

The Impact of Digital Literacy on the Creativity of Art Major University Students

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Abstract: *This paper discusses the influence of digital literacy on the creativity of college students majoring in the fine arts. In the context of the rapid development of information technology, digital literacy has become an important part of artistic creation. An analysis of the impact of access to information and digital technology on the creative process reveals that rich knowledge reserves and access to information can stimulate inspiration and promote artistic creativity. Moreover, the use of digital tools provides creators with broader creative space and flexibility, thus enhancing their creativity. The paper also highlights the shortcomings of digital literacy education in colleges and universities and proposes suggestions for improvement, including updating the curriculum, improving equipment and strengthening teacher training, to better support the enhancement of digital art creation and the creativity of fine arts students.*

Keywords: Digital literacy, Creativity, Fine arts students, Inspiration, Knowledge.

1. Introduction

In the 21st century, the information industry is gradually becoming the key pillar of social development, and the surge of knowledge and information has become a remarkable characteristic of the times. The information technology represented by multimedia computers and network communication penetrates every level of society, profoundly impacting society, and gradually changes people's working mode, living habits, learning methods and thinking mode, promoting the development of society (Sun Xichao, 2002; Xu Zhenyu, 2024). With the development of cutting-edge information technologies such as 5G, artificial intelligence and cloud computing, we have entered the era of big data. In November 2021, the Office of the Central Cyberspace Affairs Commission of China, together with relevant departments, drafted the Program of Action to improve the digital literacy of all people, which clearly proposed that by 2035, the digital literacy of Chinese citizens should reach the same level as that of developed countries (Cyberspace Administration of China, 2021).

In this context, for college students, including those majoring in fine arts, such as future managers, participants and promoters of the country, their digital literacy education is crucial to the long-term development of the country and is the core part of the realization of the national digital talent strategy (Gong Xi, 2022). Advances in digital technology have had a significant impact on the creation of fine art, enabling artists to access rich knowledge resources through the internet and turning these resources into creative inspiration. Moreover, technological innovation provides artists with the opportunity to realize inspiration into concrete works of art, encouraging them to explore more diverse ways of expression, thus promoting creativity.

2. Creativity and Digital Literacy

2.1 Creativity and Inspiration

Creativity is an individual's ability to generate new, original, appropriate ideas and solutions or products, and it includes not

only the thought process but also the ability to generate those ideas. Creativity is very important in the field of art, and creativity is the core of artistic expression and creation. It enables individuals to express their thoughts and emotions through unique perspectives and novel methods. It is an individual's ability to solve artistic problems and produce novel and high aesthetic value or products (Sternberg, 2006; Feist, 1998). Throughout the history of world art, from the Renaissance (14th--16th centuries) to Baroque (17th century), Rococo (18th century), Neoclassicism (late 18th century), Romanticism (late 18th century) to Impressionism (late 19th century), and post-Impressionism (1880s and 1890s), the style and subject matter of artistic creation have changed over time. Continuous evolution and innovation are the processes of giving creators new knowledge and new ideas at different times, thus prompting painters to bring forth the new idea. This process is the creative process of creators. Compared with general creativity, artistic creativity involves individuals observing and sorting out the external world through aesthetic activities, emphasizing the externalization of subjective emotions, and paying more attention to aesthetics and novelty (Shen Wangbing, Liu Chang and Wang Yongjuan, 2010). If there is no creativity in art creation, there will be no evolution of art history. Therefore, for art majors, many colleges and universities take stimulating students' creativity as the teaching goal.

Studies have shown that the production of creativity is complex and involves many factors, including intelligence, knowledge, cognitive thinking, motivation, personality, the family environment, the school environment, the cultural environment, etc. (Sternberg, 1998; Yan Mengshuai, 2015). Knowledge is an important cause of creativity (Sternberg & Lubart, 1992). In painting, inspiration is a vital spark in the creative process that can stimulate the creativity of creators and guide them to explore unknown artistic fields. Inspiration often comes from the inner experience of the creator, the observation of the surrounding world and the pursuit of beauty. It is the soul of artistic creation, able to transform the ordinary into the extraordinary, and materializes invisible ideas into visible works.

2.2 Inspiration and Digital Literacy

However, inspiration does not occur in a vacuum; it is closely related to the creator's knowledge acquisition. Creators constantly absorb new knowledge, skills and cultural backgrounds through learning and accumulation, which can be obtained through the internet or books, as well as in any form of nature (GONÇALVES, 2014). The accumulation of such knowledge provides rich soil for the generation of inspiration (Luo Shijian, Dong Yannan, 2017). The creators reserve more knowledge, the more they can relate to each other and integrate different elements and concepts to produce novel and unique artistic expressions. (Gao Yana, 2024).

