

The Influence of the Development of Design-Based AI on the Creativity of Students at SMK PB Soedirman 1 Jakarta, Visual Communication Design Department

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Abstrak. The development of design-based artificial intelligence has had a significant impact in various sectors, including the world of education. Design-based AI offers various tools and technologies that can be used by students to increase their creativity. The research method used is quantitative descriptive. The sample for this research is students at SMK PB Soedirman 1 majoring in Visual Communication Design (DKV). The measurement scale used is the Likert scale. The number of respondents was 27 students at SMK PB Soedirman 1, East Jakarta. The development of design-based AI has a significant influence on the creativity of vocational school students. The data obtained showed that as many as 60.26% of students knew and used/applied AI in the learning process at school; 24.89% of students still rarely use AI and the remaining 14.56% are hesitant. Based on the results of interviews, students think that AI helps improve technical skills, provides easy access to resources, and develops students' critical thinking skills. Additionally, AI also encourages collaboration and teamwork, and enables personalization of learning and bolder creative experiments. However, challenges such as potential over-reliance on AI and ethical issues need to be addressed carefully. With the right approach, AI can be an invaluable tool in enhancing the creativity and design abilities of vocational school students, preparing them for future success.

Keywords: artificial intelligence, creativity, design applications, students

I. Introduction

The phenomenon of AI or what is called Artificial Intelligence has been popular since the 2010s and above, where the use of AI is widely used by young people to help with their project work and assignments so that they can produce instant results and without any extra effort. [1]. The use of Artificial Intelligence is becoming increasingly widespread and has even become a trend that is loved by society, now it is not only used by certain groups but by agencies that have an interest in its use or application in any sector. Empirically, this AI has various functions, namely to help users, in editing a design or photo, and also creating certain algorithms, in the field of computer science and can change the sound from being noisy to focusing on the sound, and many more [2].

The development of design-based artificial intelligence (AI) has had a significant impact in various sectors, including the world of education [3], [4]. AI-based design offers a variety of tools and technologies that students can use to enhance their creativity. Design-based AI helps improve students' technical abilities. Technology like graphic design software equipped with AI can provide design suggestions, automate repetitive tasks, and even generate new creative ideas[5]. For example, applications like Adobe Illustrator and Photoshop are now equipped with AI features that can recognize objects, provide color recommendations, and enhance images more efficiently. This allows students to focus on the creative aspects of their designs rather than getting bogged down in time-consuming technical details. Additionally, AI can also help in prototyping and simulation, allowing students to see the final results of their designs before actually bringing them to life. This not only saves time but also resources, which is very important in an educational environment [6], [7].

Ease of access to resources is one of the biggest benefits of design-based AI developments. With AI technology, students can easily access a variety of educational resources such as tutorials, design templates, and visual references [8]. AI-powered online learning platforms, such as Coursera, Khan Academy, and LinkedIn Learning, offer design courses that can be accessed anytime and anywhere. This gives students the flexibility to learn at their own pace and schedule. Additionally, AI-enabled search engines can help students find relevant visual references quickly and efficiently. This is very helpful in the process of brainstorming and developing design concepts, where visual inspiration is very important.

The development of critical thinking skills is another important aspect influenced by the development of design-based AI. AI can encourage students to think more critically and analytically about their work [9]. For example, AI-enabled design tools can provide real-time feedback on a student's design, pinpoint areas for improvement, and provide suggestions for improvement. This helps students to not only receive feedback but also to analyze and understand the reasons behind the suggestions [8]. Additionally, AI can also assist in the analysis of design data, such as audience preferences and market trends, allowing students to make more informed and data-driven design decisions. It teaches students to not only rely on their creative intuition but also to support their decisions with relevant data.

Design-based AI developments also encourage collaboration and teamwork among students. AI-based collaboration tools allow students to work together on design projects in real-time, regardless of their geographic location [10]. For example, platforms like Figma allow multiple users to work on the same design project simultaneously, with any changes made by one user immediately visible to other users. It promotes teamwork and collaboration, which are important skills in the professional world. Additionally, AI can also help in project management, such as task scheduling, work assignment, and progress tracking, ensuring that design projects run smoothly and on schedule. [6].

