Introducing Open-sourced AI to Art and Design Education: A Gamified Course on LoRA Model Training

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Abstract. The adoption of AI technologies by artists and designers encounters low technology acceptance, due to concerns over the potential replacement of their roles, and the unauthorized use of original works for training AI models. The paper suggests enhancing AI literacy among creatives to enable responsible and productive use of AI in art and design. Through a gamified course on LoRA model training in art education, we aim to improve the acceptance and understanding of AI among artists and designers. Through a survey experiment, we compare participants' attitudes toward open-sourced AI and close-sourced AI. The study offers insights into the strategies for integrating AI into design education with gamification. It underscores the significance of involving the creative community in open-sourced AI model training to ensure responsible application and high-quality outcomes. We highlight the irreplaceable aspects of art and design creativity that AI cannot replicate and hope to promote more possibilities in the field by introducing open-sourced AI to art and design education through gamification.

1 Introduction

As advancements in the quality of AI-generated images continue, emerging companies, including OPEN AI, Mid-journey, and Stability AI, are creating methods that enable the generation of images within seconds with simple texts and images as inputs. Consequently, the landscape of the creative industry as well as education has been significantly influenced recently [1]. Designers and artists, who have honed their painting and creation skills through years of practice, nurtured their artistic abilities, curated materials, and found inspiration, now feel offended as their traditional role in creativity production is possibly displaced by AI [2]. AI-generated artwork forgery further poses harm to artists. They express frustration when their original works are used as training data, essentially leading to the potential plagiarism of their creations [1]. Concerns loom over the quality of images produced by AI [4] and, more significantly, the potential for unauthorized use of artwork in training AI models [3].

It is crucial, however, to make a clear distinction between the misuse of technology and its proper application in education. For designers and artists who are hesitant to utilize this technology, learning about the mechanics and practice of AI arts can aid

them in better protecting their works by methods such as using invisible watermarks [5]. To integrate AI ethically and effectively into creative work, it's crucial to enhance the AI literacy of designers and artists. By involving them in the AI model training process and focusing on respect for original creations, we can foster a more creative and responsible use of AI in creation.[6]. To increase art and design students' AI literacy, there is a need to improve the acceptance of AI technology.

Gamification as using game design elements in non-game contexts, can enhance players' engagement and motivation during challenging tasks[7]. The implementation of game elements such as narrative, points, and interactive cooperation potentially reduces anxiety toward technologies[8]. In this study, we introduce a gamified course about LoRA model training, a method for fine-tuning open-source models, in an art school's design and art education. A survey experiment was conducted with designers and artists who participated in the gamified course, and who only used closed-source models, to gauge their acceptance, attitudes, and usage of AI technology. The findings highlight crucial insights into how AI can be integrated into design education. We hope to strike a balance between ethical usage, technological advancement, and creativity. This approach encourages more informed and responsible engagement with AI, fostering a better environment for future artists and designers. It also provides valuable experience in applying gamification to contemporary design education.

2 Related Work

In this literature review, we examine the current state of generative AI within the creative industries, identifying existing gaps that contemporary design and art education programs can fill. We delve into the characteristics of gamification, laying a solid foundation for the development of a gamification-based course aimed at integrating AI into art and design education.

2.1 The State of Art of Generative AI

Advancing of generative AI art has become capable of creating synthetic images that mimic artworks [9]. Generative AI art tools such as DALL-E [10], Mid-journey, and Stable Diffusion [11] enable users to generate images through text prompts. Among these, open-source models supported by Stable Diffusion allow for customization based on existing models, leading to task-specific solutions that meet users' particular needs. This method of using fine-tuned models is seen as a promising solution for creating tailored AI applications that cater to specific requirements. Compared to these open-source models, platforms like Midjourney offer more closed-source models with high image quality and user-friendliness, which are beneficial for individuals lacking a technological background [12].

Despite the efficiency and novelty brought by these generative AI art models, concerns have arisen regarding the application of certain technologies in the creative industries. Some artists and designers express strong anxiety about the potential of being replaced by AI [13]. Specifically, protests have been raised among designers and artists

because their work was used without permission as training data for these models [14]. Consequently, many artists and designers exhibit a low level of acceptance towards AI tools, demonstrating resistance to engaging with certain technologies [15, 16]. However, improving AI literacy in Art and design education can help them understand ways of responsible use, and the irreplaceable traits they should develop as artists and designers, thereby fostering an environment that enriches rather than undermines creative work.

2.2 Generative AI in Art and Design Education

Capabilities of Artists and Designers

Artists and designers have valuable traits that cannot replaced by AI. Designers possess proficiency in design thinking skills, including provoking social innovation [17], exploring aesthetic philosophies [18, 19], dealing with wicked problems characterized by complex and conflicting requirements [20], and applying practical skills in real-world prototyping and activities, a predisposition toward multifunctionality, a systemic vision, and communication and teamwork skills [21]. Similarly, artists create novel visual styles, which are fundamentally different from combinations of existing artwork manipulated by algorithms. Art creation is based on comprehension of culture, history, perception, reality, society, and more [22]. As stated by Limin, "Art is not solely a visual challenge, it emerges as a product shaped by the extensive impact of the entire human society [22]."

Both designers and artists are advanced in imaginary processing and have strong abilities in dealing with tasks involving mental image transformation and visualization [23]. This process contrasts markedly with the experience of novice artists, who may lack a well-defined mental image to guide their creation. Consequently, it is challenging to quickly identify the actual needs and expected outcomes through AI image generation via text prompt. Most frequently, the generated image itself lacks creativity, because everyone can simply generate similar pictures [24]. Open-model training processes, such as the Low-Rank Adaptation (LoRA) models are promising for fine-tuning generation results based on customized datasets [25].

