

AI and Art Pedagogy

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Abstract

In recent years, Artificial Intelligence (AI), a term coined by John McCarthy in 1956, has been continuously debated as creating arts using an AI has become more common in our daily lives. However, we argue that gifted arts educators are not yet prepared for the paradigm shift. As art educators interested in introducing contemporary art to the K-12 curriculum, in this paper, we shed light on the implications of the work of contemporary artists who actively incorporate AI technologies into their practices, particularly for today's gifted arts education. We highlight the bodies of work of three artists/artist groups: Patrick Tresset, Shinseungback Kimyonghun, and Es Devlin. Their definition of the role of AI in creative art making processes is distinctive in their own terms and centered on their artistic goals and missions. Constantly seeking artistic possibilities in playful ways, these artists focus on intuitive processes, maintaining and developing their artistic curiosity and critical thinking, rather than on technologies themselves. They suggest that AI use in creative activities can push the boundaries of artistic practices and can challenge our traditional notion of what constitutes good art. It also questions the definition of "gifted" and "talented." We encourage fellow gifted arts educators to accept this new challenge and to help their students encounter new ways to develop critical thinking and problem-solving skills by employing the conceptual fluidity and flexibility required for human-centered AI use.

Keywords

Artificial Intelligence (AI), visual art education, contemporary art, creativity, Patrick Tresset, Shinseungback Kimyonghun, Es Devlin

Introduction

An interesting piece of news was released in September 2022 about a man winning an art competition at the Colorado State Fair. The reason this artist drew many people's attention is that this art piece was generated by Artificial Intelligence (AI) (Kan, 2022). What is particularly intriguing is the furious responses of his fellow artists. People questioned the validity of this winning piece because an AI-powered program, Midjourney, generated the image. In recent years, AI, a term coined by John McCarthy in 1956, has been continuously debated as creating arts using an AI has become more common in our daily lives. In addition, many scientists, engineers, educators, and policymakers have

indicated the need to be prepared for the paradigm shift that AI will cause. However, the outrage of people regarding the competition win of an AI-generated art piece clearly shows that we are not yet prepared for the paradigm shift.

This unpreparedness may be due to two obstacles. First, we have some level of fear regarding AI use in art and art education, as the use of machines as creative agency is new to us. This natural concern about the uncertainty is demonstrated by the scarce sources in the literature about AI-related activities in art education despite the increasing educational interest in this topic. The other barrier is our resistance to the premise that AI challenges traditional definitions of creativity and requires the reconstruction of how this important concept applies to arts education practices. In fact, the terms, themselves, such as "computational creativity" and "creative machines," that engineers and scientists commonly use (Dufva, 2023; Leonard, 2020, 2021) are confusing to many art educators regarding what they mean in educational settings.

This paper is an endeavor to respond to these concerns and unconfident responses. As art educators interested in introducing contemporary art to the K-12 curriculum, in this research circle presentation, we illuminate the implications of the work of contemporary artists who actively incorporate AI technologies into their practices, particularly for today's art education. We highlight the bodies of work of three artists/artist groups: Patrick Tresset, Shinseungback Kimyonghun, and Es Devlin. The suggestions for art education practices are also discussed.

Artificial Intelligence and Creativity

In the fields of science, mathematics, and psychology, scholars have been analyzing and comparing the function and logic of the human brain and computer for decades (McCarthy, 2005, 2007; Newell & Simon, 1956, 1972). From general intelligence to human-level machine intelligence, the investigation of how humans "find" and "solve" problems has been integral to this long-lasting research (McCarthy, 2007; Simon, 1988). In 1954, psychologists Allen Newell and Herbert Simon began developing "programming computers for general intelligence" (McCarthy, 2007, p. 1174), and later, they explored the human brain's cognitive function as an "information processing system" (Miller,

2019, p. 37). At the same time, the examination of computer creativity emerged in the 1960s. As one of the main figures of those studies, Simon (1988) argued that “creativity involves nothing more than normal problem solving processes” while countering the argument of Csikszentmihalyi who insisted that “problem-finding is the hallmark of creativity” (Csikszentmihalyi, as cited in Simon, 1988, p. 177).