In today's digital era driven by big data, access to knowledge and information has undergone a fundamental transformation. The internet has become a key platform for easy access to all kinds of knowledge (Jeffres, 2012). In the early days, people acquired knowledge through human newspapers, books, self-practice, word-of-mouth and other forms. Students could only enter the classroom and be taught by teachers. In the past, if people wanted to appreciate famous paintings, they had to visit museums or exhibitions, which cost a large amount of money and time. Even if they saw authentic paintings, they might be too far away to observe them in detail, which is difficult for college students, who are very tight in economy and time. However, in today's era of big data, it is no longer complicated for people to acquire knowledge. The computer is opened, and the network is entered to obtain the content needed. College students majoring in fine arts, online galleries, digital libraries, design websites and other types of online resources are all good tools and resources for learners to acquire materials and store knowledge (Li Zhongyang, Sun Ning, 2017; Sugiarto & Julia, 2019; Zhang Yiyun, 2022; Park Jeong-hyun, 2022; Hu Jun, 2020). These tools not only accelerate the retrieval of information but also expand the horizons of creators and facilitate the generation of new inspiration. Research has also shown that visual elements are more effective than text in stimulating inspiration and creativity (ZHU, 2020). Digital information collection tools enable creators to ignore the boundaries of time and space and access a wider range of cultural resources and artistic works, thus incorporating more diverse perspectives and innovative elements into their creations (Feng Xiao, 2019; Yu Cui, 2024).

2.3 Digital technology and creativity

Painting, as a time-honored artistic technique, usually relies on physical media such as canvases, paper and walls and adopts techniques such as oil painting, watercolor, drawing and printmaking to achieve artistic creation. This approach requires the artist not only to master high skills but also to have a deep understanding of the materials used to create artworks that reflect personal emotions and the characteristics of the times through the stacking of colors, the use of brush strokes and the matching of tones. However, traditional painting is limited by its material properties, including the cost of materials, the difficulty of preserving works and the inconvenience of carrying them, as well as the irreversible changes in the creation process, all of which restrict artists' freedom of exploration and creation to a certain extent.

Driven by advances in modern digital technology, the field of painting has undergone a transformation. New technologies, such as graphics software such as Photoshop and Illustrator; digital drawing boards such as Wacom and iPad Pro; and 3D modeling software such as Blender and Maya, provide artists with a new way to create art (Cui Shiyue, 2023; Liu Zhijuan, 2012). These tools can not only imitate the techniques of traditional painting but also overcome the limitations of traditional art, allowing creators to create works such as moving images, virtual spaces and interactive art that are difficult to achieve with traditional methods. The advantages of digital technology lie in its convenience, flexibility and unlimited creative potential, allowing artists to experiment and explore freely in the digital environment without worrying about the consumption of physical materials while also easily preserving, sharing and displaying their work (Lixin Jiang, 2024; Xiao Leqi, 2024). In addition, the reproduction and dissemination of digital art works has become more efficient, allowing art works to be quickly accessed and appreciated by more people.

3. Literature Review

3.1 Concept of creativity

Creativity is a multifaceted and interdisciplinary concept that plays a central role in the development and progress of human society. Research on creativity has been very rich, and the definition of creativity has also been subdivided. (1) Personality trait theory. Guilford, the author of this view, believes that creativity is an individual difference and an inherent personality characteristic of a class of people (Guilford, 1950). (2) Process theory. Robert (1985) is a representative of the process theory of creativity. In his view, creativity is the mental process, ideas and solutions that can create the theory of originality. This view holds that creativity lies not in the result but in the process. Individuals can use their previous experience to creatively solve problems, and its essence lies in combining original thoughts or concepts into new forms and looking at problems from a new perspective (Robert, 1985). (3) Results theory. Amabile (1996) is a representative of the result theory of creativity. On the basis of the process theory of creativity, he further defined creativity as the observation and measurement of the production of new things through novel ideas. Scholars who hold this view argue that creativity is the result of creative activities and that creative achievements include innovative and creative ideas created or provided during activities, ideas with strong operability, or ideas that have been realized as product results through positive actions (Amabile et al., 1996). (4) The theory of creativity. Sternberg (1991) is representative of the power theory of creativity. In his view, creativity is the ability to produce novel and valuable ideas, solutions or products (Sternberg & Lubart, 1996; Runco & Jaeger, 2012).

