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Discussion of AIGC Technology in a Photography Course at a Higher Vocational College

Fu Wang

Changzhou College of Information Technology, Changzhou, Jiangsu, China

Abstract: ***This study explores the teaching strategies of photography courses at a higher vocational college in China, focusing on the application of Artificial Intelligence Generated Content (AIGC) technology, specifically Stable Diffusion. Utilising the AI-TPACK theory as a theoretical framework, data were collected from teachers and students through 1) observation, 2) semi-structured interviews, and 3) focus group discussions. The researcher analysed the data using a phenomenological approach to capture the following core themes: 1) practical photography skills, 2) innovation and efficiency in post-processing, and 3) exploration of personalised styles and creative thinking. The results of this study contribute to the ongoing development of photography courses in higher vocational colleges amid technological innovation, demonstrate the positive effects of AIGC technology on enhancing the quality of photography teaching and creativity, and provide both theoretical support and practical guidance for curricular reform and teaching strategies.***

Keywords: AIGC, AI-TPACK, Photography course, Higher vocational college, Teaching strategy.

1. Introduction

1.1 Research Background

With the rise of AIGC technology, particularly in image generation, AIGC is gradually transforming the traditional methods of creating photographic art. AIGC technology can assist photographic creators in completing complex image generation and processing more efficiently by simulating human creative thinking. Photography courses in a higher vocational college aim to cultivate students' mastery of the fundamental principles and operational skills of photographic art. However, issues such as insufficient creativity cultivation and a lack of equipment resources in course design continue to limit students' learning outcomes. By utilising Stable Diffusion as a technical tool, this study explores the teaching design strategies for integrating AIGC technology into photography courses in a higher vocational college to promote technological innovation in photography education and enhance students' creativity.

1.2 Purpose of the Study and Research Questions

This study aims to explore the application of AIGC technology, particularly Stable Diffusion, in photography courses at higher vocational colleges and universities and to propose effective teaching strategies based on the AI-TPACK theoretical framework. Through this framework, the researcher seeks to gain a deeper understanding of the potential of AIGC technology in education and to enhance course design from this perspective. This study aims to answer the following research questions:

1) How can AIGC technology, particularly Stable Diffusion, be applied to the innovative design of photography courses in higher education institutions?

2) Can AIGC technology effectively address the current issues of insufficient creativity cultivation and a lack of equipment resources in photography courses?

3) What is the effectiveness of AIGC technology in enhancing students' technical abilities and creative expression?

1.3 Significance of the Study

This study focuses on teachers and students with experience in AIGC technology at a higher vocational college in China and explores their practices and experiences in photography courses. Firstly, the study contributes to a deeper understanding of the potential impact of AIGC technology on photography teaching, particularly in terms of enhancing teaching quality and students' creativity. Secondly, it reveals the experiences and challenges faced by teachers and students during the integration of AIGC technology, providing theoretical support for the transformation of teachers' roles and the exploration of students' personalised styles. Finally, this study aims to construct strategies for effectively integrating AIGC technology into photography teaching, which not only clarifies the value positioning of teachers in the era of intelligent education but also provides a practical basis for promoting the reform of photography courses in higher vocational colleges.

1.4 Theoretical Framework

AI-TPACK is an extension of the TPACK (Technological Pedagogical Content Knowledge) theory. The TPACK framework was developed by Mishra and Koehler (2006) and consists of three main knowledge domains: 1) Content Knowledge (CK), 2) Pedagogical Knowledge (PK), and 3) Technical Knowledge (TK), which overlap to form a dynamic and integrated approach to teaching and learning about technology. The framework emphasises the importance of balancing these domains to link the application of technology to content requirements and instructional strategies in a given educational context (Warr & Mishra, 2022). TPACK has evolved from a theoretical structure to a practical tool used in research and development projects aimed at understanding and enhancing the integration of technology in teaching and learning environments (Baran et al., 2011). It is particularly valuable in teacher education, where courses designed around the TPACK model can enhance pre-service teachers' competence in technology integration by concretising knowledge through concept maps, digital storytelling, and learning management systems (Yurdakul et al., 2013). Furthermore, it serves as a starting point for analysing

teachers' knowledge construction practices, highlighting the significance of personal pursuit of technological knowledge and contextual interactions in shaping effective pedagogical practices (Olofson et al., 2016).

