Being Creative with a Non-Human: The Use of Generative Artificial Intelligence and Art

Shirley Gregor
Research School of Management
Australian National University
Canberra, Australia
Email: shirley.gregor@anu.edu.au

Abstract

What does it mean to be creative with generative Artificial Intelligence (GenAI) in producing images in visual art and design? An overview is given of saliant prior work on human creativity, machine creativity, human-machine creativity, technology affordances and ethical issues. The author then reports an autoethnographic study of a seven-month project to produce artworks as part of a group project for an exhibition at a regional gallery, including her experimentation with different ways of using image generative-AI (image-GenAI). Insights from the author's experiences are combined with relevant prior literature to develop guiding principles for assisting creative endeavours in this context. The set of principles, termed *ORCA/E for AI-Art*, comprise: (1) Openness to alternative perspectives; (2) Reflection and reflexivity; (3) Common communication framework; (4) Affordance-based design; and (5) Ethical and legal concern. Appropriate mechanisms for the principles are identified. The study responds to calls for research in the field of creative human-AI collaboration, which is a fast-changing and important field. The study contributes by adding to the limited number of first-hand accounts of the use of image-GenAI and by proposing guiding principles that address new ways of working creatively with this technology.

Keywords: Creativity, Art, Text-to-image Generative AI, Human-AI Collaboration, Autoethnographic Study, Technology Platforms, Guiding Design Principles.

1 Introduction

What does it mean to be creative with artificial intelligence (AI) in fields such as art and design? How does such creativity arise? Significant technological advances with generative AI (GenAI) and its deployment on publicly accessible platforms has been accompanied by very rapid growth in usage and extensive coverage in the research literature. The process aspect of human-GenAI creativity is referred to in many ways, including augmenting, assistance, co-design, co-creating, partnership, teamwork, and tool or supertool use (see Audrey 2021; Shneiderman 2022). Relevant literature is distributed across many disciplinary areas, from art and artificial intelligence to management, health, organizational studies and law (see Holzner, Maier and Feuerriegel 2025). In information systems work appears in the research stream termed human-AI collaboration (Richter and Schwabe 2024).

The appearance of publicly accessible GenAI, however, is recent and it appears that the attention paid to accounts of human creators' experiences with GenAI in this context is relatively underrepresented in the research literature as is guidance for its use. A systematic literature review showed that although the number of studies on machine creativity had increased markedly in recent years, relatively few were case studies or interviews concerning usage (Boo, Kim and Suh 2025). Richter and Schwabe (2025) propose that further research is

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needed in information systems on human-AI collaboration, highlighting the importance of context. Questions they propose include the need to understand how we can design adaptive practices that can accommodate the evolving nature of human-AI collaboration and how we can pay due attention to ethical outcomes. Benbya, Strich and Tamm (2024) give an in-depth examination of the opportunities and challenges presented by GenAI for research in information systems, both for knowledge and creative work. Under the heading of "machine-human team dynamics" (p. 30) they point to the need to build symbiotic collaboration between humans and GenAI for the best creative outcomes and for design principles to assist in achieving that symbiosis.

Research into creativity with GenAI can be delimited by considering its outputs, for example whether image, text or both. The use of image-GenAI[1] means that human visual processing of images is involved, as well as language processing. The visual system is said to take up as much as 30% of the human brain and yet it is not clear how the information from the visual system is passed on to other brain centres, including that for language (Cavanagh 2021). It is not obvious that findings from studies of text-to-text GenAI can be generalized to text-to-image GenAI, warranting the investigation of the latter separately.

Against this background, the aims of this paper are: (1) to further explore the nature of human-GenAI creativity, with the use of text-to-image GenAI (image-GenAI) for visual art and a focus on the personal accounts of artists and designers and how they achieve their goals; and (2) to develop guiding principles that apply specifically to this context to assist artists using image-GenAI. There appears to have been little opportunity as yet to build knowledge of patterns of usage of image-GenAI and guidelines that can assist artists and others interacting creatively with this new technology.

Understanding how creativity arises with image-GenAI and issues with its use is important. The advent of publicly available image-GenAI has led to what has been referred to as the democratization of art, making art and design tasks accessible to people without traditional training. As an example, the tool DALL·E was released for public use in September 2022 and according to its developer OpenAI had over 1.5 million active users creating more than 2 million images a day within a month (Tang et al. 2024). Professional users include graphic designers, architects, games designers, video producers and web designers. Renowned contemporary artists continue to produce well-regarded works of art with AI (AIArtists 2025, Caramiaux and Fdili Alaoui 2022). At the same time there is concern about "AI slop", a broad term that refers to shoddy or unwanted AI-generated material, that is thought to have originated in reaction to the release of AI art generators in 2022 (Hoffman 2024). There are also wider philosophical questions concerning how AI might transform core aspects of artistic production. For example, Bar-Gil (2025) extends to the digital age Walter Benjamin's arguments from the mid-1930s concerning the transformative effects of mechanical reproduction (Benjamin 2018). Benjamin argued that the "aura" of a work of art lay in its unique existence in a particular time and place and that this aura was lost through mechanical reproduction.

The implications of GenAI for human creativity in general can be striking. David Baker was awarded a Nobel Prize for Chemistry in 2024 for showing how to create entirely new proteins

[1] *The shortened term "AI" is used in the following discussion to refer to "image-GenAI" when the context makes clear the intended meaning.*

with new functions that can be of societal benefit (Nobel Prize 2025). He used an AI deep learning generative approach, taking advantage of its "hallucinations" – a tendency to fabricate information that is actually false (Wicky et al. 2022).

The autoethnographic study reported here arises from a project that ran over seven months. The author was one of a selected group of local artists taking part in a structured process with mentors, workshops and individual coaching to help them prepare for the *Volatile Terrain* exhibition at The Condensery, the Somerset Regional Art Gallery. The exhibition focussed on the environment and also included nationally recognized artists. The author chose to utilize an image-GenAI platform in the preparation of her artworks, with varying degrees of reliance on the image-GenAI. The four artworks form a series entitled *Balance* and encourage reflection on how human needs and technologies can be balanced against care for the environment. The exhibition was selected as a finalist for the Queensland 2025 Gallery and Museum and Galleries Achievement Awards.

Guiding principles for working creatively with image-GenAI are developed, extending an existing framework termed ORCA (Buyssens et al. 2025). ORCA provides principles for action design research in situations characterized by uncertainty and requiring creativity through human teamwork to deliver platform technology-based innovation. The new set of principles is termed *ORCA/E for AI-Art*[2] and includes: Openness to alternative perspectives; Reflection and reflexivity; a Common communication framework; Affordance-based design; and Ethical and legal concern. New mechanisms for each principle are advanced for the image-GenAI context, with grounding in the findings from the autoethnographic study, published personal accounts of others and relevant theory. This approach is congruent with multi-grounded design science research (Goldkuhl 2004) and recommendations for the specification of design principles (Gregor, Chandra Kruse and Seidel 2020). The *ORCA/E for AI Art* principles are placed, along with the image-GenAI, in the context of Rhodes' "Four P" conceptual model of creativity (Rhodes 1961).

The study contributes with insights into creative processes in human-AI collaboration, an area identified by Benbya et al. (2024) as requiring further research. It develops a set of guiding principles that extends knowledge on how creative processes can be enhanced by image-GenAI platforms, with mechanisms for consideration by artists and designers in this context.

2 Background

Research relevant to AI and art can be found in information systems and human-computer interaction as well as in other disciplines. A proposal was made as far back as 2006 that computer art could be seen as a form of information system, with examples including art in web design (Oates 2006). AI in general can be utilized as a collaboration support technology, where support is given to activities including communication, coordination, and information processing among human team members working on joint tasks, which can include creative tasks (e.g. Porter and Grippa 2020). More recently, consideration has been given to how an AI could be seen as a team member or teammate, albeit of a special kind, rather than merely providing support to human team members (Seeber et al. 2020; Richter and Schwabe 2025).

[2] *"AI-Art" includes both AI-Generated artworks and AI-Assisted art, where the final work is created by the artist with non-digital media.*

The concern of the current study is with the use of GenAI in the creation of visual imagery. The overview provided below focuses on areas that emerged as salient in relation to the aims of this paper, before, during and after the completion of the autoethnographic study. The material helped the artist to understand more fully the technology she was dealing with and how it could be used responsibly and it also provides theoretical grounding for the guiding principles that are developed.

Only relatively brief coverage can be given of areas that have been treated extensively in the literature. Readers are directed to sources cited for more in-depth coverage.

2.1 Human Creativity

As defined by Amabile (1996) creativity is the production of a novel and appropriate response, product or solution to an open-ended task. The most basic requirement for being creative is that what is created is new and original. The response must also be appropriate to the task or problem, being seen as valuable, correct, feasible or somehow fitting to a goal, as assessed by a relevant social group. Amabile's componential theory of creativity proposed four components as necessary for any creative response: domain-relevant skills; creativity-relevant processes; intrinsic task motivation; and a supportive social environment. An assumption is that there are degrees of creativity in the work of an individual or team, with a continuum from ordinary levels in everyday life to the highest levels in significant inventions, performances and works of art.

Sawyer and Henriksen (2024) provide an integrated framework of the various stages of the creative process. The eight stages are: (1) find and formulate a problem; (2) acquire knowledge relevant to the problem; (3) gather a broad range of potentially related information; (4) take time off for incubation; (5) generate a large variety of ideas; (6) combine ideas in unexpected ways; (7) select the best ideas, applying relevant criteria; and (8) externalize the idea using materials and representations.

Rhodes' (1961) "Four P" model of creativity gives a holistic view encompassing *Person*, *Process*, *Press and Product*. *Person*(s) are the individuals who contribute their individual characteristics such as intellect, ideas, and knowledge to a creative endeavour. *Process* includes the steps in creating ideas and artifacts. *Press* refers to the environment in which the endeavour occurs. *Product* refers to the resultant creative ideas and artifacts that can be shown or communicated to other people.

The "value" part in assessing creativity can be a judgment of a social group. Art history shows how social groups' perceptions of value in works of art has varied over time and cultures, ranging across representational fidelity to expression of ideas. For example, the surrealism movement aimed at allowing the expression of the unconscious mind and found beauty in the unexpected and the uncanny. In modern conceptual art, the idea behind the artwork is seen as more important than its aesthetic qualities (Tate Modern 2025).

Some, however, hold that there are aesthetic principles that go beyond a social group's preferences and relate to human perceptions and possibly unconscious neural reactions in the brain. The principle of the "golden ratio", of building a composition around proportions where a line is segmented such that the smaller segment is in the same ratio to the larger segment, as is the larger segment is to the whole, has been observed to occur in art, design and architecture over centuries and in many different cultures (Meisner 2018). Cross-cultural empirical aesthetics examines whether psychological processes underlying aesthetic preferences are

universal. Che et al. (2018) surveyed available evidence and concluded that people from different cultures base their aesthetic preferences on a common set of formal features, including symmetry, complexity, proportion, brightness, contour and contrast. Their conclusion was that these preferences emerge from basic valuation and perceptual processes that are common to all humans and even to some animals.

There is support for the idea that human groups are more creative than individuals, when a group is working well. A number of factors have been identified as contributing to well-functioning creative groups (Sawyer and Henriksen 2024). Amongst these factors some are potentially relevant to "groups" that include a non-human intelligence, these factors being cognitive diversity at the right level and developing a shared sense of purpose. Mamykina, Candy and Edmonds (2002) studied the tools, methodologies and practices that can support collaboration in creative work, when there are interdisciplinary teams: for example. artists and technologists. Drawing on two projects of creative collaboration, they suggested tools are needed to support: devising a shared language; developing a common understanding of the artistic intentions and vision; and engaging in extensive discussions and what-if sessions.

2.2 Machine Creativity

In order to understand how human can better collaborate with image-GenAI, it is necessary to understand how the technology itself works and how humans have input into the processes of developing the AI.

