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Transforming Computer Network Learning: The Role of Animation Media in Developing Students' Understanding of Abstract Material

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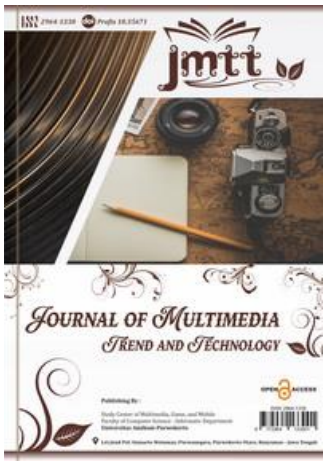

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ABSTRACT

The Malaysian Polytechnic's job is to supply the nation with semi-skilled labor to meet its demands. Numerous study programs, such as the Sequence Systems Diploma program, whose material is integrated with the CISCO professional certification program, have been established for this aim. This effort is in response to industry demand for skilled labor. However, based on examination decisions made by students, it was discovered that there might be shortcomings in the way this subject—which has a lot of abstract content—is taught, which could affect how well students do. This working paper proposes a transformation towards the use of new media such as animation, which has been proven through the study to be effective in depicting abstract lesson content to students. In this regard, a pilot study has been conducted among the teaching staff of this subject to identify the problems being faced. The results of a pilot study carried out in the form of interviews found that teaching staff actually faced problems in understanding students' abstract content in the form of lectures alone. This is because creating a workforce that is semi-skilled, competent, and capable of competing in the more demanding workplace of today requires a precise grasp of the contents of this abstract knowledge.

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INTRODUCTION

The Computer Series is an extremely mentally demanding course for pupils. This is a result of the overwhelming number of theories pertaining to non-physical objects that they still need to master [1]. When exchanging data in a sequence of events, students are compelled to use their own imagination in order to comprehend and make connections between the theory they have studied and the real world [2]. Instead of truly grasping the theory they are studying, all they are able to do is recall it. Because of this, when they are questioned or asked to connect the ideas they are learning to real-world situations, the responses they provide are biased [3].

The use of suitable simulators or software is crucial and can improve students' comprehension of the ideas behind computer circuits [4]. This is due to the fact that most pupils learn better through simulations and images than through words alone. In relation to the theory they study, students can also exhibit their creativity [5]. If a simulator or animator is available to help with abstract content issues when teaching the OSI Model, the P&P process will be simpler [6].

Offer comprehensive teaching resources, with films and animations explaining complex subjects. Given the complexity of this course, I believe it should be condensed [7]. I spend extra time explaining certain things to kids because they are not easily understood by them [8].

To help pupils better understand the real conditions that exist, simulations are offered. particularly for lecture material, which is distinguished by abstract ideas that are difficult to explain [9]. supplying P&P materials in the form of animation or simulation for challenging subjects like the OSI model. P&P process can be simplified with the use of an efficient simulator [10].

During the first semester, possibly in the course "Computer Hardware," students should be introduced to some (basic) understanding about computer circuits [11]. This is due to the fact that a large number of pupils lack firsthand experience with computer circuitry. Basic Computer Circuits (F2034) is a challenging course for individuals without prior experience with Computer Network technologies. In actuality, developing simulations and animations is essential for abstract subjects [12].

Poor English proficiency is a big barrier for pupils. Thus, the use of a simulator or animator can facilitate visual comprehension and shorten the time needed for learning complex concepts [13].

Examples to give to students during P&P are lacking. If there is a visual simulator/multimedia, you might be happier. The use of 'Chalk & Talk' is still the main medium during the teaching process in lecture rooms [14].

Numerous study programs that are pertinent to the demands of the modern industry have been created in polytechnic institutions in order to accomplish this goal. The Network Systems Diploma program, which incorporates the material of the Cisco professional certification program, has been established and implemented as one of the core programs at the polytechnic in response to the growing demand for semi-skilled workers in the information technology industry. Never the less, it was determined that the student's academic performance in the foundational course for the Diploma in Sequence Systems program [15], Basic Sequence Systems, was inadequate. This can be seen through the student's CISCO professional certification and examination results. Where it was discovered that 100% of students failed the first CISCO certification level and the majority of students received a score of 3.00 or lower.

Looking at the content of the Basic Network Systems course, there is a lot of content that is abstract and cannot be demonstrated physically or through practical exercises, such as the OSI Model, TCP/IP, VPN, Ethernet and so on. Lecturers who are involved in teaching abstract topics like this are actually faced with a big challenge to provide precise understanding to students.

METHOD

The methods to be able to prove that multimedia can make you understand the teaching material include:

1. Concept Visualization.

Multimedia allows abstract or difficult to understand concepts to be clearly visualized through images, diagrams, graphs, or animation. This helps students understand concepts better as they can see attractive visual representations.

2. Interactivity.

Multimedia can often be designed with interactive features that allow students to actively participate in learning. For example, through interactive quizzes, simulations, or learning games that allow students to apply the concepts learned directly.

3. Immersive Multimedia Experience:

By utilizing various media such as video, audio, images and text, multimedia can present learning material in a more in-depth and comprehensive manner. This helps students gain a more comprehensive understanding of the topics studied.

4. Learning Flexibility.

Multimedia allows students to learn independently and flexibly, where they can access learning materials anytime and anywhere according to their needs. This allows students to study the material at a time and place that is most convenient for them.

5. Increased Engagement.

Attractive and interactive multimedia can increase student involvement in learning. This is because the use of diverse and interesting media tends to make students more interested and motivated to learn.