Responsible Use with LoRA

LoRA, which adjusts only a small fraction of a model's parameters, empowers users to refine AI models for image generation using limited amounts of data. This method is especially beneficial for artists and designers, allowing them to tailor subject-specific, style-centric, and concept-driven generation models with minimal input generated by themselves. By utilizing an open-sourced model with their creations, artists, and designers can save effort from respective work and focus on innovating in visual representation, style, and concept, thereby extending the reach and influence of their artistic output [26]. Certain tools require responsible use by designers and artists. Enhancing AI literacy and learning from best practices can facilitate such responsible use. Yet, many designers and artists are hesitant to engage with AI, deterred by the harm caused

by its inappropriate application. Introducing Open AI model training into art and design education needs a full understanding of learners' technology acceptance.

2.3 Technology Acceptance

The Technology Acceptance Model (TAM) offers a theoretical foundation for research aimed at forecasting how users will ultimately decide to embrace technology [27]. TAM argues that the perceived usefulness and ease of use are pivotal in shaping the behavioral intention and actual use of technology. Davis describes perceived usefulness as the extent to which a person believes that using a particular system will enhance their job performance [28]. Similarly, perceived ease of use refers to the degree to which a person believes that using a technology will be free from effort. According to TAM, these factors significantly influence an individual's attitude towards technology adoption and their intention to use it, ultimately affecting their actual technology adoption decision. TAM has undergone significant theoretical development and has been applied extensively to explain technology adoption behaviors across various sectors [27, 29, 30]. Through the lens of TAM, we would like to explore effective approaches toward introducing AI in art and design education.

2.4 Gamification in art and design education

Gamification focuses on revising existing learning processes by introducing game-like experiences [31]. Gamification managing, facilitating, and augmenting the learning process playfully and engagingly could offer unparalleled value[31]. Research conducted by Wang indicates that implementing gamification in college art courses has the potential to boost student engagement and satisfaction[32]. Furthermore, findings suggest a linkage to intrinsic motivation [33]. Despite these benefits, critics argue that gamification often focuses on adding extrinsic game elements and only motivates participants at the initial stages [34]. Research suggests the effect of gamification in courses depends on how well the gamified systems align with the content of learning [35].

Regarding our specific topic, previous studies have shown that AI anxiety can be mitigated as participants increase their AI literacy [36]. The use of gamification to engage participants in the initial stages of learning can be effective in alleviating AI anxiety, and helping learners start to build their AI literacy.

3 Research Questions

Through the literature review, we found the potential of gamification in addressing gaps such as technological acceptance of AI in design and art education. We would like to explore further how these gamified educational strategies can be applied specifically within the context of open-source AI courses for art and design students. We are curious about the difference in participants' TAM between open-source AI and closed-source AI. We would like to explore the broader spectrum of applications and concerns that

artists and designers may have and address these critical points for design and art education with AI. Therefore, the following research questions were posed:

- RQ1: What's the impact of gamified open-source AI courses on art/design students' attitudes, acceptance, and application of AI?
- RQ2: What are the primary applications and concerns of artists and designers when integrating AI into their creative processes?
- RQ3: What are the key considerations for creating a gamified course on open-source AI training for art/design education?

To answer these research questions a survey experiment was conducted with 34 participants who only experienced closed-sourced AI art tools and 32 participants who experienced open-sourced AI art tools through the gamified course.

4 The Gamified Course

The course lasted for 4 weeks and was conducted at the Guangzhou Academy of Fine Arts with 32 participants aged 19 to 21, 18 of them self-identified as female while 14 of them self-identified as male. The course structure is provided in the appendix (Table 1 in the Appendix). The course involves lectures, practices, and team activities, in a gamified platform. The main tools used for image generation and model training are Stable Diffusion Web UI and SD-Trainer GUI based on khoya-ss developed by Akegarasu [33].

There were a few gamification concepts (Table 1) that were considered in the design of the course including the storyline, points, missions, time restriction, and more referring to previous research[37]. The description and visual representation of interfaces applied with gamification principles used are shown in Table 2 in the Appendix.

Table 1. Design choices made based on gamification principles from the literature

Gamified principles	Design considerations	Reference
Storyline	Previous research has shown the potential of Narration for anxiety reduction. The course features a narrative-embedded concept explanation with comics at the beginning of each lecture given to reduce the potential technology anxiety for students with an art background.	[8]
Aesthetics	Identification with characters can increase players' motivation and enjoyment. Stylized visuals, including flat lighting, cartoon textures, and models, can make challenges appear less daunting to players compared to more realistic visuals.	[38, 39]
Missions	Tasks with increased complexity aligned with the learning contents are essential for motivating participants to engage in the learning activities. We design the game tasks with increasing challenges following the learning content: image generation, model use, Control Net, and model training.	[40]
Interactive cooperation	Cooperation in gamification fosters engagement and problem-solving. The course took place in a computer classroom, where each student had access to an individual computer. Considering this setting, face-to-face interactions among students were somewhat limited as everyone was focused on their computer screens. Therefore, the gamification design also considered the need to encourage interactivity among students.	[41, 42]
Points	Point systems manage the accumulation of points that quantify user performance. Utilizing such systems helps to assess performance and promote engagement effectively.	[37, 40]
Time limits	Time limits are a motivator to faster performance as well as a trigger to anxiety. This feature was carefully designed in consideration of dynamic feedback.	[43]

5 RESULTS AND DISCUSSION

A survey experiment was conducted involving 66 participants from art schools. 32 participants engaged in a gamified AI open-source model course, Data regarding participants' self-reported Perceived Usefulness, Perceived Ease of Use, Intention to Use, and Actual Use were collected using the 5-point scale of the Technology Acceptance Model (TAM) [27]. In this section, we explore the answers to the research questions proposed.