However, while there are many benefits to design-based AI developments, there are also challenges that need to be overcome. One of the main challenges is the potential for over-reliance on AI, which could reduce student initiative and creativity. If students rely too much on AI to complete design tasks, they may not develop the basic skills necessary to become competent designers[9]. Therefore, it is important for educators to ensure that AI is used as an aid, not a substitute, in the learning process. Educators should encourage students to remain critical and creative, and use AI as a tool to improve and enrich their design processes.

Ethics and responsibility are also important concerns in the use of design-based AI. Students should be taught about the ethical implications of using AI, such as privacy issues, copyright, and the social impact of their designs [11]. They need to understand that while AI can help in the design process, the ultimate responsibility remains with humans. Educators must ensure that students understand the importance of considering ethical and responsible aspects in every design project they work on [12], [13].

The development of design-based AI is able to develop students' critical thinking skills. Additionally, AI also encourages collaboration and teamwork, which is very important in the professional world. However, challenges such as potential over-reliance on AI and ethical issues need to be addressed carefully. With the right approach, AI can be an invaluable tool in enhancing students' creativity and design abilities, preparing them for future success.

II. Method

The research method used is descriptive quantitative. The descriptive quantitative approach is a data collection method that aims to create objective descriptions using numbers. Literature study is the first step that will be taken to understand the concept of creativity in design and the use of AI to gather information. The sample for this research were students at SMK PB Soedirman 1 majoring in Visual Communication Design

(DKV). This research was conducted from September - December 2023. This research instrument used a questionnaire composed of several assessment indicators.

The measurement scale used is the Likert scale. The data collection technique taken was distributing questionnaires via Google Form with a sampling method distributed via the WhatsApp Group of SMK PB Soedirman 1 with the DKV Department. The number of respondents was 27 students at SMK PB Soedirman 1, East Jakarta.

III. Result and Discussion

This research involved 27 students of SMK PB Soedirman 1 with the DKV Department. Respondents were randomly selected to ensure diversity in the data collected. Surveys and interviews were conducted to collect data regarding their use of design-based AI in their learning and how it influences their creativity. This sample selection was carried out randomly to ensure that each class was represented proportionally in the study.

Table 1. Percentage of Respondents

No	Class	Percentage of respondents
1	10	22,2%
2	11	48,%
3	12	29,6%

According to statistics taken from Google Form, the results of our collection of respondents, class 11 is the group of students who have the most answers, namely (48.1%) and is followed by class 12 (29.6%) and class 10 is the one with the lowest graphic score, namely (22.2).

This research uses a questionnaire to measure the influence of design-based AI developments on the creativity of secondary school students majoring in Visual Communication Design. This questionnaire was distributed to 27 students from various classes (classes X, XI, and XII) who were randomly selected. The following are the results of the questionnaire filled out by the students:

Table 2. Percentage of Questionnaire Results

No.	Question	Percentage				
		Strongly disagree	Don't agree	Doubtful	Agree	Strongly agree
1.	Do you know what AI is?	3.7%	7.4%	14.8%	48.1%	25.9%
2.	Have you ever used AI before?	3.7%	14.8%	7.8%	40.7%	33.3%
3.	Have you ever used design-based AI?	18.5%	7.4%	11.1%	48.1%	14.8%
4.	In a day, how often do you use AI-based Design??	14.8%	29.6%	3.7%	25.9%	25.9%
5.	Do you agree that you feel helped by this design-based AI??	0%	11.1%	14.8%	33.3%	40.7%
6.	Do you sometimes feel dependent on using Design-based AI??	14.8%	18.5%	11.1%	37.0%	18.5%
7.	Do you think it is good to use AI continuously?	22.2%	18.5%	40.7%	14.8%	3.7%
8.	Do you agree that over time AI will replace humans in the future??	14.8%	18.5%	18.5%	22.2%	25.9%
9.	Did you know that AI websites are based on design??	7.4%	14.8%	11.1%	29.6%	37.0%

