Jurnal Teknologi

Designing Interactive Tutorial Compact Disc (CD) for Computer Network Subject

Kasman Rukun, Asrul Huda*, Yeka Hendriyani, Suryo Hartanto

Education Program Technical Information, Electronic Engineer Department, Technical Faculty, Padang State University

*Corresponding author
asrulhuda@gmail.com

Graphical abstract

Abstract

Early observation that was done by the researcher showed that the student learning outcome at SMK 1 Pulau Punjung is still at the low level due to the assumption that the students lack media support in learning. Using an Interactive Tutorial CD is believed to be able to reduce the dependence of the student toward the teachers. The aim of this research was to design the interactive tutorial CD in the form of multimedia based learning media which contain the theory and the basic subject of computer network. It is also equipped with examples of Video tutorial lab computer network installation. The result of this study indicates that there is an improvement in student learning outcome by using this learning media. The problem of limited teachers in school can also be alleviated.

Keywords: Learning media, interactive tutorial, computer network

1.0 INTRODUCTION

Learning is the process of obtaining mastery, knowledge, habits, which is obtained from the process of learning [1]. The knowledge that is obtained in the form of facts, concepts, procedures and principles of students characteristic can do so by involving interaction with external environment that can change someone's behavior [1,2]

The low students' learning outcomes can be caused by two factors: (1) external factor, involves social or non social such as, teachers' qualification, teaching method, media, the equipment, and the evaluation. (2) Internal factor involves intelligence, interest, talent, motivation, perception and learning style (Suryabrata)

The use of media in a learning process is really needed as one of teacher–students interaction efforts. Learning media are tools that communicate learning material to the students to stimulate students' thought, interest, attention to create the learning process [3].

The use of learning media should be perceived well by the students. Someone perception of something is

influenced by its relevance to their needs, they will give positive reaction, if it is a necessity for them. In learning process functional literacy will get a positive response from students when the instruction given relevant to their lives. It's like a debriefing skills that they can apply even can be a source of income

According to Prayitno [3] learning outcomes is something that is acquired, possessed, or is the result of their learning process. Measurement of the results of this study will demonstrate the achievement of something; in this case the thing that should be measured is something that has existed in students

Nasution [4] also argued that the definition of learning outcomes is the acquisition of knowledge or skills developed by the subjects, which is indicated by the value of the test or the scores given by the lecturer. This test is used to measure the level of success of an educational program and to determine the extent to which students have to utilize their cognitive abilities

Learning is an activity that can change the individual behavior, both actual and potential that is obtained in the learning process. In teaching and learning process will affect several factors they are internal and external factors. Internal factors consist of: (1) the physiological state in the form of the general

physiological condition and senses, and (2) psychological states involve interests, intelligence, talent, motivation and cognitive abilities. On the other hand, external factors consist of: (1) the natural environment factors, social and cultural environment; and (2) an instrumental factor in the form of curriculum, programs, infrastructure and the teachers [5].

The characteristic of media according to experts [6] are as follows:

1. Media in the learning process tends to be interpreted as a means of graphical tools, photographic or electronic to capture, process and reconstruct the visual and verbal information
2. Instructional media are media that carry messages or information aimed at learning or contain of learning purpose
3. Instructional media covering all the resources needed to communicate with students. It could be hardware and software used in the hardware
4. Instructional media is anything that can be used to deliver messages (learning materials), so it can stimulate students' attention, interest, thoughts and feelings in learning activities to achieve specific learning objectives

Based on the aforementioned characteristics, the authors conclude that the characteristic of learning media are as follows:

- Its use is reserved or allocated for the needs
- It is a tool to explain what is in the book, it can be words, symbol, and numbers.
- Learning media are not the result of an art form
- The use of instructional media is not limited to a particular science, but is used in all fields of science

Media that can meet the criteria of users' expectation is obtained through the media that is designed based on the user's needs. Because it is hard to get the media package in the market, the researcher tried to fulfill the demand through the designing interactive Tutorial CD for learning purpose at SMK N 1 Pulau Punjung. Furthermore, the interactive tutorial CD was implemented in computer network subject and then the researcher studied the impact on the improvement of learning outcomes.

2.0 THE PURPOSE OF THE RESEARCH

The purposes of this research are:

1. To design an interactive tutorial CD in computer network subject based on the demand of the curriculum.
2. To get the data and the information about the steps of designing multimedia based learning media for the computer network subject
3. To get the data about students learning outcomes of the computer network subject at SMK 1 Pulau Punjung.