5.1 Reliability test

The Cronbach's alpha for self-reported perceived usefulness was found to be 0.86, indicating a high level of internal consistency among the items measuring perceived usefulness in the survey. The Cronbach's alpha for self-reported perceived ease of use was 0.63, suggesting a moderate level of internal consistency among the items measuring perceived ease of use. However, after deleting the reversed question (R3), Cronbach's alpha T raises to 0.77, suggesting some participants might be confused by the reversed question. The Cronbach's alpha for intention to use was 0.77, indicating a good level of internal consistency among the items measuring intention to use.

5.2 Comparison

This study investigated the integration of AI into design education by introducing a gamified course on LoRA model training within an art school's design and art curriculum. To assess the acceptance and attitudes towards AI technology among designers and artists, a survey experiment was conducted. The participant group consisted of 32 individuals experienced with open-source models from a gamified LoRA model training course, and 34 individuals who have only used closed-source models in their previous projects. A one-way ANOVA was performed to compare the effect of the type of model (closed vs. open) on various aspects of technology acceptance and use. We combine the descriptive information (Table 2) of the data to report the results.

Table 2. The descriptive information of participants' self-reported attitudes toward AI-generated images

Aspects	Groups	N	Mean	SD	Std. Error	Minimum	Maximum
Actual Use	Open	32	4.25	1.05	0.19	1	5
	Close	34	2.62	1.28	0.22	1	5
Intention to Use	Open	32	4.45	0.71	0.12	2.33	5
	Close	34	3.79	1.03	0.18	2	5
Perceived Usefulness	Open	32	3.52	0.95	0.17	1.75	5
	Close	34	2.97	0.9	0.15	1	5
Easy to Use	Open	32	3.03	0.77	0.14	1	4.5
	Close	34	3.16	0.8	0.14	1.75	4.5

Descriptive statistics revealed that individuals who learned model training with open-source models from the gamified course demonstrated a higher actual use,

intention to use, and perceived usefulness compared to designers and artists who used closed-source models. An independent T-test supported these results, indicating a statistically significant difference in actual use between the two groups, $t(62.82) = 5.69$, $p = 0.00$, intention to use, $t(58.68) = t3.03$, $p = 0.00$, and perceived usefulness $t(63.15) = 2.40$, $p = 0.019$. The perception of ease of use, however, showed no significant difference between the two groups $t(63.94) = -0.68$, $p = 0.501$.

5.3 Correlation

The correlation analysis conducted within the study examined the relationships between Actual Use, Intention to Use, Perceived Usefulness, and Ease of Use of AI technology. The Pearson correlation coefficient was used to measure the strength and direction of these relationships.

The correlation analysis indicated significant positive relationships among actual use, intention to use, and perceived usefulness of AI technology. Higher actual use was linked to a greater intention to use and higher perceived usefulness. However, ease of use did not demonstrate a significant relationship with the other factors. These findings suggest that while usability may not directly impact attitudes and usage, the actual engagement with and the perceived advantages of AI are closely connected with the actual use.

Literature on the Technology Acceptance Model (TAM) indicates that an individual's intention to use a computer system is significantly influenced by their belief in the system's potential to enhance their performance in the workplace. Our study aligns with these findings, demonstrating that a gamified course was instrumental in enabling participants with backgrounds in art and design to recognize the capabilities of open-sourced AI models in augmenting their work performance. This realization, in turn, led to a significant increase in their intention to use these models, as well as in their actual usage. Actual usage is also shown to be influenced by perceived ease of use in previous work, which can enhance user efficacy and control. However, in our case, the correlation proved to be insignificant. A potential explanation for this is that the output quality of AI tools may outweigh the importance of operational simplicity. Additionally, previous research has shown that ease of use tends to have a lesser impact on the intention to use and actual usage in later stages [29]. In our study, all participants experienced the tools through all stages.

Research by Du et al suggests that AI literacy—knowledge and capability for using AI, and AI anxiety—fear of potential threat or harm from AI, are the key drivers of designers' and artists' attitudes towards AI [15]. Through the knowledge and skills acquired in the course, designers have seen an enhancement in their AI literacy, which in turn, fosters more positive attitudes towards AI.

Table 3. The correlation of different aspects of all participants' self-reported attitudes and use

	Actual Use	Intention to Use	Perceived Usefulness	Easy to Use
Actual Use	1	.582**	.557**	0.005
Intention to Use	.582**	1	.603**	-0.031

Perceived Usefulness	.557**	.603**	1	0.114
Easy to Use	0.005	-0.031	0.114	1

**. Correlation is significant at the 0.01 level (2-tailed).

Considering the potential concerns from participants, many of whom lacked algorithm knowledge, and the prevalence of AI anxiety among them, we designed a gamification system. This approach is supported by numerous studies demonstrating the effectiveness of gamification methods in significantly reducing learning anxiety [35]. By alleviating AI anxiety, participants are more open to exploring the full potential of AI technology, which in turn, leads to its more frequent use. However, there are also concerns among designers and artists regarding the application of AI in creative processes. These concerns stem from the current limitations of the technology and the established practices within the field, which will be further discussed in the next section.

5.4 Application and Concerns

We invited participants from both groups to express their concerns regarding the use of AI in creative activities. The detailed feedback collected is summarized in Table 4 below. This table demonstrates the applications, limitations, and concerns addressed by participants who experienced the open-source models and closed-source models in image generation.