The debate regarding whether creativity is solely a human’s possession or whether creativity can be practiced by AI has been an ongoing dialogue (Koo, 2022). As the notions and boundaries of creativity became blurred, more artists and scientists began exploring whether a computer can create art (Miller, 2019). As demonstrated in the case of Colorado State Fair’s art competition, the outcomes created by humans and AIs cannot be easily distinguished, and AI’s artworks have been obtaining recognition in many parts of the globe. Consequently, the public has begun to realize its potential both in positive and negative ways. Individuals continue to question the boundary between human and technology in art making.

AI-Based Practices of Contemporary Artists

There have been significant debates regarding who the subject of creativity is and whether AI can be the main agent of those creative activities. Even the artists, scientists, and/or engineers themselves have different points of view regarding the question of whether creativity is a human’s sole territory. In this section, we discuss the possibilities of utilizing AI as a part of humans’ creative activities by exploring three artists/artist groups—Patrick Tresset, Shinseungback Kimyonghun, and Es Devlin. These artists were selected based on the following process. First, we conducted preliminary research to identify artists who use AI in their art making. Then, we created a list of 11 artists from different parts of the world based on the originality and significance of their AI-incorporated work. Finally, we reviewed the list and selected three artists using the following criteria: 1) artistic perspectives that align with our two problem statements regarding arts educators’ fear of AI use in arts and arts education, as well as their resistance to the premise that AI challenges traditional notions of creativity; 2) artworks that have the potential to renew arts educators’ perceptions about AI use in arts classrooms; and 3) artistic approaches relevant to gifted arts students and educators. We also considered gender, age, and length of AI use to provide readers with balanced perspectives.

Patrick Tresset: Examining Humanness through AI

Patrick Tresset, a Brussels-based French artist, explores humanness, “human traits and the aspects of human experience” by utilizing computational technologies and robots as agents of acting (Tresset, n.d., para. 1). Tresset was originally a painter attracted to the spontaneity of drawing. When he was in a graduate program, he worked on simulated drawings, for which the approaches were transferred to his robots

later in his career (Waelder, n.d.). His interest in human characteristics and the spontaneity of drawings generated by robots resulted in using the posthuman entity as a mediating medium for humans to meditate. In an interview with *ArtDependence Magazine*, Tresset said that his goal is “[t]o give a multi layered aesthetic experience to a wide audience...to provide rich emotions, to amaze, intrigue whilst showing something about humanness” beyond focusing solely on the advanced technologies themselves (Verbist, 2016, para. 3). In his interview, Tresset argues that by reflecting on the robotic agency, people can revisit human behavior such as “how humans depict other humans” or “how humans perceive artworks” (Verbist, 2016, para. 1).

First, it is noteworthy that Patrick Tresset’s use of AI focuses on the re-examination of humanness and not the technical aspects of AI technology. Although some people have emphasized his unique utilization of technologies in making art, he asserts that such is not the focal point of his pursuit (Verbist, 2016). To him, “intentionality” and “embodiment” in art making processes (Tresset & Deussen, 2014, n.p.) are more essential than the novelty of technologies. Notably, his strong interest in the spontaneity of drawings and simulated drawing making led him to apply robotics and AI. This can be a meaningful message for gifted arts educators regarding the role of AI in art classrooms. When they successfully encourage students to focus on developing their artistic interests, the use of new technologies, such as algorithm and machine learning, can be easily integrated into students’ art practices. Second, in his artistic practice, Tresset answers the questions that many gifted arts educators have about the view of AI as creative agency. By depicting the existence and characteristics of humans, he utilizes AI technology as a means to reflect on how humans behave, think, and interact. To him, robots function as mirrors to observe humans more closely. In addition, Tresset considers AI to be his collaborators, as demonstrated in his explanation of his partnership with e-David introduced above. However, he contrasts his use of AI to artists who have assistants to aid their artistic productions and artwork commercialization (Tresset & Deussen, 2014). Rather, in his practice, Tresset uses AI technology to welcome a wider audience and invite different perspectives of art and humanness.