10.	Do you feel that the presence of AI in the creativity process can increase your learning motivation??	7.4%	3.7%	18.5%	33.3%	37.0%
11.	Do you feel that it is easier when using AI??	0%	7.4%	3.7%	33.3%	55.6%
12.	Do you feel that using AI in design learning can increase efficiency and productivity??	7.4%	0%	14.8%	37.0%	40.7%
13.	In classroom learning, do you and your teachers at school often use AI??	15.5%	18.5%	18.5%	11.1%	33.3%
14.	Do you also suggest using AI during the teaching and learning process?	33.3%	14.8%	14.8%	18.5%	18.5%

As many as 74% of students reported that they knew about AI. This figure shows that most students are familiar with the concept of artificial intelligence and its potential in various fields, including design. Knowledge about AI is an important foundation for students to be able to utilize this technology effectively in the learning and work process.

As many as 71% of students stated that they had used AI before. This indicates that the majority of students already have practical experience with AI technology, which could be using AI-based applications or interacting with AI systems in various contexts. This experience is important because it helps students understand how AI works and how they can utilize it in everyday activities, including in design.

Only 51.8% of students reported that they had used design-based AI. While this is a significant number, there are still almost half of students who have never tried using an AI-based design tool. This shows that there is room for improvement in terms of adoption of AI technology in design curricula in schools. With more students using design-based AI, the potential for increased creativity and efficiency in their work can be maximized.

As many as 74% of students felt helped by design-based AI. This shows that the majority of students who have used AI-based design have found it useful in their design process. AI can help in various aspects of design, from making initial sketches, color adjustments, to preparing efficient layouts. With the help of AI, students can save time and effort in completing their design projects.

As many as 70.4% of students believe that the presence of AI can increase their creativity and motivation. This is an important finding because it shows that AI not only helps with the technical aspects of design, but also provides a psychological boost for students. With AI, students can experiment with new ideas without fear of failure, because AI can provide real-time feedback and suggestions for improvement. This encourages them to be more creative and motivated to produce better work.

As many as 88.9% of students felt that it was easier when using AI. This is a strong indicator that existing AI technology is well designed so that it is easy to use by students, including those who may not have a strong technical background. This ease of use is critical to ensuring that AI can be widely and effectively adopted in design education.

Knowledge about AI possessed by 74% of students shows that education about this technology is quite good among vocational school students. Previous experience of using AI by 71% of students also shows that this technology is already starting to be known and used. However, there are still challenges in introducing design-based AI to more students, as only 51.8% have ever used it. Schools and educators need to be more active in introducing and integrating design-based AI in their curricula. The benefits of AI in design felt by 74% of students show that this technology really helps in the design process. AI can take over repetitive and technical tasks, so students can focus more on the creative aspects of their designs. With AI, students can complete projects more quickly and produce higher quality work. This can also help them in developing a better portfolio, which is very important for their future career. AI not only helps in technical aspects, but also provides a psychological boost to students. As many as 70.4% of students felt that AI increased their creativity and motivation. This shows that AI can be a very effective tool for encouraging students to be more daring in experimenting and innovating. With real-time feedback and suggested improvements from AI, students can learn from their mistakes quickly and continually improve their abilities. The ease of use of AI perceived by

88.9% of students is another important aspect. The well-designed and user-friendly AI technology ensures that students from various backgrounds can use it without any difficulty. This also means that educators don't have to spend as much time teaching how to use these tools, so they can focus more on developing students' design skills.