With the development of artificial intelligence (AI) technology, an AI technology dimension was added to the original TPACK framework to form the AI-TPACK framework, which aids teachers in effectively integrating AI technology to enhance teaching effectiveness. A study by Ning et al. (2024) further explored the application of the AI-TPACK framework, emphasising the necessity for educators to integrate AI technology into teaching and learning through seven components: pedagogical knowledge (PK), content knowledge (CK), AI technological knowledge (AI-TK), pedagogical content knowledge (PCK), AI technological pedagogical knowledge (AI-TCK), AI technical content knowledge (AI-TPK), and AI-TPACK itself. The theory underscores the interplay between technology, content, and pedagogy for teachers, particularly in rapidly evolving technology. Specifically, the AI-TPACK framework highlights the need for teachers to not only master the fundamental functions of AI technologies but also to comprehend how these technologies can be applied in curriculum design to promote student learning and creativity (Figure 1. shows an example).

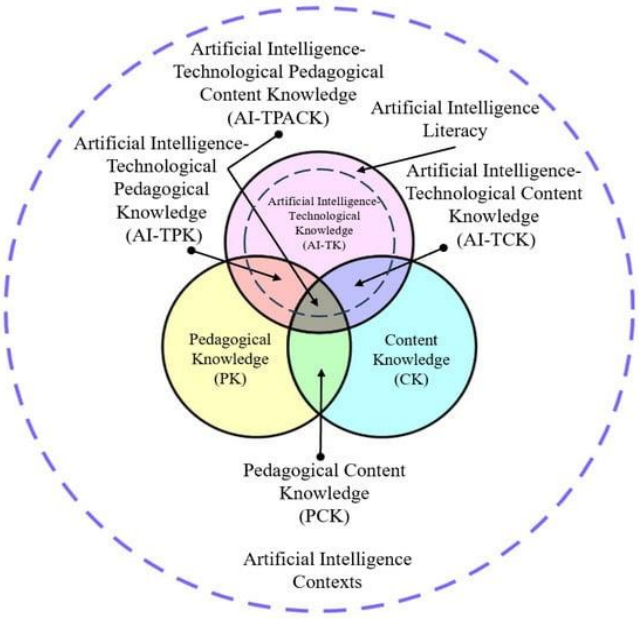

Figure 1: AI-TPACK structural diagram. (Ning et al., 2024)

The AI-TPACK theory (Ning et al., 2024) is valuable in this study as it guides teachers in seamlessly integrating AIGC technology with the content and methods of photography teaching. Additionally, the AI-TPACK theory enables educators to flexibly adjust their teaching strategies to accommodate the diverse learning needs of students across various teaching contexts. Teachers can design curriculum projects that incorporate real-world tasks, allowing students to utilise AIGC technology to receive feedback and iterate on their creations, thereby enhancing both the efficiency and quality of their work. With this comprehensive understanding, educators are equipped to identify suitable teaching strategies that improve the quality of instruction in photography courses within a constantly evolving technological landscape.

2. Related Research

2.1 AIGC Technology

AIGC refers to Artificial Intelligence Generated Content, which involves the automatic or semi-automatic generation of text, images, audio, video, and other forms of content using AI technology. Over the years, the development of AIGC image generation technology has progressed significantly, driven by advancements in computational power, algorithmic innovation, and the integration of deep learning techniques. The technology has evolved from basic image simulation to complex systems capable of generating high-quality, photorealistic images. First, regarding the historical background and early development, the concept of computer-generated images dates back several decades, with early systems employing analogue and numerical computation to simulate visual scenes for training purposes. Bunker (1975) indicates that the evolution of these systems, from the use of scale models and photography to digital computation for real-time image generation, marked a major shift in the field. Adorni et al. (1984) argue that initial efforts in natural language-driven image generation focused on creating static scenes using simple phrases, addressing challenges such as the positioning and balancing of objects within the generated images.

Second, regarding technological advancements, the introduction of deep neural networks has been crucial for the progress of AIGC image generation. Nikolaev et al. (2017) assert that deep neural networks facilitate the creation of image, audio, and 3D content using pre-trained models, enabling the generation of diverse and complex content from a single template. Soo and Ho (2020) state that meta-learning techniques employed in Generative Adversarial Networks (GANs) further accelerate the image generation process. These methods involve generators and discriminators that iteratively improve one another, allowing for faster and more accurate image generation.