Table 4. Application and concerns toward open-source models and closed-source models.

	Open-source model	Closed-source model
Application	Enhance the completeness	Enhance the completeness
	Reference/Inspiration/Concept Visualization	Reference/Inspiration/Concept Visualization
	Character/Product/ Game/ Graphic Design/	Graphic Design
	Conceptual illustrations/ expression	Conceptual illustrations/ expression
	Color and refine the sketch	
	Story Telling	
	3D modeling texture	
Limitation & Concerns	Time time-consuming to prepare the dataset	Copyrights/ Infringement
	High learning cost	Hard to meet the needs (Time-consuming)
	Quality issues （inadequate model training）	Weak control over the content
	Detail control	AI promotes a 'good enough' spirit, forsaking artistic pursuit
	Need post-editing	Need post-editing
		Limited visual styles

Overall, participants from both groups recognized AI’s capacity to enhance the completeness of their work and to serve as a powerful tool for communicating needs and concepts. They also appreciated AI as a wellspring of inspiration and a means for

conceptual visualization at the initial steps of creation. Participants particularly highlighted the versatility of open-source models, reporting broader applications across various design disciplines. The major reason is the use of control nets has notably increased participants' control over image content, which encompasses aspects such as framing, content structuring, character posing, coloring, detail refinement, and IP adaptation. This advancement enables them to integrate AI technology more effectively into their creative processes, including complex design activities such as storytelling with consistent settings, rapid texturing for 3D models, instant concept visualization for communication, and more. Previous work suggests that designers whose work focuses on product appearance sketching, without involving complex activities such as facilitating R&D departments and transferring needs into design, have the greatest anxiety about being replaced by AI [15]. In conjunction with our findings, we discovered that after learning about the capabilities and applications of AI for repetitive tasks, many designers have realized they can benefit from this technology and engage in more complex design practices.

Despite the complex control that open-sourced models are capable of, participants indicated that images generated still need post-editing, using tools such as Photoshop. Manual editing exists in both cases, however in different ways. With closed-source models, participants use AI-generated images as a reference or an initial draft. They further process these images through Photoshop, often adjusting and enhancing them to meet their visual goals. This may involve toning, repainting, and combining various elements. With open-source models, participants frequently integrate their own preprocessed images into ControlNet to achieve more accurate results. Manual editing is also employed to better control the image generation process.

Participants from both groups voiced concerns about the limitations of deploying AI in art and design. Those utilizing closed-source models expressed significant concerns over copyright issues and the potential for infringement with the models they employ. Such apprehensions were less pronounced among participants who train open-source models with their self-generated imagery content. Nonetheless, a degree of concern remains regarding the opaque boundaries of infringement. They highlighted that, even after LoRA model training, while the resulting imagery might be original and closely aligned with their own creations, there's uncertainty about whether the foundational model for fine-tuning may have used unauthorized content in its training dataset, leading to possible infringement issues. This question remains open, whereas sparking a discussion in art and design education is a valuable step towards shaping responsible practices.

Additionally, concerns have been raised by users of the closed-source model, highlighting issues such as a limited visual style and weak control over content style and elements that meet their creative needs. Some users have noted that adjusting prompts and waiting for the generation of images that meet their requirements can sometimes be more time-consuming than creating the artwork by themselves. This issue of time consumption is also reflected by participants who fine-tune open-source models, however, for different reasons. They suggested that generating the dataset and labeling the contents for training an open-source model required additional time, and the effort invested was comparable to the amount of work they put into their normal creation

workflow without the aid of AI. Nevertheless, the potential benefits of AI models, including increased productivity and the impact of spreading their creations through the open-source community, were acknowledged.

Despite the positive effects of the open-source community, participants voiced their concerns over different qualities due to the diverse datasets and training methodologies employed in different open-source model training. Quality issues such as broken shapes, extra limbs, and incorrect hands were less frequently reported by users of closed-source models. However, participants from the closed-source model groups indicated that the application of AI might promote a “good enough” mentality, potentially forsaking the pursuit of artistic excellence in traditional art and design. These concerns spotlight the need for art and design education to address how creativity and the artistic quest for quality can be encouraged and valued amidst the growing reliance on AI technologies.

6 Feedback with the gamified course

Through semi-structured interviews with students, we found that the implementation of gamification techniques helped in demystifying concepts and creating a supportive environment that encourages learning from mistakes. Participants reflected that the approach of using a "trainer" metaphor in the gamified learning experience was engaging. In the game context, improving the quality of the trained models through parameter and database adjustment was perceived as a level-up for training their digital pet companions. This approach helps alleviate the fear of learning technology, as one participant stated, “I feel a sense of achievement when the models I trained can generate outcomes that meet my needs.”

Furthermore, most participants lacked a foundation in algorithms from their formal education and expressed a daunting attitude toward understanding AI and algorithm-related concepts before the course. However, this narrative method enabled them to grasp the principles of AI and model training effectively. One participant remarked, “It is beyond my expectations that I can comprehend and apply these concepts.” These learned concepts were successfully applied by all 32 participants to adjust the parameters in their training LoRA models, leading to the production of excellent individual and team projects that reflect the artistic background of each student by the end of the course (Appendix Figure 1).

We also observed that different students have varying levels of interest and abilities to grasp the deep principles behind the technology. One student stated, “This course has opened the door of AI to me. I am curious about the mathematics behind the technology but am a bit hesitant about whether I should delve deeper into this knowledge.” This feedback suggests that, for the future of this gamified course, we should consider personalized learning paths. Such paths would not only cater to students interested in basic concepts but also provide opportunities for in-depth study for those who wish to explore further.