Building machines that exhibit creativity[3], if such a thing is possible, belongs to the field of AI. One definition for AI is that it is the development "of machines that perform functions that require intelligence when performed by people" (Kurzweil 1990, cited in Russell and Norvig 2016, p. 2). For image-GenAI, sub-fields of AI include computer vision, natural language processing and machine learning with neural networks[4].

On what basis can we think of machines being creative? Much AI today, including the neural networks in GenAI, builds on important ideas from the field of cybernetics, where seminal work proposed that for a behaving object (or system): "The term **purposeful** is meant to denote that the act or behavior **may be interpreted** as directed to the attainment of a **goal"** (p. 18) and "All purposeful behavior may be considered to require **negative feedback**" (p. 19) (Rosenblueth, Wiener and Bigelow 1943, emphasis added)[5]. Negative feedback is needed to ensure that corrections are made when needed and the object's behaviour stays on track to accomplish its goals. Negative feedback can be provided by the broader system of which the object is part. For example, with image-GenAI a model (the object/system) can be refined in reinforcement learning so that output that contains objectional material is suppressed.

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3 Readers are referred for more in-depth treatment to work such as Art in the Age of Machine Learning by Audry (2021), Artificial Aesthetics by Manovich and Arielli (2024) and the review by Centinic and She (2022). Resources are also available from AIArtists (2025).

4 Deep learning is a sub branch of machine learning that uses artificial neural networks, modelled on the architecture of the human brain. Generative AI (GenAI) is an even further sub-field of deep learning where the purpose is to create new content. Natural language processing is commonly used to understand the relationship between input texts and output of different kinds.

5 Audrey (2021) provides an account of how thinking from cybernetics has evolved in the context of AI-Art.

What goals are addressed in machines that are aimed at being creative? Lee, Cooper and Grimmelmann (2024) describe the image-GenAI "supply chain"[6] as having eight stages: (1) human artists and other creators produce expressive works (e.g. an artwork); (2) the works are converted to machine readable data (data objects); (3) datasets are produced containing many individual data objects (e.g. image-text label pairs) and curated; (4) a model is pre-trained (the dataset is converted to a "base model", a very sophisticated software, system); (5) the model may be fine-tuned to optimize it for particular domains; (6) the model (system) is deployed, possibly via an external-facing platform such as Midjourney; (7) users interact with the system by entering text prompts and the system produces a new expressive work in digital form (e.g. a new artwork); (8) model refinement can occur to further adjust the model in light of human feedback data (e.g. in reinforcement learning). This pipeline is complicated as different actors may undertake different stages, or one actor may undertake many stages, and the stages may be inter-related. The process can also be very expensive. Lee et al. (2024) state that one model, BLOOM, which has 176 billion parameters, was trained for 3.5 months on 1.6 terabytes of text, using 384 GPUs and cost an estimated $2-5 million (USD).

With a process of such complexity and with many different actors, the goals that were aimed at in different stages of the GenAI pipeline and how human input is involved may not be easily discernible to those outside the developing teams. An example shows how some developers' concepts of creativity and creative goals are built into an AI. Mazzone and Elgammel (2019), an art historian and computer scientist respectively, describe their development and use of a special form of GenAI, a creative adversarial network, where they managed all stages themselves in the development process. They adopted theory from psychology on creative processes and their AICAN system was designed to aim at two opposing goals: following the aesthetics of the art it was shown in its training set but also maximizing style ambiguity (aiming at novelty). The training set consisted of 800,000 images, representing five centuries of art history. The authors tested how people reacted to the generated images, in comparison with artworks from a contemporary art fair. Their results showed that human subjects could not reliably tell whether the art was made by a machine or a human artist.

The case above shows a system that was explicitly trained to follow a human creative process in fine art. Other image-GenAI systems that are publicly available may be less focussed, with usage outside the fine arts in areas such as entertainment, illustration and design. One such system is Stability AI's Stable Diffusion, which builds on the LAION dataset. The researchers who originally produced LAION-5B made it openly available, stating it has 5.85 billion image-text pairs, of which 2.32 billion are English language (Schuhmann et al. 2022). Schuhmann (2022) describes LAION-Aesthetics, several collections of subsets from LAION 5B with high visual quality. A criterion used in creating LAION-Aesthetics was the rating people gave when they were asked "How much do you like this image on a scale from 1 to 10?".

It should be noted that there is some dissatisfaction with AI-generated outputs in general. For example, Edwards (2023) identifies six characteristics of AI-generated art: uniform texture, incompetent anatomy, lack of perspective, flat camera angle, indistinguishable lighting, and muddled details. These characteristics can be linked to the notion of "AI Slop", the proliferation of shoddy and unwanted AI-generated imagery (Hoffman 2024), noted in the introduction.

6 Also referred to as a "pipeline" (Lovato et al. 2024), which gives a less industrial impression.

Thus, AI-generated artwork, at least with some systems, cannot easily be distinguished from human artwork, possibly depending on the style of art with which it is compared. The process by which the image-GenAI is developed involves human input at various points in the pipeline. Assessing whether AI-generated outputs are creative may vary in a manner similar to attitudes taken towards creativity in art history, with differing values placed on attributes such as novelty, representational fidelity, or simply human liking of artworks. The processes by which the art is created and its goals are often opaque to the user - a barrier to the development of a common communication language and the shared sense of purpose thought desirable for creative human teams.

2.3 Human-Machine Creative Collaboration and Affordances

Usage of image-GenAI is now widespread, with many different users and types of usage, from people using GenAI professionally to people using it for enjoyment.

Some artists were using AI tools even before public-facing GenAI became available. A portrait created by an algorithm, *Edmund de Belamy*, sold at Christie's in 2018 for US$432,500 (AIArtists, 2025). Caramiaux and Fdili Alaoui (2022) interviewed five world-renowned contemporary visual artists who used AI in their creative work, with a focus on cultural and political underpinnings. These artists were not using off-the-shelf products and were all developing their own datasets and tools.

A considerable number of people now use image-GenAI simply for enjoyment. Oppenlaender (2022) writes from the point of view of someone who pursues text-to-image generation for pleasure. He argues that in this context creativity can take place on a personal level where an individual creates something that is personally meaningful and valuable. He also shows the importance of online communities in the creative ecosystem of text-to-image art. A survey by Tang et al. (2024) showed that non-professional users felt that "AI tools have the potential to democratize creative processes, making art and design tasks more accessible to individuals without traditional expertise" (p. 451). McCormack et al. (2024) collected and analysed over 3 million prompts for image-GenAI and found that prompting focuses largely on surface aesthetics, reinforcing cultural norms, popular conventional representations and imagery. They also found that many users focused on popular topics (such as fantasy art, Christmas cards or making colouring books) suggesting that the users dominant aim was recreational rather than artistic.

Another group of users comprises professional artists across various fields. Ko et al. (2023) interviewed 28 professional visual artists, employed in fields including video editing, product design, fine arts and fashion design, to gather their thoughts about using image-GenAI (DALL-E). The GenAI was used in a number of ways, including as an image reference search tool and a fast real-time communication tool (e.g. of draft ideas). One limitation noted was that structuring the prompt text into forms decipherable by the machine could be difficult.

The topic of how textual prompts are developed (prompt engineering) by users to communicate their aims to an image-GenAI is a thriving area of interest, both in research and practice. Oppenlaender (2024) provides a taxonomy of prompt modifiers that may assist AI-art practitioners to improve their images. Mahdavi Goloujeh, Sullivan and Magerko (2024) report that prior studies have shown that crafting prompts in natural language often fails to yield desired outputs. These authors interviewed 19 users of Midjourney, a commercially available text-to-image AI that is hosted on the Discord platform, with over 10 million users

as of February 2023. Their findings showed that the participants used a variety of techniques to control the overall structure of prompts and there were variations in image evaluation and prompt refinement. There were two major challenges: aligning user intentions and generated outputs and challenges in mastering prompt crafting knowledge.

GenAI is often spoken of as being available on platforms. A technology "platform" refers to an arrangement where foundational layers of technology support the creation of a wide variety of applications and services by many individuals and organizations (Sun, Gregor and Fielt 2021). Platforms share a common characteristic, that of "generativity", a platform's "overall capacity to produce unprompted change driven by large, varied and uncoordinated that arises from developers making parts or all of the AI model available for others to use. audiences" (Zittrain 2006, p. 1980). When the base technology in a platform is GenAI, then we have a case of what could be termed "double generativity" – the creative generativity in the base AI model, plus the platform generativity. GenAI platforms can be public (public-facing, off-the-shelf) or private. With public AI, the AI models are made available to the general public, for free or on a paid basis, and are typically built on datasets that use a wide variety of data. Examples are Midjourney and Stable Diffusion. With private AI, a model is trained on data specific to one user or company. The model could be built in-house by experts or use could be made of a platform developer's base model: for example, from OpenAI's developer platform (OpenAI 2025).

Use of a GenAI platform can be viewed through an "affordance" lens. Affordance theory was originally developed by Gibson (1979) to describe how a goal-directed actor perceives an object in terms of how it can be used: that is, what it "affords" the actor. In the art world, the availability of paints in tubes increased the viability (afforded) the plein air approach favoured by the impressionists. Norman (1988) used the term affordances to refer to both perceived and actual objects of an object. Other developments and extensions to the theory have occurred in information systems and human computer interaction (HCI), as described by Volkoff and Strong (2017). Importantly for the current work, Volkoff and Strong make the point that the construct of "perception" can be used to cover mindful, cognitive awareness, although this was not the case in Gibson's original theory. Further, they argue that affordance theory should serve work in design science well, as design science has a focus on the mechanisms that underlie processes that lead to new artifacts and states-of-affair. By identifying potential affordances, both those that are explicitly defined and those that emerge, design processes and products can be improved. Public-facing AI platforms have the potential to offer many affordances to users and they often include tools and aids apart from the GenAI itself. For example, Ideogram (2025) has an image editor and a "magic prompt" option.

How should we refer to the AI in a creative human-AI process? Shneiderman (2022, p. 105) points out the potential dangers of using anthropomorphic labels such as collaborator or teammate for an AI. He argues that getting beyond the "human teammate idea" might lead to superior performance as designers can take advantage of unique computer features that humans team members do not possess. He sees the important differences between humans and computers as including: responsibility, computers are not responsible participants, legally or morally; distinctive capabilities, such as sophisticated algorithms, huge databases and superhuman sensors; human creativity, the human operator is the creative force and can extend a computer design or give feedback to developers on improvements for use. Shneiderman prefers the use of the terms "tool", "supertool" or "augmentation". Differing

views exist. Richter and Schwabe (2025) propose that "the term 'team' remains relevant in describing 'human-AI collaboration', albeit with a refined understanding of what constitutes (team) collaboration" (p. 5). It is important to keep in mind that the AI is a special type of team member, a non-human one, as it is a bit tricky to think of human team members offering affordances to other team members.

As yet, there appears to be little in the way of systemized knowledge, patterns or guidelines to assist humans who aim to be creative with an image-GenAI. One framework that offers the potential for adaption is the ORCA framework from the field of information systems (Buyssens et al. 2025), which deals with creative problem solving in action design research, where there are varied team members, the problem context is characterized by a high degree of uncertainty and open-endedness, and there is also a sophisticated technology platform that can be used as a base for a solution. The ORCA framework has four guiding principles: Openness to alternative perspectives; Reflection and reflexivity, with learning and iteration; Common communication language for team members; and Affordance-based design. Some of these principles resonate with what has been discussed above, in terms of creative work in human groups (Mamykina et al. 2002) and the themes Caramiaux and Fdili Alaoui's (2022) found in their interviews of five visual artists who used AI in their creative work. These latter works, however, either do not include, or do not highlight, a platform technology that offers affordances as part of a socio-technical system.

