The Influence of The Computer Network Flipbook with The *Subak* Concept Analogy on The Learning Outcomes of Vocational Students

Ketut Agustini[1], D.S. Wahyuni[2], I.N.E. Mertayasa[3], N.Sugihartini, I.G.Bendesa Subawa, I.K. Andika.P

{ketutagustini@undiksha.ac.id[1], seri.wahyuni@undiksha.ac.id[2], eka.mertayasa@undiksha.ac.id[3], sugihartini@undiksha.ac.id[4], bendesa.subawa@undiksha.ac.id[5], ipradnyana@undiksha.ac.id[6]}

Universitas Pendidikan Ganesha, Jl. Udayana No. 11 Singaraja, Bali, Indonesia[1,2,3,4,5,6]

Abstract. The demands of teacher creativity in packaging learning resources that are interesting and make it easier for students to learn are very high, and the textbook has been repackaged into a valid flipbook has been done. This study aims to analyze the influence of computer network flipbooks with the Subak concept analogy on student learning outcomes. The population in this study was all class XI TKJ students at SMK Negeri 3 Singaraja which amounted to 112 students. The sample is determined by the intact group technique. on 54 students. The research design used Posttest Only Control Group Design. Data collection uses the methods of interview, observation, documentation, and tests, but the analyzed data are tests. The student test score is the average post-test score for the experimental class of 79.55 and the control class of 75.53 which is then analyzed with a t-test that gives results = 3.31. This result shows that there is a significant influence of learning activities using computer network flipbook media with the Subak concept analogy on the learning outcomes of class XI TKJ students at SMK Negeri 3 Singaraja.

Keywords: Flipbook, a computer network with the Subak concept analogy, student learning outcomes.

1 Introduction

The Covid-19 pandemic has dramatically changed everything, including the world of education with changes in how we learn and teach. Today's students/learners have to get used to distance learning through digital platforms due to social distancing [1]. Although some schools are reopening, this trend continues until an undetermined time limit. The latest Education Technology trends are being revolutionized with a strong focus on connectivity, versatility, and student-centered learning (https://elearningindustry.com/top-educational-technology-trends-2020-2021).

Teachers as agents of change are also required to always be creative and innovative in making changes in the school environment related to learning [2]. Teachers must embrace technology to quickly repackage content and make the learning process an engaging new experience for students [3] [4]. The learning resources and media that support the learning process also need

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to be rapidly transformed into digital formats to keep up with current trends. As AECT points out, educators need to move from traditional books to digital formats to make learning more effective.

In the current digital era, computer technology has been carried out in the learning process but it is not yet comprehensive, especially at the Vocational High School (SMK) level. The current learning resources that professional students refer to are still traditional books or printed materials. The downside of this printed material is that it looks awful and is rarely carried by students as they want something simple and easy to carry everywhere [5]–[7]. Enable teachers to create innovative teaching materials using engaging information technology that can be picked up and read anytime, anywhere [8]. Especially now that students are already identified with gadgets (smartphones) that are often carried by students. These opportunities should be utilized by teachers to improve the quality of learning. It aims to improve student learning outcomes. Learning outcomes are a reflection of students' true abilities so that they can find out the level of student understanding of the material that has been studied [9]. To improve learning outcomes, a medium and learning model is needed that provides activity for students to learn. Learning activities with the right media will be able to improve student learning outcomes. The selection of media must consider terms of its suitability to the material taught as well as the circumstances, learning characteristics, and abilities of students as well as the allocation of teaching and learning time in the classroom they have. The use of learning media is also very helpful for the learning process and the delivery of messages and lesson content[10], [11]. In addition to generating student motivation and interest, learning media can also increase understanding, and present data interestingly and reliably.

Based on preliminary research and discussions with several PPG teachers, especially from vocational high schools majoring in Computer and Network Engineering (TKJ), Innovation is needed to create digital-based materials that students can access from their own devices. It was determined that there was In order for students to easily access these materials, the materials developed should use software that runs on her Android platform. Researchers estimate that approximately 90% of college students have her Android-primarily based totally gadgets.

The textbook "Data Communication and Computer Networks and Their Analogies in Subak Concepts" is a printed textbook used especially by high school students in the TKJ department as a reference in studying the concepts of computer networks. Based on the current situation and the results of identifying issues in schools, it is necessary to repackage textbooks in the form of interesting digital module innovation (IMD) to increase students' interest and insight into knowledge of local wisdom. there is. A concept similar to the knowledge *Subak* learned: computer networks. The digital teaching materials provided are in the form of e-books based on his Flip Book Makers, an e-book application with images, sounds and videos. Flash flipbooks have several advantages such as the learning process becoming more interesting, the learning process feeling more enjoyable, making students more active in the learning process, can help students in independent learning, and is easy to use because it does not require special skills in its operation. This feature motivates students to learn and makes it easier to read from any device. [12], [13]. The use of electronic materials influences increased student participation in classroom learning [6][14]. This led to the development of a computer network flipbook with Subak's concept logo as an attractive digital learning medium for colleges. This article discusses the impact of these products on SMK student learning outcomes. This validated and tested

product represents a game-changer in learning technology and can inspire teachers to innovatively package teaching materials that are attractively presented to students.