Addressing RQ3, we highlight key considerations for creating a gamified course on open-source AI training in art and design education, based on insights gained from participants' feedback. There are two major aspects of consideration: the integration of gamification into educational topics, and the integration of open-source AI into art and design education.

Participants from both groups discussed the potential and limitations of AI in art and design, including copyright issues, quality concerns, and the investment of time, among others. Concurrently, the importance of responsible use should be emphasized. Responsible usage can be promoted by encouraging participants to integrate their manually created content into open-source model training, allowing them to effectively merge their artistic skills with AI capabilities. However, the boundaries of copyright infringement, whether related to outcomes or models, demand careful consideration and a push for further regulation. Previous research about data attribution, a means to identify the importance of training data, has played an essential role in evaluating the copyrights of the training samples [44]. Integrating the explanation of certain AI technology into art and design education could play a pivotal role in shaping future regulations.

21st-century design and art education values a comprehensive skill set that extends beyond painting to include an understanding of aesthetics, context, social perspectives, innovation, and more [21]. Design and art education must maintain these core values. The integration of AI into art and design education should explore ways in which AI can serve as a tool to augment, rather than replace, art and design skills and values.

In designing gamified educational experiences, narratives that facilitate an understanding of concepts, along with playful and fantastical elements that reduce participants' AI anxiety, are recommended. Fostering a community of practice by encouraging sharing and collaboration among participants can further motivate engagement in learning activities. Moreover, while it is true that designers utilizing AI with open-sourced models like Stable Diffusion are not required to understand complex underlying algorithms, it is essential for educational programs to offer and promote opportunities for in-depth exploration. By enabling participants to select paths that align with their interests and skill levels, future art and design education could nurture individuals proficient in both art and technology, thereby unlocking new possibilities in the field.

7 CONCLUSIONS

In this work, we introduce a gamified course on LoRA model training within art and design education. Participants learned AI concepts through comic narratives and practices of using and training open-sourced models such as LoRA through a gamified platform based on Miro. Survey experiments were conducted with participants who had experience with open-source AI and LoRA model training, as well as those who had experience in closed-source AI image generation but had never attended the course. We investigated their perceived usefulness, perceived ease of use, intention to use, and actual use of AI technologies.

The findings revealed that the experience with the open-sourced model use and training significantly influenced participants' attitudes towards AI, demonstrating a higher

actual use and intention to use compared to those accustomed to closed-source models. Furthermore, participants who experienced open-source models perceived stronger usefulness, which significantly impacted their technology adoption behaviors.

Discussions highlighted the effectiveness of the gamified course in demystifying AI concepts and fostering a supportive learning environment. The "trainer" metaphor and the narrative method were beneficial for participants with limited backgrounds in mathematics and programming, enabling them to grasp AI principles effectively. This educational approach not only alleviated AI anxiety but also enhanced participants' AI literacy, positively influencing their attitudes toward AI.

Open-source model fine-tuning, such as LoRA, as described by Viraj and colleagues, enhances customization using content provided by users, improves the quality of generated images, and provides the capability to recontextualize user-generated content within broader contexts [45]. Enabling artists and designers to customize the model with their own content leads to increased control over the output images and fosters trust in the application. Furthermore, existing research supports the notion that trust in AI technology is a critical factor in facilitating its actual usage [46].

The discussions underline the potential enhancements AI can bring to creative fields, alongside challenges such as copyright, quality, and the need for responsible use. We suggest the incorporation of personal creativity into open-sourced AI training for empowering artists and designers. Furthermore, the development of gamified educational experiences can alleviate AI anxiety and promote a collaborative learning environment. Ultimately, by fostering opportunities for deep exploration tailored to individual interests and abilities, the future of art and design education can nurture individuals' abilities in combining artistic vision with technological innovation, opening new possibilities in the field.

8 LIMITATIONS & ACKNOWLEDGEMENT

The current study did not capture data regarding the academic majors of participants. The attitudes to AI-generated images may differ substantially across disciplines where the impact of AI on creative processes might be viewed differently. Additionally, the study design excluded individuals with no prior experience using AI tools for image generation due to the survey's prerequisite. Consequently, the attitudes of those fundamentally opposed to the use of AI in image creation, some of whom were lack of firsthand experience with such technologies, were not represented.

While providing gamification and non-gamification education for different students potentially led to concerns regarding equity in educational experiences, we didn't prepare the non-gamification group to test the effect of gamification separately.

The authors are grateful for the funding support from the Guangdong Province Youth Innovation Project for Ordinary Higher Education Institutions [grant number ZX2023000101], [grant number 2023KQNCX033], funding support from GAFA [grant number 24XSC31].

