STUDENT READINESS FOR CHANGE: ACCEPTANCE OF AI-INTEGRATED CREATIVE SOFTWARE

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ABSTRACT

This Paper investigates how ready are design students to use AI-integrated creative software in producing their artwork. The researcher used a quantitative method and Likert-scale questionnaires to assess student's familiarity with AI tools, their willingness to adopt AI, and also the perceived benefits from AI to enhance creativity. It was found that design students have generally have neutral to positive attitude towards AI in art and design but facing limited practical experience, insufficient training, and concerns with its impact on the artistic authenticity. While the design students curious on AI's potential, they still need the practical experience and confidence to fully accept the change. This paper also proposes that future research should include ongoing studies with diverse participants and assess AI training education to boost design student's skills and assurance with AI in producing designs.

Keywords: Artificial Intelligence, Creative Software, Creative process, Design Education, Python

INTRODUCTION

In November 2022, ChatGPT was rolled out by Open AI and shocked the humanity by its generative capabilities and ability to understand human natural language. The rapid development and future of AI computing became evident. Although AI had been a topic of discussion for a long time, the introduction of ChatGPT changed the general perception. The development of AI is not limited to GPT or Generative Pre-Trained transformer alone, as it also extends to the development of other generative tools in fields such as graphics, animation, film, engineering, architecture, and many others ("The Role of ChatGPT, Generative Language Models, and Artificial Intelligence." 2023). These developments have led to a significant alteration, like what happened when the Internet was introduced 40 years ago. The internet had brought significant change across various aspects of society, business, technology and culture. The introduction of Internet had brought an unprecedented access to information, transforming communication, education, commerce and entertainment. It had no doubt altered daily life, while at the same time created new opportunities and reshaping global community globally. Similarly, AI can be

seen as a paradigm shift in human life that brings significant changes in the way people think, behave and interact with the world leading to new norms and practices (Gates, Bill, 2023).

With the recent development of AI in the graphic field, it can significantly transform the graphics and animation field by automating complex tasks, promote efficiency and enhancing creativity. AI recently enables realistic rendering such as DALL.E 2, Midjourney, DeepArt.io to name a few while some AI application can produce short animation and video such as RunwayML, DeepMotion and Lumen5. All these AI apps had the potential in reducing production time and costs. These new technologies had no doubt foster innovation and expanding the creative possibilities within the industry ("How Gen AI Is Transforming Video, Motion Design, and the Visual Arts. 2024,)

All these developments have led to significant changes in the methods of teaching and learning in schools and higher education institutions. These changes cannot be underestimated or excluded from the teaching and learning processes of students in this field, as the rapid advancements in AI will not remain confined to existing platforms. Taking Adobe Photoshop for example, it was released on February 19, 1990 and quickly became the industry standard for digital image editing and graphic design (Smith, John 1990)

Unlike earlier versions of Photoshop, students today must adapt to the new usage methods, as most modern software, including Photoshop, now incorporates AI-powered features. Students need to develop a combination of technical skills and an understanding of how AI tools can enhance the creative process (Jackson, E.A., & Jackson, H.F. 2024). This article discusses how design students can prepare themselves to use graphic and multimedia software that integrates AI tools into their creative processes. The introduction to the latest software, which relies heavily on AI, also serves to strengthen readers' understanding of what is meant by AI-enhanced application tools. Today's students must be prepared to face a paradigm shift in handling their creative processes.

Background and significance of the research topic

In the early 1990s, the introduction of design software such as Photoshop drawn mixed reactions from designers. At the time, manual methods of creating art—such as analogue photography, hand-drawn illustrations, and collage—were the norm. Many designers, accustomed to traditional techniques, were sceptical about transitioning to computer-based design. They feared that this shift might negatively impact their creativity and the quality of their work. One of the primary challenges they faced was the deeply ingrained habit of working manually. Designers were comfortable using familiar tools such as brushes, pencils, and paint, and Photoshop represented a new technique that required them to relearn or acquire new skills (Montague, G. 2010).

Additionally, access to technology in the early 1990s was limited, and awareness of the potential of digital design was low. Many designers did not yet recognize the capabilities of Photoshop in terms of editing and manipulating images, achieving effects that were impossible with manual techniques, and producing work in a much shorter timeframe. However, as more designers and artists began to explore the advantages of the new technology, their attitudes toward Photoshop gradually shifted (Manovich, L. 2011).