Based on this background, this study will look for the influence of computer network flipbooks with the Subak concept logo on student learning outcomes in vocational students. This study presents the influence of learning activities on student learning outcomes in the implementation of the Computer Network flipbook which has the Subak concept analogy as Attractive Digital Learning Media.

2 Method

The research method used in this study is Quantitative Research with experimental methods. The quantitative research method of experimentation can be interpreted as a research method used to find the influence of certain treatments or treatments on others under controlled conditions. This article was created from the results of an experimental study with posttest only control group design research design. In this design, neither the experimental group nor the control group was randomly selected. In this design, both the experimental group and the control group were compared. The experimental class gets the treatment while the control class doesn't get treatment.

Table 1. *post-test control group design Schema*

Group/class	treatment	Posttest
Experiment	X	O
Control	-	O

In the design of this method, the experimental group was given treatment, namely in the learning process using computer network flipbook media with the Subak concept. Whereas in the control group, the learning process was carried out, as usual, the researcher did not provide treatment or treatment. Both groups were given the same final test or posttest as an assessment tool to find out the learning outcomes of students from the two groups.

This research was carried out at SMK NEGERI 3 Singaraja. The population in this study was class XI TKJ students at SMK Negeri 3 Singaraja which consisted of 4 classes totaling 112 students. Sampling was carried out using the intact group technique. In this study, sampling was carried out by providing pre-tests in classes TKJ 1, TKJ 2, TKJ 3, and TKJ 4, then 2 classes were selected that had an average and standard deviation that was not much different / the same, namely TKJ A and TKJ B classes.

The data that wants to be known in this study is student learning outcomes. The data collection technique used is in the form of a written test. In terms of content, the tests used already meet the elements of basic competencies used. Meanwhile, the empirical validation analysis, which was reviewed from the analysis of the internal consistency of the test, included 15 test questions, of the 15 test questions tested, 3 were declared invalid and 12 were declared valid. Of the 12 valid test questions, 10 test questions were selected. The test reliability analysis states that the reliability of the objective test and the essay test of 0.908 is at a very high qualification. The analysis of the difficulty level of the test obtained 6 questions including the medium category and 4 questions including the difficult category. Analysis of the differentiation of the test items

obtained 9 questions about having a differential power index in the excellent category and 1 question about having a different power index in the good category.

Data on student learning outcomes were taken by providing post-tests to students after applying learning activities using a computer network flipbook with the concept of Subak and applying conventional learning activities. The hypothesis in this study was analyzed using the t-test.

3 Findings and discussion

Data from the learning outcome test were obtained by conducting a post-test on 27 students in the experimental group, with 6 students receiving excellent predicates and 16 students receiving good predicates, received appropriate predicates from up to five students. subordinate predicate and never was. The highest score on this test is 90 and the lowest is 73. With statistical calculations obtained the final test result the average value is 79.55, standard deviation (Sd) = 5.62.

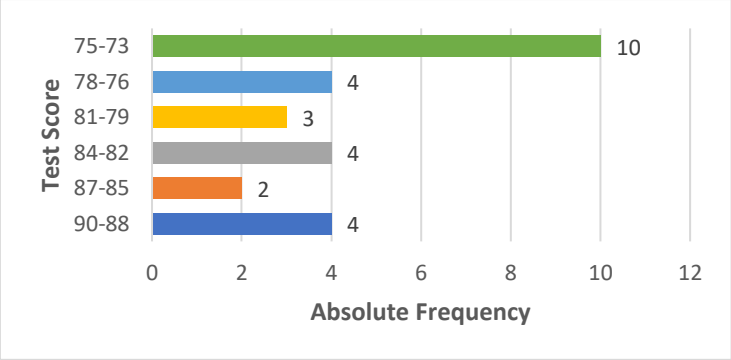

Figure 1. Experimental Class Final Test Scores

A post-test of 27 students in the control class revealed that the number of students with good grades was 2 students with good grades, up to 12 students with good grades, and less received predicates. With a maximum of 14 students, fewer misses. The maximum score for this test is 88 and the minimum score is 65. From statistical calculations obtained the average result of the value is 75.53, standard deviation (Sd) = 5.93.

