

Comparison of Video Tutorials and PowerPoint on Microsoft Project Learning Outcomes in Vocational High School

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Abstract

Advances in digital technology have had an impact on various aspects of life, including education. This study examines differences in students' learning outcomes between the use of video tutorial and PowerPoint media in Microsoft Project learning at a vocational high school. A quantitative approach with a quasi-experimental nonequivalent control group design was applied, involving two intact classes consisting of 30 students in each group. Data were collected through pretests, posttests, and student response questionnaires, and analyzed using descriptive statistics and a Mann-Whitney U test. The results show that the video tutorial group obtained a higher mean score (82.53) compared to the PowerPoint group (71.27). The hypothesis test also indicated a significant difference between the two groups with a significance value of 0.000 (<0.05). In addition, students gave very positive responses to the video tutorial media, with a percentage of 84.6%. These findings indicate that different learning media are associated with different learning outcomes in Microsoft Project instruction.

Keywords

Learning Outcomes; Microsoft Project; Powerpoint; Video Tutorial.



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INTRODUCTION

Advances in digital technology have had an impact on various aspects of life, including education. The change encourages vocational schools to adapt the learning process to technological developments and competency needs in the world of work (Mayer & Fiorella, 2021). In Vocational High School (SMK), learning aims not only to provide an understanding of concepts, but also to develop skills that can be directly applied in their field of expertise every (Fachri et al., 2021). Thus, the use of learning media is an important element that needs to be considered to support the achievement of educational goals.

In the Building Modeling and Information Design Expertise Program (DPIB), students are required to have the ability to provide an understanding of construction concepts as well as master various skills related to project planning and implementation. The characteristics of

learning cause the selection of learning media to be adjusted to the type of material studied. Media that is able to convey information clearly and systematically is expected to help students understand the content and improve the skills needed in the learning process (Alvianto, 2022; Mayer & Fiorella, 2021)

One of the materials that requires mastery of practical skills is construction scheduling using Microsoft Project. This software is used to compile project schedules, determine the duration of work, organize relationships between activities, and display project execution plans in a structured manner (H. P. Setiawan et al., 2024). In learning, students not only need to understand the function of each available feature, but also must be able to apply it through sequential work steps. This condition shows that Microsoft Project learning needs a medium that makes it easier for students to understand the procedure for using the application (A. Setiawan, 2024; Susanti et al., 2021).

One of the media that is widely used in skill-based learning is video tutorials. With the help of this media, students can observe the process directly through a visual display accompanied by an audio explanation. The presentation of the material that is carried out in stages allows students to follow each step of using the application more clearly. In addition, students are given the opportunity to play videos again according to their needs so that students can study the material independently and adjust their learning speed (Rubiyati et al., 2022). In addition, a number of studies show that the use of video tutorials can increase student engagement during the learning process (Mangesa, 2022).

In addition to video tutorials, PowerPoint is still a commonly used medium in learning activities in schools. This media is able to present information in the form of text, images, diagrams, and animations in a structured manner to make it easier for teachers to convey material (Damitri, 2020). The use of PowerPoint is relatively practical and easy to apply to a wide range of subjects (Amiruddin & Suroto, 2025). However, students' understanding of information that requires mastery of the work stages often depends on the teacher's explanations given during the learning process.

According to several studies, the use of different learning media can produce different learning outcomes. (Utami et al., 2020) report if students using video media achieve higher learning outcomes than students who study using PowerPoint. Similar findings were also presented by (Mudasih & Subroto, 2019) who found that the use of video media resulted in better learning outcomes than the use of PowerPoint. The results of the study indicate that the characteristics of learning media can affect the way students receive information and build understanding of the material learned (Mayer & Fiorella, 2021).

However, research on the comparison of the use of video tutorials and PowerPoint in Microsoft Project learning is still relatively limited. Most of the previous research was conducted on different subjects, education levels, and learning conditions (Mudasih & Subroto, 2019; Utami et al., 2020). In fact, Microsoft Project is a material that has special characteristics because it requires mastery of systematic software usage procedures (A. Setiawan, 2024; H. P. Setiawan et al., 2024). Therefore, research is needed that examines the comparison of the two media in the

same learning context in order to obtain a more appropriate picture of the characteristics of the material.

This research was conducted at SMK Negeri 1 Nganjuk on grade XI DPIB students who had never learned Microsoft Project before. This condition provides an opportunity to compare learning outcomes between groups of students who have relatively equivalent initial experience to the material studied. A comparison was made between students who learned when using video tutorials and students who learned when using PowerPoint in construction scheduling materials with Microsoft Project.

