Redefining Reality: Art Education and Student Sensibilities at the Digital Inflection Point

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Abstract

The concept of 'reality' within art and design is inherently dynamic, subject to the influences of varying cultures and times, along with philosophical and technological developments. Recent advancements in virtual reality (VR) and artificial intelligence (AI)-generated art have propelled us into new, uncharted creative territory, challenging existing theoretical frameworks within the art world and presenting many unaddressed questions and uncertainties. Art education is at a pivotal moment, grappling with the integration of such technologies, the training needs of faculty, shifting modes of exhibiting work, and ethical considerations such as 'ownership', 'authenticity', and 'originality.' Parallel to these issues is the shifting perception of the very nature of 'reality' among digital-native art students, who increasingly embrace digital experiences, a transformation further accelerated by the rapid increase in digitalisation due to the COVID-19 pandemic. This ongoing collaborative research aims to map out the changing sensitivities to 'reality' among art university students, addressing the widening gap between what institutions offer and what students need, and presenting possible frameworks for future developments in art education. Through analysis of survey data on the evolving concept of 'reality' and its connection to digital experiences, it explores the integration of technological innovations and the future of artistic careers in an increasingly digital age, offering insights into developing curricula that align with evolving artistic and educational landscapes.

Keywords: Art, Education, Reality, Digital, Technology, IT, STEAM

Introduction

Currently, over 90% of students at our college, a private art university in Japan, belong to Generation Z (Gen Z), a demographic characterized by their extensive use of the internet and social media. In art universities, the digital influence on traditional art production techniques is becoming increasingly prominent (Asare et al., 2023). Historically, art was considered an 'imitation of reality.' However, since the Renaissance, this notion has evolved, with artists being recognised as intellectual creators engaged in the elevated task of producing reality itself (Grau, 2007). The distinction between reality and fiction is intricately connected not only to the artist's skill but also to the technological advances of the time. The development of these technologies has significantly reshaped people's sensibilities, with perceptions of reality and fiction evolving alongside technological advancements.

Gen Z perceives the digital world as one of multiple realities. They skillfully navigate both physical and digital realms as the context requires, without assigning absolute hierarchies to either (Tolstikova et al., 2020). This perspective provides a backdrop to our current paper, which builds on previous research into the changing sensitivities to 'reality' among art university students (Hall & Iwasaki, 2024). The concept of 'reality' within art and design is inherently dynamic, influenced by varying cultures, times, philosophical shifts, and technological developments. Recent advancements in virtual reality (VR) and artificial intelligence (AI)-generated art have introduced new, uncharted creative territories, challenging existing theoretical frameworks and presenting numerous unaddressed questions and uncertainties.

Art education is at a critical juncture, contending with the integration of these technologies, the evolving training needs of faculty, shifting modes of exhibiting work, and ethical considerations such as ownership, authenticity, and originality. Concurrently, there is a shifting perception of 'reality' among digital-native art students, who increasingly embrace digital experiences; a transformation accelerated by the COVID-19 pandemic.

This study aims to address the widening gap between institutional offerings and student needs in terms of creative digital technology and propose frameworks for future developments in art education. Through an analysis of survey data on the evolving concept of 'reality' and its interplay with digital experiences, along with students' prior exposure to, interaction with, and attitudes towards digital media, this paper explores the integration of technological innovations and the future of artistic careers in an increasingly digital age. It aims to provide insights into developing curricula that align with these evolving artistic and educational landscapes.

Background

From STEM to STEAM

Within education, the term 'STEM' (Science, Technology, Engineering, and Mathematics) was coined in the early 2000s and has been the focus of many educational systems around the world (Tytler, 2020). One of the key advantages of a STEM oriented education system is its ability to foster critical thinking and problem-solving abilities in students, which are crucial for success in a wide range of professional fields. It promotes creative and independent thought, enabling students to understand and utilise complex concepts and ideas effectively.

