

Multimedia Animated Corrosion for Corrosion and Coating Metals Course

Yusep Sukrawan, Tatang Permana, Enda Permana

Departemen Pendidikan Teknik Mesin
Universitas Pendidikan Indonesia
Bandung, Indonesia
yusepsukrawan@upi.edu

Kebri Kein Moudy Pajung

Program Studi Pendidikan Teknologi Informasi dan
Komunikasi
Universitas Negeri Manado
Manado, Indonesia
kkmoudyp@gmail.com

Abstract—Multimedia Animation in teaching metal corrosion and plating course on the corrosion proses remains largely unused. There are many students who do not understand the corrosion process, despite having attended lectures. This study aims to discover the effect of Multimedia Animation on students achievement. This study applied a quasi-experimental method on two classes, consisting of a control class using image media and an experimental class using Multimedia Animation. Instruments used for measuring learning are pretest and posttest. So, are the learning results obtained by using Multimedia Animation better than those using image media? The results showed that the use of Multimedia Animation is better than the use of image media.

Keywords—multimedia animation; teaching corrosion; plating course

I. INTRODUCTION

In the learning process, learning media is one of the important elements as a determinant of the quality of learning outcomes. Learning media is needed so that the teaching materials presented can be understood by learners. Learning media are very good benefits for students because it adds knowledge and can foster the spirit of learning for students [1]. Computer-based learning media developed every time is appropriate to assist the learning process in order to produce learning with optimum quality. Computer-based learning media with a variety of images, text, sound and video (multimedia) is expected to stimulate learners so as to improve the learning quality. Multimedia is a melody sung in harmony with multi-channel and multi-modal bits of knowledge and creation [2]. The process of knowledge acquisition becomes more efficient when the learners experience an event through a multimedia simulation. Multimedia technology empowers the educational process by means of increased interaction between teachers and the students. The effectiveness of the learning by using multimedia depends on how far the learning style is accommodated in the learning strategy [3].

The use of CD-ROM interactive multimedia is more effective with a variety of learning activities than the media presented through print media with face to face activity and more effective than the media presented over the web with online learning [4]. Utilization of interactive multimedia (MMI) has been proven to improve scientific generic skills and

problem-solving skill of prospective vocational teachers [5]. As for the use of multimedia animation (MMA), it has been shown to improve the reading skills of projected images of vocational students [6], and it can improve the outcomes of learning competence of vocational students on the assembly and installation of the brake system [7].

As a complete media, multimedia technology is able to develop the power of imagination, creativity, fantasy and emotions of students to a better direction. Students' learning outcomes after the use of macromedia flash-based multimedia applications for the learning of computer network topology experience a higher increase compared with the results of students' learning without the use of macromedia flash-based learning multimedia applications [8].

When possessing a media that can explain corrosion process in detail, it is expected that the media can facilitate the students to understand the topic. Learning process using multimedia animation aims to be closer to the actual conditions, especially in this case for simulation type. The use of multimedia was applied to corrosion course to discover the changes in students' learning achievements.

II. METHODS

The method used in this study is experimental research method in the form of Quasi Experimental Design.

The form of quasi experiment is considered to have the ability to provide an estimate of information correctly, approaching real experimental research in educational research. This is because the subjects of the research are humans wherein the variables affecting it are difficult to control.

This study begins with choosing two classes. Both classes are distinguished as the experimental group and the control group. Both groups were given an initial benchmark by giving the pre-test to the experimental group and the control group (OEK1 and OK1). The next stage gives different treatment to the two classes. The experimental group is given learning using animation media (X1), while the control group is given learning using media wall charts (X2). The final stages in this study are giving posttest in the experimental group and the control group (OEK2 and OK2).

With the existence of control group, it becomes so much easier to know the extent of differences in concept mastery of the students in the control group and in the experimental group. The research design designed is tabulated in table 1.

TABLE I. PATTERNS OF RESEARCH DESIGN

Group	Pre test	Treatment	Post test
Experiment	O _{EK1}	X1	O _{EK2}
Control	O _{K1}	X2	O _{K2}

- O_{EK1} = pre test to determine the initial ability of group student experiment before being treated
- O_{K1} = pre test to find out the ability of group student control before being treated
- X₁ = learning using animation media.
- X₂ = learning using media wall charts.
- O_{EK2} = post test to determine the ability of group students experiment after being treated.
- O_{K2} = post test to find out the ability of group students control after being treated

Both groups were given pre-test and post-test with the same questions to determine the effect of different treatment given. If there is a significant difference between the experimental group and the control group, the treatment will have a significant effect.