2.4 Ethical and Regulatory Concerns

Ethical and moral issues abound with the use of AI in general and GenAI in particular and regulatory bodies and the law scramble to keep abreast. Some encompassing guidance is provided by the Codes of Ethics for professional bodies and the "guardrails" being enacted in legislation in some countries (e.g. The Council of Europe's Convention on Artificial Intelligence, COE 2024). There is also work on human-centered or ethical AI (e.g. Shneiderman 2022).

Articles specifically addressing ethical issues in image-GenAI are also beginning to appear. For example, Bendel (2023) lists a number of risks of image-GenAI, the first six being: copyright infringement and third-party use; copyright protection; privacy and informational autonomy in prompts; responsibility and liability; and stereotypical, discriminatory racist, and sexist depictions; and false representations of beings and things.

Of particular interest to professional artists is the issue of copyright. Useful discussions are provided by legal scholars (e.g. Lee et al., 2024; Murray, 2023; Samuelson, 2023). On the issue of copyright infringement, there is the concern that the copyrighted work of artists may be being "stolen" when datasets are prepared for use in training a model. Samuelson (2023) notes that:

> *"copyright lawsuits that are now underway in the United States have substantial implications for the future of generative AI systems. If the plaintiffs prevail, the only generative systems that may be lawful in the United States would be those trained on public domain works or under licences* (p. 158)."

Samuelson notes further that some of these actions are likely to fail (e.g. the one brought against Stability Diffusion by Getty Images), based on existing precedents. Training sets contain a parametized version of images but not the images themselves. Further, the outputs

from Stable Diffusion "are highly unlikely to be substantially similar to particular images on which its model was trained" (p. 161).

There is a further question of who owns the copyright of an artwork generated by an AI. Lee at al. (2024) discuss the issue of copyright in terms of the generative-AI supply chain. They note that precedents in the US have held that a computer program, for example a GenAI, cannot be assigned the copyright for a work it generates. They conclude, however, that because of the complexity of the situation it is not possible to give generalized advice and courts will have to work through the details of numerous lawsuits to develop doctrines.

The Arts Law Centre of Australia (2025) states:

> *"Copyright law only recognizes humans as authors (or performers) and only human authors (or performers) are given moral rights. One of these rights is a right to be attributed as an author of the work."*

Further, if a work is generated with the assistance of AI, a human author who contributed "independent intellectual effort" to the creation of the work should be credited as an author. As an AI does not have any rights under copyright law, there is no legal obligation to state that an AI was used to generate a work. However, ethically and to be transparent, it is seen as best practice to indicate when AI was used in preparing a work. Some forums ask that work that is "AI Generated" be labelled as such.

There are broader societal issues, although these lie mostly outside the scope of this study. Artists themselves report negative consequences of GenAI including loss of employment and public distrust towards artists (Kawakami and Venkatagiri 2024; Lovato et al. 2024). Environmental issues with the use of GenAI are also of concern, including the amount of power needed to develop and utilize models and the many tonnes of electronic waste produced (Wang et al. 2024). McCormack et al. (2023) question whether writing prompts is really making art. They highlight the limitations of linguistic descriptions and the exclusion of other modalities that occur when humans physically make artwork themselves.

2.5 Summing Up

Criteria for human creativity is that a work of art be novel and also valuable as assessed by some social group. Image-GenAI can now generate art that is in some circumstances not easily distinguished from human artists' work. The pipeline for producing such AI-art is, however, extremely complex and the goals of the actors and the mechanisms employed at different points may be opaque to outside observers. Further, the manner in which an AI model arrives at novel outputs is, as it is a machine-based algorithm, different from the way humans arrive at novelty. Finding text prompts that the AI can interpret as intended can be difficult. Humans are also free to become aware of "affordances" in an image-GenAI and actualize them for purposes its designers did not anticipate.

Usage of image-GenAI varies, from people using it for entertainment and personal enjoyment in "democratized" art, through design professionals in varying roles, to artists with some degree of mastery. There are concerns with the quality of some AI-generated work and threats to artists' livelihoods, as well as other societal concerns.

The situation regarding ethical and regulatory concerns is complex and evolving, particularly with regard to copyright protection and authorship, although some guidance is available.

3 Method

The method for the study is that of an autoethnographic case study accompanied by the development of guiding principles that build on the insights gained from the study.

3.1 Autoethnography

Autoethnography is a qualitative research method that can be used to relate an author's personal story against its larger cultural meaning (Cooper and Lilyea 2022; Ellis, Anders and Bochner 2011). Arising from anthropology the method allows self-revelation and critical reflection in a social setting in which the researcher participates. The researcher is both subject and investigator, thus allowing personal insights into a process and rich accounts of reality. Autoethnography is subject to criticisms on the grounds that subjective perspectives may be biased and lack credibility (Ellis et al. 2011). To address these criticisms, Ellis et al. (2011) suggest that autoethnographers should also consider how others may have similar experiences, by comparing and contrasting personal experiences with existing research, interviewing cultural members and examining relevant cultural artifacts. Reflexivity is also called for, where researchers are asked to reflect on and report their own actions, feelings and positionalities (culture/race/background/gender) to allow consideration of how these matters may be tied to interpretations and findings (Luttrell 2019).

Autoethnography has been extended from its anthropological origins to fields such as HCI, where it can be used to critically reflect on user experiences in interacting with technology (Kaltenhauser, Stefanidi and Schöning 2024). Weir, Leonards and Roudaut (2025) offer a vivid example showing the first author's engagement in an equine-assisted intervention program and the resultant lessons for therapeutic robot design.

3.2 Developing Guiding Principles

The autoethnographic method is combined in this study with techniques from the design research paradigm, which is increasingly accepted in the information systems field and encompasses a range of approaches that aim to develop design knowledge about how people can construct and use an artifact to achieve a desired goal (Maedche et al. 2019). The Weir et al. (2025) study cited above from HCI shows how autoethnography can be combined with the development of design-oriented knowledge. The approach adopted here is somewhat similar.

Works of art (artifacts) were developed in this study using creative processes similar to those described in the creativity literature (Sawyer and Henriksen 2024), rather than the traditional design science process model for developing artifacts (Peffers et al. 2008), although these processes share common elements. The process is described in the ethnographic case study section that follows.

Reflection and abstraction activities are advocated in design science for the development of design knowledge, particularly for the analysis of different types of causality that can be detected in a design project, namely creative, passive (affordances) and active (functional) causation (Gregor, Muller and Seidel 2013). This type of causal analysis exhibits some congruence with a narrative concept of autoethnography where there is an emphasis on pivotal experiences or turning-points in the researcher's experience (Cooper and Lilyea 2021). That is, one reflects on why things turn out as they do rather than some other way.

Pivotal points are highlighted in the ethnographic case study and provide a base for the subsequent development of guiding principles. The development of the guiding principles

takes account of Goldkuhl's (2004) proposal for multi-grounding of design knowledge, with grounding of design knowledge in empirical, theoretical and internal grounds.

3.3 Autoethnographer Identity and Positionality

In the spirit of openness regarding the autoethnographer's background, I provide the background to the study to show how I participated as a member of the research setting under study and that I was visible as a member in public accounts (Anderson 2006). This background may assist the reader in evaluating how my background and the conditions of my involvement may have affected my reports and analysis.

In April, 2024, I applied to take part in an Environmental Biennial art exhibition to be held in February 2025 at The Condensery Gallery, in Toogoolawah, Queensland, Australia. Artists in the region were invited to submit expressions-of-interest and five were chosen to participate. We were then mentored through a program of workshops and personal discussions with a Mentor and a Curator to help develop our work, with submission in November 2024. The participants were given an allowance for materials and the loan of their work for the exhibition but were not otherwise renumerated. The artworks were not offered for sale at the exhibition.

In my expression-of-interest I stated that:

> *"A recent personal interest is in the use of Artificial Intelligence (AI) to support artistic processes and how this can be done in a responsible and ethical manner. If it is permitted within the program offered, then I would like to pursue this avenue further as a part of my work."*

This personal interest provided the focus for the case study description and analysis that follows. It was in my mind from the outset that I might produce a report of some type after the project, if only for use in a workshop at the Gallery.

I have enjoyed art since I was young, but my opportunity to engage in art practice to any extent is relatively recent. Previously I had studied mathematics, psychology, computer science and information systems and worked as a software engineer and academic. My academic interests include HCI, design methodologies and innovation. I have worked with AI for some years, but mainly logic-based forms. I practice art for enjoyment, with what I think of as modest level of ability, rather than being an expert or well recognized artist.

3.4 Data Collection and Analysis

My data sources include my personal notebook kept throughout the program, emails I exchanged with the Mentor, Curator and others, the materials from the program workshops, and my artworks themselves, including the many reference images, sketches and drafts that were obtained or produced before the final versions. Table 1 gives an overview of records and their reference codes for the following case study, shown in square brackets.

I have shared draft versions of this manuscript with the Mentor, Gallery Curator and one of my fellow artists to obtain feedback and check my interpretation of events.

In analyzing my experiences to develop design principles, I focussed first on pivotal points where insights occurred, or I was given hints or guidance that had a marked effect on how my work then progressed (Gregor et al. 2013). Reflecting on my creative process and its pivot points suggested that I could possibly extend the ORCA set of guiding principles developed for action design research where there was need for a high level of creativity and a sophisticated technology platform is available (Buyssens et al. 2025).

Code	Records
EM	Emails with Curator, Mentor and others, including responses to "homework" set by the Mentor.
EOI	Expression of interest to join project, 3 April, 2024, 2 pages plus images of 5 existing artworks and CV.
EX	Exhibited material, including framed artworks (Figure 1) and Artist's Statement (Table 2).
IL	Image Library with pencil sketches, preliminary watercolour works, printed and digital reference images and digital files with AI-generated works (more than 100 images).
MN	Minutes of Art Society's meeting, 21 June, 2024.
NB	Notebook – personal entries from April 2024 to 8 Jan 2025, 13 pages.
NL	Newsletter - Article for Art Society's monthly newsletter, 25 June, 2024.
WB1, WB2, WB3	Workbooks from artist professional development sessions: 1) Creative reflections and ethics, 28-29 June 2024; 2) Reflections and problem-solving, 28 July 2024; 3) Artist Statements, 31 Aug - 1 Sept 2024.

Table 1 Project Data Records

I grouped the pivot points I observed against the themes represented in the ORCA principles. All the pivot points I observed fitted under one or more of these themes. I also reflected carefully to see if there were any pivot points that did not fit into ORCA and realized that it did not include a component for ethics. This is not surprising as the ORCA principles are meant to extend existing guidelines for action design research and the latter explicitly includes ethical considerations (see Sein et al. 2011).

Given the potential shortcomings of the autoethnographic method (Ellis et al. 2011) and Goldkuhl's (2004) call for multi-grounding, I examined two other studies in detail that reported themes from first-hand accounts of artists's experiences with image-GenAI. The study by Caramieux and Fdili Alaoui (2022) reports themes from interviews with five pioneering international artists using AI. The study by Ko et al (2023) reports findings from a study of 28 experienced visual artists in 35 domains and here the artworks could be required for professional design, rather than artistic expression. Other relevant studies are included where appropriate. Theory supporting the principles was overviewed in the Background section.

The Appendix shows excerpts from the comparison of the ORCA themes, my case study and the two other studies examined in detail.

This process led to a set of five guiding principles termed *ORCA/E for AI-Art*. The fifth principle for ethics and legal concern is shown following a slash sign to indicate that it underlies all other themes. The names of the new principles, apart from the ethics principle, reflect their origin in the original ORCA set. The principles and their mechanisms are shown following the case study below.

