

EFFECTIVENESS: PACKAGING DESIGN ONLINE EDITOR TECHNOLOGY ON LEARNING

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Abstract— The purpose of this study is to demonstrate the effectiveness of using the latest design online editor technology, Pacdora, as a learning medium for VCD Packaging courses. This research uses a qualitative descriptive research method using survey results as a source of quantitative data. The post-test results showed normal distribution ($\text{Sig} > 0.05$), and the significance of the post-test of the creativity variable of the experimental group Sig value was 0.087, and the Sig value of the control group post-test was 0.076. Homogeneity of both groups ($\text{sig } 0.077 > 0.05$). The post-test independent sample t-test showed a significant increase in creativity between the experimental group and the control group ($\text{sig } 0.000 < 0.05$). The average post-test of creativity of the experimental group (64.83) was higher than that of the control group (49.57). Based on the results and discussion, the use of Pacdora online editor is considered effective in improving creativity in learning packaging dieline design. Therefore, the Pacdora online editor is considered suitable as a learning media to support and expedite the teaching and learning activities of lecturers and students.

Keywords— *Learning Media, Pacdora online editor, Dieline Packaging.*

1 Introduction

In an era of rapid technological advancement, the role of Visual Communication Design (VCD) has become important in various fields of life, from branding to marketing strategies. Advances in technology are driving changes in creative approaches, giving design students more opportunities to develop their skills. Currently, the use of printed learning resources such as books is considered less effective in responding to various challenges due to the rapid development of technology and the influence of the digital era. (Jasrial, Saputra, & Rifma, 2023). Online platforms are essential to support the learning process and stimulate greater creativity. With this change, the concept of learning organisations has become more modernised (Halimah & Marwati, 2022).

The utilisation of digital technology in education has become an important issue to improve access to education through access to various digital platforms and the provision of websites as online learning media. (Leksono, Marianingsih, Ilman, & Maryani, 2021). One of the latest packaging design online editors, 'PACDORA' is an online packaging design tool that integrates editing, 3D preview, rendering, and export into a single web product. Designers no longer need to buy and install multiple software and can do all their work in the browser. (Pacdora, 2023). Pacdora is specifically designed for easy creation of packaging dielines. The website can be developed and modified as needed and

used for learning according to teaching and learning needs and student skills. (Chang, Tzung-Shi, & Wei-Hsiang, 2011). Pacdora not only simplifies the design process, but also offers advanced features designed to enhance the creativity of design students. The utilisation of technology such as websites as a learning tool has become a trend in the world of education, especially in today's digital era. (Damayanti & Deni, 2014). As such, an online editor can have an optimal impact if it is well designed (Peterson, 1998).

Seeing the dynamics of these changes, research on the effectiveness of Pacdora in increasing the creativity of design students is very important. The utilisation of technology in design education can change the way students interact with learning materials and design creative concepts. Creative learning engages students in the process of discovering and creating new ideas (Zhuang, et al, 2021).

Creativity refers to the use of advanced cognitive abilities to generate useful and unique responses and ideas (Redifer, Bae, & Zhao, 2021). Creative thinking is a cognitive process that leads to spontaneous and original thinking through open-ended questions (Zhang, Guo, & Xiao, 2021). Pacdora can act as a catalyst for student creativity, especially during the packaging dieline design process. Dieline, which is a model of product image and design, plays an important role as a guide for designers before creating the final product. In reality, dieline serves as a visualisation that supports the process of design execution and product presentation. Especially when evaluating a product from superiors or customers, the use of dieline can help clarify the product image. Therefore, the dieline plays an important role in accepting the design concept (Apridesain, 2022).

This study aims to determine the extent to which Pacdora as a web-based learning media can increase student creativity in designing packaging dieline. Learning media such as Pacdora is considered a means of delivering information that stimulates students' attention and interest in learning (Rusman, 2013). Therefore, this study examines the extent to which web-based learning media such as Pacdora can enhance creativity in making packaging dieline.