III. RESULT AND DISCUSSION

A. Result

Research conducted out on the student from the class of 2016 in Departemen Pendidikan Teknik Mesin FPTK UPU, and the number of each sample in the control class and in experimental class is 36 students. The data obtained is in the form of value data of the result of pretest and posttest conducted on control and experimental group. These data were used to describe quantitatively so that conclusion resulted from this research could be drawn. Results of pretest and posttest value showed in the figure 1.

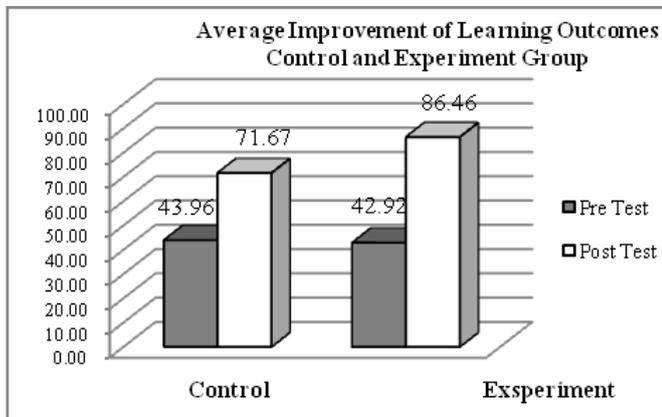


Fig. 1. Comparison of Pre test and Post test.

Based on figure 1 there is a difference in the increase in learning outcomes shown from the average value of the control group pre-test of 43.96 and the average value of the control group post-test is 71.67, while in the experimental group the

average pre-test value is 42.92 and the average posttest value is 86.46.

The increase in learning outcomes is reinforced by the N-Gain score achieved by students. N-gain data shows an increase in students' abilities after participating in learning. N-gain data can be seen in table 1.

TABLE II. N-GAIN

Group	Highest N-gain	Lowest N-gain	Average N-gain
Control	0,64	0,20	0,49
Experiment	1,00	0,36	0,76

Based on the data in table 1 the average increase in mastery of material in the experimental group students was higher than in the control group. The highest N-gain experimental group is 1.00 and the lowest N-gain is 0.36, while the highest N-gain control group is 0.64 and the lowest N-gain is 0.20.

The average N-Gain in the experimental group shows a higher average than the control group as shown in figure 2.

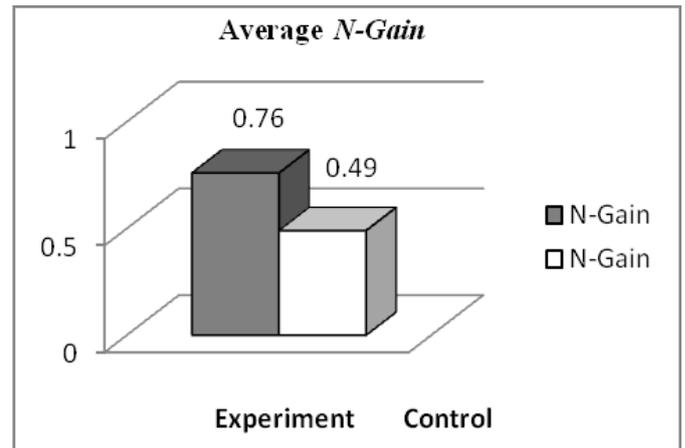


Fig. 2. Comparison of N-Gain.

Based on the data described at figure 2, the average N-gain of the control group reached 0.49 in the medium category, while the average N-gain of the experimental group reached 0.76 in the high category.

B. Discussion

The results of calculations and data analysis of the results of the study showed the influence of the use of animation media in learning. this can be seen from the improvement in student learning outcomes that use animation media better than learning outcomes using wall chart media. The results of these studies indicate a difference in the improvement of student learning outcomes.

The increase in learning outcomes is reinforced by the N-Gain score achieved by students. The highest N-Gain in the control group was 0.64 and the lowest N-Gain was 0.20. While the highest N-Gain value of the experimental group is 1.00 and the lowest N-Gain is 0.36. The average N-Gain in the experimental group showed a higher average than the control group.

Based on the data described at figure 2, the average N-Gain of the control group reached 0.49 in the medium category. The acquisition of the average N-Gain which is still in the medium category shows the students' absorption of the material being studied in the class in the medium category. The average N-Gain of the experimental group reached 0.76 in the high category.

The acquisition of the average N-Gain that is still in the high category shows the students' absorption of the material being studied in the class is in the high category. This means that the animation media can further improve student learning outcomes in the competence of the corrosion.