In recent years, however, the term STEAM has emerged, incorporating an 'A' for the Arts into the traditional STEM framework. This addition recognises that STEM subjects alone overlook several crucial elements that employers, educators, and students consider essential for success in an increasingly complex and interconnected world which requires a diverse skill-set. The key to this approach is integrating subjects rather than learning them in isolation. As a result, education moves from teaching isolated disciplines through simple reductionism. Instead, by combining STEM with the Arts, forming the STEAM model, both creativity and rational thinking can be cultivated. This model emphasises the development of sustainable futures, rather than relying on short-term financial projections that can result in socio-economic instability (Boy, 2013). The approach is especially relevant to art universities, as creative technologies continue to develop and the range of potential career paths for art university graduates increasingly overlap with engineering and scientific fields. Thus, STEAM subjects become more relevant for careers involving creative technology, programming, internet use, robotics, and data analysis.

In recent years, the Japanese government has also recognised the benefit of an integrated STEAM approach not only within universities but also in high schools and junior high schools. Two notable government initiatives are the 'Kyoto STEAM - International Arts and Science Festival'[1] which features future-oriented and innovative projects at the intersection of art, science, and technology, and the 'Moonshot Research and Development Program' from the Japan Science and Technology Agency[2], which consists of ambitious interdisciplinary research and development projects aiming to solve some of society's more difficult issues by 2050. These kinds of endeavors, which integrate both creativity and technology, are precisely the type of project we hope our students will pursue. However, it is important to critically evaluate whether we are doing enough to support them in this challenge. We propose that there is a compelling need to reconceptualise and restructure art education in Japan to better meet the needs of our students today.

Methods

A comprehensive survey (n 225) was conducted among our students, the objectives of which were (1) to explore the possible disconnect between traditional art education methods and the digital competencies required today and (2) to help inform new educational frameworks that integrate digital tools, catering to the evolving needs of students and the creative industries they will enter. The survey focused on students from Kyoto Saga University of Arts and Kyoto Saga Art College and was divided into three main sections. The first section assessed the use of information technology (IT) in various areas of students' daily lives, including entertainment, study, and creative purposes. The second section aimed to gauge students' prior exposure to IT subjects before entering university. The final section sought to map out students' attitudes towards IT subjects by inquiring about their interest in, perceived benefits of, and demand for more IT education within their current university curriculum. For the purposes of this survey, IT subjects were defined by giving examples which included computer programming and coding, internet use and web development, robotics, and data analysis.

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[1] Kyoto steam-international arts × science festival. (n.d.). https://kyoto-steam.com/en/
[2] *Moonshot Research and Development Program*. Cabinet Office Home Page. (n.d.). https://www8.cao.go.jp/cstp/english/moonshot/top.html

Demographics of Survey Participants

Most participants were aged between 18 and 20 (85%), with smaller percentages between ages 21 and 23 (14%), and over 30 (1%). In terms of departmental distribution, 157 participants (approximately 70%) were from the Design department, while 68 participants (roughly 30%) were from the Fine Art department. While this higher representation from younger students and a significant majority from the Design department may have had an influence on the pattern of results, the demographic distribution is typical of small art universities in Japan today.
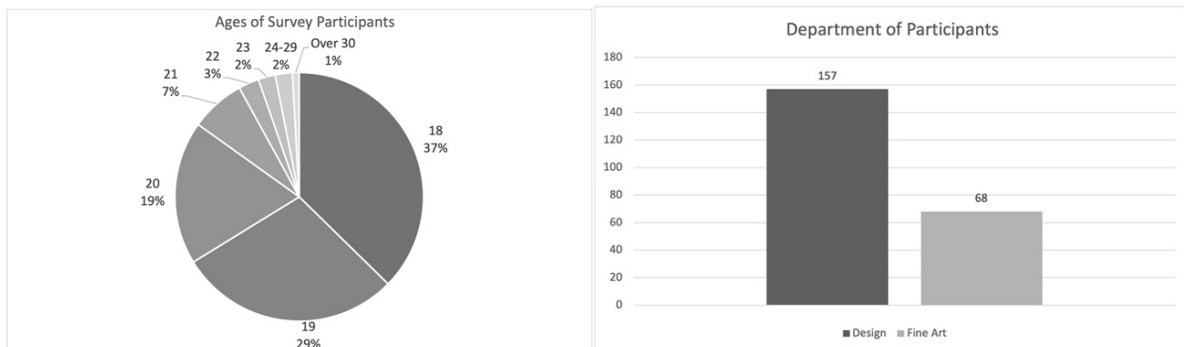
Figures 1 & 2: Ages and departments of participants.