Third, AIGC techniques have applications across various fields, including entertainment, education, and design. Shihara et al. (2023) note that AI image generators have been integrated into the Kansei engineering design process, facilitating innovative product design through fine-tuning and other models. Xu et al. (2024) suggest that the deployment of AIGC in mobile networks enables real-time, personalised content generation while preserving user privacy. This is achieved through a collaborative cloud-edge mobile infrastructure that supports multiple applications and enhances user accessibility.

Despite the progress made, AIGC image generation still faces challenges related to quality and perceptual assessment. Variations in image quality arise from hardware limitations and technical proficiency, highlighting the need to develop objective models for quality assessment. Zhang et al. (2023) report ongoing efforts to create databases and conduct experiments to benchmark current image quality assessment models. Wang et al. (2023) emphasise the misuse of AIGC techniques in sensitive areas, such as ChatGPT, underscoring the necessity for effective detection mechanisms. The low performance of current detectors for code-related content

suggests that there is a gap in outreach that requires fine-tuning to improve accuracy. Wu et al. (2023) argue that the integration of large-scale pre-trained models enhances the capabilities of AIGC, making it a promising tool for various applications. However, challenges such as ethical considerations, security, and privacy remain key areas for future research and development. Cousins (2023) argues that as AI-generated images become increasingly lifelike, distinguishing them from real images poses significant challenges, which will impact the authenticity and trustworthiness of visual media. Addressing these issues is therefore critical for realising the full potential of this technology and ensuring its responsible use across different domains.

2.2 Impact of AIGC Technology on the Creation and Teaching of Photography

AIGC technology has become an integral part of all stages of photography, from image capture and editing to the generation of entirely new visual content. First, there is the transformation of photographic creation. Marei (2020) argues that the use of AI algorithms in digital cameras and smartphones to automatically adjust exposure and focus allows photographers to concentrate more on the creative aspects rather than technical adjustments. Feng (2022) states that the application of BAS algorithms improves image quality through techniques such as transformation, restoration, and enhancement, which are essential for achieving high-quality photographic results. Artificial intelligence is not only used for technical improvement but also for creative purposes. Poltronieri and Hänska (2019) assert that the utilisation of Generative Adversarial Networks (GAN) and other AI models to create novel artefacts and digital images pushes the boundaries of traditional photography. Zhang and Tsai (2021) demonstrate that AI techniques, such as CycleGANs, are employed to generate sketches and artistic images that can be further processed and coloured using AI algorithms, thereby facilitating the creation of unique artistic expressions that merge photography with digital art.

Second, there has been a shift in the teaching of photography. Morton (2017) contends that the rise of digital technology and the online information economy has shifted the focus of photography teaching from traditional technical skills to narrative competence, authenticity, and subjectivity. Anantrasirichai and Bull (2021) assert that artificial intelligence techniques such as Generative Adversarial Networks (GANs) and Convolutional Neural Networks (CNNs) are being employed to augment content creation and post-production workflows in photography. These tools enable students to experiment with new forms of creativity, allowing them to generate and manipulate images in ways that were previously impossible. Partin-Harding (2011) discusses strategies for integrating technology into the fine art photography curriculum, including the use of digital tools to promote creativity and problem-solving, thus preparing students for the changing demands of the digital world. Learning is also enhanced through technology. Masdi et al. (2018) note that interactive instructional media and multimedia skills have been incorporated into photography courses to improve student engagement and learning outcomes. These tools provide practical and effective means of teaching photography, making the learning process more dynamic and interactive. McGuire (2016) argues that open courses and informal learning platforms utilise mobile photography to engage a broader audience. These platforms promote collaborative learning and the sharing of Creative Commons-licensed content, fostering a community-based approach to education. As Rubinstein (2009) has previously researched, the digital shift in photography has prompted educators to adopt a conceptual rather than a purely technical approach. This perspective enables students to engage with the cultural and semantic meanings of digital photography, thus encouraging a deeper understanding of the role of digital photography in contemporary media. Zhou (2022) emphasises the analysis of the integration of AI and photography based on the characteristics and methods of AIλI, summarising the logic and methods of how AI can better serve photography and how AI and photography can be more effectively integrated under the conditions of AI Intelligent Integration. Brack et al. (2022) introduce the Stable Artist approach to semantic guidance, which allows for fine-grained control of image generation. This method facilitates subtle editing and optimisation of image composition and style, which is particularly beneficial in educational settings such as photography courses. Stöckl (2023) evaluates synthetic image datasets generated using Stable Diffusion and shows that the model can produce different conceptual representations that can be used for data enhancement in machine learning applications.