The research method is to closely observe students using the Pacdora website. Observations include various aspects such as the level of engagement, adaptability to Pacdora's functions, and the resulting skills. The data collected was thoroughly analysed to provide detailed insights into the impact of using Pacdora in the context of design education. Before the Pacdora editing website is widely used in educational settings, careful research should be conducted to assess its effectiveness as a learning medium (Abdillah & Agus, 2017).

Considering the above problems, this research discusses whether the Pacdora editing website can increase student creativity in the VCD Packaging course at the Visual Communication Design Study Programme, Faculty of Design and Creative Industries, Esa Unggul University.

2 Literature review

The word "media" comes from the Latin "medius" which literally means middle, intermediary, or introducer. In Arabic, "media" is defined as an intermediary or messenger from the sender to the recipient of the message (Arsyad, 2013). Media is a messenger from the sender to the recipient of the message; thus, the media is a vehicle for channeling learning information or channeling messages (Rusman, 2013).

According to the National Education Association (NEA), media are printed and audiovisual forms of communication and their equipment. Media should be manipulable, can be seen, heard, and read (Sadiman, 2012).

Based on the above opinion, it can be concluded that media is a tool used to support learning so that learning can run well. Media can also be interpreted as a link between the giver and receiver of information. Learning media is any form of communication tool that can be used to convey information from sources to learners in a planned manner so as to create a conducive learning environment, where the recipient can carry out the learning process efficiently and effectively. In conclusion, learning media is anything that can be used to convey messages or information in the teaching and learning process so that it can stimulate the attention and interest of students in learning (Arsyad, 2013).

Packaging is not just an industrial necessity, but also acts as an added value of a product. Packaging serves as an effective information and marketing tool, especially if it is designed creatively and attractively to be easily remembered by consumers. Packaging involves design structure, graphic design, and product information (Cahyorini & Rusfian, 2011).

However, (Danger, 1992) views packaging as a container or wrapper that helps prepare goods for transport, distribution, storage, sale, and use; with packaging, the product inside will be protected. views packaging as a container or wrapper that helps prepare goods for transport, distribution, storage, sale, and use; with packaging, the product inside will be protected. Describes packaging as a creative design that combines structure, material, shape, colour, and design elements with other product information to facilitate marketing.

Visual Communication Design (VCD) as a design discipline covers a wide range of creative aspects, including packaging design. In the context of learning packaging design, visual language and design principles are used as the foundation for creating effective packaging design. Students learn to apply relevant visual elements, design principles and design techniques to convey brand messages, attract consumer attention and create positive experiences through product packaging. Packaging pattern making in the packaging design course is one of the important processes in the beginning of designing packaging products. Therefore, the selection and use of tools in learning packaging dieline making is a crucial factor that must be carefully considered in order to achieve effective learning outcomes.

Creative and attractive packaging design can increase the attractiveness of the product and help consumers remember it. Packaging design involves various aspects, including design structure, graphic design, and product information. It creates a visual experience for consumers and plays an important role in marketing. In the context of learning packaging design, students learn to apply relevant visual elements, design principles and design techniques. They use their creativity to convey brand messages, grab consumers' attention, and create positive experiences through packaging design.

3 Research methods

This study used a quasi-experimental design. Evaluation of the effectiveness of using Pacdora online editor as a learning tool was conducted by comparing the control and experimental groups. The purpose of this trial is to observe the effects of a particular action. The research design used was pre-test and post-test group design using one type of treatment. In the pre-test and post-test control group design, two classes are directly selected and a pre-test is conducted to evaluate the initial conditions and detect the improvement between the experimental and control classes (Sugiyono, 2009).

Table 1 Pre-test-Post-test Control Group Design

Class	Pre-test	Treat	Post-test
Experimen	O ₁	X	O ₂
Control	O ₁		O ₂

Keterangan :

O₁: Experimental Class Pre-test

O₁: Control Class Pre-test

O₂: Experimental Class Post-test

O₂: Control Class Post-test

X: Learning Media Treatment

The participants in this study consisted of students of the Visual Communication Design Study Programme who were carrying out the task of making packaging dieline. Sampling was carried out by applying random sampling techniques, providing equal opportunities for all members of the population of 70 students, with each group consisting of 35 students. The research procedure involved two groups as follows:

- a. Control group: This group will undergo learning with the design method using the image editor software, without using the Pacdora online editor. Baseline data will be collected before the start of the course.
- b. Experimental group: This group will use Pacdora online editor as a learning medium during the same period as the control group. Baseline data will also be collected before the start of the lesson.