The learning process by using animation media on the corrosion competency turns out to have a very large influence on improving student learning outcomes. In accordance with the function of the media that is to assist in the learning process, clarify, facilitate and make interesting learning messages that will be delivered by the teacher to students so that they can motivate their learning and streamline the learning process.

Teaching and learning activities will be more effective and easier when assisted with visual facilities, where 11% of what is learned occurs through the sense of hearing, while 83% through the sense of sight [9]. Besides that, it was stated that we can only remember 20% of what we hear, but can remember 50% of what was seen and heard [9].

The use of animation media also causes students to be more active and enthusiastic in following the learning process. Improved learning outcomes are known based on learning outcomes obtained after the post test. This animation media turns out to affect learning outcomes and students' understanding in mastering the material that has been taught. This is indicated by the results of research obtained by researchers. Animation can help the learning process if students will do cognitive processes.

Based on research, students who have a low educational background and knowledge tend to need assistance, one of which is animation to capture the concept of the material to be delivered. This is accordance with Benefits of animation in multimedia:

- Showing objects with ideas (such as the effect of gravity on an object).
- Explain difficult concepts (such as absorption of food into the bloodstream or how electrons move to generate electric current).

- Converting an abstract concept to concrete (e.g. explaining alternating current voltage with the help of animated moving sine graphics).
- Show clearly a procedural step (e.g. how to paint an equilateral triangle with term assistance) [10].

IV. CONCLUSION

Animated multimedia has benefits as a medium that helps to convey an abstract concept or material that is difficult to understand so that the message conveyed becomes more concrete and easy to understand.

REFERENCES

- [1] R.E. Mahmudah and A.A. Yudha, "Pengembangan Media Pembelajaran Dasar Kompetensi Kejuruan Menggunakan Adobe Flash CS4 untuk SMK Negeri 1 Blitar," *Jurnal Pendidikan Teknik Elektro*, vol. 02, no. 01, pp. 381-390, 2013.
- [2] S. Malik and A. Agarwal, "Use of Multimedia as a New Educational Technology Tool-A Study," *International Journal of Information and Education Technology*, vol. 2, no. 5, October 2012
- [3] H. Kassim, "The Relationship between Learning Styles, Creative Thinking Performance, and Multimedia Learning Materials" *Procedia, Social and Behavioral Sciences*, vol. 97, pp. 229-237, 2013.
- [4] J. Dikshit, S. Garg, and S. Panda, "Pedagogic effectiveness of print, interactive multimedia, and online resources: A case study of IGNOU," *Online Submission*, vol. 6, no. 2, pp. 193-210, 2013.
- [5] W. Widodo, "Pengembangan Model Pembelajaran "Mikir" pada Perkuliahan Fisika Dasar untuk Meningkatkan Keterampilan Generik Sains dan Pemecahan Masalah Calon Guru SMK Program Keahlian Tata Boga" Bandung. Indonesia University of Education, 2010, unpublished.
- [6] C. Anam and M. Khumaedi "Pembelajaran Ceramah dengan Media Animasi untuk Meningkatkan Kemampuan Siswa dalam Membaca Gambar Proyeksi," *Jurnal Pendidikan Teknik Mesin*, vol. 9, no. 1, pp. 7-13, 2009.
- [7] B.S. Harsono and Samsudi, "Perbedaan Hasil Belajar antara Metoda Ceramah Konvensional dengan Ceramah Berbantuan Media Animasi pada Pembelajaran Kompetensi Perakitan dan Pemasangan Sistem Rem," *Jurnal Pendidikan Teknik Mesin*, vol. 9, no. 2, pp. 71-79, 2009.
- [8] I.C. Bisono, "Penggunaan Aplikasi Multimedia Pembelajaran Topologi Jaringan Komputer Berbasis Macromedia Flash Untuk Meningkatkan Hasil Belajar Mata Pelajaran Tik Siswa Kelas XI SMA N 1 Godean (Doctoral dissertation, UNY), 2013. unpublished.
- [9] Rusman, *Belajar dan Pembelajaran Berbasis Komputer: Mengembangkan Profesionalisme Guru Abad 21*. Bandung, Indonesia: Alfabeta, 2012.
- [10] Munir and H.B. Zaman. "Aplikasi Multimedia Dalam Pendidikan. *Jurnal BTP*," *Fakulti Teknologi dan Sains Maklumat Universiti Kebangsaan Malaysia*, vol. 1, pp. 1-16, 1998.