Several factors contributed to this change in acceptance. Among them were the software's ability to increase productivity, the opportunity for experimentation with different ideas, the growing acceptance and recognition of digital design within the industry, and the software's compatibility with other technologies. Over time, these benefits became clear, and the initial scepticism faded. While the transition from manual design to computerized applications was gradual, designers and artists eventually came to see the potential of digital tools in enhancing both the quality and efficiency of their

work. Photoshop ultimately became the industry standard, revolutionizing the way design and artwork were produced.

This study is important because it helps educators understand how prepared design students are to use AI in their creative work. As AI tools become a regular part of design software, knowing students' attitudes and skills can guide universities in improving their programs. By adding more AI-focused training, students can feel more confident and prepared to use these tools effectively. The research also gives insights into how the next generation of designers may work with AI, balancing new technology with traditional creative skills. Understanding these trends helps schools and industry leaders support students in using AI to boost creativity without losing their personal style. This study highlights that students are curious about AI's potential but need more hands-on experience to fully trust and adopt it, which could shape how art and design are taught in the future.

RESEARCH QUESTIONS AND OBJECTIVES

This research examines the transition and acceptance of designers from analogue to digital design, which first occurred in the 1990s. At that time, this shift was regarded as a significant paradigm shift, encountering resistance as many designers struggled to adapt from traditional, manual design methods to digital tools. The change challenged long-standing habits and workflows, making it difficult for some designers to embrace new technologies. This study explores how this transformation unfolded and analyses the factors that contributed to the eventual acceptance of digital design within the creative industry. The objective of this research is to measure art and design students' exposure to artificial intelligence (AI) in design software normally used by them. It is also aimed to assess their willingness to adopt AI aides in their creative process. The study aims to evaluate both the familiarity and experience with AI tools and the openness to using AI in creative work.

AI Integration in Creative Design Software

The combination of AI in creative software such as Adobe Photoshop is often when the software has now been supplied with tools that are basically able to improve, edit or generate creative elements such as images, videos automatically with just a few clicks. Before the integration of AI, all these activities had to be done manually. Now with the advent of AI nearly all creative processes like removing the background of a picture, editing an image or video, or generating images or video are possible and on top of that, it is done quickly and accurately. It is like a very smart helper that can assist designers to do their job quickly and getting ideas at the tip of their finger (Tomić, I., & Juric, I. 2023).

Like the field of writing that places more reliance on AI with ChatGPT, Copilot and others, this type of AI is more like LLM or Large Language Model that allows computers to understand human language and provide feedback. Unlike AI that is more towards generation, AI that is geared towards video and images uses Machine Learning (ML) which learns from past or existing designs, user behaviour and also editing activities to provide recommendations or repetitive work methods such as adjustments colour or apply a filter. Apart from that, it also uses Generative AI, where it generates New digital images, textures and even complex designs based on user input such as typing prompts to generate images or creative elements (Soikun, 2023).. This type of AI includes models such as Generative Adversarial Networks (GANs) and Stable Diffusion. Another element that helps this type of AI is Computer Vision. This allows the software to understand and manipulate images more effectively such as object detection, edges identification and facial recognition and re-editing (Rai, D.H. 2024).

METHODOLOGY

Research Design

This short study employs a quantitative research design using a Likert scale questionnaire as its primary tool in collecting data. The research is cross-sectional, meaning data are collected at a single point in time to provide a snapshot of UMS design students' perspectives on AI in art and design software. The study selects this type of research design as data is collected at a single point of time making it suitable for studying the current state of the phenomenon. This type also enables the researcher to observe directly without manipulation of variables or influencing the participants. It is suitable to assess insight into the current state of AI in design education software.



Figure 1: The Research Design

Target Population and Sampling

The target population will consist of students currently enrolled in design program at UMS only. The study would like to state that this research applies localized study, which focus on a specific University Program. The goal of a localized study is to understand phenomena, within a specific setting. It seeks to gain in depth insights on the level of readiness and exposure of the design students in UMS on the adoption of AI technologies. The inclusion criteria of the participants would be those who registered for a specific program that involves creative software tools. The Exclusion criteria, however, would be those who do not need any design software in their studies. A sample of 100 students will be recruited using purposive sampling. The study intentionally selects participants who meet certain criteria that is relevant to the study's objectives.