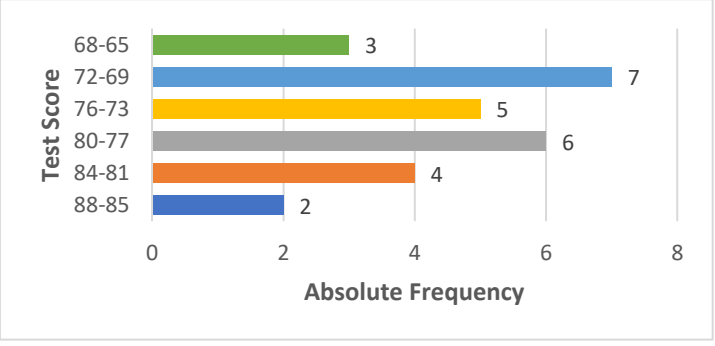

Figure 2. Control Group Final Test Scores

Based on the comparison of the average scores of learning outcomes, it shows that the average score of student learning outcomes of the experimental group is higher than the average score of the learning outcomes of the study results of the students of the control group. So, learning using a computer network flipbook with the Subak concept is more effective in improving the learning outcomes of SMK students either than the learning outcomes of students who are taught through the lecture method (conventional).

Before hypothesis testing with an independent test, it is first carried out to test the prerequisites needed for the distribution of research data. The prerequisite test of the analysis includes two things, namely (1) the normality test of the distribution of data to the entire unit of analysis, and (2) the test of homogeneity of the variance between groups.

A normality check turned into finished to decide whether or not the look at populace turned into typically distributed. This check makes use of the Kolmogorov-Smirnov check formula. This normality check is finished on experimental and manipulate elegance data, along with preliminary and very last check effects for every group. The significance level used to determine the normality of the data is 0.05 or at the level of 5%. A summary of the results of the data normality test in the experimental group and the control group are presented in table 2.

Table 2. Summary of Data Distribution Normality Test Results

Data Groups	Test	n	Mean	Dmax	DTable
Post Test Experiments	Initial Test	27	67,74	-0,09536	0,2540
	Final Test		79,55	-0,1585	
Post Test Control	Initial Test	27	69	0,04255	0,2540
	Final Test		75,53	-0,07227	

Based on the Kolmogorov-Smirnov calculation from the experimental group, the first test gave Dmaks = -0.09536. Dtabel, the first test data population for the experimental group was normally distributed. The final test gave Dmaks = -0.1585, Dtabel = 0.2540, N = 27 with a significance of $\alpha = 0.05$. Since Dmaks <> Dtabel, the final experimental group test data population was normally distributed. The control group received Dmaks = 0.04255 on the first test, but Dtabel = 0.2540 at the significance level $\alpha = 0.05$ and N = 27. The first test data population for the control group, Dtabel, was normally distributed. The final test yielded Dmax = -0.07227, but Dtabel = 0.2540 with N = 27 and a significance level of $\alpha = 0.05$. Dtabel, the final control group test data population was normally distributed. Therefore, the distribution of data from both groups is declared normal.

The homogeneity test was carried out to prove that the data obtained from the research results in the form of student learning outcomes (initial test and final test) in both groups from both the experimental class and the control class had similarities in variants or not. The homogeneity test on the data from this study used a Bartlet test at a significant level ($\alpha = 0.05$) with the test criteria $\chi 2$calculation < $\chi 2$table. The results of the homogeneity test calculation can be seen in table 3.

Table 3. Homogeneity Test

Group/Class	n	Variants (s)	χ2hitung	χ2tabel	Information
Experiment	27	5,5	0,45	3,84	Homogenous
Control	27	5,35	0,9	3,84	Homogenous

Based on the table above, the results of the homogeneity test calculation in the experimental group were obtained χ2count = 0.45 and χ2table = 3.84 while in the control group obtained χ2count = 0.9 and χ2table = 3.84. This indicates that the data for both groups have a uniform variance with χ2 count values <1. χ2 table. Allows the next test, the hypothesis test, to run.

After performing normality and uniformity of variance tests, obtain results for normally distributed data and obtain uniform variances. Then perform a statistical test t.

Table 4. Differences between the initial test and the final test of each group

Test	Group	N	Mean	Md	t-count	t-table
Pre-test	Experiment	27	67,46	-1,44	-0,33	2,056
	Control		69			
Post-test	Experiment		79,55	4,33	3,31	2,056
	Control		75,53			

In the first test, the t-value for each group is -0.33, which is below the 5% t table value of 2.056. This means that the first test found no significant difference between the experimental and control groups. On the other hand, the t-value for the last test was 3.31, exceeding the 5% t table value of 2,056. This means that there is a significant difference between the experimental and control groups at the final test.

