

**Exploring College Students' Perceptions of Using Generative AI to Produce
Agricultural-Related Vector Images**

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Introduction/Need for Research

Within the agricultural communications discipline, graphic design courses are popular reflecting the emphasis on visual communication and the multimedia nature of the modern field (Cannon et al., 2016). Recently, artificial intelligence (AI) has become a popular concept to explore (Dehman, 2023), and recent advancements in AI technology have led to a range of questions and concerns from both design practitioners and academia about the future of AI-driven designs (Engawi et al., 2021). AI-powered tools have increasingly become more prevalent and assist designers in tasks like generating ideas, enhancing productivity, and improving overall design quality (Engawi et al., 2021). Generative AI refers to AI technologies that automatically generate visual or written content based on text prompts (Oppenlaender, 2023). Generative AI is designed to create new data, like images or text, that is like, but not identical to, existing data. However, it is unknown if AI can create accurate depictions of text-based prompts, for agricultural topics. Practitioners have expressed a need to better understand AI tools and their use and have outlined ethical concerns such as lazy design work and the transparency of their own work as a challenge in using AI technology (Engawi et al., 2021). Traditional approaches to creating agricultural graphics involve manual efforts, often requiring a team of experts with diverse design, technology (i.e., Adobe Illustrator), and drawing skills. Additionally, practitioners have highlighted a need to study AI and the loss of the more traditional, human-touch approach to design and the impacts that may have on the accuracy of images created (Fatima, 2023). As we work to train future generations of agricultural communicators, we need to better understand the potential use of generative AI tools in crafting agricultural images. A logical place to start is to first explore students' perceptions of the images these tools create to determine their accuracy and usefulness for agricultural communicators.

Theoretical Framework

Davis (1985) developed the Technology Acceptance Model (TAM), to gauge an individual's desire to adopt different technologies. Davis (1985) suggested that user motivation, influenced by external stimuli containing the system's features and capabilities, can explain or predict responses to system use (Chuttur, 2009). According to TAM, technology acceptance involves a three-stage process. The initial stage involves external factors, such as system design features, triggering a cognitive response in the second stage, like perceived ease of use, which then shapes an effective response in the third stage, such as a person's attitude toward technology and intention to use, influencing user behavior (Davis, 1989; Davis, 1993).

Purpose and Objectives

In this study, we sought to analyze college students' perceptions of the accuracy and perceived usefulness of generative AI tools in Adobe Illustrator in the creation of agricultural images. The following research objectives guided this study:

1. Determine students' perceptions of the accuracy of generative AI graphics in representing agricultural-related prompts.
2. Evaluate students' perceived usefulness of generative AI tools for agricultural communicators.

Methodology

Students ($N = 37$) enrolled in an advanced agricultural communications graphic design course were asked to create vector graphics using generative AI in Adobe Illustrator. Each student was given a unique prompt related to an agricultural topic (i.e., a farmer standing in a wheat field with a barn in the distance under a blue sky.) They were then tasked with generating six vector scenes of their prompt using Illustrator's text-to-vector tool. After creating their AI graphics, students were asked to reflect on this activity and record their thoughts related to the accuracy of their vector images and how useful they felt this tool could be to agricultural communicators via a Google Form. Students also uploaded PDF versions of their generated images to the Form. Responses were coded and analyzed to define common themes using open and axial coding and the constant comparison method (Creswell, 1998).

Results

Most students (62.1%, $n = 23$) were favorable of the generative AI tool and felt that the technology produced images that accurately portrayed agriculture based on the prompts given to them. Some students ($n = 11$, 29.7%) felt the AI images only somewhat represented agriculture, while only 8.2% ($n = 3$) felt they did not accurately portray agriculture. Five main themes were identified from students' thoughts regarding their AI-created vector scenes. Students suggested that using the text-to-vector tool is great for *idea generation*. One student mentioned, "While it is not our own work, AI can be used to get the ball rolling on ideas and help us move forward creatively." Another indicated, "There are a lot of ways in which the generator tool can help people design and come up with ideas for when we are in a creative rut." Students also expressed that using the text-to-vector feature can help agricultural communicators when there is a need to *produce work quickly*. "This can produce some awesome scenes that would take someone hours in a short time." Another mentioned, "AI makes quality graphics, better than what I could do on my own, in a fraction of the time I would spend designing them." However, students did find the graphics created to be somewhat *stereotypical*. "It seems to generate scenes and subjects that are stereotypical, not what we see in our everyday life." Additionally, students learned the *prompts must be detailed* for them to be accurate. "I learned that if you want specific details in your graphic you need to add those elements as keywords." Lastly, students said the tool was *easy to use*. "This exercise helped me learn about how I can better use AI in creating certain graphics," and "It is very easy to use and get results fast."

Conclusion/Implications/Recommendations

The themes identified from students' reflections echoed the potential use of generative AI for idea generation, rapid production, and design quality (Engawi et al., 2021). The use of AI for idea generation can be a powerful way to leverage the capabilities of machine learning models to assist and inspire creative thinking. The students' perceptions of the perceived usefulness of the text-to-vector tool indicate that they believe that the system will help improve their tasks and may influence their behavior and intention to use generative AI in the future (Gonçalves et al., 2023). Generative AI can create accurate agricultural images; however, there may be a lack of detail and some stereotypical imagery used which can reflect the loss of human touch in the designs (Fatima, 2023). Addressing these concerns will require a comprehensive and ongoing effort from developers and users to build fair, unbiased, and inclusive AI systems. It is recommended that designers run prompts through AI software, like Chat-GPT, to generate language that AI can understand for the best results. This could enhance the accuracy or level of detail provided in generated images.

References

- Cannon, K. J., Specht, A. R., & Buck, E. B. (2016). Agricultural communications: A national portrait of undergraduate courses. *Journal of Applied Communications*, 100(1). <https://doi.org/10.4148/1051-0834.1018>
- Chuttur, M. (2009). Overview of the technology acceptance model: Origins, developments, and future directions. *All Sprouts Content*. 290. https://aisel.aisnet.org/sprouts_all/290
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Sage Publications, Inc.
- Davis, F. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. [Unpublished doctoral dissertation]. Massachusetts Institute of Technology.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>
- Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, 38, 475-487. <https://doi.org/10.1006/imms.1993.1022>
- Dehman, H. (2023). Graphic design, already intelligent? Current possibilities of generative AI applications in graphic design. *DIVA*, 59. <https://www.diva-portal.org/smash/record.jsf?dswid=5956&pid=diva2%3A1797022>
- Engawi, D., Gere, C., & Richards, D. (2021). The impact of artificial intelligence on graphic design: Exploring the challenges and possibilities of AI-driven autonomous branding. *Proceedings of the International Association of Societies of Design Research*. Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4472-7_238
- Fatima, I. (2023). Designing with AI: A user study to explore the future role of AI as a collaborative tool in graphics design. *DIVA*, 12. <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1811190&dswid=-6130>
- Gonçalves, A. R., Pinto, D. C., Rita, P., & Pires, T. C. (2023). Artificial intelligence and its ethical implications for marketing. *Emerging Science Journal*, 7(2), 313–327. Doi: 10.28991/ESJ-2023-07-02-01
- Oppenlaender, J. (2023). A taxonomy of prompt modifiers for text-to-image generation. *Behavior & Information Technology*, 1–14. <https://doi.org/10.1080/0144929x.2023.2286532>