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10 Appendix

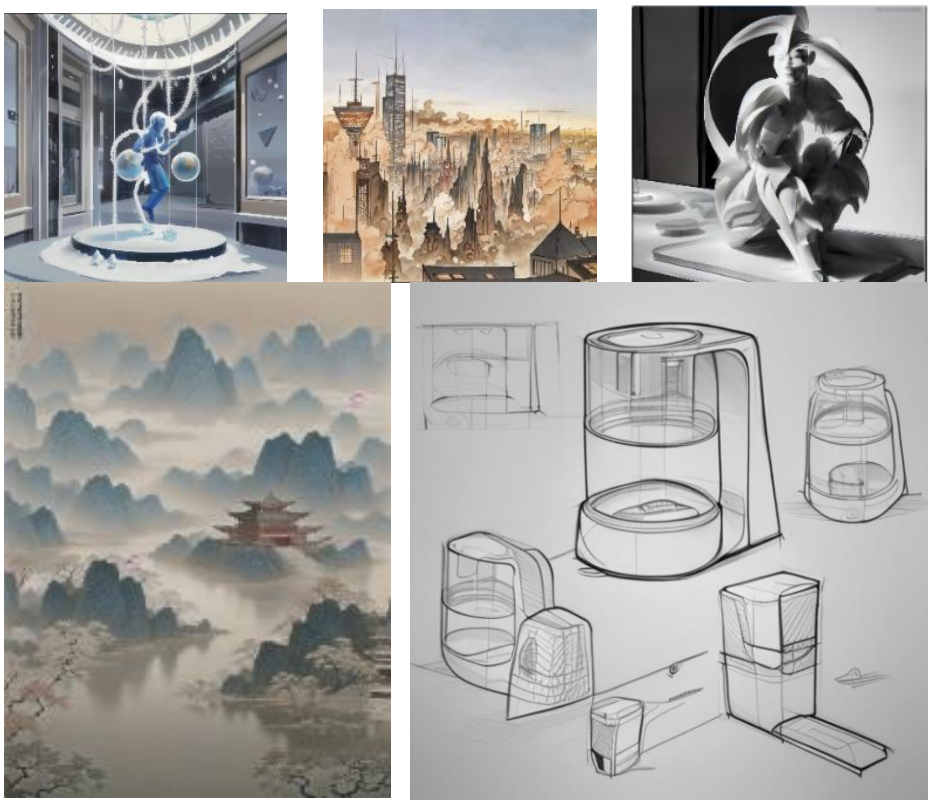


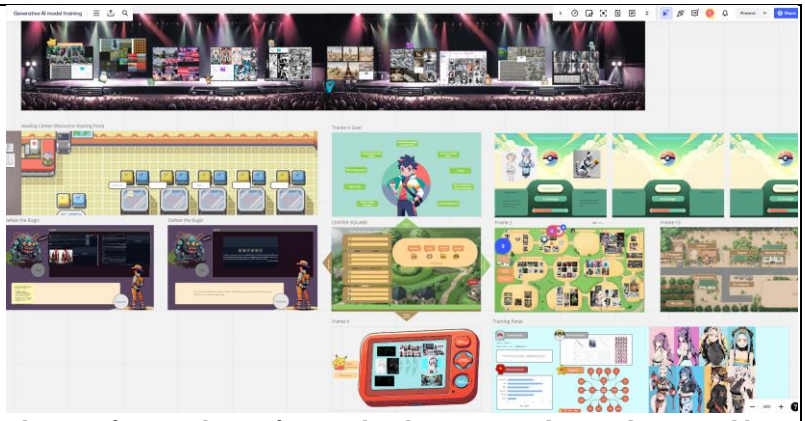
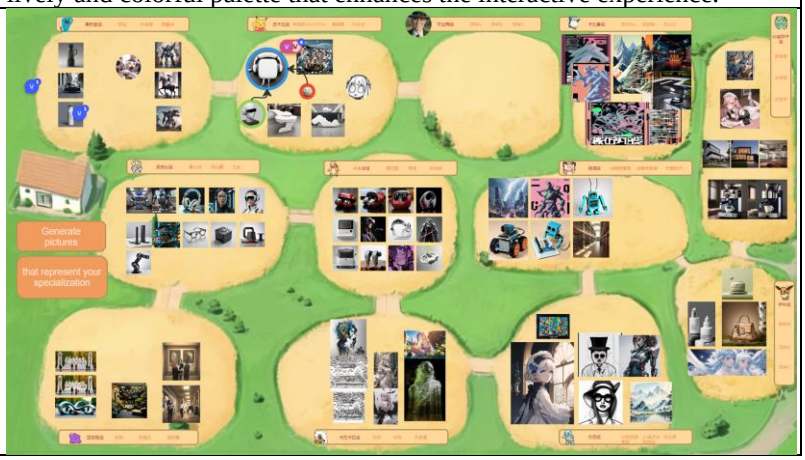
Fig. 1. Images generated with LoRA models trained by Lin Ming from art and sculpture, Chen Liwen, Liu Yang from environment design from art management, Liu Yang Art Science, Xu Jiaman from public Art