This paper studies the influence of digital literacy on the creativity of college students majoring in the fine arts. Creativity here is influenced by external factors such as individual knowledge intake and interpersonal communication. Therefore, in this study, creativity is defined as the ability to generate new ideas in the process of communication and to apply new ideas in some way.

3.2 Domain-general and Domain-specific Creativity

Some scholars believe that creativity is domain-general and domain-specific (Kaufman & Sternberg, 2010). The domain generality view holds that creativity is a universal ability that can be applied to multiple fields or tasks. This view emphasizes the existence of a fundamental, cross-domain creative thought process that is not constrained by domain-specific knowledge (Plucker, 1998). For example, a person's ability to think creatively in the field of painting may be similar to their ability to think creatively in the fields of science or mathematics. The domain-specific view holds that creativity is domain-specific and closely related to domain-specific knowledge and skills. This view holds that creative thinking and performance are influenced by an individual's expertise and experience in a particular field (Baer, 1998; Weisberg, 2006). For example, Monet excelled in his field of painting, but would he have been successful if he had worked in mathematics? Ask Einstein to paint, and what kind of work can he create? Artistic creativity is a type of domain-specific creativity that refers to the ability of individuals to solve artistic problems and produce novel and high aesthetic value concepts or products (Feist, 1999; Sternberg & Lubart, 1996).

3.3 Factors influencing creativity

On the basis of his triad theory of intelligence, Sternberg proposed the three-sided theory of creativity, which is a trinity of intelligence, cognitive style, personality or motivation, in the late 1980s. On the basis of Sternberg's long-term research on creativity, he believes that the creation of creative behavior requires the integration of six different but interrelated resources: intelligence, knowledge, thinking style, motivation, personality, and environment.

3.2 Digital literacy concepts

The concept of digital literacy is constantly evolving over time. In 1994, colorist Yeset-Alkalai first proposed the conceptual framework of the connotation of digital literacy, which includes five kinds of literacy: photovisual literacy; (b) reproduction literacy; (c) information literacy; (d) branching literacy; and (e) socioemotional literacy (Yeset-Alkalai, 1994). It was later formally defined by Paul Gilster in his 1997 book *Digital Literacy*, which he defined as the comprehensive ability to acquire, understand and use digital technologies (Gilster, 1997). Approximately 2008, with the publication of the EU Digital Competence Framework (EU DigComp), the definition of digital literacy began to expand to include multiple dimensions, such as information, communication, content creation, security awareness, and problem solving. In 2011, the European Commission's Joint Research Centre (EU JRC) defined digital literacy as "the ability to use information technologies confidently, critically and innovatively for work, employment, learning, leisure and social participation" and developed a framework for doing so. In 2015, UNESCO included digital literacy in the 2030 Sustainable Development Goal on Education (SDG4) monitoring indicator system, emphasizing the ability to access, manage, understand, integrate, communicate, evaluate and create information securely and appropriately through digital technologies. In November 2021, the Cyberspace Administration of the CPC

Central Committee, together with relevant departments, studied and drafted the Program of Action to Improve Digital Literacy for All. Digital literacy and skills are defined as the collection of a series of qualities and abilities that citizens of digital society should possess in their learning, work and life, such as digital acquisition, production, use, evaluation, interaction, sharing, innovation, security and ethics (Cyberspace Administration of China, 2021).

Notably, digital literacy has experienced different development processes in the early stage, and many similar concepts have been developed, such as media literacy in the electrical age, information literacy in the information age, network literacy in the internet era, and digital literacy in the era of artificial intelligence (Yan Yifeng, 2024). At present, there is no clear definition or concept of digital literacy for painting majors, but through the definition of digital literacy by the Cyberspace Administration of China, digital literacy is the content and standard used to guide people's literacy training in different periods to meet the development needs of the times; digital literacy is able to address the products of the times rationally and understand their inner meaning; and the concept of using these new products to provide services for oneself on the basis of good and bad discrimination (Bao Yajun and Liu Yonggui, 2020).

In this study, the digital literacy of painting majors is defined as a series of abilities that college students majoring in painting should possess in their study and life, such as the acquisition and evaluation of art-related digital information and images, the use and production of art-related digital technologies, the communication and sharing of artistic works, the ethics and copyright protection of artistic works, and the digital preservation of artistic works.

