

Effectiveness of Video Use in the Teaching and Learning of Electronic Practice in Vocational College

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Abstract: This study aims to evaluate the effectiveness of video use in the teaching and learning of electronic practice at selected vocational colleges. Currently, the instructors at most vocational colleges are still using the traditional methods (use of worksheets) in their Teaching and Learning (T&L) process. The objective of this study is to (i) measure the effectiveness of video use practices in the teaching and learning for electronic practice and (ii) evaluate the level of acceptance of students of video use. A quantitative approach was adopted by means of a quasi-experimental design. A total of 60 respondents from two vocational colleges were selected and placed in control groups and treatment groups. The instruments used in this study were pre-post-tests and a set of questionnaire. Statistical Package for the Social Sciences (SPSS) version 22.0 was used to analyse the data by means of inference and descriptive analyses. ANCOVA and MANOVA test analyses were used for inferential statistics and statistical analyses in the forms of frequency, mean, and percent were used for descriptive statistics. The findings show a significant difference in the achievements of students who used a video and those who used a worksheet for the course "Electronic Practices." These findings indicate that the students were able to accept the use of video for the teaching and learning of the course. In conclusion, the use of video for the teaching and learning of "Electronic Practice" was found to have a positive impact on electronic practice and in attracting the students to use the method.

Keywords: Effectiveness, teaching and learning, Electronic Practice, video uses, Vocational College.

I. INTRODUCTION

Teaching and learning (T&L) based on multimedia technology was introduced in Malaysia's education system in 2012, in line with the efforts of the Ministry of Education Malaysia (MOE) to ensure that educators empower the elements of multimedia technology in their T&L processes. This aspiration was embedded in the draft of Malaysia's Education Development Plan 2013-2025 (PPPM) and in the Transformation Plan Vocational Education.

As noted in the Preliminary Report of Malaysia's Education Development Plan, the planned development was to utilize information and communication technology (ICT) in education hence the provision of training to all teachers on the application of ICT elements in T&L to support student learning. According to [1], teachers need to establish themselves with knowledge-based multimedia technology because the use of ICT in a T&L process in Malaysia has long begun. In order to realize the effort, the teaching techniques of all educational institutions in Malaysia, specifically those in the vocational sector, need to undergo a transformational process in order to realise the vision and planning of the government. One of the measures taken by the government to integrate ICT into education was to establish vocational colleges. The transformation of teaching techniques can be seen in these institutions as they applied ICT elements in a T&L process for vocational subjects. In their T&L process, the vocational colleges apply educational technology in classroom as a teaching aid material. Educational technology is a technology that helps to improve the quality of teaching, as well as the skills and effectiveness of a T&L process. According to [2], the application of technology in T&L is a necessity in education, particularly in relation to the use of high-tech teaching aid materials. Technology-based teaching such as computers, graphic dynamics software or information technology media are often used in a T&L process. In parallel with the awareness of the importance of ICT usage today, teachers are encouraged to strengthen the use of technology in the teaching process. Hence, one of the efforts to form a teaching process so that students understand a concept is to integrate the use of technology in a form that students can understand.

II. LITERATURE REVIEW

The Use of Video Elements in Teaching and Learning Process

The practice of using video elements in a T&L process is a new learning style today and has become the focus of educators in line with the concept of twenty-first century learning. Various teaching methods have been used in applying video elements in a T&L process, specifically by incorporating video elements in teaching aid materials. Video elements are one of the multimedia elements that work to promote the effectiveness of a T&L process [3]. The T&L process is intended to transfer the knowledge or skills of a teacher to a student. The process of transferring knowledge to students needs to go through the correct process so that the Learning goals are not missed.

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Hence, the right approach and the proper use of teaching aid materials can help teachers and students achieve their learning objectives.

A number of studies have reported the use of video as a teaching aid material in the T&L process by teachers to help students in understanding and mastering knowledge. As reported by [4], the use of multimedia technology in T&L can deepen the memory and understanding of students through clearer and better quality graphics, text, audio and video viewing. [5] Contended that students who study technical skills and are exposed to the practice of video use in their learning process have the potential to achieve better results than those who lack such exposure. [6] also demonstrated that students who were taught using videos gained a better score than those who were taught with traditional methods. In other words, the development of multimedia technology promises great potential in changing the way people learn, obtain information, and customize information [7].

Material-Based Learning Strategy

Along with this 21 century learning era, the proper and appropriate selection of strategies and actions is essential to ensure the sustainability of education and it being in line with the current learning climate. According to Azman [8], an effective teacher will plan the right learning workforce to get satisfactory learning outcomes. The material-centered learning strategy is a strategy that involves a material to be used as a tool in an T&L process. This material-centered learning encompasses two elements:teaching material and learning materials. Examples of teaching materials are the use of models, charts, graphs, videos and projectors; and examples of learning materials are like modules, computers, printed materials, activity cards and worksheets.