After the learning period, final data will be collected from both groups to evaluate changes in learning outcomes. The research instruments include:

- a. Questionnaire: Measuring creativity related to the experience of using Pacdora's online editor in designing dieline designs.
- b. Observation: Observing and recording the results of the performance assessment test. The observation sheet was prepared based on the creativity variable indicator data.

Data analysis will involve a comparison between the control group and the experimental group to identify the significant impact of using Pacdora online editor as a learning medium.

4 Results and discussion

4.1 Results

The following are the results of the analysis of the research questionnaire regarding the Effectiveness of the 'Pacdora' online editor as a Learning Media on Packaging Dieline Design. The evaluation instrument consisted of 20 objective questions presented to students of the Visual Communication Design Study Programme at the Faculty of Design and Creative Industries. The data analysis methods applied in this study include: 1) prerequisite tests, such as the normality test, 2) homogeneity test, and 3) hypothesis testing (Sugiyono, 2014).

The validity and reliability of the creativity assessment instrument were tested using SPSS version 22.0 statistical software. Instrument testing was carried out involving a sample of 70 students, which was selected to ensure that the questions in the questionnaire had a reliable level of validity. The validity test is carried out by comparing the calculated r value with the r table for the degree of freedom (df) = $n-2$, with n as the number of samples in this study, namely 70. By calculating $df = 68$ and $\alpha = 0.05$, the value of r table = 0.2352 is obtained (referring to the r table at $df = 68$ with a two-sided test). The principle applied is if the value of r count $>$ r table (0.2352), then the questions in the questionnaire are considered valid, and vice versa.

Table 2. Validity Test Results of Creativity Indicators

Variable: Creativity	R- calculated	α	R-table	Conclusion
.1	.541	>	.2352	Valid
.2	.728	>	.2352	Valid
.3	.645	>	.2352	Valid
.4	.720	>	.2352	Valid
.5	.675	>	.2352	Valid
.6	.615	>	.2352	Valid
.7	.481	>	.2352	Valid
.8	.691	>	.2352	Valid
.9	.644	>	.2352	Valid
.10	.662	>	.2352	Valid
.11	.368	>	.2352	Valid
.12	.691	>	.2352	Valid
.13	.645	>	.2352	Valid
.14	.720	>	.2352	Valid
.15	.675	>	.2352	Valid
.16	.615	>	.2352	Valid
.17	.481	>	.2352	Valid
.18	.691	>	.2352	Valid
.19	.644	>	.2352	Valid
.20	.662	>	.2352	Valid

From the figure above, it is known that the R-count value of each questionnaire item is greater than the R-table, which is 0.2097. The conclusion is that all questionnaire items that have been distributed to participants can be said to be valid as data collection tools.

The reliability test is used to test whether the instrument used is reliable. Reliable if there is similarity in data at different times. This reliability testing technique uses analytical techniques that have been developed by Alpha Cronbach. In this reliability test, α is considered reliable if it is greater than 0.6 (Ghozali & Imam, 2005). The rules for determining whether an instrument is reliable or not are as follows:

- 1) If the Cronbach Alpha reliability number exceeds 0.6, the instrument is reliable, the questionnaire can be trusted and can be used.
- 2) If the Cronbach Alpha reliability figure is less than 0.6 then the instrument is not reliable, the questionnaire cannot be trusted and cannot be used.

Tabel 3. Statistik Reabilitas

ase Processing Summary

Cases	Valid	70	100.0
	Excluded ^a	0	.0
	Total	70	100.0

Listwise deletion based on all variables in the procedure.

eliability Statistics

Cronbach's Alpha	N of Items
.920	20

From the table above, it can be seen that the Cronbach Alpha value of all variables is more than 0.6, namely 0.920, so it can be concluded that all question items used in the questionnaire are reliable, which means that there is similar data at different times and the resulting data is accurate.

Effectiveness of Pacdora online editor-based learning media to improve creativity.