Furthermore, Carlini et al. (2023) suggest that diffusion models, including Stable Diffusion, still present a privacy risk, as they can remember and reproduce individual images from training data. This vulnerability necessitates improved privacy-preserving training methods to mitigate potential data leakage. Zhuang et al. (2023) highlight that adversarial attacks on Stable Diffusion models reveal their susceptibility to content changes while minimally interfering with textual cues, raising concerns about the robustness of these models in real-world applications. While AIGC photography offers exciting possibilities, it also poses challenges related to authorship, quality assessment, and the philosophical understanding of art. Smith and Cook (2023) argue that these images can be viewed as ‘readymades’, i.e., artefacts that are presented as art under their visual attributes and the context in which they are displayed. Oscar (2022) states that the emergence of AI in art challenges traditional definitions of creativity and raises philosophical questions about the role of human agency in the artistic process.

However, the rapid pace of technological advancements requires educators to continually update their curricula and pedagogical methods to keep pace with industry changes. Additionally, a balance must be struck between the use of AI and traditional photographic techniques to ensure that students acquire a well-rounded skill set. As photography curricula continue to evolve, the focus should remain on fostering creativity and critical thinking to equip students to deal effectively with the complexities of the digital age.

2.3 Stable Diffusion

The theoretical basis of diffusion models, which generate high-quality images by gradually adding noise and subsequently removing it in reverse, was first proposed by

Sohl-Dickstein et al. (2015). Yang et al. (2023) state that the core idea of this model is to simulate data generation through a gradual process of noise injection and removal, thus providing a new and stable framework for image generation tasks. The stable diffusion model iteratively refines a noisy image to produce high-quality output. Chauhan et al. (2024) argue that this approach differs from traditional Generative Adversarial Networks (GANs), as it offers a more stable and consistent training process, reducing issues such as mode collapse and training instability. Jadhav et al. (2024) note that Latent Diffusion Modelling (LDM) is a significant advancement in the field, enabling the generation of images with high fidelity and diversity by operating in latent space rather than pixel space. This approach reduces computational costs while maintaining image quality.

Stable Diffusion has also been effectively applied to text-to-image tasks, bridging the semantic gap between textual descriptions and visual content. Seema (2024) explains that this is achieved by combining natural language processing (NLP) techniques with diffusion modelling, allowing for the generation of coherent and realistic images based on textual cues. Additionally, Stable Diffusion has been used to create interactive educational tools. In a study by Lee et al. (2024), the Diffusion Explainer was proposed to help users understand and manipulate the operation of the model without specialised hardware, thus facilitating AI education for a broader audience.

Despite its impressive capabilities, Stable Diffusion faces challenges, particularly concerning the legal and ethical implications of AI-generated content. Ma et al. (2024) addressed these issues by developing frameworks such as Safe-SD, which embeds invisible watermarks into images during the generation process, thereby enhancing copyright protection and content monitoring. According to Zhang et al. (2024), the robustness and security of the model are subjects of ongoing research exploring adversarial attacks and defences to improve its resilience against potential vulnerabilities. Furthermore, Conde et al. (2024) investigated the model's performance in recursive repair tasks, showing that while it could maintain image stability over multiple iterations, it was prone to image degradation under certain conditions. Horváth (2024) stated that integrating amnestic cellular neural networks further enhances Stable Diffusion's performance, providing superior accuracy and energy efficiency for image generation tasks.

In summary, Stable Diffusion represents a significant leap forward in the field of AI-driven image synthesis. Its applications span multiple domains, including computer vision, graphic design, and multimedia content creation, thereby opening new possibilities for creative expression and content generation. As research continues to refine and optimise these techniques, Stable Diffusion promises to revolutionise intelligent image synthesis and interpretation, bridging the gap between textual descriptions and visual content in innovative ways.

3. Research Method

3.1 Phenomenological Research Method

This study employed the phenomenological research method (Husserl & Moran, 2012) to explore the experiences and perceptions of students and teachers concerning AIGC technology in photography learning and teaching. By utilising this phenomenological approach, the researcher identified and analysed the impact of AIGC technology on enhancing students' creative abilities and technical skills during the teaching process through in-depth interviews and observations. The selection of this method is particularly appropriate for revealing the profound experiences of students and teachers in applying AIGC technology, thereby providing a theoretical foundation for the development of teaching strategies in photography courses. Furthermore, it facilitates a deeper understanding of how AIGC technology reshapes the pedagogical model of photography education.