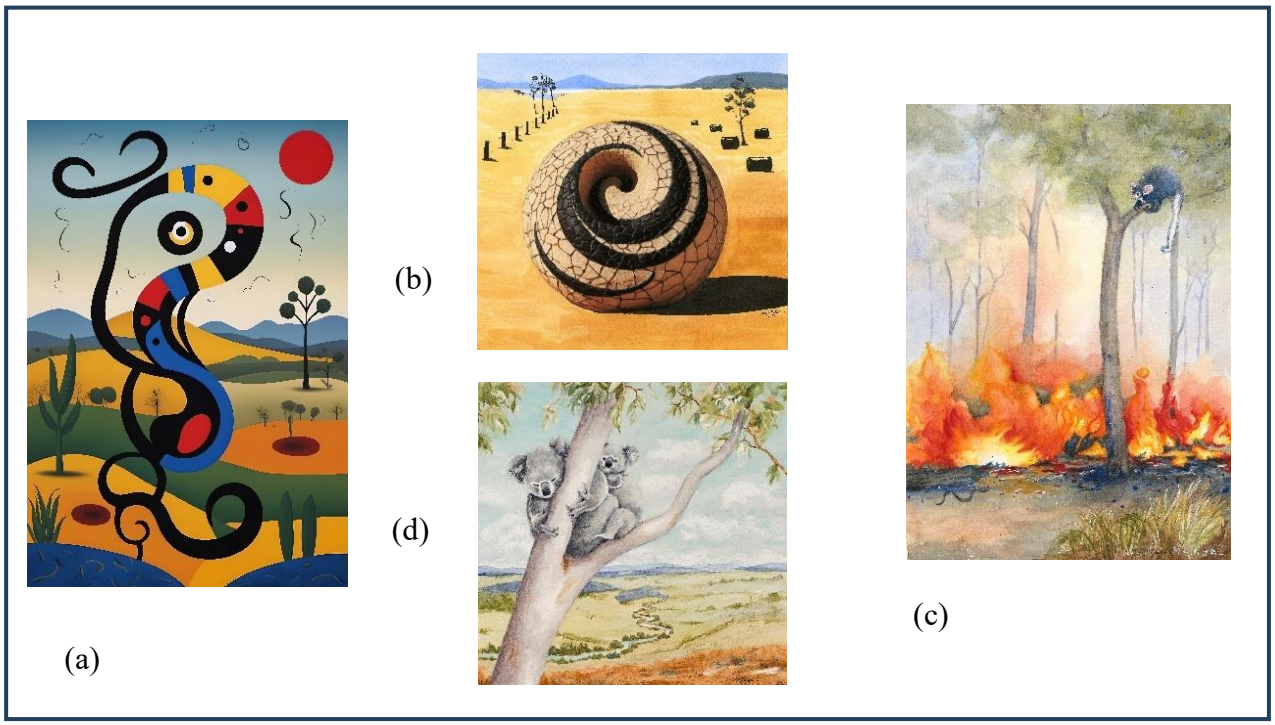

Figure 1 Balance: (a) The Snake in the Bush (b) Goanna Hiding (c) Glider Survival (d) Koala Heaven

Series Title: Balance

The series *Balance* explores the balance between human needs, activities and technologies on the one hand and care for our natural environment on the other. Humans and their technologies can be seen as a threat, but technologies can also aid survival in a volatile terrain.

Shirley Gregor has used native fauna as symbols, with elements of surrealism. Her materials and techniques also reflect the issue of balance with technology. Artificial intelligence (AI) was used to varying degrees in creating the works. The first is AI-generated and pigment on paper. The second is part AI-generated and pigment on paper and part watercolour and ink. The third is watercolour, with some inspiration from an AI-generated image. The fourth is watercolour on paper, with no use of AI. The AI when used is Stable Diffusion Online

Gregor developed the series with the intention of evoking emotional responses and provoking us to think more deeply about environmental issues, technology and policy:

The Snake in the Bush - The snake symbolizes technology as a threat. But the snake is a living creature itself and requires food and a suitable environment to survive.

Goanna Hiding - The goanna is shown hiding at Glen Esk from technology represented by the farmer's fence, haymaking and Lake Wivenhoe at the rear. The act of hiding also represents the denial by some humans of threats to the environment from human activity.

Glider Survival – Greater gliders have recently been seen again in Deongwar State Forest after years of logging and bushfires. Technology (symbolized by the snake) can be used to aid the gliders' survival by mapping habitats and building suitable nesting boxes when hollow trees are not available.

Koala Heaven - Koalas in the Boat Mountain Conservation Park near Murgon are living in a protected habitat. Technology is now represented by the stylized snake transformed to a river flowing peacefully away.

Table 2 Artist Statement at Exhibition

4 Ethnographic Case Study

4.1 Prior activity

Prior to the project beginning I had experimented with image-GenAI using Craiyon (2025). I used it to generate images to get ideas such as including more lively colours in my own work.

The outcomes were my own watercolour paintings. After that I just dabbled a bit and played with things like entering song lyrics and observing the sometimes very surprising results. I also made productive use of the tool for illustrations for PowerPoint presentations. Once I had put in my expression-of-interest for the exhibition I started investigating different tools [NB] and settled on Stable Diffusion Online (2025). One reason for this choice was that the product description said that neither my prompts nor the images I created would go back into a pool for training data but would remain private. Further, images created through the tool are fully open source.

4.2 Program Overall

The production of the artworks and the use of AI here took place in special circumstances, with a structured program of mentoring five local artists. Workshops were held in June, July, and August 2024. The program aimed at giving the artists more of the skills they needed to get their work to a higher level and included icebreaking activities, provocation to question our art practices, project management, research skills, ethical considerations and writing skills. There was also one-on-one individual mentoring and checks on how our work was proceeding through the process. The other artists included two photographers, someone working in scratchboard and someone using lithography and other techniques. It was helpful to me that the Mentor had experience in digital art.

A number of us have discussed the program after it was finished and the comment that I pick up on most often is "how confidence building" the whole thing was, as well as general praise for how much it was appreciated and valued. To me a significant thing was the provocation question in the first workshop: "Is failure a good or bad thing? Can you elaborate, or provide reasoning?" [WB1]. Further discussion acted as encouragement to try for more than what I was currently aiming at, even if this meant interim attempts at what I was doing did not work. Thus, the program as a whole was supportive of the openness to new ideas and the iterative learning activities that are identified as pivot points in the following.

4.3 Ethical and regulatory concerns

The responsible use of AI was in my mind from the beginning of the project [EOI], as I have published on ethics and responsible AI in different contexts (Gregor 2024).

There were issues with some people in my Art Society when they learned that I had been selected for the exhibition and was being allowed to use AI. There was a move to have a "No AI-Art" clause in the terms and conditions for a different smaller local gallery that is managed by the art group [MN]. The Curator suggested I look at material on AI use developed by the National Association for the Visual Arts (NAVA 2025). This material was helpful and I joined

NAVA. I also wrote a piece for our Art Society's monthly newsletter [NL]. This article showed the distinction between "AI-generated" and "AI-assisted" art and a number of the practices associated with the responsible use of AI, including appropriate acknowledgement of the use of AI. It included suggestions that if the AI was being used in a commercial context, then it could be advisable to pay for a tool where the owners of the images have provided the images for a fee and that others look at the NAVA material as we all learned about the new technology.

I have had to continue reading in an attempt to keep abreast of the many evolving issues. One practical step was to use Google image search to ensure that any images generated by the AI were not too close to someone else's work. To date I have found two: Stable Diffusion generated a koala image that was very close to one on Pixabay and an image of a fire in a forest matched a human artist's work [IL].

There were several pivot points here. First was my signalling that I wanted to investigate the responsible use of AI in art from the project beginning. Second was the degree of ill-feeling directed towards the use of AI in art by some (a lack of openness to new ways of working), which I found surprising. Third was the need to gain more knowledge about legal and regulatory issues to inform my work and keep up-to-date with these issues. Fourth was the need to check that the AI was not producing close copies of existing works.

4.4 Snake in the Bush

I had ideas about what I wanted to do in the series from the start, as can be seen from my expression-of-interest:

> *"My expectations for the audience of my art is that they should "feel something", that is, that there is some sort of emotional response. The reaction might be one of pleasure to the shape and colours used, or the artwork might try to tell some sort of story. Again, I have studied how emotions arise from images used in the construction of web pages….*
> *By inclination I have been drawn to depicting representations of the environment in my work, mainly watercolours and ink and wash of the natural world. I feel that people reactions of pleasure to this type of work can help in nurturing love and support for the environment* [EOI]."

So my idea was to do a series that represented fauna in ways that gave rise to positive and negative emotional arousal: reptiles for negative arousal and small marsupials for positive arousal. At the same time I also wanted to use AI to different degrees in the works, beginning with one that was AI-generated. My personal preference is for artworks that tend to follow traditional aesthetic principles in terms of composition, contrast between lights and darks (tones), colour and so on.

The question that then arose was how to communicate my preferences to the AI? My understanding from my reading and prior experience was that GenAI works on associations and is not necessarily good with logic or knowledge-based reasoning. I thought it might be possible to get the effects I wanted if the AI tool had been trained on works from art museums or similar or if I specified particular artists' styles. Investigation indicated that the models were not trained on aesthetic principles. To confirm my understanding, I sent an email to an experienced researcher in the area, asking:

> *"A question that I have concerns the prompts that one types in and the relationship, if any, they might have to "principles of art". I have not seen anything that would help with getting the*

> *results to have some relationship to accepted design principles eg for composition, golden mean, balance of lights and darks* [EM, 30 April, 2024]."

The researcher kindly replied and indicated that the models were not specifically trained on compositional principles, but they may have picked up these principles between the lines[7].

I decided to experiment with work in the Surrealist style, as this seems to match a bit with how the image-GenAI works and also a sense of the mysterious could help engage people with the artwork and think about the issues represented. I decided a good candidate for a style guide was Joan Miro (1893-1983), a surrealist painter I admire whose work is abstract but carefully planned. I was careful to check here and later with Google image search that AI images produced did not resemble any of Miro's own works. I tried a number of prompts and could not get what I wanted [IL] but eventually found something that matched what I was aiming at with: "Snake against Australian landscape background, Joan Miro style, artwork" and using the Surrealism style option in Stable Diffusion (20 May 2024) (see Figure 1a).

The pivot point here was the confirmation that communicating your vision for an artwork to an off-the-shelf image-GenAI is not straightforward and that you may need to find "workarounds" to find something that the AI "understands".

4.5 Goanna Hiding

For the second work I wanted to show a stylized reptile in an attitude of "ignorance" to represent the views of people who don't want to think about how their actions and use of technology can impact the environment. Again, after much experimentation with prompts and different settings, the AI produced a rather striking goanna [IL]. The prompt used was: "goanna curled in ball, Australia, desert background, style of Joan Miro", with the Surrealism option again.

My original thought was that I would use this as a reference image for painting my own work. In a "homework" email to the Mentor [EM, 16 July 2024] I described the progress on my work and asked specific questions about how to get digital images printed. In her response, the Mentor also suggested a "provocation".

> *"Would you consider shifting one of the works into a piece that is both printed and painted? It could act as a transitional work between the 100% AI printed work and the manually created work? For example, taking the generated artwork and removing some elements to print, and then painting in the rest* [EM, 21 July 2024]."

This was an excellent idea and I was able to remove the original background of a generic desert with a tool that was part of Stable Diffusion, send the digital file to a digital images print shop and have it printed in archival ink on good watercolour paper. I was then able to use ink and watercolour to paint around the goanna, after some initial drafts [IL]. I took inspiration for the background from a local farm with the farmer's hay bales and fencing shown and also a man-made lake in the background to represent technology (Figure 1b). This process meant that I was able to make the work more relatable to a specific local area and also employ my own skills. It meant a degree of learning for me in terms of how to use the tool options in Stable Diffusion and how to engage with professional digital printing.