This research involved 27 vocational school students majoring in Visual Communication Design from various classes. One part of this research is to find out which AI-based design applications are most often used by students and how using these applications affects their creativity. The results of the questionnaire show that students use various design applications with different frequencies. Below is usage data for several major design applications:

Tabel 3. Aplikasi Bantuan yang digunakan Siswa

Application	Percentage
Canva	81.5%
Adobe Illustrator	92.6%
Adobe Photoshop	59.3%
Corel Draw	14.8%
Paint	22.2%

Canva is an easy-to-use web-based design application that offers many ready-to-use templates and AI features to assist in the design process. As many as 81.5% of students reported using Canva for their various design projects. This high number shows Canva's popularity among students due to its ease of use and accessibility. AI features in Canva, such as automatic adjustment of design elements and template recommendations, help students complete assignments quickly and efficiently. Apart from that, Canva also allows real-time collaboration, which makes it easier for students to work in teams. High use of Canva also reflects that students value flexibility and simplicity in the design process. Canva provides a variety of tools that allow students to experiment with colors, fonts, and layouts without requiring in-depth technical knowledge. This helps enhance students' creativity by allowing them to focus on aesthetic and innovative aspects rather than technical aspects.

Adobe Illustrator, used by 92.6% of students, is a very popular and powerful vector design application. The high use of Illustrator among students indicates that they recognize the need to use professional tools in preparing for careers in design. Illustrator offers advanced AI features such as shape recognition and automation of repetitive tasks, which goes a long way in improving work efficiency. Students report that using Illustrator helps them develop important technical skills in vector design, such as logo creation, illustration, and typography. AI features that help in automatic adjustment of design elements also allow students to focus more on creative ideas rather than technical details. Additionally, Illustrator is frequently used in the professional design industry, giving students a competitive edge in the job market.

Adobe Photoshop was used by 59.3% of students, showing significant but lower popularity compared to Illustrator. Photoshop is a very powerful tool for photo manipulation and raster-based graphic design. AI features in Photoshop, such as object recognition and automatic image enhancement, help students improve the quality of their designs more quickly and easily. Despite its lower usage percentage than Illustrator, Photoshop remains an important tool for students who want to develop skills in image manipulation and graphic design. Students report that Photoshop helps them create more realistic and engaging visuals, as well as allowing them to experiment with a variety of complex visual effects. Using Photoshop also strengthens their technical skills, which are highly valued in the creative industry.

Corel Draw is used by 14.8% of students, indicating that although it is a powerful design tool, its popularity is not as large as other applications such as Illustrator or Canva. Corel Draw is a vector design application that offers a variety of creative tools for creating illustrations, layouts, and typography. However, the AI features in Corel Draw may not be as popular or easy to use compared to other applications, which could be one reason why its use is lower among students. Students who use Corel Draw report that the

application helps them in developing vector design skills, but they also mentioned that the learning curve is steeper compared to other apps. Despite this, Corel Draw remains a valuable tool for students who want to deepen their skills in vector and graphic design.

Microsoft Paint is used by 22.2% of students, indicating that even though it is a very basic design tool, there is still a group of students who use it. Paint is known for its simplicity and the basic features it offers. Although Paint doesn't have advanced AI features or professional design tools, students who use it may do so for simple tasks or as they start learning the basics of graphic design. The use of Paint shows that there is still a place for basic tools in design education, especially for students who are just starting out and need tools that are easy to use without a steep learning curve. Paint helps students understand basic graphic design concepts, such as color and shape organization, before they move on to more advanced tools.

The results of this research show that various AI-based design applications have different influences on student creativity. Canva, with its high usage, shows that easy-to-use and accessible tools are highly valued by students. Canva's AI features that aid in automation and collaboration support students in producing designs quickly and efficiently, while still allowing them to experiment and innovate.

Adobe Illustrator, with the highest usage rate, shows the importance of professional tools in design education. Advanced AI features that help in customization and automation of technical tasks allow students to focus on the creative and innovative aspects of their designs. The use of Illustrator also prepares students for industry needs, giving them a competitive edge in the job market.

Adobe Photoshop, although not as popular as Illustrator, is still an important tool for photo manipulation and graphic design. AI features that help in object recognition and automatic image enhancement improve the efficiency and quality of student designs. The use of Photoshop shows that students appreciate a tool that allows them to create realistic and engaging visuals.