3.2 Participants

Three data collection tools were employed in this study, including (1) observation, (2) semi-structured interviews, and (3) focus group activities. First, observation serves as a crucial qualitative research method, enabling the researcher to acquire authentic insights into classroom instruction and student learning environments directly. The researcher conducted classroom observations in a photography course taught by one teacher over a week, spanning four classes (totalling 160 minutes). The focus was on how the teacher utilised Stable Diffusion during instruction, as well as the levels of student engagement and interaction observed throughout this process. This method also facilitated the capture of students' emotional responses, technical challenges, and interactions with the teacher, thereby providing a comprehensive understanding of the practical effects of AIGC technology in the classroom.

Second, according to Creswell, semi-structured interviews are an effective tool for obtaining rich, in-depth qualitative data. Seidman recommends conducting multiple interviews to reveal participants' life stories and personal backgrounds, which assists researchers in gaining deeper insights. Consequently, this study involved semi-structured, one-on-one interviews with both students and teachers aimed at understanding students' experiences with AIGC technology, their feedback on course design, and the challenges they encountered during the creative process. Additionally, the research sought to gather teachers' perspectives on the application of AIGC technology in teaching, their views on the improvement of instructional strategies, and the challenges and successes they faced in their pedagogical practices.

Finally, the researcher organised the 12 participants into three groups to facilitate focus group discussions. These discussions were designed to gather participants' viewpoints and narratives based on group interactions, involving both teachers and students in collaborative dialogue. To protect the privacy of the interviewees, a coding system was implemented, representing each respondent in the format "ID-Role-Gender," where "ID" denotes the participant number, "Role" signifies either 'S' for student or 'T' for teacher, and "Gender" indicates 'F' for female or 'M' for male. For example, 03-S-F represents Female Student 03, while 01-T-M denotes Male Teacher 01.

3.3 Data Collection

Three data collection tools were used: (1) observation, (2) semi-structured interviews, and (3) focus group activities.

Firstly, observation is an important qualitative research method that can help the researcher directly access the real situation of classroom teaching and student learning. The researcher chose a teacher's photography course for classroom observation for a week (four lessons totalling 160 minutes), focusing on how the teacher used Stable Diffusion to teach and the engagement and interactions that the students demonstrated in the process. The observations also capture students' emotional responses, technical difficulties, and interactions with the teacher during the lessons, helping to provide a comprehensive picture of how well the AIGC technology is being used.

Second, according to Creswell, semi-structured interviews are an effective tool for obtaining rich and insightful qualitative data. Seidman suggests that conducting multiple interviews can reveal the participants' life stories and personal backgrounds, helping the researcher to gain a deeper understanding. Therefore, this study conducted semi-structured, one-on-one private interviews with students and teachers in the course to understand students' experiences with the AIGC technology, their feedback on the course design, and the difficulties and challenges they encountered in the creative process. At the same time, to understand teachers' perceptions of the use of AIGC technology in teaching and learning, their views on the improvement of teaching strategies, as well as the challenges and successes they faced in the teaching process.

Finally, the researcher divided the 12 participants into three groups and arranged focus group discussions to collect participants' perspectives and stories based on group interactions; the focus groups included joint discussions between teachers and students. To protect the privacy of the respondents, the codes of the respondents represent the respondents' "serial number-student-gender" and "serial number-teacher-gender". For example, 01-S-F represents female teacher 01, and 01-T-M represents male student 01.

3.4 Data Analysis

This study used thematic analysis (Braun & Clarke, 2006) to extract themes related to teaching strategies through verbatim transcription of the observation transcripts and semi-structured interviews. The researcher first collected observation data and audio files of the interviews and reread the transcribed text several times to gain a deeper understanding of participants' perspectives and experiences and to identify potential themes. Recurring themes such as 'technology support for creative expression' and 'student dependence on AIGC technology' were extracted from the analyses. Subsequently, similar themes were grouped to produce core themes, including 'teaching strategies to enhance creative thinking' and 'strategies to improve the teaching of technology manipulatives'. Finally, through an in-depth analysis of these themes, the researcher summarised specific teaching strategies to guide the design and innovation of photography courses in higher vocational colleges, to clarify the impact of AIGC technology on teaching and to provide a theoretical basis for the reform of course teaching.