Data Collection

As mentioned earlier, this preliminary study focuses on objectives to measure and assess student's exposure to AI in their design software and their willingness to adopt the new technology. Hence, the primary data collection instrument is a Likert scale questionnaire designed to assess the following:

- Section 1: Exposure to AI in design software (e.g., familiarity with AI features in Adobe products).
- Section 2: Willingness to use AI powered software in design.
- Section 3: General perception of AI's role in the creative process.

The questionnaire will include 20 statements rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) and an open-ended question, designed to assess perception, awareness, knowledge and future expectations based on the answer provided by the participants. This question is only to gain insights into individual belief, hope, concerns or fears about the relation between AI and design to assist the conclusion at the end of the study. A pilot test of the questionnaire will be conducted with a sample of 10 students to ensure clarity, reliability and validity using SPSS Cronbach Alpha to assess internal consistency. Participants are recruited via email and during academic meetings with specific art and design students. The questionnaire is distributed electronically through ITEL UMS, which is learning Management system or LMS, in which they were directed to Google forms. Data collection occurred over a 4-week period to ensure a high response rate. All participants are informed about the purpose of the research, the voluntary nature of participation, and the confidentiality of their responses through the academic meetings with the specific students' group and informed consent were obtained before participation.

Data Analysis

Data collected from the Likert scale responses are analysed using quantitative statistical methods, focusing descriptive Statistics. Frequency distributions, means, and standard deviations are used to summarize responses for each questionnaire item.

Timestamp	Email address	Score	Name	Email	Course	Gender	AGE
6/27/2024 10:47:10	alfiqa_laurentiara_bc22	0 / 20	ALFIQA LAURENTIAR	alfiqa_laurentiara_bc22	Teknologi Seni Visual	Female	24-26
6/27/2024 10:50:23	ganibundan3@gmail.co	0 / 20	ANDERY GANI ANAK	ganibundan3@gmail.co	TEKNOLOGI SENI KRI	Female	21-23
6/27/2024 11:11:33	austinlawai41@gmail.c	0 / 20	AUSTIN LAWAI HENR	austin_lawai_bc22@ilu	CV21202 ANIMASI 3D	Male	21-23
6/27/2024 19:57:57	nurannizzana@gmail.c	0 / 20	Nur Ann Izzana Binti R	nur_ann_bc22@iluv.un	Teknologi Seni Visual	Female	21-23
6/27/2024 21:53:54	ashzuinsyafiqaasrah@	0 / 20	Ashzuin Syafiqa	ashzuinsyafiqaasrah@	Teknologi Seni Visual	Female	21-23
6/29/2024 18:51:10	shiyi2364@gmail.com	0 / 20	LEE SHI YI	lee_shi_bc22@iluv.um	Teknologi Seni Visual	Female	21-23
6/29/2024 18:58:46	wongbetty808@gmail.c	0 / 20	BETTY WONG HUI XIN	betty_wong_bc22@iluv	Teknologi Seni Visual	Female	24-26
6/30/2024 22:12:38	sazliyanajakil@gmail.c	0 / 20	NURUL SAZLIYANA BI	Sazliyanajakil@gmail.c	teknologi seni visual	Female	21-23
7/1/2024 3:26:43	syuhadahamza@gmail	0 / 20	NUR AMIRA SYUHADA	nur_amira_amir_bc22(TEKNOLOGI SENI VIS	Female	21-23
7/1/2024 16:17:24	hiengziet@gmail.com	0 / 20	TAN HIENG ZIE	hiengziet@gmail.com	Teknologi seni visual	Male	21-23
7/4/2024 17:37:17	linundusseha@gmail.c	0 / 20	Linundus Abigail Seha	linundusseha@gmail.co	Teknologi Seni Visual	Female	21-23
7/12/2024 13:10:47	jessicalimjiaxin@gmail.	0 / 20	LIM JIA XIN	jessicalimjiaxin@gmail.	TsV	Female	21-23
7/17/2024 11:42:11	mohammad_rizwan_bc	0 / 20	MOHAMMAD RIZWAN	mohammad_rizwan_bc	Teknologi Seni Visual	Male	21-23
7/17/2024 22:31:03	bradizzy35@gmail.con	0 / 20	Brad ardell	Bradizzy35@gmail.con	Teknologi seni visual	Male	21-23
7/28/2024 12:59:23	misssyahirah23@gmai	0 / 20	DAYANG NOR SYAHIF	misssyahirah23@gmai	TEKNOLOGI SENI VIS	Female	21-23
7/30/2024 11:00:46	norhanisnaspin2010@	0 / 20	NORHANIS SIMPOT @	norhanisnaspin2010@	VISUAL ART TECHNO	Female	21-23
7/31/2024 22:36:13	nurainsahaly@gmail.co	0 / 20	NUR AIN BINTI SAHAL	nurainsahaly@gmail.co	TEKNOLOGI SENI VIS	Female	21-23
8/6/2024 3:37:02	ameliadaniea17@gmai	0 / 20	daniea amelia	ameliadaniea17@gmai	teknologi seni visual	Female	21-23
8/6/2024 21:46:37	nhudava320@gmail.co	0 / 20	NURHUDAYA BINTI YA	nhudava320@gmail.co	TSV 2	Female	21-23