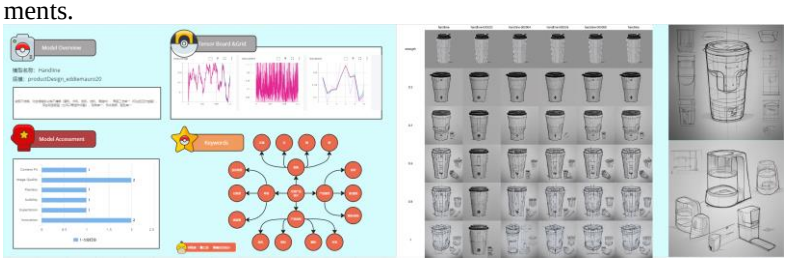
Table 2. The curriculum of the course

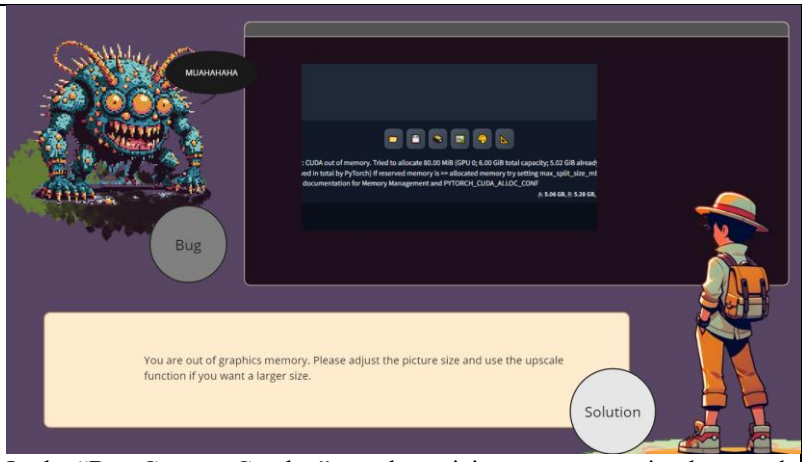
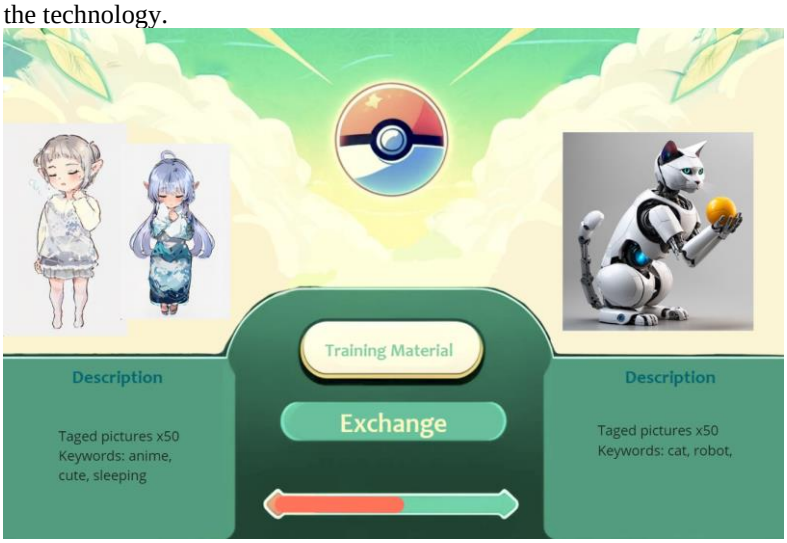
lesson	Description	Form
1	Concept Introduction and SD Interface Overview	Lecture, practical demonstration, Gamified Platform
2	Stable Diffusion Basic Parameter Adjustment	Lecture, practical demonstration, Gamified Platform
3	Introduction to Model Types and Usage	Lecture, practical demonstration, Gamified Platform
4	Model Training Material Preparation	Individual practice, Gamified Platform
5	ControlNet Introduction	Lecture, practical demonstration, Gamified Platform
6	Advanced Use of ControlNet	Lecture, practical demonstration, Gamified Platform
7	Exploring LoRA Model Training	Lecture, practical demonstration, tutoring
8	Image Pre-processing and Tagging	Lecture, practical demonstration, tutoring
9	Individual Model Training (Beginner Mode)	Individual practice, Gamified Platform

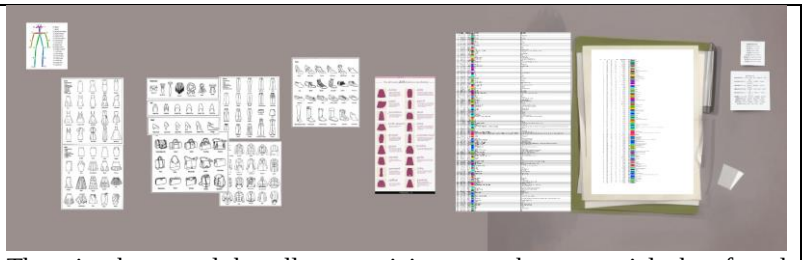
lesson	Description	Form
10	Detailed Explanation of LoRA Training in Expert Mode	Lecture, practical demonstration, Gamified Platform
11	Individual Model Training (Expert Mode)	Individual practice, Gamified Platform
12	Group Training Part 1 (Q&A)	Group topic formulation, material collection, image processing
13	Large Model Training / Animate Diffusion Extensions	Lecture, practical demonstration, tutoring
14	Group Training Part 2 (Q&A)	Group activities, tutoring
15	Finalizing Group Assignments	Group activities, tutoring
16	Demo Day Pitch (Final Presentation)	Presentation and evaluation, Gamified Platform

Table 2. Gamification principles applied in the interface

Aesthetics	 The gamification design features bright, anime-style visuals inspired by Japanese role-playing games (JRPGs), with fantasy avatars. It features a lively and colorful palette that enhances the interactive experience.
Mission	