Based on this description, this study aims to determine the difference between the learning outcomes of students who receive learning using video tutorials and students who learn using PowerPoint on construction scheduling materials using Microsoft Project. The novelty of this study lies in the comparative study of the use of two learning media in the context of Microsoft Project learning in vocational school students who have no previous experience in using the software. The results of this study are expected to help as a consideration in the selection of appropriate learning media for application-based materials in vocational education.

The novelty of this study lies in the comparison of the use of Microsoft Project tutorial video media and PowerPoint media in construction scheduling learning in class XI DPIB SMK, which until now has rarely been studied directly in the context of construction software-based learning. This study examines differences in students' learning outcomes between the use of video tutorial and PowerPoint media in Microsoft Project learning at a vocational high school.

METHODS

This study uses a quantitative approach with a quasi experiment design of the Nonequivalent Control Group Design type (Sugiyono, 2016). The design was used to compare the learning outcomes of students who participated in learning using Microsoft Project tutorial video media with students who learned using PowerPoint media. Two groups were given a pretest before treatment and a posttest after learning was completed to get an idea of the changes in learning outcomes that occurred.

The research was conducted at SMK Negeri 1 Nganjuk in the even semester of the 2025/2026 school year. The research subjects consisted of 60 students in grade XI of the Building Modeling and Information Design Expertise Program (DPIB) which was divided into two classes. Class XI DPIB 1 had 30 students in the experimental group, while class XI DPIB 2 had 30 students in the control group. The determination of the sample was carried out using the intact group sampling technique because the class had been formed before the research was carried out (Arikunto, 2019).

The free variables in this study are the learning media in learning, namely Microsoft Project video tutorials in the experimental group and PowerPoint in the control group. The bound variable is in the form of student learning outcomes on construction scheduling materials using Microsoft Project.

The research data was obtained through learning outcome tests and student response questionnaires. The learning outcome test is used to measure students' skills in drafting construction scheduling using Microsoft Project. Before using the research instrument, the validity was tested using Pearson Product Moment correlation and also reliability using Cronbach's Alpha.

The assessment is carried out through practices that include setting up the project calendar, input work data, determining the duration of activities, arranging relationships between jobs (predecessor), input work weight, and presenting project schedules in the form of Gantt Charts. The assessment instrument is prepared based on learning indicators and has been validated by experts before being used in the research. In addition to the learning outcome test, a response questionnaire was given to students in the experimental group to find out their responses to the use of video tutorial media during learning.

The initial stage of the research was by giving a pretest to two groups to find out the initial ability of students. Next, the experimental group received learning using Microsoft Project video tutorials, while the control group received learning using PowerPoint media. The material taught in the two groups was made the same, namely construction scheduling using Microsoft Project. After each class was given a different treatment, two groups were given a posttest to obtain data on final learning outcomes. In the last stage, response questionnaires were distributed to students in the experimental group.

The data was analyzed using IBM SPSS Statistics 25 software with descriptive and inferential analysis methods. Descriptive analysis is used to describe the characteristics of the data based on minimum, maximum, average, and standard deviation values. Before testing the hypothesis, the posttest data was first checked to see if it was normally distributed using Shapiro-Wilk (Ghozali, 2018) and tested for variance from that group using Levene's Test. The hypothesis test was carried out with the provision that if the data were distributed normally and homogeneously, the Independent Samples t-test at a significance level of 0.05 was used, if the data did not meet the assumption of normality, the Mann-Whitney U nonparametric test at a significance level of 0.05 was used to determine the differentiation of learning outcomes between the two groups (Priyatno, 2014). Student response data is analyzed using percentages and interpreted based on student response categories referring to table 1. (Manap, 2014).

Table 1. Criteria for Interpretation of Student Responses

Percentage	Category
0% < R < 20%	Ineffective
20% < R < 40%	Less effective
40% < R < 60%	Quite effective
60% < R < 80%	Effective
80% < R < 100%	Highly Effective

FINDINGS AND DISCUSSION

Findings

The results of the study are presented based on an analysis of data obtained from pretest, posttest, and student response questionnaires. Data analysis was carried out in order to find out the initial condition of students' abilities before the learning process took place, assess the learning outcomes achieved after the treatment was given, and find out students' responses to the use of Microsoft Project video tutorial media. The data obtained was then analyzed descriptively and inferentially to answer the research objective, which was to determine the difference in learning outcomes between students who learned using Microsoft Project video tutorial media and students who learned using PowerPoint media

The analysis of the results of the research began by processing pretest data in order to provide an understanding of the initial condition of students' abilities in the experimental class and the control class before they received different learning. The results of the pretest analysis are used as a basis to ensure that the two groups have the same or almost the same initial condition, so that the comparison of learning outcomes after participating in learning can be done more fairly and objectively. A summary of the results of the descriptive analysis of the pretest scores of the two groups is shown in table 2.