3.0 RESEARCH METHOD

Based on the limitation, the formulation of the problem, and the purpose of the research that is explained, this research seeks to design a video based interactive tutorial CD for the computer network subject. The steps in designing the interactive Tutorial CD are as follows [7]:

1. Designing the Concept
   In designing the concept, application of this interactive tutorial CD is started by selecting the material particularly that has relationship with the computer network subject. Then, the selected material will be processed to be served in the form of interactive audio, visual or animation.
   Designing the concepts was done with a creative strategy approach so that the CDs produced will be interesting for the students.
2. Designing the Content
   Developing interactive tutorial CD needs detailed preparation in order to make it easier to convey the information. Designing this interactive tutorial CD also needs to be supported by the appearance of audio, visual and animation.
3. Preparing the Script
   Choosing the proper dialogue and listing the elements in detail are really needed in designing the script. A script is a complete specification of the text and narration in multimedia applications. In writing the script for multimedia applications, several considerations need to be adhered to [8]:
   a) Understanding the sight and sound of each element needed and used, which is associated with teaching materials should match with the characteristics of the user
   b) Words and visual images displayed should interpret the thought
   c) The communicative features should be prominent
   d) The planning in content display should be careful and cautious, because a very complicated display can make users confused
   e) Applications can be followed easily if the regular menu sequence in the order
   f) The contents of the menu that is loaded should meet the needs of users
4. Diagram of application
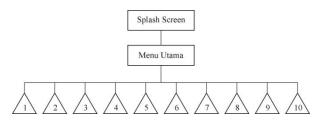   The multimedia structure that is used in this application is a hierarchy structure (refer Figure 1).

Figure 1 Structure applications interactive CD tutorial computer networking [9]

Note:
1. Pray before learning
2. Basic concept of network (1)
3. Basic concept of network (2)
4. Basic concept of network (3)
5. Network Transmission media
6. The hardware network
7. UTP wire installation
8. Sharing the folder and file
9. Sharing the file
10. Praying after learning

4.0 RESULT AND DISCUSSION

This part explains the results of interactive tutorial CD design which can be used for computer network learning at SMKN 1 Pulau Punjung, Dharmasraya regency. In this part, the students are expected to be able to follow the learning modules because the interactive tutorial CD is not only able to help students in the lab work process but also can extend the students' knowledge about the basic concept of computer network.

4.1 Main Menu

The main menu has buttons which can be used to go to the content pages of computer network materials. There is a header on the left top, and the control button of the main menu to minimize and close, in the right corner (refer Figure 2).

Figure 2 Main menu of interactive CD for computer network

4.2 Module of Network Basic Concept

The module of basic network concept is divided into three parts, i.e. network basic concept: (1) network basic concept, (2) network basic concept, and (3) Network basic concept which collectively explains about the basic concept of the computer network (refer Figure 3).

Figure 3 Sub menu layout of computer network basic concept

4.3 Module of Transmission Media

The module of transmission media presents the type of media which can be used as a data transmission media in computer network, and is presented in audio visual layout (refer Figure 4).

Figure 4 Sub menu layout of transmission media

4.4 Module of Hardware Network

The module of hardware network discusses about the hardware of network, i.e. server computer, workstation computer, LAN card, HUB, Switch, Modem and bridge, which are presented in the audio visual layout (refer Figure 5).

Figure 5 Sub menu layout of computer hardware

4.5 Module of UTP Cable Installation

Module of UTP cable installation discusses about the steps of doing the UTP cable installation and RJ45 connector which is presented in the audio visual layout (refer Figure 6).

Figure 6 Sub menu layout of UTP cable installation to make computer network

4.6 Module of Folder and File Sharing

Module of folder and file sharing discusses about the steps to share a folder and file in the computer which has been connected to the network. The discussion is presented in the audio visual form (refer Figure 7).

Figure 7 Sub Menu layout of folder and file sharing steps in computer network

4.7 Module of Printer Sharing

The module of printer sharing discusses about the steps for printer sharing in the computer which has been connected to the network. The discussion is presented in the audio visual layout (refer Figure 8).

Figure 8 Sub menu layout of Printer sharing steps in the computer network

4.8　　Data Description of Implementing Interactive Tutorial CD's result

In order to know the distribution of respondents' answers based on each indicator which has been responded regarding students' perception towards the implementing of Interactive tutorial CD at SMK N 1 Pulau Punjung, Dharmasraya Regency, data were obtained accordingly. Table 1 presents the data collected.

Table 1 Students' perceptions score about implementing interactive tutorial CD

Indicators	Items numbers	Amount of items	4 SS F	3 S F	2 KS F	1 TS F	Average
General	1-5	5	40	58	7	0	3.31
Studying in class	6-10	5	61	37	7	0	3.51
Computer media	11-15	5	59	41	5	0	3.51
Media desig	16-20	5	34	68	3	0	3.30
Software	21-25	5	34	58	11	2	3.18
Visual communication	26-32	7	56	89	2	0	3.37
Studying in laboratorium	33-44	12	96	145	11	0	3.34
average total		44	380	496	46	2	3.36

Note : SS = totally agree, S= agree, KS= not quite agree, TS= not agree, F= frequency

Based on the Table 1, it is known that total data score in the research about students perception's regarding the result of interactive tutorial CD design for the computer network subject at SMKN 1 Pulau Punjung, Darmasraya regency, are 3,36. It means that the correspondents agreed to the use of interactive

tutorial CD's design for the computer network subject. Seeing from the average score for each indicator, the general indicator has 3.31 of the average score. The average score for indicator of class lesson and computer media are 3.51. An indicator which is related to the media design obtained an average score of 3.30. The average score for software indicator are 3.18. Visual communication indicator obtained 3.37 as its average score, and the average score for lab work is 3.34.