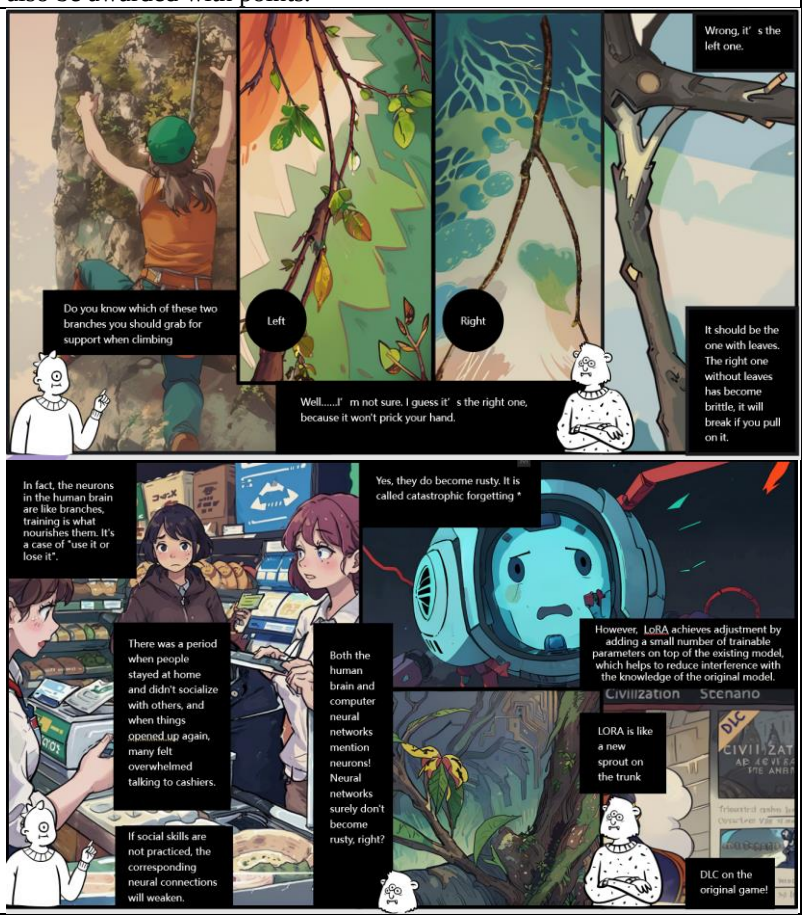
	Mission 1: participants were asked to use Stable diffusion to generate pictures that represent their majors using open-sourced models they found and post the picture in the “Path of Showcase” panel.  Mission 2: Participants were grouped into teams of three and given a "digital pet," which is a base model for creating images. Each team worked together to fine-tune settings and apply techniques like Control Net and LoRA, aiming to produce high-quality images that fit design requirements.  Mission 3: After studying model training, participants were instructed to share with others their model's profile, Tensor Board data, and a personal assessment to reflect on the training process.  Mission 4: In the final showcase stage, team members collaborate using their training materials to train a model. They present the images and performance metrics of the model they trained.

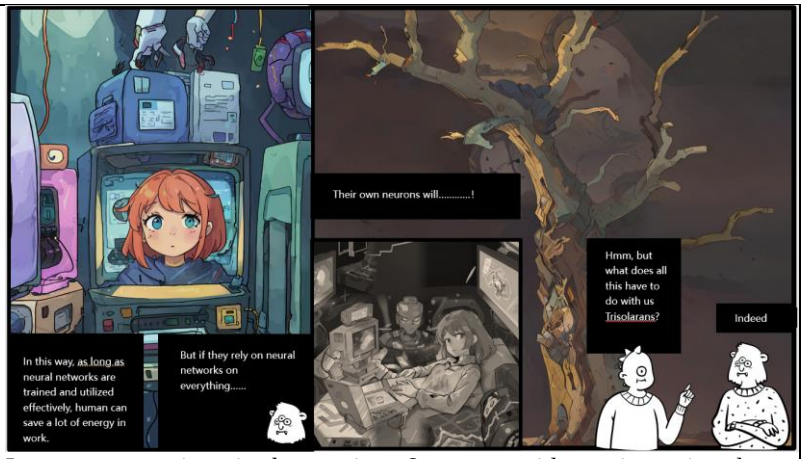
Interactive cooperation	 In the “Bug Counter Combat” panel, participants encountering bugs and seeking assistance with solutions can post their error messages in the monster section. Those capable of solving the problem can post their solutions in the player section. Through this task, we aim to further enhance collaboration among participants and increase their engagement as they learn the technology.  Tagging materials for training can be quite time-consuming. To assist, we've provided an exchange platform for those seeking additional data and opportunities for exchange. Points will be gained for those who exchange materials.

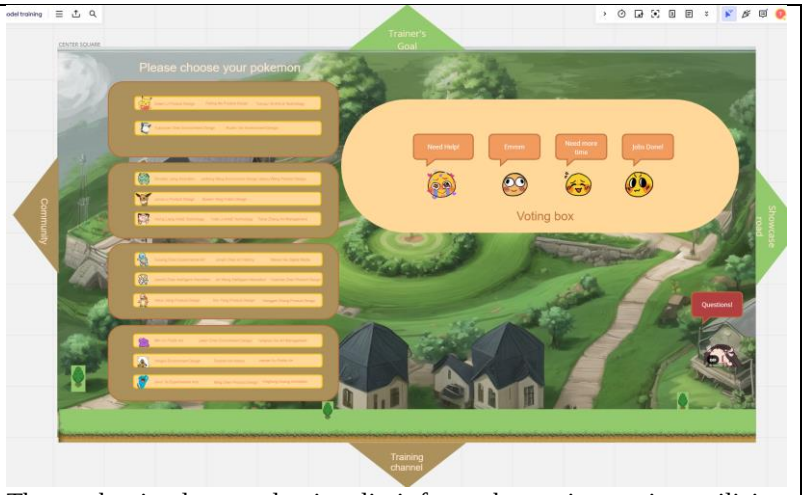


There is a bag panel that allows participants to share materials they found useful for training. Individual who made contributions in this section will also be awarded with points.

Storyline



	 Lectures were given in the previous 8 courses with comic stories about concepts in AI and neural networks. Each chapter of the comic was created using a specific type of open-source model, and the workflow with different models was elucidated subsequently.
Points	 The teacher explained how to use 15 different Control Nets. Students should apply what they've learned to create images. Once a Control Net is used successfully, they can occupy the Control Net house they used with their team Pokémon. Points will also be gained as mentioned above in the interactive cooperation sections.

Time Limits	 The teacher implemented a time limit for each practice session, utilizing Miro's voting feature. The voting boxes remain accessible throughout the session, allowing students to give immediate feedback.