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[7] *A recent test asking Stable Diffusion to produce "A Golden Rectangle" resulted in a square gold picture frame, when it should be a rectangle based on the golden ratio (Google returns the correct answer) (August, 2025).*

There were three takeaways from pivot points here. The first was that one needs to be willing to consider new ways of working. A new idea here came when the mentor pointed out a possibility as a provocation. It was not something that I could perceive from the affordances offered by the AI tool by myself. The second, however, was that this new way of working could take advantage of one of the suite of tools available in the GenAI platform (an affordance). The third was the need for ongoing need for iterative practice, reflecting and learning about how to work with the new AI tool.

4.6 Glider Survival

For the third work I wanted to show how human actions and environmental change can impact local fauna, especially threatened species. I started out with ideas from a number of images I had seen of burnt forests and koalas being rescued and my own observations of the Black Summer bushfires in Australia in 2019-20.

There were many attempts at this work (Figure 2). I looked at photos and other people's paintings of fires and koalas – there are quite a few. I asked Stable Diffusion to produce images of burning forests. One of these was quite similar to a painting by the Australian artist Bruce Clarke. I tried some initial watercolour sketches myself but none of the results were very pleasing.

At this point I shifted direction and decided to place the work in the Deongwar State Forest that I drive through often. The State Forest is home to a threatened species, the Greater Glider. These Gliders need very tall trees with large hollows near the top to nest in and they are threatened as a species due to fires and logging, which is allowed in State Forests. Logging has recently been halted in this forest and some Gliders have been seen again. I took one of my photos of the forest and fed it into the image-to-image option in Stable Diffusion, using the prompt "fire, big flames in background, watercolour, Australia, hazy background". Several drafts needed to be done using watercolours, mostly done to make the fires more impressive and the trees more like the forest's trees [IL]. I added a Greater Glider adapted from reference photos. I also added a small snake at the left front, to symbolize the way technology can help save species like the Gliders, through construction of artificial nest boxes and tracking their movements. At the end, the only part of the work that built on the Stable Diffusion generated image was the hazy background and the flames behind the trees. There are still elements of surrealism, in that one wonders if the Glider has actually survived, or will survive, the fire, the glider is out of proportion with the trees, and the snake is symbolic.

The pivot points here again included the need for openness to new directions as well as iteration, reflection and learning. In addition, experimentation with the AI showed that use of the image-to-image tool (an affordance) could assist in achieving something of what I had envisaged.

4.7 Koala Heaven

For the fourth work I wanted to show a situation where a threatened species was being given some protection from environmental change. I had a photo of a mother and baby koala from a visit to the Boat Mountain Conservation Park in my region, where human activity is restricted. The new work was entirely in watercolour and again took many attempts [IL].

The photo I had of the koalas showed them almost obscured by leaves and I had difficulty in producing any work that I liked. At one point there was a real "ah ha" moment. I was in an academic workshop and part of my brain must have been thinking about the painting problem

rather than the workshop. The workshop, however, did have papers about design science work developing applications that could help wildlife survive. It occurred to me that I could

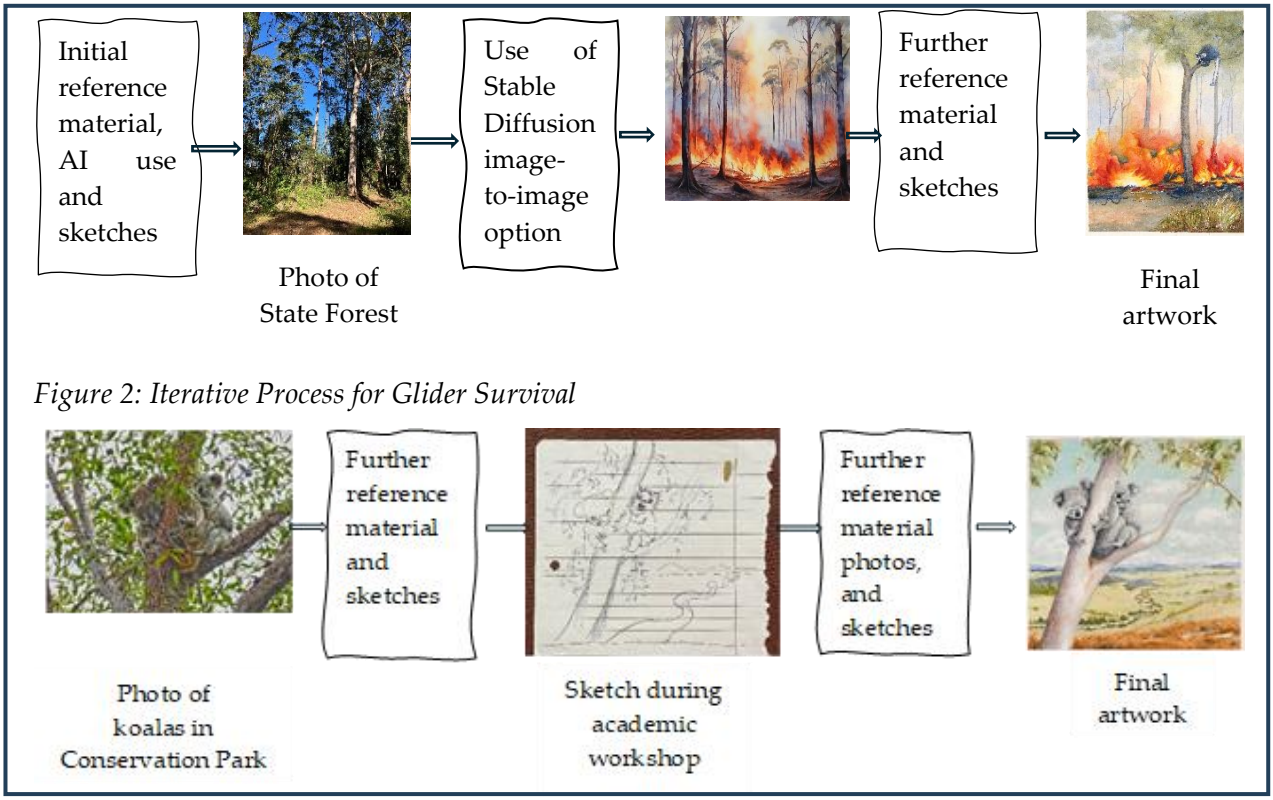


Figure 2: Iterative Process for Glider Survival

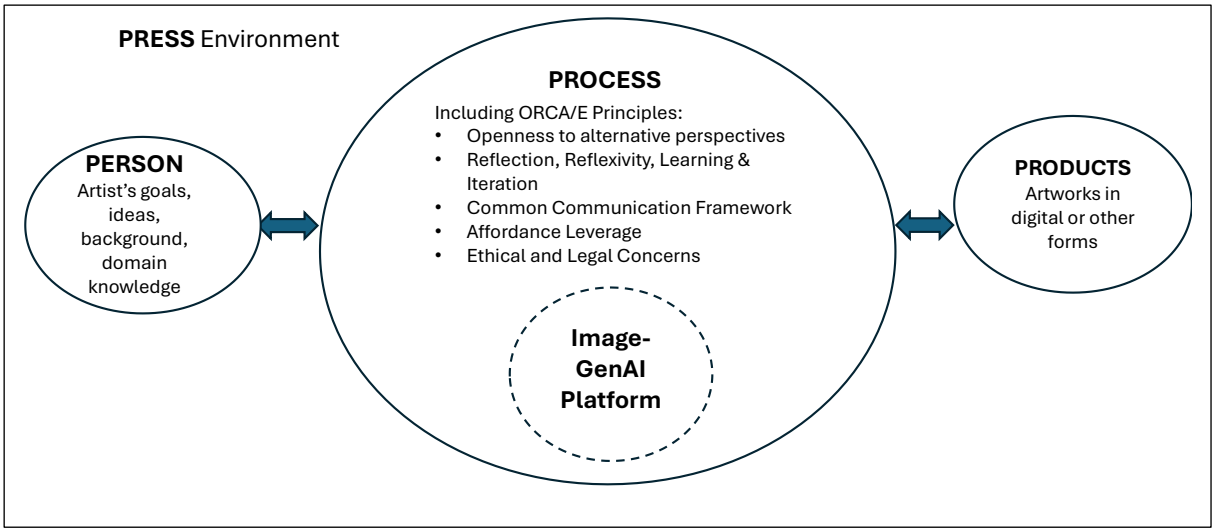
Figure 3 Iterative Process for Koala Heaven

just let go of the need to stick faithfully to the photo I had and do something like the AI had been doing in producing surrealist images. So I made a quick sketch in the notebook I was using, as in the middle image in Figure 3. I placed the koalas in a tree with pleasing shapes and the lower ground surrounding the Park in the distance. A river was added to symbolize that the snake had been transformed into a river and the koalas and the cleared land below were living in harmony. This sketch was later developed into the final watercolour painting.

The pivot point here is that I believe that the prior work with the AI and the aspects of surrealism employed influenced what I did, encouraging my learning reflexively and a change of direction from my usual practice.

4.8 Concluding Reflections

My initial project aimed to explore the responsible use of AI in art in the course of creating work for an exhibition. Now that the project has concluded I have reverted to mainly using traditional methods. I still use image-GenAI for generating images for PowerPoint presentations. Otherwise, I use it on occasion for generating reference images when I cannot get an idea clear enough in my mind or I feel that I need help in looking at different ways of doing things and some imaginative stimulus. I still then paint my own artworks. While using the AI can be helpful in a number of ways, it does not give the same sense of enjoyment and satisfaction that arises from doing something myself and continuing with the challenge of mastering watercolour techniques so that I can express my ideas.



As an aside, I have had small greeting cards made from the artworks by a professional printer and I give these away to friends. If someone is given a choice of which of the four they would like, they mostly choose the koalas, with the image that did not involve AI (Figure 1d).

Figure 4: Image-GenAI Use and ORCA/E for AI-Art Principles in the Four Ps Creativity Context

5 Guiding Principles

An aim of the study was to use insights from the ethnographic study, along with other empirical evidence and theory, to develop guiding principles that could benefit research and practice. This process follows recommendations from Goldkuhl (2004) for multi-grounded design science. This section first shows the organizing framework for the individual design principles that follow.

5.1 Organizing Framework

Reflection on my description of the project showed that I paid attention to all the components of Rhodes' Four P model of creativity. There are the *People* (myself and others), the *Processes* I engaged in, the *Products* (my artworks) and the *Press* (the supportive, structured environment). In addition, there is the image-GenAI, which is not regarded as a person, but as an augmenting non-human collaborator that can be used in the processes engaged in.

Figure 4 shows a diagrammatic representation of the *ORCA/E for AI-Art* principles in the context of the Four P model of creativity. Note that Oppenlaender (2022) also argued that text-to-image art should be seen in the context of the four P model of creativity, as this gives a wider view of creativity that includes the creativity in prompt engineering rather than a product-centred view of creativity. His work, however, focuses on the production of images in digital form (AI-generated art) rather than the context here, where the image-GenAI may be used as a tool to augment human artistic processes (AI-assisted art) in addition to AI-generated art. In each case, the artist in the creativity process may be "outsourcing" some of the creativity process to the image-GenAI platform.

The guiding principles are formulated following recommendations from Gregor et al. (2020). Thus, each principle should have a title and specify: 1) aim, implementer and user; 2) context; 3) mechanisms that lead to, or allow, users to accomplish some aim; 3) enactors who perform actions as part of the mechanisms; and 4) rationale, the justification for the principle.

The ORCA/E principles share some overarching components, as shown in Table 3. Further, the principles are inter-related – being open-minded to new perspectives in particular underlies a number of the other principles. The principles are referred to as "guiding" principles in that they are not expected to be applied in a deterministic fashion, but to provide assistance to artists and designers where possible.

Component	Details
Aim, Implementer and User	To enhance the creativity of artists and designers when developing visual imagery for appreciation by others in their society.
Context	In a context where an image-GenAI platform is available for use in a creative process.