Table 2. Pretest Descriptive Statistics Results

Classes	N	Minimum	Maximum	Mean	SD
Eksperimen	30	38	63	45,87	6,23
Control	30	25	58	41,93	9,53

Based on Table 2, the average pretest score of the experimental class was 45.87, while in the control class it was 41.93. The difference between the two groups on average is not so great that it shows that the students' initial abilities are not much different. In addition, the range of values obtained by the two groups is also still at a fairly balanced level. This condition shows that the two groups have a starting point that is equal enough to be used as a research subject. The results of the different tests in the pretest data showed a significance value of 0.064 (> 0.05), so that there was no significant difference in initial ability between the experimental class and the control class.

After all the learning series were completed, students in two groups took a posttest to measure the achievement of learning outcomes in construction scheduling materials using Microsoft Project. Table 3 presents a summary of the results of the descriptive analysis of existing posttest data to see the differentiation of learning outcomes between the experimental class and the control class after receiving different learning treatments.

Table 3. Posttest Descriptive Statistics Results

Classes	N	Minimum	Maximum	Mean	SD
Eksperimen	30	73	95	82,53	5,33
Control	30	52	83	71,27	8,35

Based on Table 3, the average score of student learning outcomes in the experimental class was 82.53, while in the control class the average score was 71.27. The average differential of 11.26 points showed a difference in learning outcomes between the two groups after

receiving different treatments. In addition to having a larger average, the experimental class also showed a more uniform distribution of values than the control class, for example as seen from the lower standard deviation values.

Before testing the hypothesis, the data is first checked whether it meets the requirements of normality and homogeneity. The results of the normality test using Shapiro–Wilk showed that the experimental class data had a significance level of 0.209, while the control class had a significance level of 0.013. Furthermore, the results of the homogeneity test using Levene's Test showed a significance value of 0.079. The results showed that the data were not normally distributed and the variance of the two groups was considered homogeneous until the differentiating test of learning outcomes was continued using the Mann-Whitney-U test. A summary of the hypothesis test results is presented in table 4.

Table 4. Tabel Mann-Whitney U

Test Statistics ^a	Nilai Posttest
Mann-Whitney U	125,500
Z	-4,803
Asymp. Sig. (2-tailed)	0,000
a. Grouping Variable: Kelas	

Based on Table 4, the significance value obtained was <0.001 less than 0.05. The results showed that there was a significant difference in learning outcomes between students who learned using Microsoft Project tutorial video media and students who learned using PowerPoint media. Thus, a research hypothesis that states that there is a differentiation of learning outcomes between the two groups is acceptable.

In addition to measuring learning outcomes, this study also collects student response data regarding the use of video tutorial media. The results of the questionnaire analysis showed that the student response reached a percentage of 84.6% and was in the very good category. The findings show that most students feel positive about the use of video tutorials in Microsoft Project learning.

Discussion

Multimedia learning theory put forward by (Mayer & Fiorella, 2021) Explain that students will be easier to understand when information is presented through a combination of visual and verbal elements. This theory is used as a basis for comparing learning outcomes between the group that studied with the Microsoft Project video tutorial and the group that used PowerPoint media.

Based on the results of the study, students who participated in learning using Microsoft Project video tutorials showed better learning outcomes than students who studied using PowerPoint. The findings are in line with multimedia learning theory (Mayer & Fiorella, 2021) which emphasizes the importance of presenting information through a combination of visual

and verbal elements in helping the process of understanding students. The results of statistical testing also showed if there was a considerable difference between the two groups. Because the initial abilities of the students in the two groups were relatively equal before learning was implemented, the differentiation of learning outcomes that occurred can be attributed to the characteristics of the learning media that existed during the learning process.

In the group that uses video tutorials, students have the opportunity to observe firsthand each stage of using Microsoft Project. The material is not only presented in the form of an explanation, but also shows the process of working starting from setting up the project calendar, compiling a work list, determining the duration, arranging the relationship between activities, to presenting the project schedule in the form of a Gantt Chart. This example presentation helps students understand the relationship between the concept and practice of using applications. In addition, video tutorials allow students to repeat certain parts when experiencing difficulties so that the learning process can take place according to the needs of each student.