4.9 Data Description Of Students' Study Result

To know the students' study results before and after the implementing of interactive tutorial CD at SMKN 1 Pulau Punjung, Dharmasraya regency for computer network subject, data are presented in the Table 2.

Table 2 Studying result data in the pretest and posttest

Respondents number	Pre-test	Post-test
1	87	84
2	67	83
3	80	85
4	80	83
5	80	88
6	87	88
7	60	75
8	80	85
9	73	77
10	73	89
11	83	92
12	53	77
13	80	88
14	57	73
15	53	81
16	73	90
17	80	87
18	87	86
19	73	89
20	63	87
21	80	78
Minimum	53.00	73.00
Maximum	87.00	92.00
Average	73.76	84.05

Based on Table 2, the authors concluded that there are improvements in students' study result after the implementing of interactive tutorial CD for the computer network subject. From the data above, it can be seen that the students' score before the implementing of interactive tutorial CD (pre test) are 73, 76, but after the implementing of interactive tutorial CD, the students' score are 84, 05. It can be concluded that there is an improvement toward students' study results after the implementing of interactive tutorial CD for the computer network subject at SMKN 1 Pulau Punjung, Dharmasraya regency.

4.10 Discussions

The research study has been attested by data description and the implementing of interactive tutorial CD for the computer network subject at SMKN 1 Pulau Punjung, Dharmasraya regency.

The design of interactive tutorial CD for the computer network has been done in 4 steps, i.e. (a) designing the concept, (b) designing the content, (c) designing the script, and (d) designing the application diagram. The researcher hopes that students can learn the prepared material maximally by using the interactive tutorial CD in the computer network subject. The students' study results after the experiment of implementing the interactive tutorial CD for the computer network subject.

From the data obtained, the authors concluded that the students' scores before the implementing of interactive tutorial CD for the computer network subject (pre test) was 73, 76. After the implementing of the interactive tutorial CD for the computer network subject, the students' average score was 84, 05. Based on this explanation, it can be seen that there is an improvement toward the students result study after implementing of interactive tutorial CD for the computer network at SMK N 1 Pulau Punjung, Dharmasraya regency.

The students' study results have strong relation to the instructional purpose which has planned by the teacher. Generally, the instructional purpose is categorized into three categories,i.e. (a) cognitive domain, which consists of remembering, understanding, applying, analysing, synthesising and evaluating; (b) affective domain, which consists of accept, giving feedback, assessment, organizing and characterizing; and (c) psychomotor domain, which consists of imitation, manipulation, accuracy, articulation and artlessness [10].

5.0 CONCLUSION

Based on the analysis and the design of interactive tutorial CD for computer network, which is also continued with the implementing of interactive tutorial CD for the computer network subject at SMK N 1 Pulau Punjung, Dharmasraya regency, researcher can conclude that:
1. The pretest results of SMKN 1 Pulau Punjung students in the computer network subject are 73.76.
2. The posttest score of SMKN 1 Pulau Punjung students in the computer network subject after implementing interactive tutorial CD are 84.05.
3. There is a significant difference in the students' study result between before the implementing and after the implementing the interactive tutorial CD for the computer network subject at SMKN 1 Pulau Punjung, Dharmasraya regency.

Acknowledgement

References

[1] Djamarah, B. S. 1996. *Strategi Belajar Mengajar*. Jakarta : Rineka Cipta

[2] Gagne, R. Dkk. 1977. *Principles of instructional design*. New York:Holt Rinehart and Winstgman

[3] Kemp, E. J. & Deane,D. K. 1994. *Planing Prodicing And Using Introctional Media*. New York: Harper & Row Publishers.

[4] Nasution, Noehi. 1995. *Psikologi Pendidikan*. Jakarta: Universitas Terbuka

[5] Prayitno. 1973. *Teknik Bimbingan dan Penyuluhan Dasar Pengungkapan masalah*. Padang Proyek PMPT IKIP Padang

[6] Ramainas. 2006. *Motivasi Belajar dan Persepsi siswa Tentang Media pembelajaran terhadap hasil belajar. Jurnal Pembelajaran*. UNP. Padang

[7] Sudjana. 1996. *Metoda Statistika*. Tarsito Bandung.

[8] Sudrajat, Ahkmad. 2007. *Media Pembelajaran*. Artikel.http://ahkmadsudrajat. wordpress.com/bahan-ajar/media-pembelajaran/

[9] Suryabrata, S. 1994. *Beberapa Prinsip Psikologi Belajar*. Jakarta : Teknologi Pembinaan Siswa Dirjen Dikti P & K.

[10] Usman, MU. 1995. *Menjadi Guru Profesional.* Bandung