Based on the test results of the initial and final tests above, it can be said that the initial ability of students in the experiential and control classes is the same, but the learning outcomes after treatment are different. Therefore, there is a difference in student learning outcomes when using computer network flipbook media as engaging digital learning media in the Subak concept and when not using flipbook media in his TKJ class at SMK Negeri 3 Singaraja. So, the achievement of student learning outcomes with computer network flipbook media in the Subak concept as an attractive digital learning media is higher than in the lecture method.

Insights were gained from the analyzed research data. So the average initial test grade for the experimental class = 67.46. This indicates that the student's initial proficiency on the tested subject is still very low. I'm studying In this first test, students can only guess. A final test was administered with an average score of 79.55 after processing in the form of learning using computer network flip-flop media of the Subak concept as an engaging digital learning medium. There is an increase in the results of this test because students make discourses based on the knowledge, they have learned from the learning treatment that has been given. The use of flipbook media as an attractive digital learning media is following the characteristics of SMK students. Based on research findings that some of the traits that influence a student's learning success are motivation, knowledge and learning style, flipbooks are highly adaptable according to student characteristics. Based on student characteristics, most professional students need

support in learning using interactive flipbooks, so the teacher's role as a facilitator is very important. This is consistent with Vygotsky's scaffolding theory, which argues that with sufficient support, students can reach the greatest realm. When students learn unaided, they are unable to reach their higher potential and remain in the field. / It can be said to be a bridge that connects what we know. The main thing in the application of scaffolding lies in the guidance of the teacher. By giving students problems and then gradually guiding teachers, we ensure that students' actual abilities reach their potential. Help can take the form of instructions, encouragement, warnings, step-by-step instructions on how to solve a problem, or providing examples [15][16][17]

In the lecture-based control group, the average initial test score was 69. As with experiential education, students typically answer this initial test by guessing because the material being tested is not what the student learned. On the other hand, after students received lecture-based learning therapy, their final test scores averaged 75.53, an increase compared to their initial test scores. Comparing the mean initial test scores of the two study groups, we found that the learning outcomes of the experimental class were greater than those of the control class. This occurs because experimental education uses computer network flipbook media with the concept of the Subak analogy as an engaging digital learning medium, encouraging students to become more actively involved in the learning process. There is likely to be. [7], [12], [18]. In a control class, students experience learning activities in a lecture format, so students typically only passively listen to instructions. Students' activeness is more on taking notes and occasionally asking questions. Activities that only listen and take notes, cause boredom for students, which results in students' lack of attention to the lessons delivered. From the two learning activities above, students achieve better learning outcomes in computer networks than in lectures when learning using computer network flipbook media with the concept of the Subak analogy as an engaging digital learning medium. Because of this, it is clear that a deeper learning experience can be obtained. base learning method. This means that learning how to use flipbooks as a learning medium can have a fairly positive impact on a student's understanding of the material presented [19], [20]. Thus indirectly affecting the improvement of students' critical thinking [21], [22]. It is also supported by research [23] which states that the development of learning media makes students faster to capture the information presented in learning content based on visuals, animations, and graphics than textual forms.

A student's learning experience after using an interactive flipbook is inseparable from the Dale Cone experience. This creates a tangible abstract network of students participating in real experiences and students as observers of reality. It leads to students as observers of world events, students presented by the media, and finally events represented in symbols. These concrete and abstract traces are represented in the form of adventure cones. Edgar Dale's Cone of Experience is a detailed account of Bruner's proposed three levels of experience. Human learning outcomes derive from verbal symbols through direct experience, realities present in living environments, and artifacts. The higher the tip of the cone, the more abstract the medium of the message. Dale's Cone Representation is a level of learning experience ranked according to the specificity and relevance of the learning experience and the receptivity of the lesson content and message. By converting it into symbols such as charts, graphs, and words, the abstraction of the message increases. When messages are contained in such symbols, the meaning of interpretation becomes increasingly restricted [24][25]. An interactive flipbook based on The Cone of Experience, containing still images, visual symbols and phrases that clarify the content of the

material. Students will also experience first-hand the concepts of understanding the concepts of data communications and computer networks by viewing, using, and manipulating these materials.

4 Conclusion

This study found that the learning activities of computer network materials assisted by flipbooks with the Subak concept had a positive effect on the learning outcomes of class XI TKJ students at SMK Negeri 3 Singaraja. Learning activities of computer network materials assisted by flipbooks with the Subak concept show better learning outcomes compared to conventional learning activities. Therefore, it is recommended that teaching teachers should use flipbook-based learning media with the concept of Subak in their classrooms as an alternative to learning so that it is more effective. This research can be used as a reference to conduct further research on different subjects.

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