According to Sidek [9], this material-centered learning strategy is a teaching method that involves the use of audio-visual such as the use of projectors and computers, television to enable teachers to communicate lessons more easily, attractively, and effectively. By using this strategy, teachers can communicate their teaching more easily, interestingly and effectively, whereas students can understand the lesson more meaningfully and carry out learning activities individually or in groups without the presence of teachers.

III. RESEARCH METHODOLOGY

A quantitative approach was adopted by means of a quasi-experimental design, which aimed to assess the effectiveness of video use in the T&L of electronic practice on treatment groups and comparing the results with those who used a worksheet (control group). The quasi-experimental study was designed to consist of pre-post test design for non-equilibrium groups which contained two groups of randomly selected respondents.

The sample selection technique in this quasi-experimental design was cluster random sampling. The sample of the study consisted of 60 second-year students of majoring in Electronic Technology from two vocational colleges namely Juasseh Vocational College and Kuala Klawang Vocational College. Thirty students from Juasseh Vocational College were placed in the treatment group while 30 students from Kuala Klawang Vocational College were placed in the

control group. To determine the students' level of acceptance on the use of video, 30 students from the treatment group were selected as the respondents.

The instrument used in this study was an achievement test paper and a set of questionnaire. The respondents from both groups occupied the pre and post tests, which contained practical work sets for the topic "Transistor Testing," whereas the respondents from the treatment group answered the questionnaire after the experiment was conducted. The questionnaire used in this study consisted of two parts: Part A and Part B. Part A seeks the students' demographics information and Part B contains the items related to the response and acceptance of the students to the effectiveness of the video use in the T&L for Electronic Practice. A total of 12 items constitute Part B which sought to collect information or data from the students. Their responses were to be stated on a five-point Likert scale.

The validity of the instrument involved in this study is the validity of the instrument for the achievement test and the questionnaire. Therefore, in order to determine the validity of the content on this achievement test, the instrument developed was revised and verified by three content experts comprising the Electronic Technology instructors at the vocational college with over 15 years of teaching experience. However, in regard to the validity of the questionnaire (which contains the validity aspects of the content, criteria and constructs), the researchers obtained the confirmation from three experts comprising KV lecturers and lecturers at Universiti Tun Hussein Onn Malaysia (UTHM) to obtain their opinion and comment on the questionnaire items being constructed.

The reliability of the questionnaire instrument was determined through a pilot study that involved 30 second-year students of Electronic Technology at Ampangan, Seremban Vocational College. The reliability of the questionnaire was measured with a Cronbach's alpha value calculated by the SPSS software. The Cronbach's alpha value obtained for the questionnaire instrument was 0.845. The pilot study was conducted to measure the validity and reliability of the questionnaires developed.

The quantitative data were obtained using the achievement test instruments (pre-post test) and the questionnaire instruments. The data were analysed by means of inference and descriptive statistics. The inference statistics used in this study were ANCOVA test and MANOVA test. The analyses of the descriptive statistics are presented in the form of frequency, average mean, and percentage.

IV. RESULTS

The data analysis process served to measure the effectiveness of video use in the teaching and learning (PdP) of electronic practice particularly in the tests performed. The study involved two vocational colleges and 60 respondents. Pre-test and post-test achievement tests were conducted involving all the respondents at both colleges. The questionnaires were distributed to the respondents to measure their level of acceptance of using video in PdP for the subject "Electronic Practice."

The data were analysed using the software SPSS version 22.0 for Windows.

Analysis of the Effectiveness of Using Video

Analysis of the mean difference between the pre- and post-test achievement for both groups was carried out. However, in order to answer the first question, the researcher presents only the analysis of the the treatment group, the purpose being to determine the effectiveness of video use for the pre- and post-test performance tests.

Table. 1 Findings of MANOVA Analysis of Pre-Post Control and Treatment Groups

Source	Method	Mean ²	Significant Value
prepost	Video	97.200	.007
	Elements	2745.633	.000

As shown in Table 1, a significant difference is noted in the mean scores of the post test between the treatment group and the control group (p < .005). This finding indicates that the use of video in T&L for electronic practice has a positive effect on post-test performance mean score for the treatment group. The researcher also compared the mean scores between the pre- and post-test scores for the control group.

Table. 2 Difference in Pre-Post test Scores Mean for Both Groups

Group	Methods	Mea n	Standar d Deviatio n	Sample
Control	Lab sheet pre test	70.27	3.982	30
	Lab sheet post test	72.07	2.532	30
Treatment	Video pre test	73.10	3.818	30
	Video post test	82.67	5.040	30

As shown in Table 2, an marked increase was noted in the mean score for the treatment (from 73.10 per cent on pre-test to 82.67 per cent on post-test achievement). The percentage of increase is thus 9.57 percent. This finding therefore clearly indicates a considerable increase in the mean score between pre-test and post-test for the treatment group.

Analysis of Difference of Teaching Methods

The mean difference of post-test performance score for the treatment groups and control groups was to identify the difference in the students' achievement score between teaching methods using video using worksheet.