Pre-test is a test given before learning to measure students' initial abilities. The results of the pre-test scores of student creativity in the Experimental Class and Control Class can be seen in Table 4.

Table 4 Creativity Pre-test Score

Experiment Class		Control Class	
Respondents	Pre-test score	Respondents	Pre-test score
R1	60	R1	57
R2	66	R2	61
R3	60	R3	57
R4	58	R4	59
R5	69	R5	67
R6	68	R6	65
R7	61	R7	60
R8	62	R8	60
R9	71	R9	68
R10	73	R10	71
R11	69	R11	67
R12	70	R12	66
R13	66	R13	63
R14	58	R14	61
R15	68	R15	65
R16	52	R16	53
R17	56	R17	58
R18	64	R18	62
R19	53	R19	52
R20	58	R20	55
R21	63	R21	60

R22	51	R22	51
R23	56	R23	58
R24	66	R24	66
R25	47	R25	46
R26	50	R26	48
R27	48	R27	44
R28	59	R28	53
R29	47	R29	44
R30	63	R30	58
R31	58	R31	59
R32	64	R32	65
R33	55	R33	55
R34	65	R34	58
R35	62	R35	56

Analytical needs testing is carried out in such a way that the conclusions drawn do not deviate from the truth to be taken. Before running the analysis, several tests of analytical requirements were carried out, including normality and homogeneity tests. The normality test is a test carried out before data processing based on the proposed research model. The data normality test aims to determine the distribution of data in the variables used in the study. Data that is suitable for proving the research model is data with normally distributed data. To test normality, the Shapiro-Wilk formula was used for small samples (<100).

Tabel 5 Creativity Pre-test Normality Test Results

class	Shapiro-Wilk		
	Statistic	df	Sig.

Variable Score	Pre-test Experimen	.969	35	.413
	Pre-test Control	.966	35	.343

Based on the results of the Shapiro-Wilk normality test using SPSS Statistics 22, it is known that the significance of the experimental creativity variable pre-test obtained a significance value of 0.413 and the control pre-test obtained a significance value of 0.343. As required, if the significant value > 0.05 then the residual value is normally distributed.

Homogeneity test is used to distinguish two or more groups. The homogeneity test was applied to the pre-test data of the experimental group and the control group.

Table 6

est of Homogeneity of Variances

variable Score

Levene Statistic	df1	df2	Sig.
.345	1	68	.559

The results of the data homogeneity test using SPSS Statistic 22, obtained a sig value of 0.559. The requirement for data homogeneity is a significant value > 0.05 then the data is homogeneous. The independent sample t test is used to determine whether there is an increase in the average of two unpaired samples.

Table 7 Results of Sig. (2-tailed) Creativity Pre-test

dependent Samples Test

	Variable Score	
	Equal variances assumed	Equal variances not assumed

Levene's Test	F	.345	
for Equality of			
Variances	Sig.	.559	
t-test for	t	1.170	1.170
Equality of			
Means	df	68	67.858
	Sig. (2-tailed)	.246	.246
	Mean Difference	1.943	1.943
	Std. Error Difference	1.660	1.660
5% Confidence Interval of	Lower	-1.370	-1.370
the Difference	Upper	5.255	5.256

The test criteria uses the following significance figures:

If the significance number (Sig.) > 0.05, then H_0 is accepted, H_1 is rejected

If the significance number (Sig.) < 0.05, then H_0 is rejected, H_1 is accepted

The pre-test test results above, resulted in a significance value > 0.05 then H_0 is accepted, H_1 is rejected. The significance value of 0.246 > 0.05 means that there is no increase in creativity ability.

After the experimental group received treatment, a post-test was then given to the experimental group and the control group. *Post-test is a test of ability given to the subject after getting treatment.* The following results of the post-test scores of student creativity in the Experimental Class and Control Class can be seen in Table 8.