5.2 Table 3 Overarching Components of the ORCA/E for AI-Art Principles P1 - Openness to Alternative Perspectives

Remain open to new ways of being creative enabled by an image-GenAI:
- Consider the range of ways in which AI can be used, from AI-generated images to AI-assisted work
- Take advantage of surprises and "glitches" in what the AI produces

Table 4 Mechanisms for the Openness Principle

This principle is congruent with theory of creativity in general and observations that creative problem solving occurs when people "think outside the box". You can overcome a fixation on one way of solving the problem and restructure it so you can realize the solution (Sawyer and Henriksen 2024, p. 119). With creativity in art, however, we are not thinking so much of problems and solutions as with imaging new possibilities.

The principle is also congruent with theory of creativity and groups, where cognitive diversity at the right level can lead groups to be more creative than individuals (Sawyer and Henriksen 2004). Here the "group" comprises both human and the AI, whose creative processes are different, but on occasion symbiosis can occur arising from the different ideas produced.

This theme is linked to some of the others, in that openness may be needed to conceive of different ways of communicating with team members or AI tools and it may need openness and imagination to perceive new ways of actualizing affordances provided by a tool. First, one needs to be open to the idea of using AI as a tool in art – some people are not and some may be actively opposed, as in my art group.

In my case study, a pivot point was the suggestion from the Mentor that I consider using the AI-generated image for part of my artwork and painting around it myself when it was printed on paper (Figure 1(b)). This idea was not something I would have perceived by myself from looking at the affordances offered by the AI. I had to be open to learning new things about digital printing and the background removal tool in the AI platform.

A theme found in the study of five internationally renowned artists working with AI was "working with surprises", with the AI able to provide "surprising results, unexpected errors and glitches" and the artists able to take advantage of these (Caramiaux and Fdili Alaoui 2022). These artists were not using a publicly available platform but were able to engage with the technology directly through creating datasets, training models and so on. They were open to

working with a complex technology whose unpredictability they found appealing. Ko et al. (2023) refer to AI helping artists to try unconventional things and to think out of the box.

5.3 P2 - Reflection and Reflexivity with Learning and Iteration

Be prepared for multiple iterations in image development and the discarding of images that are judged unsatisfactory.
Check the accuracy of images when realism is an aim.
Take advantage of learning opportunities to enhance one's own abilities and understanding.

Table 5 Mechanisms for Reflection and Reflexivity Principle

This second principle shows how the artist's reflections, aims and personal knowledge shape the creative process and, conversely, use of the AI may shape the artist's thinking and practice through a reflexive learning effect.

The principle is congruent with thinking on creativity in general. Amabile's componential framework of creativity shows cycles from problem generation though responses and outcome assessment, with a return to the beginning if some progress is being made (Amabile, 1996). In art, even Matisse went through multiple iterations in preparatory paintings for his works: for example, with *Lady in Blue*, despite the appearance of freshness and simplicity in the final painting (Canaday 1980, p. 150).

In my study, I ended up with multiple iterations in both generating AI images and my own preparatory sketches, encouraged by the confidence building provided by the structured program and the idea that failure should not be feared. AI-generated work and sketches were discarded if they were thought unsatisfactory. Awareness of the AI's capacity to "hallucinate" means checking carefully for a lack of realism in images, if realism is an aim. What the AI produces may be dependent on its training data set. Even with a very large data set, there may be an under-representation of some subjects, meaning, for example, that the prompt "koala bear" may result in an image of an American brown bear. The AI will often struggle with spatial relationships and things like the number of limbs an animal has.

One pivot point in my study was the influence of what the AI had been producing in the Surrealist style on my own work, with reflexive thinking about my own practice and a freeing up of what I was doing (Figure 4).

Audry (2021) reports the artist Anna Ridler found the AI she used "revealed to her aspects of her own style, such, such as her tendency to draw eyebrows in the same way as eyes" (p. 160). The study of the five renowned artists by Caramiaux and Fdili Alaoui (2022) concluded that "iterative workflows are fundamental" (p. 10). Anna Ridler, described her process as a combination of playing, tweaking and iterating with the algorithm. Other terms used were "learning by doing" or "crafting", when there were incomplete analytical understanding of the technology and its possibilities. "We are able to augment ourselves and extend our bodies and our minds with the tools that we build" (pp. 11-12). Ko et al. (2022) talk of an iterative process and fast prototyping.

5.4 P3 - Common Communication Framework

When developing prompts, consider how the image-GenAI was developed in terms of its training sets and assigned goals.

Learn through experimentation how prompts can be improved for desired effects.
Make use of prompting support in the AI tool if available.
Learn more about prompting from like-minded communities.

Table 6 Mechanisms for Common Communication Framework Principle

In the original ORCA framework, the corresponding principle is to work towards finding a common communication framework that all partners in a project can share. This principle is congruent with studies in human creativity that show that in interdisciplinary teams it is necessary to devise a shared language and develop a common understanding of the artistic intentions and vision. The situation with the image-GenAI is different because of the differences between the way the AI works and the way that humans think and work. As explained in the background section, much of the pipeline for the AI development can be opaque, including the selection of datasets and the goals that have been set in training the model. In language theory, "alignment" is seen as important in successful dialogue between people. Branigan et al. (2010) point to one mechanism for alignment in human interactions as being "audience design": "a speaker might choose to use a particular expression because she believes that it is the appropriate expression for that particular interlocutor" (p. 3) (see also Bell 1984). A common framework for communicating with the AI through prompts may be developed both by considering how the AI was developed in terms of its data set and training goals and by iterative exploration.

In my ethnographic study a pivot point was that I could not see originally how to create prompts that would get the AI to create the type of thing I wanted, given that it had not been created to attend to aesthetic principles. As a workaround, shifting perspective, I included "style of Joan Miro" in the prompt to get results that better matched my ideas. This experience had a flow-on effect in that it made me more open to combining strong colours in watercolour with ink to get desired effects and also to introducing a touch of surrealism to my other works, adding to their interestingness (P2). I have also found that including words in a prompt such as "artwork" seems to improve results, acting on the belief that the term might direct the AI to use its representations of images from galleries and museums, rather than its more general stock. I have also observed the AI communicating with me with a "not suitable for work" message and refusing to produce images that it thought might be inappropriate (this was not the intention).

Shalu Attri, an artist experimenting with DALL-E, found: "My frustration increased as I found myself lecturing the AI about composition, and value-design. I checked myself, and wondered – was the problem with the AI, or with my prompts?" (Attri 2023). She continued by "deciding to switch gears" and use different types of prompts. A renowned artist, Memo Atken, emphasized the difficulties in interaction with his model because of a precarious sense of control – "I'm trying to find ways of interacting with them [AI] such that what you say happens … What is in this network and how can I get it out" (Caramiaux and Fdili Alaoui 2022, pp. 11-12).

This principle points to what appears a relatively new phenomenon: interacting with a machine where the commands (prompts) you give it are interpreted in seemingly mysterious ways. Oppenlaender's (2024) taxonomy of prompts points to some of the workarounds that are used by practitioners in the text-to-image art community to deal with and take advantage

of this mysteriousness. A "qualify booster" term (p. 7) can be added to increase aesthetic qualities and the level of detail. Examples are "awesome", "#wow", "epic" and extra verbosity or "fluff". "Repeating terms", such as "a very very very very very beautiful landscape" will likely produce a better result. "Magic terms" introduce randomness to the image and can lead to surprising results: for example, adding "control the soul" to a prompt about an orchestra conductor (P2). Although some explanation can be given as to why these types of prompts are effective in terms of the way the models work, the artists appear mostly to have developed these workarounds by experimentation.

5.5 P4 – Affordance-Based Design

Build on the affordances the image-GenAI offers for embracing different ways of working: for example, reference image generation, ideation and fast prototyping.
Familiarize oneself with the capabilities and options offered by the AI platform.

Table 7 Mechanisms for Affordance-Based Design Principle

Affordance theory shows how the properties of designed objects or tools reveal to users what they can do with them. For affordances in digital technologies, it may be challenging to design technologies that are natural for humans to use and become aware of what opportunities the technology offers, but these opportunities can be important for creativity (Sawyer and Henriksen, 2024; Volkoff and Strong 2017).

In my study I made use of affordances in the tools offered by the AI technology platform: for example, the ability to manipulate an AI-generated image by removing the background and the ability to use an image-to-image transformation rather than inputting a text prompt (Figure 2). I am continuing to use the AI to create reference images and in ideation for new works.

Another study has shown how many different ways an image-GenAI can be used. Ko et al. (2023) interviewed 28 professional visual artists who used GenAI, employed in fields including video editing, product design, fine art and fashion design. Primary uses of the GenAI included: as an image reference search tool; a fast real-time communication tool (for example, of draft ideas); for rectifying human's biased creations (thinking out-of-the-box) (P1); for low-fidelity prototyping for novices; and as a justification tool for the credibility of the artwork.

5.6 P5 - Ethical and Legal Concern

Maintain awareness of relevant ethical and legislative frameworks.
Use a reverse image search tool to ensure other artists' artworks are not copied.
Consider use of an AI that is developed with public domain datasets or where artists are paid to have their work included, especially if using for commercial purposes.
Follow good practice in acknowledging the use of AI in a creative process.

Table 8 Mechanisms for Ethical and Legal Concern Principle

Much prior work points to the need for consideration of ethical, legal and regulatory concerns with the use of image-GenAI. There is the potential for harm in many ways, including theft of

intellectual property, as shown in the Background section, and negative impacts on the employment of professional artists.

In my study I was aware of a number of these issues from the beginning and had to work at keeping abreast of developments. The opposition to AI from members of my art group led me to produce an article for our newsletter where I advocated that AI should be used responsibly and pointed to mechanisms similar to those in Table 6. I suggested joining our national artists' association, which provides ethical guidelines and advocates for artists' rights (NAVA 2025). The choice of the tool one uses is important and it may be preferable to use a tool where the dataset is based on public domain material or created by the artist themself. One check I employed was to do a Google image search to check if the AI was reproducing someone else's work, which it did on two occasions.

Use of prompts that say "in the style of [a certain artist]" is an issue and one that I grappled with. I believe it is more pertinent when the artist is living or their works are still protected by copyright – 70 years after the life of the artist in Australia. The area of copyright law is complex as explained in the Background section and this issue appears to be a grey area legally.

The study of five renowned AI artists found that the artists engaged with ethical questions concerning their responsibility in using AI, and that this questioning did not necessarily occur with other technology (Caramiaux and Fdili Alaoui 2022).

6 Conclusions

This study aimed to explore the nature of human-GenAI creativity in the arts, with a focus on artists' personal accounts, and to develop guidelines for artists in this context. It includes an autoethnographic study by the author using her experiences in a seven-month project preparing artworks for an exhibition. Relevant prior literature and theory on creativity and AI was surveyed in the course of the project and guiding principles were developed at its conclusion.

Findings from the autoethnography study were analysed against themes from the prior ORCA framework (Buyssens et al. 2025), the personal accounts of other artists and prior literature. A set of five guiding principles was developed termed *ORCA/E for AI-Art* that should inform artists in their use of image-GenAI: 1) Openness to alternative perspectives; (2) Reflection and Reflexivity with learning and iteration; (3) Common communication framework; (4) Affordance-based design; and (5) Ethical and legal concern. Mechanisms were identified for the ORCA/E design principles that are appropriate for the image-GenAI and art context.

The study contributes by answering a call in information systems for further work in human-AI collaboration and for design principles to assist symbiotic creative work (Benbya et al. 2024). The ethnographic method allows for rich insights into an individual's personal experiences and subjective understanding as they unfold over a period. Ethnography is used as a precursor to developing design knowledge in HCI (e.g. see Kaltenhauser et al. 2024). Relatively few studies of the use of image-GenAI have provided such personal accounts or analysed them in terms of both human and machine creativity, and the technology platforms that support them. Having an information systems researcher who is also an artist means that understanding of both the technology and the creative process can be developed together. Knowledge building in this context is important because of the growing use of image-GenAI

and its value for recreation, for professional use and for artists wishing to enhance their creativity.