Shinseungback Kimyonghun: Uncovering Both Possibilities and Limitation of AI

Shinseungback Kimyonghun (ssbkyh) is a Seoul-based duo of Korean artists, Seungback Shin and Yonghun Kim. Shin, who studied computer science, and Kim, who studied visual art, formed the team in 2012 and have been investigating the impact of technology on humanity and the possibilities of artistic exploration via new technologies. Similar to Patrick Tresset, ssbkyh contextualizes unique human traits and abilities in a playful way while examining the realms of machines, humans, and nature, asking us how they are interconnected and influence one another. In their projects,

people's faces overlap with animals' faces; we see human faces on clouds; and people could have second-hand experiences as if they were a stone on the shore. In an interview with *METAL* magazine, Kim states that the current trend of AI could be "an opportunity for us to find new human values" (Spratley, n.d., para. 6).

First, the work of Shinseungback Kimyonghun presents a great amount of conceptual flexibility and playfulness based on their tireless artistic experiments. Gifted arts educators can easily find enthusiasm and openness in the artists' approach to art making. These characteristics of their art practice stem from their genuine curiosity as artists and creators. For example, as presented in the projects *Nonfacial Portrait* and *Animal Classifier*, they are delving authentically into expanding human creativity through a new interpretation of object/subject/surrounding while exploring AI technology. Second, Shinseungback Kimyonghun push the boundaries of creativity through multilayered interactions between AI and humans, challenging the traditional approaches to art making. By providing data and/or feedback between human and AI, both learn about and expand the scope of the definitions and boundaries of art and creativity. Furthermore, by highlighting possible errors of cognitive processes that both humans and AI possess, Shinseungback Kimyonghun invite the audience to become aware of the clear limitations and biases we all have.

Es Devlin: Using AI to Fulfill Emerging Needs

Es Devlin, a British artist and stage designer, creates performative sculptures and public artworks utilizing a mixture of light, music, and words. Based on her interest in film and literature, she has worked on various large-scale projects. In her artistic practice, Devlin particularly focuses on the interaction between her work and the audience. She explains that in her work, the viewers become participants, and she deepens her understanding of the concept of audience engagement by collaborating with theater companies and working on set design (Devlin, n.d.). Devlin began to use machine learning and algorithm for art making in 2016 for *Poem Portraits* on view at the Serpentine Gallery, London, UK (Ranjit, 2021). To integrate the poems donated by 1,500 visitors into the work, she collaborated with engineers who introduced what AI could do for her project (see Figure 9). Since then, she has continued to explore the machine-generated poem creating for her projects at the Victoria and Albert Museum in 2017 and in Trafalgar Square in 2018. The most recent example of Devlin's AI integration is the UK Pavilion, also called the Poem Pavilion, exhibited at Expo 2020 Dubai. Using the structure of a giant wooden instrument, she integrated a machine-learning algorithm into the crafting of a cumulative collective poem displayed on the 20-meter diameter façade (see Figures 10, 11, and 12). The UK Pavilion utilizes a machine-learning model, GPT-2, which is "an exclusive language model defined by 1.5 billion parameters"

(Ranjit, 2021, para. 7). After a thorough text-based training, it refined a diverse and selectively curated collection of more than 1,000 poems.

First, what is intriguing in Devlin's utilization of AI in her creative processes is that she chooses machine learning as part of problem solving. She applies algorithm mechanisms to incorporate the inputs from her audiences/participants into her work—using her own term, to create the "magic" (WIRED Live, 2021) she was searching for to present all the poems donated by numerous people. Her purpose in utilizing AI was to address the needs she encountered during her art making process. The fact that she successfully incorporated AI into her practice as a mid-career artist due to her emerging needs can inspire many experienced gifted arts educators who are not familiar with AI technology. Second, her artwork offers suggestions for how gifted arts education can embrace AI within its traditional practices and contexts. Es Devlin explained that she generates interactions between the living and the dead as well as between the past and the future (WIRED Live, 2021), by reconstructing our exploration of the work of poets from centuries ago using a machine-learning algorithm. In this context, gifted arts educators can learn about how to make connections among the past, present, and future in their practices while moving forward by incorporating the new challenges associated with AI-generated arts creation.