6. Problem Based Learning.

Multimedia can be used to support problem-based learning by providing realistic simulations or case studies. It helps students to apply learned concepts in practical contexts and solve relevant problems.

7. Differentiation Support.

Multimedia can be used to support learning differentiation by providing additional content or extensions for students who need more challenge or additional help in understanding the material.

By utilizing multimedia methods in learning, teachers can create a more interactive, interesting and in-depth learning experience for students, which in turn can help improve their understanding of teaching material [16].

A total of nine lecturers who teach the Sequence System Diploma study program from different Polytechnics were identified as respondents for this study. An online structured interviewing instrument was implemented using the Survey-Monkey software. Respondents are required to answer all questions raised in writing through this software. The decisions for some of the questions raised have also been processed statistically by the SurveyMonkey software used.

RESULT

Examples to give to students during P&P are lacking. If there is a visual simulator/multimedia, you might be happier. The use of 'Chalk & Talk' is still the main medium during the teaching process in lecture rooms.

Overall, the results of the interview clearly show the difficulties faced by lecturers in teaching this course. The results of the review statistically show that 88.9% of respondents stated that they had difficulty teaching abstract topics in the Basic Computer Series Course (F2034).

Among the popular abstract topics that are the main problem for lecturers who teach this course are OSI Model (88.9%), Addressing Scheme (33.3%), Encapsulation Process

(55.6%), Decapsulation (55.6%), Protocol (66.7%), Routing protocol (66.7%), Other topics such as Frame Relay and WAN Connection (22.2%). As seen in the graphic results as follows:

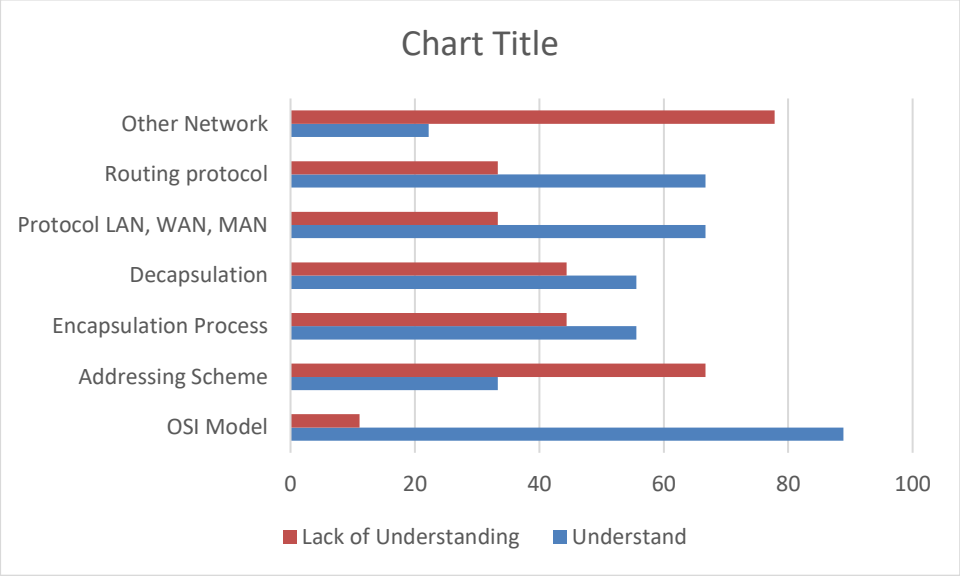

Figure 1, Level of Understanding of Abstract Material.

Among the responses that were also conveyed was that the implementation of the course content was quite burdensome compared to the lecture period, namely 15 weeks. Therefore, something needs to be done so that lecture content can be delivered effectively and easily understood.

As a solution to the problem above, the application of animated instructions is seen to help students visualize and understand abstract topics such as the OSI Model, Network layer, Encapsulation, Connectionless Data Transfer, Protocol Data Unit, Virtual Connections and Virtual Private Network in the field of networks. computer more effectively.

The advantage of animation compared to other media is its ability to convey abstract information clearly and dynamically to students. In this regard, computer animation is very effective for conveying information or things that change with time, moving, analyzing processes, explaining abstract concepts, attracting attention, increasing interest and motivation, showing dangerous or sensitive subjects, demonstrating process flow and conveying important information. a lot in a short time.

CONCLUTIONS

The Malaysian Polytechnic's role is to provide semi-skilled workforce to meet the country's needs. For this purpose, various study programs have been introduced, including the Network Systems Diploma program whose content is integrated with the CISCO professional certification program, namely the Cisco Certified Network Associate (CCNA) level. This initiative is in line with the demands of the industry which requires a competent workforce. However, based on the student's examination results, it was found that there may be deficiencies in the teaching methods for the abstract content that contribute to the student's achievement.

The results of the study, which was carried out in the form of an interview, found that the teaching staff actually faced problems in understanding students' abstract content in the form of lectures alone. In this regard, this working paper proposes to the polytechnic system a transformation towards the use of new media such as animation which has proven to be effective through studies in depicting abstract lesson content to students. This is because accurate understanding of the abstract content in this course is an important principle for producing semi-skilled workers who are competent and able to compete in the increasingly challenging world of work today, especially in the field of Computer Network Technology. This is also in line with polytechnic transformation efforts from the teaching and learning aspect.

In fact, developing effective animations or simulations is a necessity to ensure quality teaching and learning. The combination of teachers and instructional designers will strive to produce solid and accurate animation and simulation dimensions.

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