4. Findings and Discussion

The application of AIGC technology in photography education has begun to have a far-reaching impact, which has put forward new requirements for the design of photography courses and teaching strategies in higher education institutions. These changes are not only reflected in the innovation of teaching content and methods but also in the rethinking of teachers' professional development and students' skill enhancement. To cope with the problems in the current curriculum, such as the lack of equipment resources, the disconnection of AI technology, and the lack of creativity cultivation, this study proposes a teaching and learning implementation strategy for the photography curriculum based on Stable Diffusion. Based on the comments of twelve people participants, the researchers collected a large amount of data and proposed three themes. The themes are summarised in Table 1.

Table 1: Themes.

	Themes
4.1	Skills in Practical Photography
4.2	Innovation and Efficiency in Post-Processing
4.3	Exploration of Personalised Style and Creative Thinking

4.1 Skills in Practical Photography

In the teaching process of a photography course, the lack of equipment resources has become an important factor affecting the quality of teaching and the improvement of students' skills. As a highly practice-dependent art, the abundance of equipment used in teaching is directly related to student's learning experience and skill mastery. Under the traditional teaching mode, students often find it difficult to fully master photography skills due to the lack of equipment. Two teachers said,

…we have a limited amount of equipment, and students often have to queue up to use the camera during the learning process, which limits their opportunities for practice… (06-T-M)

Many students would like to be able to practice more filming outside of the classroom, but the shortage of equipment prevents them from doing that…(03-T-F)

Students also expressed concern about this state of affairs. One student said,

…I would like to improve my shooting skills, but I feel that progress is slow as I only have so little time to use the equipment in each class… (01-S-M)

In terms of composition, Stable Diffusion can generate different styles of compositional solutions by studying a large number of classic photographs. This technology enables students to freely adjust their compositions in the virtual environment and experiment with different perspectives and layouts, thus deepening their understanding and application of compositional rules. In a classroom observation, when the teacher guided students to use Stable Diffusion to generate different photographic compositions, students actively discussed their ideas and quickly adjusted the input text descriptions to view the generated images. This interactive process not only enhanced students' creativity but also promoted critical thinking. One teacher said,

...students demonstrated greater self-reflection when evaluating the generated images, and they began to pay attention to the details and aesthetics in the compositions… (01-T-M)

Students demonstrated a high level of engagement and creativity while using Stable Diffusion. Teachers mentioned

that with Stable Diffusion, students were able to experiment with different compositions and depths of the field in a virtual environment. Although it wasn't a live shot, this virtual practice allowed me to see how active their creativity and thinking were… (04-T-F).

...using Stable Diffusion in the classroom has not only increased student engagement, but it has also allowed me to focus on guiding their creative thinking rather than just teaching techniques…(02-T-M)

The role of the students also changed from being passive recipients of knowledge to being active agents in exploring and constructing knowledge. The excitement and curiosity that students displayed during the observation while manipulating the Stable Diffusion was impressive. One student shared his experience,

...I was able to experiment with different shooting styles without the limitations of my equipment, which made me more confident in live action… (02-S-M)

...this virtual shooting experience has helped me to understand the impact of different compositions on the effect of a photo, which was previously difficult to understand in a real shoot…(06-S-F)

In summary, by introducing the Stable Diffusion technology, the senior photography course not only effectively copes with the problem of the lack of equipment resources but also provides a flexible learning platform for students to improve their real shooting skills and stimulate creative thinking. According to the AI-TPACK theory, when teachers integrate technical knowledge, pedagogical knowledge and subject knowledge, they can create an interactive learning environment that promotes students' active participation and self-reflection. This intelligent teaching model not only enhances students' understanding of the core elements of the art of photography but also lays the foundation for their future career development, demonstrating the great potential of AIGC technology in education.