Figure 2: Sample of participants in the study (sourced from google assessment) Students exposure to AI infused design software

```
import pandas as pd
file_path = 'Assessment for python AI Readiness.csv' # Change to your file's location
df = pd.read_csv(file_path)
print(df.head())

df_survey = df
df_analysis = df_survey.describe().transpose()
df_analysis['Median'] = df_survey.median()
df_analysis['Median'] = df_survey.mode().iloc[0]
print(df_analysis)
```

Figure 3: Python codes to measure mean using the csv files



1: I am interested in learning about Al-based tools in art and design.
 2: I believe that Al can assist in improving the design process.
 3: I would consider incorporating Al-based solutions into my future art and design projects.
 4: I feel confident in my ability to integrate Al technologies into my design process.
 5: I believe Al can significantly improve the quality and efficiency of my design work.
 6: I am excited about the potential of Al to inspire new creative ideas.
 7: I am curious to see how Al technology will evolve and its impact on the future of art and design.
 8: I believe that Al assistants can handle repetitive tasks, allowing me to focus on more creative aspects of my work.
 9: I am willing to invest time in learning how to use Al tools efficiently for design work.
 10: I am confident that Al-based tools can help accelerate my design workflow.

Figure 4: Graph for students' exposure to AI infused creative software

Referring to the graph of mean Likert scores above, the key observation is that the highest mean score is 2.82, while the lowest is 1.92. This indicates that, on average, the responses fall between neutral and disagree. Low exposure is evident in Question 9, which asks about the willingness to invest time in learning how to use AI tools efficiently for design work. It can be inferred that students are hesitant and lack motivation to actively learn AI tools, possibly due to limited motivation and insufficient reference materials.

Question 8 also shows a low score of only 2.0, suggesting that students do not yet trust the potential of AI in assisting with creating good designs, likely due to limited exposure and experience with AI. For Question 6, which has a relatively high score of 2.82, this indicates that students are somewhat optimistic and curious about how AI can stimulate creativity. Although AI usage is still low, students show interest in AI's future potential.

For Questions 2, 3, 4, and 5, the scores are close to or above 2.5. These questions pertain to integrating AI in the software that they are using into their creative work, their confidence in combining AI with their processes, and AI's potential to improve the quality of their designs. The relatively higher scores suggest that students are somewhat aware of AI's potential in the software they use, although they have not yet directly engaged with AI software in their design activities.

There are also questions indicating a neutral attitude, as seen in Questions 1, 2, 3, 4, and 5, which reflect a neutral stance and limitations in AI usage but also a willingness to learn and awareness of AI's existence and advantages.

In conclusion, based on the graph observations, students' exposure to creative design software integrated with AI is relatively low. While they are aware of the existence and potential advantages of such software, they lack access to and practical experience with AI tools, as well as formal training. Students are excited about AI's potential, but this enthusiasm has not yet translated into practical experience or formal training.

Willingness to use AI powered software in design.

```
•[7]: import pandas as pd
      import matplotlib.pyplot as plt
      file_path = 'l00 participants willingness1.csv'
      df = pd.read_csv(file_path)
      df.columns = df.columns.str.strip()
      questions = df.columns.tolist()
      statistics = {}
      for question in questions:
         # Calculate mean and median
          mean_score = df[question].mean()
          median_score = df[question].median()
          statistics[question] = {'Mean': mean_score, 'Median': median_score}
      mean_scores = [statistics[question]['Mean'] for question in questions]
      plt.figure(figsize=(12, 8))
      plt.barh(questions, mean_scores, color='skyblue', edgecolor='black')
      plt.xlabel('Mean Score')
      plt.ylabel('Survey Questions')
      plt.title('Mean Scores for All Survey Questions')
      plt.tight_layout()
      plt.show()
      statistics_df = pd.DataFrame(statistics).T
      print(statistics_df)
```