The *ORCA/E for AI-Art* principles are largely congruent with theory of human creativity, the nature of the image-GenAI and technology affordance theory. Some areas in particular, however, are worth highlighting as novel phenomena. The first is that apart from iteration and reflection occurring in a creative process, it is possible that the human artist may reflexively learn from using the AI and subsequently amend their practice when working without the AI. This finding parallels what is seen in art history, where artists learn from other artists by seeing their works. A second area of particular interest with this new tool is the development of a common communication framework, a process seen by as some as "mysterious". Artists appear mainly to develop effective ways of communicating by experimentation and learning from their communities. The communication process may, however, be assisted by considering how the AI was developed with respect to its training set and the goal it was given. It could help to know how and what type of text labels were associated with images, and whether the images came from general sources or from a restricted set of prior artworks. Some part of the "mystery" around communicating may arise from the gaps in transferring information from the human visual system to the human language centres, something that is still not well understood (Cavanagh 2021). Gaps and loss of information occur when labels are associated with an artwork in a training set, when a learning system builds its parameterized model and again when a human attempts to convert their mental images to prompts and the machine interprets the prompts.

An autoethnographic study has advantages in being able to provide rich insights into human subjective experiences in a social situation. The method, however, can also be seen as having limitations in terms of possible bias and lack of credibility (Ellis et al. 2011). Recommendations followed to address these issues in this study include the references to physical records, the comparison of experiences reported here with those of others in the literature and a check by others in the project group of the account provided (see Ellis et al. 2011). The author has also reflexively engaged with her own positionality in regard to the study, allowing others to assess how her prior experience and personal characteristics may be tied to interpretations and findings (Luttrell 2019).

There are many avenues for further work. Both the area of reflexive human learning from use of an image-GenAI and the communication process are worthy of further investigation. Another interesting finding to be followed up is how artists were able to take advantages of "glitches". Something similar has occurred elsewhere, where it has been found that AI-generated hallucinations can spark new ideas and lead to significant discoveries, as in David Baker's Nobel Prize for Chemistry in 2024. Studies of artists accounts here range from the use of image-GenAI for recreation and enjoyment (Oppenlaender 2024), to professional use (Ko et al 2023) to experienced visual artists (Carmieux and Fdili Alaoui 2022). Although a number of congruent themes were identified across these different groups, it may be of interest to explore if there are differences among the groups.

The coverage of ethical and legal issues here has focussed primarily on issues that individual artists face in their use of image-GenAI, such as copyright. Broader societal issues have been touched on, but their in-depth treatment is beyond the scope of this work. These issues include environmental problems, negative effects on artists' employment and the possible proliferation of AI "slop" to the detriment of art practice as a whole (Hoffman 2024). The latter

issue is attracting increasing attention even in the daily press. A survey of artists' opinions on the tension between the potential utility and threats of GenAI showed nuanced perspectives, rather than simplistic binary sentiments (Lovato et al. 2024). The relationship between traditional artworks and AI-generated art and their respective roles in society could also be further considered. In the 1930s the philosopher Walter Benjamin of the Frankfurt School wrote about another transformative technology, photography. He argued in an influential paper that mechanical reproduction diminished the "aura" of the work of art, which refers to its authenticity and its unique existence embedded in the fabric of tradition (Benjamin, 2018). He linked his views to power relationships and politics (see Jeffries 2017). Comparing Benjamin's views with what happens with the new transformative technology of AI in art over time could be interesting.

My personal feeling is that creating AI-generated artwork is not as satisfying or enjoyable as engaging in the actual process of using art materials and creating something new myself. I believe my use of image-GenAI as an aid for reference material is similar to my consulting artbooks or visiting galleries, although the AI makes the process quicker and intermediate outputs may be more stimulating. The situation may be different with artists who engage more fully with the AI pipeline by creating their own datasets, building their own software or monitoring and controlling the final generation process. Examples of work by artists who can engage with the process in this way are featured on the AIArtists (2025) website and I find them very impressive.

7 References

AIArtists (2025). Timeline of AI Art. https://www.aiartists.org

Amabile, T. (1996). *Creativity in Context*. Boulder, CO: Westview Press.

Anderson, L. (2006). Analytic autoethnography. *Journal of Contemporary Ethnography*, *35*(4), 373-395

Arts Law Centre of Australia (2025). https://www.artslaw.com.au

Attri, S. (2023). Can Artists Dream of AI-Assisted Art. Retrieved February 1, 2025, from https://www.linkedin.com/pulse/can-artists-dream-ai-assisted-art-shalu-attri-3oxic/

Audry, S. (2021). *Art in the Age of Machine Learning*. Cambridge, MA: MIT Press.

Bar-Gil, O. (2025). The transformation of artistic creation: from Benjamin's reproduction to AI generation. *AI & SOCIETY*, 1-15. doi.org/10.1007/s00146-025-02432-5

Bell, A. (1984). Language style as audience design. *Language in Society*, *13*(2), 145-204.

Benbya, H., Strich, F. and Tamm, T. (2024) Navigating Generative Artificial Intelligence Promises and Perils for Knowledge and Creative Work. *Journal of the Association for Information Systems*, *25*(1), 23-36. doi.org/10.17705/1jais.00861

Bendel, O. (2023). Image synthesis from an ethical perspective. *AI & Society*, 1-10. AI & SOCIETY (2025) 40:437–446. doi.org/10.1007/s00146-023-01780-4

Benjamin, W. (2018). The work of art in the age of mechanical reproduction. In *A Museum Studies Approach to Heritage* (pp. 226-243). Routledge.

Boo, C., Kim, Y., & Suh, A. (2025). A Collaborative Creative Process in the Age of AI: A Comparative Analysis of Machine and Human Creativity. *Proceedings of the 58th Hawaii International Conference on System Sciences.*

Branigan, H. P., Pickering, M. J., Pearson, J., & McLean, J. F. (2010). Linguistic alignment between people and computers. *Journal of Pragmatics*, *42*(9), 2355-2368. doi.org/10.1016/j.pragma.2009.12.012

Buyssens, H., Viaene, S., Gregor, S., Rossi, M., & Haj-Bolouri, A. (2025). *ORCA: Guiding Principles for Navigating Uncertainty in Design Research* [Manuscript submitted for publication]. KU Leuven.

Canaday, J. (1980). *What is Art? An Introduction to Painting, Sculpture and Architecture*. London: Alfred A Knopf.

Caramiaux, B., & Fdili Alaoui, S. (2022). Explorers of Unknown Planets" Practices and Politics of Artificial Intelligence in Visual Arts. *Proceedings of the ACM on Human-Computer Interaction*, 6 (CSCW2), 1-24. doi.org/10.1145/1122445.1122456

Cavanagh, P. (2021). The language of vision. *Perception*, *50*(3), 195-215. doi.org/10.1177/0301006621991491

Cetinic, E., & She, J. (2022). Understanding and creating art with AI: Review and outlook. *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)*, *18*(2), 1-22. doi.org/10.1145/3475799

Che, J., Sun, X., Gallardo, V., & Nadal, M. (2018). Cross-cultural empirical aesthetics. *Progress in Brain Research*, *237*, 77-103. doi.org/10.1016/bs.pbr.2018.03.002

Cooper, R., & Lilyea, B. (2022). I'm interested in autoethnography, but how do I do it. *The Qualitative Report*, *27*(1), 197-208. 08. doi.org/10.46743/2160-3715/2022.5288

Council of Europe (COE) (2024). The Framework Convention on Artificial Intelligence. https://www.coe.int/en/web/artificial-intelligence/the-framework-convention-on-artificial-intelligence

Craiyon (2025). Retrieved February 19, 2025, from https://craiyon.com

Edwards, K. (2023, July 6). Why Does All AI Art Look Like That? *Medium* https://medium.com/@keithkisser/why-does-all-ai-art-look-like-that-f74e2a9e1c87

Feingold, F. (2022). Artificial intelligence image generators bring delight and concern. World Economic Forum. https://www.weforum.org/stories/2022/10/ai-artist-systems-bring-delight-and-concern/

Gibson, J. J. 1979. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Goldkuhl, G. (2004). Design theories in information systems-a need for multi-grounding. *Journal of Information Technology Theory and Application*, *6*(2), 7.

Gregor, S. (2024). Responsible artificial intelligence and journal publishing. *Journal of the Association for Information Systems*, *25*(1), 48-60. doi.org/10.17705/1jais.00863

Gregor, S., Chandra Kruse, L., & Seidel, S. (2020). Research perspectives: the anatomy of a design principle. *Journal of the Association for Information Systems*, *21*(6), 2. doi.org/10.17705/1jais.00649

Gregor, S., Müller, O., & Seidel, S. (2013, June). Reflection, Abstraction and Theorizing In Design and Development Research. In *Proceedings of the European Conference on Information Systems*, 13, p. 74.

Hammersley, M., & Atkinson, P. (2019). *Ethnography: Principles in practice*. Routledge.

Hoffman, B. (2024). First Came "Spam." Now, With AI, We've Got "Slop.". *The New York Times*, *11*.

Holzner, N., Maier, S., & Feuerriegel, S. (2025). Generative AI and Creativity: A Systematic Literature Review and Meta-Analysis. *arXiv preprint arXiv:2505.17241*.

Ideogram (2025). https//https://docs.ideogram.ai/

Jeffries, S. (2017). *Grand Hotel Abyss: The Lives of the Frankfurt School*. Verso Books.

Kaltenhauser, A., Stefanidi, E., & Schöning, J. (2024, May). Playing with perspectives and unveiling the autoethnographic kaleidoscope in HCI–A literature review of autoethnographies. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (pp. 1-20). doi/full/10.1145/3613904.3642355

Kawakami, R., & Venkatagiri, S. (2024, June). The impact of generative AI on artists. In *Proceedings of the 16th Conference on Creativity & Cognition* (pp. 79-82). doi.org/10.1145/3635636.3664263

Ko, H. K., Park, G., Jeon, H., Jo, J., Kim, J., & Seo, J. (2023, March). Large-scale text-to-image generation models for visual artists' creative works. In *Proceedings of the 28th International Conference on Intelligent User Interfaces* (pp. 919-933). doi.org/10.1145/3581641.3584078

Kurzweil, R., Richter, R., Kurzweil, R., & Schneider, M. L. (1990). *The Age of Intelligent Machines* (Vol. 579). Cambridge: MIT Press.

Lee, K., Cooper, A. F., & Grimmelmann, J. (2024, March). Talkin' Bout AI Generation: Copyright and the Generative-AI Supply Chain (The Short Version). In *Proceedings of the Symposium on Computer Science and Law* (pp. 48-63). doi.org/10.48550/arXiv.2309.08133

Lovato, J., Zimmerman, J. W., Smith, I., Dodds, P., & Karson, J. L. (2024, October). Foregrounding artist opinions: A survey study on transparency, ownership, and fairness in AI generative art. In *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society* (Vol. 7, pp. 905-916). doi.org/10.1609/aies.v7i1.31691

Luttrell, W. (2019). Reflexive qualitative research. In *Oxford Research Encyclopedia of Education*. doi.org/10.1093/acrefore/9780190264093.013.553

Maedche, A., Gregor, S., Morana, S., Feine, J. (2019). Conceptualization of the Problem Space in Design Science Research. In: Tulu, B., Djamasbi, S., Leroy, G. (eds) *Extending the Boundaries of Design Science Theory and Practice. DESRIST 2019*. doi.org/10.1007/978-3-030-19504-5_2

Mahdavi Goloujeh, A., Sullivan, A., & Magerko, B. (2024). Is It AI or Is It Me? Understanding Users' Prompt Journey with Text-to-Image Generative AI Tools. In *Proceedings of the CHI Conference on Human Factors in Computing Systems*, May (pp. 1-13). doi.org/10.1145/3613904.3642861

Mamykina, L., Candy, L., and Edmonds, E. (2002). Collaborative creativity. *Communications of the ACM*, *45*(10), 96-99.