4.2 Innovation and Efficiency in Post-Processing

In the art of photography, the rapid development of AI technology has brought unprecedented opportunities for innovation in post-processing. However, the application of AI technology is still lagging in the photography programme of a tertiary institution, failing to adequately reflect the latest trends in industry development. One teacher noted，

...most students still use traditional software such as Photoshop in their post-processing courses and have almost zero knowledge of AI technology, which prevents them from keeping up with the rapid changes in the industry… (05-T-F)

In the post-processing segment, students generally continue to rely on traditional image processing software, lacking a comprehensive understanding and practical experience with AI-driven automated processes and intelligent features. This status quo not only limits students' mastery of new technologies but may also adversely affect their future career development and innovative capacity. Many students have expressed concerns regarding this limitation. One student said,

…I would like to be exposed to AI technology because I know it will make my work more creative and efficient, but it is barely covered in the current curriculum…(04-S-F)

The consensus among students and faculty regarding the use of AI technology highlights the inadequacies of the current curriculum, which restricts students' growth and development in new technological areas. Nevertheless, through deep learning algorithms, Stable Diffusion offers precise control and creative expression in local retouching, background replacement, and colour grading. Notably, in local retouching, Stable Diffusion intelligently identifies image details, allowing for fine-tuning of specific areas. During a classroom observation, students exhibited a high level of engagement when employing Stable Diffusion for local retouching. One teacher said,

...the students were enthusiastic in their discussions when using Stable Diffusion for blemish removal and skin smoothing, and their grasp of details and immediate feedback on the results made me feel gratified... (05-T-F)

During the background replacement session, Stable Diffusion demonstrated excellent performance in achieving seamless background replacement with ease. Several students mentioned in the interviews that they felt the creative freedom of using the technique to place their characters in different scenes. One student said,

…the process of replacing the background with Stable Diffusion was amazing, I could put myself wherever I wanted and it gave me a whole new understanding of the possibilities of photography... (03-S-F)

Colour grading is an important part of photographic post-processing, and Stable Diffusion also provides students with a wealth of colour options and ways to adjust them. By entering text descriptions, students can adjust the hue and saturation of an image to shape the visual effect to match the creative intent. One teacher said,

...students became more proactive in the colour mixing process, they were no longer passive recipients but actively explored different colour styles through the AI tools... (06-T-M)

In this process, teachers are not only knowledge transmitters but also curriculum designers and technology applicators. By post-processing images through Stable Diffusion, teachers were able to guide students to deeper creative exploration and stimulate their creative thinking and critical thinking. One teacher said,

...with the introduction of AI technology, the focus of my teaching gradually shifted to how to stimulate students' creativity rather than just teaching them how to use the tools... (01-T-M)

However, teachers also generally recognise that the technology is not a complete replacement for traditional image-processing software. In practice, it is still necessary to incorporate the advantages of traditional software to ensure that students can navigate between the two. One teacher said,

...after using Stable Diffusion to produce an image, I still guide students to use Photoshop to make the final adjustments so that I can ensure that their work is the best it can be... (05-T-M)

In conclusion, the application of Stable Diffusion in photographic post-processing not only enriches the teaching content and mode but also enhances students' creativity and practical skills. By integrating AIGC technology with traditional teaching methods, the photography course in a higher vocational college can better align with industry development needs and cultivate more innovative talents. This shift not only affords students greater creative freedom but also fosters teachers' professional development and self-efficacy, infusing new vitality into art education.

4.3 Exploration of Personalised Style and Creative Thinking

In the photography programme of a tertiary institution, students were often limited by traditional teaching models and lacked sufficient opportunities to explore and practise unique artistic styles. Two teachers said,

...the basic skills are mainly taught in the photography programme, and the cultivation of students' styles is often neglected, resulting in a lack of unique perspectives in their creative work...(02-T-M)

...Traditional teaching methods have made students homogenised in their creations, with too few opportunities for innovation... (04-T-F)

The introduction of AIGC technology has opened up new possibilities for personalised styles and creative thinking. Stable Diffusion and its combination with LoRA (Low-Rank Adaptation Model) technology provide students with the opportunity to develop their style of photography. Technology provides students with the opportunity to explore multiple artistic styles. With the LoRA model, students were able to generate personalised style images that met the requirements of specific cues, stimulating their interest in exploring photographic styles. Two students stated,

...by using Stable Diffusion, I was able to experiment with different styles, which gave me a clearer idea of my artistic preferences...(01-S-F)
...It used to be difficult to find my style, but now I can explore different ways of expression through AI technology... (03-S-M)

This kind of exploration not only enriches students' means of creation but also provides them with room for personalised development. Stable Diffusion's diagram-to-diagram function enables students to build on their existing works to make stylistic modifications, helping them to gain a deeper understanding of the composition, light source, tone and other elements of the original drawings. This process encourages students to compare and analyse the differences and connections between different styles, thus gradually grasping the essence of different styles. During classroom observations, students showed a high degree of participation and creativity when attempting style modification. One teacher said,