Table 8 Creativity post-test scores

Experiment Class		Control Class	
Respondent	Post-test Score	Respondent	Post-test Score
R1	63	R1	52
R2	76	R2	34
R3	59	R3	56

R4	60	R4	63
R5	70	R5	64
R6	75	R6	49
R7	66	R7	62
R8	64	R8	56
R9	77	R9	42
R10	77	R10	59
R11	75	R11	55
R12	74	R12	52
R13	70	R13	54
R14	60	R14	59
R15	69	R15	73
R16	56	R16	49
R17	55	R17	58
R18	69	R18	53
R19	52	R19	58
R20	65	R20	41
R21	71	R21	55
R22	53	R22	50
R23	56	R23	56
R24	70	R24	43
R25	49	R25	32
R26	58	R26	31
R27	57	R27	32
R28	67	R28	31

R29	49	R29	40
R30	68	R30	39
R31	67	R31	51
R32	67	R32	63
R33	56	R33	57
R34	76	R34	37
R35	73	R35	29

The analysis requirement test is carried out so that the conclusions drawn do not deviate from the truth that should be drawn. Before the analysis was carried out, several tests of analytical requirements were carried out, including normality and homogeneity tests.

Table 9 Post-test Normality Test Results Creativity

Class	Shapiro-Wilk		
	Statistic	df	Sig.
Core Variable Experiment Post-test	.946	35	.087
Control Post-test	.944	35	.076

The results of the normality test showed that the significance of the experimental Creativity variable post-test obtained a sig value of 0.087 and the control post-test obtained a sig value of 0.076. The normal requirement is if the significant value > 0.05 then the residual value is normally distributed. The homogeneity test was applied to the post-test data from the experimental group and the control group.

Table 10 Homogeneity Test Results of Creativity Post-test of Variances

Core Variable

Levene Statistic	df1	df2	Sig.
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3.226	1	68	.077
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The homogeneity test results obtained a sig value of 0.077. The requirement for data homogeneity is a significant value > 0.05 then the data is homogeneous. The independent sample t-Test test is used to determine whether there is an increase in the average of two unpaired samples.

Table 11 Results of Mean Value of Creativity Post-test Independent Samples Test

roup Statistics

Class	N	Mean	Std. Deviation	Std. Error Mean
Score Variable Experimen Post-test	35	64.83	8.421	1.423
Control Post-test	35	49.57	11.356	1.920

It can be seen in the table above that there is an average or mean value on the experimental class post-test value of 64.83 and 49.57 on the control class post-test value. This value can be interpreted that the experimental class average is higher when compared to the control class average.

Table 12 Results of Sig. (2-tailed) Creativity Post-test Independent Samples Test

		Score Variable	
		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	3.226	
	Sig.	.077	
t-test for Equality of Means	t	6.385	6.385
		68	62.711
	Sig. (2-tailed)	.000	.000

Mean Difference	15.257	15.257
Std. Error Difference	2.390	2.390
5% Confidence Interval of the Difference	Lower	10.489
	Upper	20.026
		10.481
		20.033

The test criteria uses the following significance figures:

If the significance number (Sig.) > 0.05 , then H_0 is accepted, H_1 is rejected

If the significance number (Sig.) < 0.05 , then H_0 is rejected, H_1 is accepted

The results of the post-test test above, resulted in a significance value < 0.05 then H_0 is rejected, H_1 is accepted. The significance value of $0.000 < 0.05$ means that the use of the Pacdora online editor can increase student creativity in the VCD Packaging course.

4.2 Discussion

Researchers conducted an experiment using a pre-test and post-test comparison group design to determine the effectiveness of using Pacdora online editor-based learning media to increase student creativity in the Packaging course. The pre-test was conducted on two directly selected classes, namely the experimental group and the control group, to evaluate the initial conditions and determine the improvement between classes. Firstly, a necessity check was conducted to check whether the conclusions drawn were correct. Normality and homogeneity tests were conducted on the pre-test and post-test data.

The normality test results show that the data is normally distributed and the significance value is greater than 0.05. While the homogeneity test shows the data is homogeneous and the significance value is greater than or equal to 0.05. Furthermore, the Independent Samples t-Test test was conducted as a pre-test and post-test of creativity. The pre-test results showed no significant improvement between the experimental and control classes. However, the post-test results showed a significant increase in creativity between the two groups, and the significance value was less than 0.05. From these results, it can be concluded that the use of Pacdora online editor significantly increases students' creativity in making packaging models. Although initially there was no significant improvement, after being treated with the use of the Pacdora online editor, the experimental class showed a significant increase in creativity compared to the control group. Need for supportive elements, creative learning positively correlates with academic performance (Yang & Zhao, 2021).