Manovich, L., & Arielli, E. (2021). Artificial Aesthetics. https://manovich.net/index.php/projects/artificial-aesthetics

Mazzone, M., & Elgammal, A. (2019). Art, creativity, and the potential of artificial intelligence. *Arts*, 8, 26. doi.org/10.3390/arts8010026

McCormack, J., Cruz Gambardella, C., Rajcic, N., Krol, S. J., Llano, M. T., & Yang, M. (2023, April). Is writing prompts really making art?. In *International Conference on Computational Intelligence in Music, Sound, Art and Design (Part of EvoStar)* (pp. 196-211). Cham: Springer Nature Switzerland. doi.org/10.1007/978-3-031-29956-8_13

McCormack, J., Llano, M. T., Krol, S. J., & Rajcic, N. (2024, March). No Longer Trending on Artstation: Prompt Analysis of Generative AI Art. In *International Conference on Computational Intelligence in Music, Sound, Art and Design (Part of EvoStar)* (pp. 279-295). Cham: Springer Nature Switzerland. doi.org/10.1007/978-3-031-56992-0_18

Meisner, G. (2018). *The Golden Ratio The Divine Beauty of Mathematics*. New York, NY: Quarto Group.

National Association for the Visual Arts (NAVA) (2025). https://www.visualarts.net.au

Nobel Prize (2025). https://www.nobelprize.org/prizes/chemistry/2024/press-release/

Norman, D. A. (1988). *The Psychology of Everyday Things*. Basic Books.

Oates, B. J. (2006). New frontiers for information systems research: computer art as an information system. *European Journal of Information Systems*, *15*(6), 617-626. doi.org/10.1057/palgrave.ejis.3000649

OpenAI (2025) Developers platform. https://www.openai.com/api/

Oppenlaender, J. (2022, November). The creativity of text-to-image generation. In *Proceedings of the 25th International Academic Mindtrek Conference* (pp. 192-202). doi.org/10.1145/3569219.3569352

Oppenlaender, J. (2024). A taxonomy of prompt modifiers for text-to-image generation. *Behaviour & Information Technology*, *43*(15), 3763-3776. doi.org/10.1080/0144929X.2023.2286532

Porter, B., & Grippa, F. (2020). A platform for AI-enabled real-time feedback to promote digital collaboration. *Sustainability*, *12*(24), 10243. doi.org/10.3390/su122410243

Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan*, *42*(7), 305-310.

Riaz, A., Gregor, S., & Lin, A. (2018). Biophilia and biophobia in website design: Improving internet information dissemination. *Information & Management*, *55*(2), 199-214. doi.org/10.1016/j.im.2017.05.006

Richter, A. & Schwabe, G. (2025). There is No 'AI' in 'TEAM'! Or is there? – Towards meaningful human-AI collaboration. *Australasian Journal of Information Systems*, *29*. doi.org/10.3127/ajis.v29.5753

Rosenblueth, A., Wiener, N., & Bigelow, J. (1943). Behavior, purpose and teleology. *Philosophy of Science*, *10*(1), 18-24.

Russell, S. and Norvig, P. (2016). *Artificial Intelligence a Modern Approach*. (3rd edn.). Essex, England: Pearson.

Samuelson, P. (2023). Generative AI meets copyright. *Science*, *381*(6654), 158-161. doi.org/10.1126/science.adi0656

Sawyer, R. K., & Henriksen, D. (2024). *Explaining Creativity: The Science of Human Innovation*. Oxford University Press.

Schuhmann, C. (2022). *LAION Aesthetics*. https://laion.ai/blog/laion-aesthetics/

Schuhmann, C., Beaumont, R., Vencu, R., Gordon, C., Wightman, R., Cherti, M., Coombes, T., Katta, A., Mullis, C., Wortsman, M., Schramowski, P., Kundurthy, S., Crowson,K., Schmidt, L., Kaczmarczyk, R., & Jitsev, J. (2022). Laion-5b: An open large-scale dataset for training next generation image-text models. *Advances in Neural Information Processing Systems*, 35, 25278-25294.

Seeber, I., Bittner, E., Briggs, R. O., De Vreede, T., De Vreede, G. J., Elkins, A., Maier, R., Merz, A.B., Oeste-Reiß, S., Randrup, N. & Schwabe, G. (2020). Machines as teammates: A research agenda on AI in team collaboration. *Information & Management*, *57*(2), 103174. doi.org/10.1016/j.im.2019.103174

Sein, M. K., Henfridsson, O., Purao, S., Rossi, M., & Lindgren, R. (2011). Action design research. *MIS Quarterly*, 37-56. doi.org/10.2307/23043488

Shneiderman, B. (2022). *Human-centred AI.* Oxford: Oxford University Press.

Stable Diffusion Online (2025). https://stablediffusionweb.com

Sun, R., Gregor, S., & Fielt, E. (2021). Generativity and the paradox of stability and flexibility in a platform architecture: A case of the Oracle Cloud Platform. *Information & Management*, *58*(8), 103548. doi.org/10.1016/j.im.2021.103548

Tang, Y., Zhang, N., Ciancia, M., & Wang, Z. (2024, November). Exploring the Impact of AI-generated Image Tools on Professional and Non-professional Users in the Art and Design Fields. In *Companion Publication of the 2024 Conference on Computer-Supported Cooperative Work and Social Computing* (pp. 451-458). doi.org/10.1145/3678884.3681890

Tate Modern (2025). Art Terms. https://www.tate.org.uk >art >art-terms

Volkoff, O., & Strong, D. M. (2017). Affordance theory and how to use it in IS research. In *The Routledge Companion to Management Information Systems* (pp. 232-245). Routledge.

Wang, P., Zhang, L. Y., Tzachor, A., & Chen, W. Q. (2024). E-waste challenges of generative artificial intelligence. *Nature Computational Science*, 1-6. doi.org/10.1038/s43588-024-00712-6

Weir, E., Leonards, U., & Roudaut, A. (2025, April). " You Can Fool Me, You Can't Fool Her!": Autoethnographic Insights from Equine-Assisted Interventions to Inform Therapeutic Robot Design. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (pp. 1-20). doi.org/10.1145/3706598.3714311

Wicky, B. I. M., Milles, L. F., Courbet, A., Ragotte, R. J., Dauparas, J., Kinfu, E., Tipps, S., Kibler, R., Baek, M & Baker, D. (2022). Hallucinating symmetric protein assemblies. *Science*, *378*(6615), 56-61. 6-61. doi.org/10.1126/science.add1964

Wu, T. et al. (2023). A brief overview of ChatGPT: The history, status quo and potential future development. *IEEE/CAA Journal of Automatica Sinica*, 10(5), 1122-1136.

doi.org/ 10.1109/JAS.2023.123618

Zhang, C., Zhang, C., Zhang, M., & Kweon, I. S. (2023). Text-to-image diffusion models in generative ai: A survey. *arXiv preprint arXiv:2303.07909*.

Zittrain, J. (2006). The Generative Internet, *Harvard Law Review*, 119, 1974–2040. doi.org/10.1145/1435417.1435426.

APPENDIX

Study Component	**Study**		
	Current	Carramiaux and Fdili Alaoui (2022)	Ko et al (2023)
Goal	Explore the nature of human-GenAI creativity and develop guiding design principles.	Explore how contemporary visual artists integrate AI in their work.	Understanding how visual artists adopt large-scale image-GenAI to support creative work.
Participants	Author, an aspirant to more creative work in the fine arts, working within a project group.	5 internationally known artists pioneering working with AI in their artistic works.	28 experienced visual artists in 35 domains (webtoon author, video editor, ceramic artist, architect, fine arts…).
Data collection method	Autoethnography	Semi-structured Interviews	Semi-structured interviews, remote, 52-88 minutes
Analysis	Identification of pivot points in case study. Integration of case findings with ORCA themes, other studies and prior literature to develop guiding principles.	Thematic analysis with coding and inter-coder agreement on themes.	First deductive and then inductive coding.
Technologies used	Stable Diffusion Online	Able to build own training sets and tools	Demonstration and experimenting with DALL-E
Themes* 1)	*Openness to New Perspectives*: Project explicitly aimed at exploring different ways of using AI in art. Uses ranged from AI-generated to AI-assisted, to no AI. Pivot: Suggestion from Mentor that one artwork be part AI, printed on paper and partly artist created.	*Working with AI is Working with Surprises* (pp. 10-11): used because of its ability to provide "surprising results, unexpected errors and glitches", "explorers of unknown planets". You can exploit the mistakes, but "you have to manually make sure you only get the good ones". *Towards AI as an embodied tool* (pp 11-12): Use of AI as a tool and sometimes as an instrument for creation.	*Rectifying Human's Biased Creations* (p.9): "help them try unconventional things and think out of the box". *Justification Tool for 'a New Era of AI Art" (*(p. 9): Artist wanted to use AI in creating a painting because "it is more credible once AI guarantees the results on a subjective concept" (e.g. ugly people).

2)	*Reflection and Reflexivity, with learning and iteration*: Many images generated and sketches before final works. Pivot: Change to practices in non-AI art with more incorporation of surrealist aspects after use of AI.	*Towards AI as an Embodied Tool* (pp 11-12): "We are able to augment ourselves and extend our bodies and our minds with the tools that we build."	*Image Reference Search Tool* (p. 8): "Use references to learn what and how others create".
3)	*Common Communication Framework*: Pivot: Had to find work-arounds to counter inadequacies in the AI's understanding of principles of aesthetics to achieve what I wanted. Pivot: Choosing to work in a certain style (surrealism) to get desired aesthetic effects.	*Towards AI as an Embodied tool (*pp. 11-12)*:* "a precarious sense of control – I'm trying to find ways of interacting with them [AI]. What is in this thing and how can I get it out".	Limitation: *Text Prompting Restraints Creativity*: "hard to describe the overall art-making process in texts"
4)	*Affordance-based Design*: Use of background removal tool, image-to-image generation, reference image generation. Pivot: Use of image-to-image option to give ideas.	As in Theme 1: *Working with AI is Working with Surprises* (pp 10-11): used because of its ability to provide "surprising results, unexpected errors and glitches".	*Image Reference Search Tool* (p. 8): "useful .. where a huge amount of images are needed for ideation". *Enabling Fast, Real-time Visual Communication* between humans (p.8): "fast prototyping", "iterative process" for "rough images". *Low Fidelity Prototyping for Novice Visual Artists* (p. 9): "can help visual artists to embrace tasks beyond their capacity" (when the outcome is needed urgently).
5)	*Ethical and legal concerns*: Review of literature. Several Pivots: Prior awareness of need for responsible AI; Heightened awareness of issues with resistance from others in group.	*AI involves Ethics and the Artists Liability:* "Regret for a certain use of 'AI to kind of bamboozle the public".	Not dealing with social impacts mentioned as a limitation of the study.
Other		Also explored politics of artists' practice and power dynamics	Limitations: [The AIs] "only generate predictable images"; [The AIs] "do not support personalization"; [The AIs] "are Inefficient and Become a Burden"

Contributions	Provides a first-hand account by an aspiring artist of her use of publicly available image-GenAI. Multi-grounded guiding principles, *ORCA/E for AI-Art*.	Provide the CSCW community with a way to expand understanding of AI not only as a tool but also as a cultural and political design material.	Four better design guidelines for intelligent user interfaces.

*Note * Theme names are in italics*

Table A1: Excerpts from Cross-Study Comparison of Themes in Visual Artists' Use of image-GenAI

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