Table. 3 ANCOVA Analyses of Post-Control and Treatment Groups

Source	Mean ²	Significant Value
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Pretest	271.456	.000
Group	1075.946	.000

As indicated in Table 3, significant difference was noted in post-test score between the treatment group and the overall control group (p < .05), thus indicating a difference in the achievement marks between the control group and the treatment group. Analysis of Students' Acceptance Level The questionnaire sought to identify the students' level of acceptance towards the use of video in the T&L process for the subject Electronic Practice. The findings are presented in the form of mean and standard deviation for each item of the questionnaire (shown in table 4).

Table. 4 Mean Analyses and Standard Deviation for Each Questionnaire Item

Item	Statements	Mean	Std. Deviation
1	The process of learning Electronic learning using video help enhances my motivation to learn	4.40	.498
2	I am more excited to learn Electronic practice through video help than using a worksheet only	4.20	.407
3	I can easily do Electronic Exercise exercises with the help of video in a learning session	4.60	.498
4	I am more confident in conducting practical exercises after a video session using video help	4.27	.450
5	I'm easy to remember the contents of the lesson when video help is used in Electronic learning	4.27	.450
6	Using video help can improve my understanding of the topic of Transistor Testing	4.37	.490
7	I can easily define Transistor foot elements when learning with video help	4.27	.450
8	I am able to easily test transistors with the help of learning video	4.23	.430
9	The videos used in the Transistor learning session are easy to understand	4.47	.507
10	The videos used in transistor learning sessions are very appropriate and appealing and in line with my learning style	4.43	.504
11	The use of video help should be continued for each teaching and learning session for Electronic practice	4.40	.498
12	Lecturers need to diversify the types of videos used in teaching and learning sessions for Electronic Practices (Ex: Youtube videos, real footage, animations)	4.57	.504

As shown in table 4, item 2 received the lowest mean value 4.20, thus indicating that the use of video in the T&L of electronic practice does not really facilitate improving the students' spirit to follow the class of practical lessons.

However, item 3 received the highest mean value of 4.60, thus suggesting that the use of video for the T&L of electronic practice managed to facilitate the students in practicing what they have learned.

V. DISCUSSION

The findings showed a marked increase in the mean scores for the pre- and post-tests for the treatment group students post treatment.

The increase was noted particularly by 13 percent (from a mean score of 73.10 to a mean score 82.67) thus indicating that the use of video facilitated the students' achievement. This finding is in line with [5] study, which found that the undergraduate students who studied the skills and were exposed to the practice of using video in a potential learning session achieved better results than prior tests.

The findings of the analysis through MANOVA test also showed a significant difference in the pre-test and post-test scores for the treatment group. However, a difference is also noted in the pre and post-test performance mean scores for the control group. These differences, however, do not indicate that the traditional methods give a better effect than the treatment method introduced because the increase in post-test scores for the control group also occurred in the control group at week 10 of experiment.

It would be premature to conclude that a learning that took place during the period did not bring any benefit to the students. However, the mean scores for the treatment group is higher than the mean value for the control group, and such significant difference implies that the teaching process using the method of treatment affected the students' learning performance in remembering the contents of the lessons learned. Specifically, the use of video in T&L managed to strengthen the students' memory and understanding through clear and quality graphics, audio, and video elements.

Comparison of the post-test mean scores for both groups also showed the treatment group obtaining a higher mean score than the control group. Compared to the mean score of the pre-test achievement with the mean score of the post-test test for each group, a marked increase was noted for the treatment group from that of the control group. This finding clearly shows that the use of video approaches in T&L for electronic practice has a considerable impact on the treatment group in regard to student achievement, particularly when compared with the control group which used only conventional learning and did not receive any treatment.

It is also worth noting that the students who undergo learning with the teaching aids have a high potential for excellence. [6] concluded that the achievement score of students who used video in a learning session was better than those who used the traditional methods. According to [10], the use of video in the T&L process can provide control over student learning, inculcate good learning habits, and enhance student learning performance.

Also noted was the fact that all the students from the treatment group accepted the use of video for the T&L of electronic practice process, as evidenced by the analysis which indicates that all the items in the questionnaire received a mean value exceeding the scale value of 4. One possible reason is that the use of video was found to have positive effect on the students. [9] study also concluded that the use of video in T&L activities can motivate students and make them to feel more excited to learn. Hence, it is evident that the use of video in the T&L of electronic partitioning process can create a more efficient learning environment hence providing the students with learning performance.

VI. CONCLUSION

In conclusion, the findings of this study have shown that

the use of video in the T&L process for the subject Electronic Practice at vocational colleges has a great impact on the students in particular. Accordingly, the use of teaching aids in the form of this learning video should be extended to all vocational colleges or be made a default method of teaching the subject. However, some weaknesses still present themselves requiring improvement in further studies. The effectiveness of video use in the T&L for the subject Electronic Practices has been proven through this study and the findings are also in line with past studies on the importance of information and communication technology culture in the education sector in schools.

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