Unlike video tutorials, PowerPoint media emphasizes the presentation of material in the form of concept summaries, pictures, and examples explained by the teacher during the lesson. The use of PowerPoint is still beneficial in helping to deliver material in a structured manner (Amiruddin & Suroto, 2025; Damitri, 2020). However, in materials that demand an understanding of software usage procedures, students need to pay attention to each step of the work in detail. When the demonstration process only lasts during classroom learning, the opportunity to re-observe that stage becomes more limited than learning using video tutorials.

The findings of this study are in accordance with the research (Rubiyati et al., 2022) which shows that students are helped when using video tutorials in providing an understanding of procedural material because each stage of work can be observed directly. Similar results were also reported by (Susanti et al., 2021) which shows if the use of video tutorials supports the learning of practical skills. In Microsoft Project learning, the ability to observe and follow the steps of using the application gradually becomes an important part because students not only learn the concept of construction scheduling, but also need to understand how to operate the software according to the correct procedures (H. P. Setiawan et al., 2024).

The results of this study also have similarities with the research (Mudasih & Subroto, 2019; Utami et al., 2020) which compares the use of video and PowerPoint media in different learning contexts. The two studies proved that there was a difference in learning outcomes between the group that used video media and the group that used PowerPoint. Although the objects and learning materials are different, similar findings suggest that the characteristics of learning media can influence the way learners receive information and develop an understanding of the material being studied.

The novelty in this study lies in the use of the existing learning context, namely construction scheduling materials using Microsoft Project in the Building Modeling and Information Design Expertise Program (DPIB) at SMK. Previous research has generally

discussed comparisons of video and PowerPoint media in other subjects (Mudasih & Subroto, 2019; Utami et al., 2020), while this research focuses on construction software-based learning that requires a systematic understanding of work steps. Therefore, this study provides additional empirical evidence regarding the comparison of the use of video tutorials and PowerPoint in Microsoft Project learning which is still relatively rarely studied, especially in vocational learning oriented towards construction software use skills.

In addition to being reviewed from the learning results, the use of video tutorials also received positive responses from students. The response of students in the category is very good, showing that the media is easy to follow and helps the process of understanding the material. Students also assessed that the video tutorial made it easier to relearn parts that were not understood. These findings are in line with the opinion (Mangesa, 2022) which states that video tutorials provide learning flexibility because the material can be accessed again according to the needs of students.

The results of this study show that the characteristics of learning media need to be considered in conducting Microsoft Project learning which requires an understanding of systematic software use procedures. The difference is that the way the material is presented in video tutorials and PowerPoint provides a different learning experience for students. Therefore, it is hoped that the results of this research can be an additional reference in the selection of learning media on application-based materials in vocational education.

CONCLUSION

This study demonstrates that there is a significant difference in learning outcomes between students who learned using Microsoft Project tutorial video media and those who learned using PowerPoint media in construction scheduling materials for Grade XI DPIB students at SMK Negeri 1 Nganjuk. The difference is reflected in the posttest results, where the experimental class achieved a higher average score (82.53) compared to the control class (71.27). Furthermore, the Mann–Whitney U test indicated a significance value of <0.001 (<0.05), confirming that the difference in learning outcomes between the two groups was statistically significant. In addition, students showed a highly positive response to the use of tutorial video media, with a response rate of 84.6%. This finding suggests that tutorial videos help students understand Microsoft Project procedures more clearly, systematically, and independently, as the material can be reviewed repeatedly according to individual learning needs. Therefore, the use of Microsoft Project tutorial videos can be considered an effective learning medium for improving both learning outcomes and learning experiences in construction scheduling instruction.

Based on these findings, teachers in the Building Modeling and Information Design (DPIB) program are encouraged to integrate tutorial video media into Microsoft Project learning, particularly for procedural materials that require step-by-step demonstrations. The effectiveness of learning may be further enhanced by combining video tutorials with hands-on practice sessions in computer laboratories. Since this study was limited to construction

scheduling materials and involved a relatively small sample from a single school, future research should explore the application of tutorial video media in different subjects, competencies, or vocational programs with larger and more diverse samples. Further studies may also investigate the effects of tutorial video media on other educational outcomes, such as learning motivation, practical skills, and long-term knowledge retention, to provide a more comprehensive understanding of the role of digital learning media in vocational education.

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