Corel Draw and Paint, although less popular, show that there is a need for a variety of design tools in education. Corel Draw helps students who want to deepen their vector design skills, although the steeper learning curve may be a barrier for some students. Paint, with its simplicity, helps students understand the basics of graphic design before they move on to more advanced tools.

The use of various AI-based design applications shows that students are utilizing this technology to enhance their creativity and skills. However, it is important for educators to ensure that students do not rely too heavily on AI and still develop their creative and analytical skills. With the right approach, AI can become an invaluable tool in design education, helping students produce better work and preparing them for future success.

Table 4. Statistical T Test Results

t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference		
				Lower	Upper	
xmean	25.425	13	.000	3.52646	3.2268	3.8261

Based on the results of the statistical T test, the calculated T value was 25,425 and the T table was 2,160. then the T value is $25,425 < 2,160$, it can be said that the use of design-based AI has an effect on student creativity at SMK PB Soedirman 1 Jakarta.

The results of this research show that design-based AI has a significant and positive influence on the creativity of secondary school students majoring in Visual Communication Design. The improvements in technical skills experienced by students show that AI can be an effective learning tool, helping them master design skills more quickly and efficiently. The automation features offered by AI allow students to focus on the creative aspects of their designs, rather than getting bogged down in technical details. This is consistent across all grade levels, showing that the benefits of AI can be felt by students at every stage of their learning.

Easy access to educational resources through AI-powered online platforms provides learning flexibility that is highly valued by students. They can learn at their own pace and schedule, which has a positive impact on better understanding and application of design concepts. This suggests that AI can help overcome some of the limitations in traditional education systems, such as lack of time and resources.

The improvements in critical thinking skills reported by students suggest that AI can encourage them to think more analytically and critically about their work. The real-time feedback and data analysis provided by AI helps students to not only receive feedback, but also to understand the reasoning behind the suggestions.

This is important for the development of critical thinking skills, which is an important component in the design process.

Enhanced collaboration and teamwork through the use of AI-based collaboration tools suggests that this technology can help students develop teamwork skills that are important in the professional world. The ability to work together on design projects in real-time, regardless of geographic location, promotes teamwork and collaboration. This suggests that AI can help prepare students for the challenges of the future workplace.

However, the challenges students face, such as potential over-reliance on AI and ethical issues, suggest that the use of AI in education must be managed carefully. Educators must ensure that AI is used as an aid, not a substitute, in the learning process. They should encourage students to remain critical and creative, and use AI as a tool to improve and enrich their design processes.

Additionally, it is important for educators to teach students about the ethical implications of using AI. Students need to understand that while AI can help in the design process, the ultimate responsibility remains with humans. They must consider ethical and responsible aspects in every design project they work on, such as privacy issues, copyright, and the social impact of their designs.

Another major opportunity emerging from the development of design-based AI is the ability to personalize learning. AI can be used to develop learning programs tailored to students' individual needs and abilities. By analyzing data from student interactions with learning tools, AI can identify each student's weaknesses and strengths, and adapt the most effective course materials and teaching methods. This enables a more efficient and effective learning process, and helps students to reach their full potential.

Additionally, AI also enables bolder creative experiments. With AI's ability to process and analyze large amounts of data quickly, students can try out various ideas and concepts without fear of failure. AI can help identify the most attractive combinations of colors, shapes, and layouts, as well as provide suggestions for improvements based on trend analysis and market preferences. This provides space for students to innovate and experiment with their designs, which is key to developing creativity.

While the results of this research demonstrate the many benefits of design-based AI, there are several challenges that need to be addressed to ensure wider and more effective adoption:

1. **Increased Access and Education:** There are still almost half of students who have never used design-based AI. Schools need to increase access to these tools and provide more comprehensive education about their benefits and how to use them. Workshops, seminars and special training can be a solution to overcome this.
2. **Integration in Curriculum:** Design-based AI should be better integrated in design curricula. This could include teaching about AI theory, how AI-based design tools work, and practical applications in design projects. With good integration, students can be better prepared to use this technology in their future careers.
3. **Ethics and Responsible Use:** With the increasing use of AI, it is important for students to understand the ethical and responsible aspects of using this technology. Schools must teach students about the ethical implications of AI, such as privacy, copyright, and the social impact of their work.