A search of the literature reveals that digital literacy has an impact on creativity. Studies have shown that self-directed learning and creativity can promote the development of digital literacy, while digital literacy can also promote creativity (Černočová&Selcuk,2019). People interact with each other through social media, share knowledge through the network, and gain recognition and information in communication, thus improving creativity (Hu Jun, 2020). Some researchers believe that big data technology provides employees with more knowledge, information and resources for work, which promotes employees' creativity (Kong Lulu, 2023). Other researchers have reported that college students' information literacy is positively correlated with their creativity and that critical thinking plays a mediating role in this process. Information literacy has a positive impact on critical thinking, and only through this impact can information literacy affect creativity (Hu Xingmei, Wang Junhua, 2022). Researchers have analyzed the influence of current digital painting technology, including digital painting and traditional painting, on painting creation. He suggested that digital technology enhances the innovation of painting creation and that digital painting brings different visual feelings to viewers and changes painting education with different creation methods and presentation methods. (Zhang Yiyun, 2022). Some researchers believe that digital painting, as an innovative medium, can be introduced into art teaching to provide free space for students to try and explore by incorporating innovative elements to better stimulate their creative potential

(Wang Bo, 2024).

4. Current Situation of Digital Literacy Education for Art Majors

At present, many universities have not fully integrated digital technology-related courses into the education of students majoring in painting. Although schools have carried out some research on digital technology empowerment, set up computer LABS for students, and teachers have received some degree of digital literacy training, there are still some obvious shortcomings in the actual teaching process. First, colleges lack digital technology courses specifically for students majoring in painting, which limits the development of students' skills in digital painting, image processing and digital media creation. Second, while the school provides computer LABS, the equipment often does not keep up with rapidly evolving digital technology, leaving students without access to the latest tools and software. In addition, teachers' training in digital literacy may not be comprehensive enough, which affects their ability to integrate digital technologies effectively into teaching and mentoring students.

The state has also realized the importance of digital literacy in the field of art; thus, in January 2014, the Ministry of Education of China issued several opinions on promoting the development of art education in schools, which clearly noted that education administrative departments at all levels and schools should establish an open and flexible art education resource sharing platform and take the national implementation of the "Broadband China" strategy as an opportunity. The construction of art education network resources should be strengthened, art teachers should be encouraged to use many types of media distance teaching equipment, the information level of art education should be improved, and high-quality art education resources should be delivered to schools and classrooms in remote rural areas (Ministry of Education of China, 2014).

5. Conclusion

Through research and analysis of the digital literacy of fine arts major college students in terms of creativity, this paper summarizes several ways to promote the digital literacy of fine arts major college students. 1) Universities should update and expand their curriculum to include digital technology courses such as digital painting, digital media art, 3D modeling and animation. By combining theory and practice, students are encouraged to use digital tools to create art. 2) Schools should invest in updating computer LABS and related equipment to ensure that students have access to the latest digital technology. Provides high-speed internet and enough storage space to support digital art creation. A library of digital resources, including online galleries and digital libraries, should be built and improved, and websites for use by students and faculty should be designed. 3) Teachers should be provided with training in digital technologies and teaching methods to improve their digital literacy and teaching ability. Teachers are encouraged to participate in digital art practice and research to enrich their teaching content. 4) Promote cross-disciplinary cooperation between arts and computer science, information technology and other disciplines and carry out interdisciplinary projects. Industry

should work to provide students with internships and practical opportunities. 5) Innovation funds or competitions should be set up to encourage students to perform digital art creation and research. Governments and educational institutions should develop policies to support the development of digital literacy education. Financial support is provided for curriculum development, teacher training and equipment upgrades.

6. Deficiencies and prospects

This paper focuses mainly on the theoretical level and lacks in-depth empirical research to support the views, nor can it fully capture the complexity of digital literacy and creativity. Other researchers can subsequently effectively prove the relationship between the two by means of empirical research and data analysis. Future studies could expand the scope of the study to include fine arts students from more regions and different educational backgrounds. Given the rapid development of digital technology, this paper fails to fully consider the latest technological trends. New research can be improved from the application of virtual reality and artificial intelligence in artistic creation. Future research could conduct more empirical studies to validate the relationship between digital literacy and creativity, and research could strengthen interdisciplinary integration to explore the intersections of arts and technology, psychology, education, and more. In addition, different teaching methods and tools should be explored to improve the digital literacy of fine arts students to improve their creativity.

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