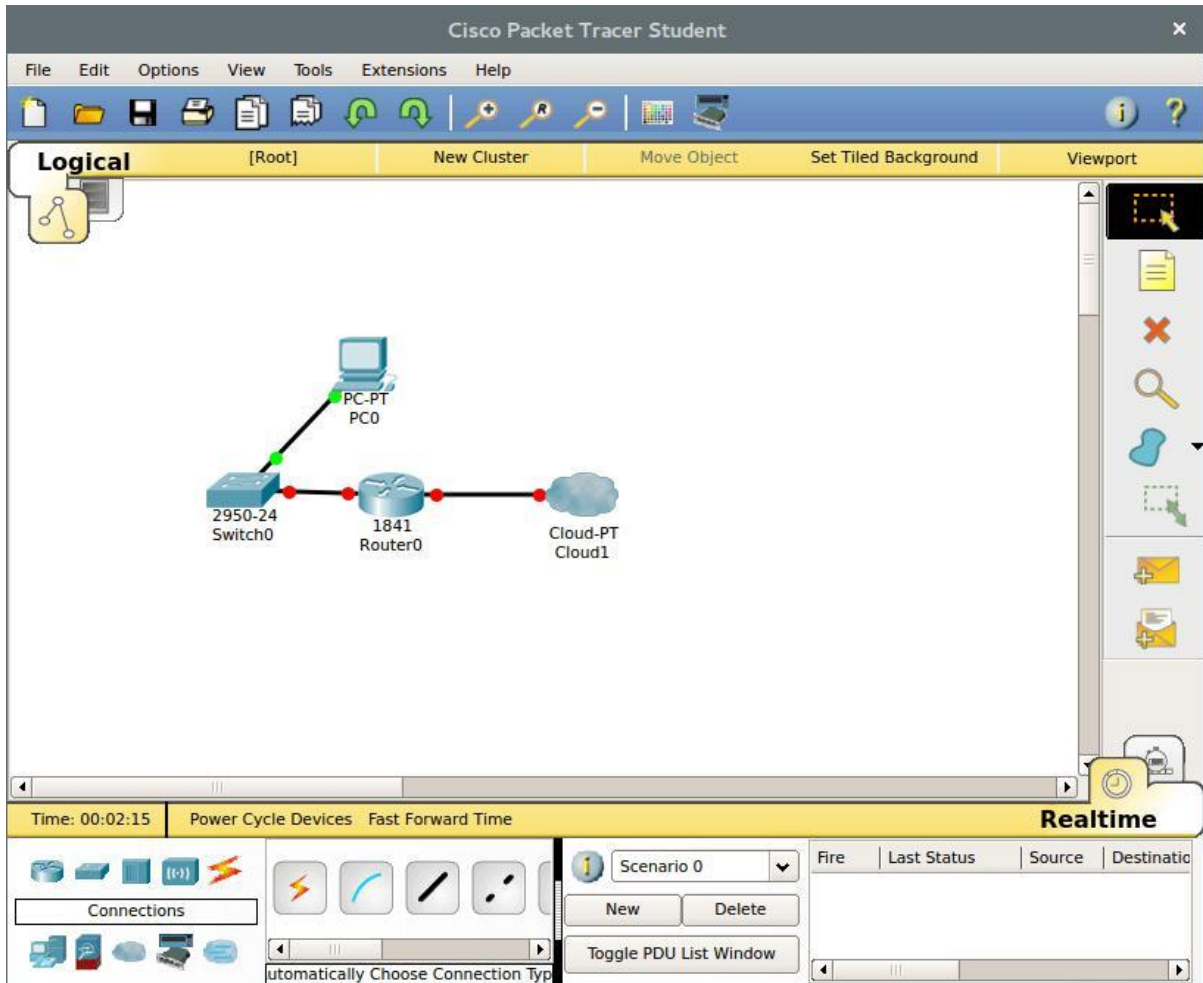
Diagram 1 : Packet Tracer software interface version 7.0

Table 1: Likert Scale

Scale	Interpretation
1	Strongly disagree
2	Disagree
3	Not sure
4	Agree
5	Strongly agree

Table 2: Interpretation of mean scores

Group	Range	Tendency level
1	1.00 – 2.33	Low
2	2.34 – 3.67	Medium
3	3.68 – 5.00	High

(Source: from Landell, 1997)

Table 3: Levels of student interest in the use of the software on a Packet Tracer Network Administration courses in semester 3 students of Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College

No	Item	Min	Standard deviation
1	I enjoyed learning using Packet Tracer Software	4.18	.549
2	My focus has increased during study	4.15	.533
3	I do not get bored while studying	4.13	.686
4	I am interested to learn related configuration	4.00	.784
5	I'm easy to learn	3.95	.677
	Average	4.082	

Table 4: The skill level of students to use the software on a Packet Tracer Network Administration courses in semester 3 students of Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College

No	Item	Min	Standard deviation
1	Simplify the topic studies	4.10	.709
2	Easier to remember the facts studied	3.85	.700
3	Can improve my performance	3.95	.504
4	Easier for me to answer tests	3.50	1.013
5	Increase my understanding compared to the usual way	3.83	.675
	Average	3.846	

Table 5: Level effects of using Packet Tracer software on network administration course in the 3rd semester students of Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College

No	Item	Min	Standard deviation
1	Suitable as a medium of teaching instruction	4.20	.608
2	Suitable for teaching network configuration	4.25	.630
3	Presenting content with effective teaching	4.00	.751
4	It should be integrated with conventional methods	4.05	.714
5	It should be used by community college lecturer	4.38	.490
	Average	4.176	

Table 6: Results of t-tests

	t	df	Sig. (2-tailed)
Gender differences on the effects of using Packet Tracer software on Network Administration course in the 3rd semester of Computer Systems and Networking Programme at Jasin Community College, Selandar Community College and Masjid Tanah Community College	1.638	38	.110

Level of significance p=0.05