...students demonstrated greater self-reflection by comparing the different styles of work generated and began to pay attention to the details and aesthetics in their compositions... (05-T-F)

One student said,

...Being able to see other students' creative ideas when discussing different styles made me more inspired... (06-S-M)

This pedagogical practice emphasises the teacher's effective integration of technology and content to support students' individual development and creative thinking. The teacher's use of AIGC technology to guide students in their exploration of personalised styles not only stimulated their creativity but also enhanced their aesthetic literacy. Through this combination of technology and art, students would show their unique personalities and styles in their photographic creations, thus developing their recognition and competitiveness in the art field.

In short, the AI-TPACK framework emphasises the interaction between the teacher's technological applications, teaching content and educational goals. In current photography education, the introduction of AI technology is redefining the role of teachers so that they are not only the transmitters of knowledge but also the guides of students' creative exploration. Teachers applying AIGC technology need to possess a deep understanding of the new technology to more effectively integrate the technology with the course content, thereby enhancing the student learning experience (Koehler & Mishra, 2009). In addition, students are better able to explore individualised styles and innovative thinking as they master AIGC technologies, which not only promotes their critical skills with technology but also enhances their interest in career development. At the same time, the support and encouragement of the instructor were particularly important, providing students with the necessary emotional support and academic guidance. Therefore, the integration of AIGC technology not only provides new possibilities for artistic creation but also promotes in-depth interaction between educators and students, as well as provides an important basis for curriculum reform and optimisation of teaching strategies so that the teaching of photography courses can be better adapted to the needs of modern artistic creation, and to cultivate talented people with innovative ability and artistic expression.

5. Conclusion

This study explored the application of AIGC technology in a senior photography course, focusing on its positive impact on

students' skills in practical photography, creativity and personalised style exploration. Firstly, the introduction of AIGC technology provides new possibilities for teaching photography courses and makes up for the lack of equipment resources in traditional courses. This technology can create a rich virtual practice environment, which greatly enhances students' learning experience and skill acquisition and promotes their free exploration in composition and post-processing. This process confirms the interactive relationship between technology application and teaching content in AI-TPACK theory, demonstrating the important role of technology in curriculum implementation.

Secondly, the role of the teacher in this teaching model changed significantly. Shifting from a knowledge transmitter to a guide for students' creative exploration, teachers must possess a deep understanding of AIGC technology to effectively integrate the technology with the course content and enhance students' learning. According to the AI-TPACK theory, teacher support and encouragement are crucial in students' exploration of individualised styles and creative thinking, which provides students with the necessary social support to further motivate their learning.

Finally, integrating AIGC technology with traditional teaching and learning provides a new direction for the continued development of the photography curriculum. This study provides an important basis for the reform and optimisation of teaching strategies in the senior photography curriculum and lays the foundation for future in-depth discussions on how to integrate AIGC technology into the curriculum system to cultivate excellent photographic talents with creative ability and artistic expression. AIGC technology should play a greater role in the senior photography curriculum to promote the career development of the students and open up the path of broader artistic exploration.

6. Limitations and Future Research Developments

This study explored the application of AIGC technology and its teaching strategies in a photography course, but there are still some limitations. Firstly, the study is mainly based on discussions in individual higher education institutions, and future research should expand the sample size to cover different types of institutions and regions to validate the effectiveness of AIGC technology in a wider context.

Secondly, there may be some subjective bias in the interview and observation process. While feedback from teachers and students provided valuable first-hand information, different individual understandings may affect the interpretation of the data. Future studies may incorporate more systematic quantitative methods to obtain more objective data support.

In addition, current research has focused on the impact of AIGC technology on students' live-action skills and creativity development, with less attention paid to the challenges faced by teachers in the process. Future research should explore how teachers adjust their teaching strategies and roles in the introduction of AIGC technology to fully understand the impact of technological change on educators.

Finally, the study only used Stable Diffusion (SD) as a proxy for AIGC technology and lacked exploration of other related technologies or tools, which limits a comprehensive understanding of the potential for AIGC applications in photography courses. Therefore, future research should consider introducing a variety of AIGC techniques to further validate their effectiveness and applicability in educational practice. As AIGC technology continues to evolve, future research should also explore the relationship between technology and humanistic literacy to develop students' deep understanding and critical thinking about art.

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