Inspirations for Art Education Practices

Of the three contemporary artists examined in this paper, Patrick Tresset, Shinseungback Kimyonghun, and Es Devlin, each artist/artist group has applied different approaches to the use of machine-learning algorithms and AI based on their genuine interest as artists and cultural creators. Their definition of the role of AI in creative art-making processes is distinctive on their own terms and centered on their artistic goals and missions. These artists' focus is on intuitive processes, maintaining and developing their artistic curiosity and critical thinking, rather than the technologies themselves. One common aspect of AI use that all the featured artists emphasized is the paradigm shift that AI has caused in our everyday routines across various areas of our communities—education, culture, arts, and society. In our research, we have endeavored to identify the implications of this paradigm shift for gifted arts education for today's children and youth. One important takeaway we found in the AI-generated and AI-assisted art practices of the artists introduced in this article is the *playfulness* that appears in all their works. It is rooted in the artists' open-minded approaches to fully experiment with all the artistic and creative possibilities of AI-generated art making. Some artists have utilized machine learning due to curiosity about its potential as a new medium, while others have found its value to their processes and outcomes in that it is a way to meet their needs and solve problems. This kind of playfulness and fearless

experiments may be what John Dewey (1938) aimed to emphasize by the motto “learning by doing” in his classic *Art as Experience*. It also appears that AI opens an avenue to explore new ways of seeing, as John Berger (1972) introduced different ways of seeing to many people in the post-television era. It is crucial to position the emergence of AI as a creative agency, tool, or medium in the historical context of arts education and gifted education by bridging the past, present, and future, just as artist Devlin explained in her WIRED UK interview.

Another critical aspect of AI use in art education is determining how to educate children and youth about the ethics that should accompany their AI use. Art educators need to be aware of the risks and potential harms in the use of AI in educational contexts. In recent years, many educators have paid close attention to the ethical aspects. For example, in 2019, United Nations Educational, Scientific, and Cultural Organization (UNESCO) initiated a two-year process to elaborate on this global instrument regarding the ethics of AI and adopted the Recommendation on the Ethics of Artificial Intelligence on November 24, 2021. On their website, this organization states, “Today, artificial intelligence plays a role in billions of people’s lives. Sometimes unnoticed but often with profound consequences, it transforms our societies and challenges what it means to be human” (UNESCO, n.d., para 1). UNESCO listed both the benefits from and risks of AI use. According to their report (UNESCO, n.d.), AI proved its value during the COVID-19 global pandemic, and we can use AI as a powerful tool to educate people about urgent needs to take action in response to climate change and environmental issues; however, the organization also warns that AI-driven growth is likely to be very unequal and to contribute to worsening existing gender gaps. In U.S. classroom settings, the use of virtual reality headsets and software is currently recommended for students aged 13 and above (Guarino, 2016). Similarly, educators need to monitor the age level for AI-based software use in classrooms to reduce any possible risks associated with AI use for children. In addition, United Nations Children’s Fund (UNICEF) also issued “Policy Guidance on AI for Children” in September 2020. In this guide, UNICEF emphasizes children’s rights and AI’s opportunities and risks. The guidebook discusses the foundations and requirements for child-centered AI. The featured artists’ explorations of AI’s biases and limits can be utilized in classrooms in these contexts.

Conclusion

To determine the implications of AI-assisted art education in future classrooms, this paper examines the artistic practices of three contemporary artists who actively use AI as creative agency. These artists adopted an inquiry-based approach to AI use and used machine-learning algorithms as a stimulator to generate their creative and artistic energy. As a result, the artists exhibited an expanded spectrum of

creative activities and art making. Today’s art educators need to consider both the educational possibilities and the potential harms of AI use for children and youth. By collaborating with other educators and policy makers, they can develop innovative solutions to possible problems AI might cause in education. Rather than considering AI use as something disconnected from the past or focusing only on its novelty, they can acknowledge that most technologies have been a part of evolution throughout human history. We found that AI use in creative activities can push the boundaries of artistic practices and challenge the traditional notion of what is considered good art. Art educators have a responsibility to showcase future pathways for education to younger generations (Kerr & Lawson, 2020; Meyer 2017). We encourage fellow art educators to embrace this new challenge and to help their students encounter new ways to develop critical thinking and problem-solving skills by employing the conceptual fluidity and flexibility required for human-centered AI use.

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Song also has actively exhibited her artwork, and her solo exhibitions were at Macy Gallery in New York City and at J. Y. Joyner Gallery, Greenville, NC.

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