The results of the discussion regarding the effectiveness of using Pacdora online editor-based learning media to improve creativity can be linked to several related theories. Firstly, constructivist learning theory provides a foundation for understanding that Pacdora is not only an information presentation tool, but also a platform that allows students to expand their knowledge and design skills through interactive experiences. (Karli & Margaretha, 2002). In addition, creativity theory supports the research which shows that students' creativity increased after using Pacdora. Huang dan Lee (2015) states that the role of creative learning depends on learners' self-efficacy and self-regulation (Huang, Lee, 2015). The theory asserts that creativity can be taught and encouraged through real-life experiences and practices, and Pacdora's application proves that technology can be an effective tool to stimulate creativity in a design context. (Amponsah, Kwesi, & Ernest, 2019).

Within the theoretical framework of technology utilisation in learning, the application of Pacdora as a technology tool is a suitable approach to enhance learning effectiveness in packaging design. Technology utilisation models also play an important role in understanding how students receive and use these platforms as effective learning tools. Creative learning enhances learners' knowledge, understanding and creativity (Huang, 2020). A cognitive approach to learning design. Creative learning requires interventions to improve higher-order cognitive skills in learners (Rudd, Buszard, Spittle, & Callaghan, 2021). Pacdora is designed to stimulate students' creative thinking process when designing packaging dieline. Lastly, participatory theory is important as Pacdora is expected to increase learner participation through visual and interactive experiences when designing the packaging dieline. A creative learning environment has a positive impact on learners as they are free to express their perceptions in original, flexible, imaginative and non-procedural ways (Gucyeter & Erdogan, 2020). These theories focus on student participation in the learning process. The use of Pacdora aims to increase student participation through a visual and interactive experience when designing a packaging dieline.

5 Conclusion

The experimental results showed that the research design with pre-test and post-test Comparative Group Design with two groups, namely the experimental group and the control group, was successfully implemented. In the pre-test stage of creativity, a pre-test assessment was carried out and the data obtained from 70 respondents in both groups showed that the residual value was normally distributed according to the requirements, a significant value > 0.05 , it was known that the significance of the pre-test of the experimental creativity variable obtained a significance value of 0.413 and in the control pre-test obtained a significance value of 0.343. Homogeneity (sig 0.559 > 0.05). The pre-test independent sample t-test showed that there was no significant increase in creativity scores between the experimental and control groups (sig 0.246 > 0.05).

After both groups received treatment through the use of Pacdora online editor in learning dieline packaging design. The results of the normality test showed that the significance of the experimental Creativity variable post-test obtained a sig value of 0.087 and the control post-test

obtained a sig value of 0.076, indicating a normal distribution ($\text{Sig} > 0.05$). Homogeneity ($\text{sig } 0,077 > 0,05$). The post-test independent samples t-test showed a significant increase in creativity scores between the experimental and control groups ($\text{sig } 0.000 < 0.05$). The average post-test of creativity of the experimental group (64.83) was higher than that of the control group (49.57).

At the pre-test stage there was no significant increase, but after the experimental class received treatment, there was a significant increase in creativity. It can be concluded that the use of Pacdora's online editor can significantly increase students' creativity in designing packaging dieline. This conclusion is supported by careful statistical analysis and fulfils the requirements of normality and homogeneity of data.

The results of this study are expected to provide deeper insight into the potential of Pacdora online editor as an online packaging design tool and as a learning media for making packaging dieline. The results of this research are expected to serve as guidelines for educational institutions and industry stakeholders to optimally utilise this technology to improve the quality of education and packaging design skills.

This research has important implications not only for design students, but also for design education institutions and technology developers. The results of this study can provide valuable guidance for developing similar tools or updating Pacdora to better meet the needs and challenges of the design education world. Therefore, this research not only provides new insights into the effectiveness of Pacdora's online editor in encouraging design student creativity, but also has the potential to shape the future direction of design education and its supporting technologies.

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