Figure 5: Python codes for willingness quantification statistic



Figure 6. Python codes to measure willingness of the participants to use AI tools using the .csv files

Conclusion from the Combined Survey Graph:

The results of the analysis on the survey questions indicate that nearly all questions received an average score of around 3. This suggests that participants generally hold a neutral to somewhat positive view regarding the use of AI-integrated software in their design practices. Questions related to awareness of AI advancements and interest in learning about AI in design received slightly higher scores, suggesting that students are both aware of and curious about AI's role in the creative field.

Meanwhile, the lowest mean score is related to the question familiarity with AI tools and trust that AI can maintain artistic style, which shows that students feel less confident about some AI tools and also how AI can help and balance with their respective creative artistic styles. Questions related to openness to using AI tools and curiosity about AI's future impact reflect a relatively balanced sentiment. Questions about openness to using AI tools and curiosity about AI's future impact reflect a relatively balanced sentiment. It shows participants are generally open to exploring what the potential of AI has to offer while at the same time being wary of the implications for creative fields. The level of readiness for students to learn and confidence in combining creative software with AI for their respective creative projects also gave a moderate score. This is seen as suggesting that students have shown interest but are constrained by concerns about the extent of the effectiveness of AI and the level of knowledge of using the equipment. As a result of this experiment, it can be seen that students want to explore creative software with AI integration but need more knowledge, exposure and practical demonstration to strengthen their confidence in operating creative software with AI integration.

General Perception of AI's Role in the Creative Process

This section uses subjective questions included in google assessments questions. It intends to assess and understand participants' perceptions of the role of AI in their creative processes. Each participant's response is transcribed, and a conclusion is drawn from all the feedback.

The responses show different opinions on how AI will shape the future of design. Many participants see AI as a valuable tool that can simplify tasks, increase creativity, and allow for more customized, data-based designs. The majority of students believe that AI can be used to handle ordinary and repetitive duties, hence, help designers to have more time on creative work. Some also feel that AI will make design tools easier for non-designers to use, helping more people create professional-quality work.

However, some concerns were raised about relying too much on AI. Some students respond that they fear that using AI too much will make traditional artistry and originality lesser than it should be, leading to designs that is monotonous and boring. Others worry that AI might replace designers who don't adapt to using it, leading to fewer job opportunities. There is also concern that AI could reduce competitiveness in the field, so it's important to balance AI's help with individual creativity.

In general, AI is seen as both helpful and disruptive: it boosts efficiency and creativity, but it could also lead to similar-looking designs and fewer jobs. While AI can advance the field, many believe designers need to keep building unique skills and creativity to stay relevant. The best approach seems to be a balanced one, where AI supports human creativity without replacing it.

CONCLUSION AND FUTURE RESEARCH

This short study shows that design students in UMS are mostly neutral and a bit positive when it comes to the use of creative software that have some sort of AI integration in them to produce their designs. While there is clear interest and curiosity about AI's abilities to enhance creativity, students of creative design currently have limited experience and practicality with these softwares. They are aware of the capabilities of AI, such as improving workflow efficiency and generating new design ideas, but most have not explored these features widely. Limited exposure is largely due to limited training opportunities, insufficient reference materials, and weak structure support in the curriculum. Despite this awareness, students generally remain wary of fully utilizing AI in their creative processes, primarily due to concerns about AI's ability to maintain an artistic style and align with their individual creative vision. Additionally, their willingness to invest time in learning AI tools is prevented by the uncertainty and complexity perceived by students in this study which emphasizes the need for more accessible learning resources.

Future research will look to focus on trend or cohort studies that can track the perception, readiness and competence of students that develop over time. This will provide a broader and deeper view of how exposure and learning to AI software impacts their confidence and creative output. Expanding the pool of participants beyond a single institution and including multiple geographic locations can yield a broader understanding of trends in AI use among design students. Additionally, conducting qualitative interviews or focus groups can capture students' detailed perspectives on the integration of AI in creative education, revealing motivations, concerns and needs that cannot be fully

captured by quantitative data alone. Research should also study the effectiveness of structured AI training programs, exploring how they improve practical skills and confidence among students.

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