IV. Conclusion

The development of design-based AI has a significant influence on the creativity of vocational school students. The data obtained showed that as many as 60.26% of students knew and used/applied AI in the learning process at school; 24.89% of students still rarely use AI and the remaining 14.56% are hesitant. Based on the results of interviews, students think that AI helps improve technical skills, provides easy access to resources, and develops students' critical thinking skills. Additionally, AI also encourages collaboration and teamwork, and enables personalization of learning and bolder creative experiments. However, challenges such as potential over-reliance on AI and ethical issues need to be addressed carefully. With the right approach, AI can be an invaluable tool in enhancing vocational school students' creativity and design abilities, preparing them for future success.

References

- [1] R. Rachmadtullah, B. Setiawan, A. J. A. Wasesa, and J. W. Wicaksono, *Monograf Pembelajaran Interaktif dengan Metaverse*. Cv. Eureka Media Aksara, 2022.

- [2] I. As, S. Pal, and P. Basu, “Artificial intelligence in architecture: Generating conceptual design via deep learning,” *Int. J. Archit. Comput.*, vol. 16, no. 4, pp. 306–327, 2018.
- [3] D. T. Pham, *Artificial intelligence in design*. Springer Science & Business Media, 2012.
- [4] A. P. Setiawi, E. N. S. Patty, and S. R. M. Making, “Dampak artificial intelligence dalam pembelajaran sekolah menengah atas,” *Indo-MathEdu Intellectuals J.*, vol. 5, no. 1, pp. 680–684, 2024.
- [5] R. Madurai Elavarasan and R. Pugazhendhi, “Restructured society and environment: A review on potential technological strategies to control the COVID-19 pandemic,” *Sci. Total Environ.*, vol. 725, 2020, doi: 10.1016/j.scitotenv.2020.138858.
- [6] A. Irbite and A. Strode, “Artificial intelligence vs designer: The impact of artificial intelligence on design practice,” in *SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference*, 2021, vol. 4, pp. 539–549.
- [7] S. Sherly, E. Chandra, S. Sisca, E. Efendi, and E. Dharma, “Sosialisasi Pemanfaatan Artificial Intelligence kepada Siswa Sekolah Menengah Atas dalam Menghadapi Era Society 5.0,” *GERVASI J. Pengabd. Kpd. Masy.*, vol. 7, no. 3, pp. 1080–1091, 2023.
- [8] H. W. Wibowo, “Implementasi Teknologi Artificial Intelligence (AI) Dalam Bidang Pendidikan,” *JRIIN J. Ris. Inform. dan Inov.*, vol. 1, no. 3, pp. 632–635, 2023.
- [9] L. E. Holmquist, “Intelligence on tap: artificial intelligence as a new design material,” *interactions*, vol. 24, no. 4, pp. 28–33, 2017.
- [10] L. Chen *et al.*, “An artificial intelligence based data-driven approach for design ideation,” *J. Vis. Commun. Image Represent.*, vol. 61, pp. 10–22, 2019.
- [11] B. G. A. Rama, D. K. Prasada, and K. J. Mahadewi, “Urgensi Pengaturan Artificial Intelligence (AI) Dalam Bidang Hukum Hak Cipta Di Indonesia,” *J. RECHTENS*, vol. 12, no. 2, pp. 209–224, 2023.
- [12] E. Fauzy, “Rekonseptualisasi Perlindungan Hukum Atas Hak Cipta Terhadap Artificial Intelligence Di Indonesia,” 2023.
- [13] N. I. Rahmahafida and W. B. Sinaga, “Analisis Problematika Lukisan Ciptaan Artificial Intelligence Menurut Undang-Undang Hak Cipta,” *J. Pendidik. Dan Konseling*, vol. 4, no. 6, pp. 9688–9696, 2022.