Results

Usage of Digital Tools

To obtain a general understanding of students' interactions with tools associated with IT topics, participants were asked about the frequency of use in various aspects of their daily lives: for entertainment, for studying, and for art production purposes. The 'entertainment' category included examples such as smartphones, tablets, streaming services, and gaming devices. In the 'studying' category, online tutorials, classes, and learning applications were suggested. The 'art production' category gave examples such as digital art and design software, as well as VR and AR technologies.
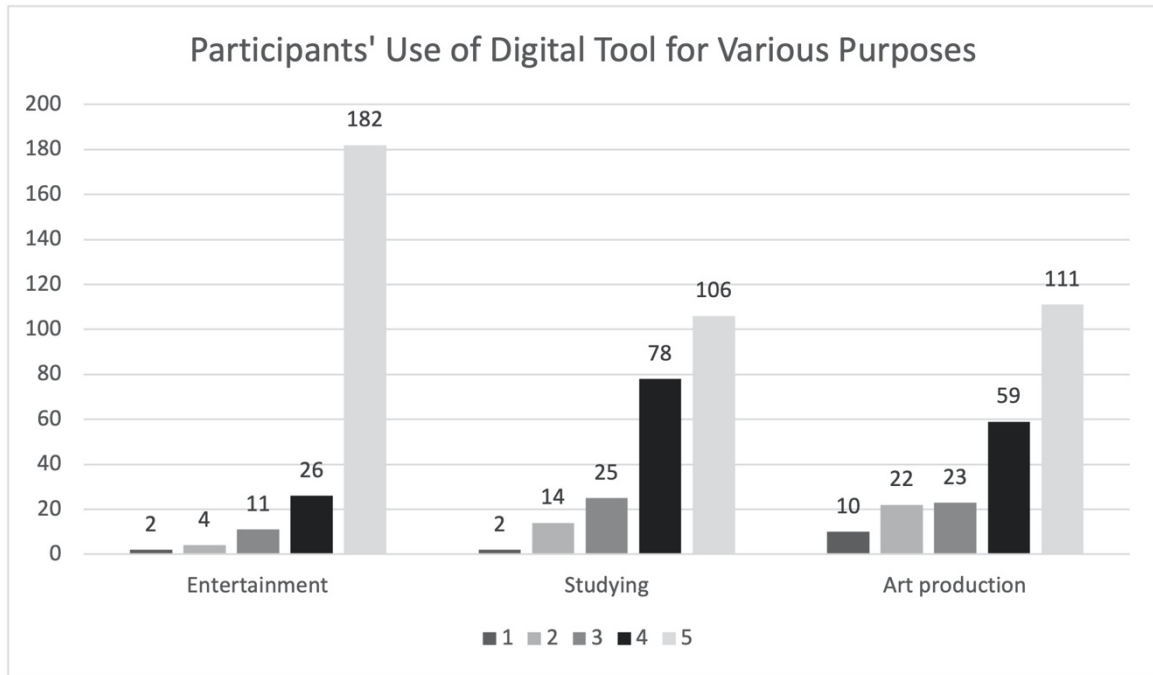
Figure 3: Participants ranked their usage on a scale from '1: never' to '5: extensively used' of digital tools for 'entertainment', 'studying', and 'art production.'

As anticipated, the results (Fig. 3) clearly show that digital tools are an integral part of students' lives, utilised widely for entertainment, educational, and creative purposes. The most common response across all categories was 'extensively used,' with minimal indications of moderate or less than moderate use. These findings align with the expectation that students today are deeply immersed in digital technology.

A follow-up question inquired about commonly used digital tools. Results reveal that digital photography and video tools, including those on smartphones, are the most frequently used, with 156 mentions, representing 69.3% of respondents. Digital art and design tools (such as Adobe Creative Suite and 3D modeling software) are the second most popular, with 153 mentions, accounting for 68% of respondents. Electronic music tools are also widely used, with 62 mentions (27.6% of respondents). Additionally, data processing software like Microsoft Excel is used by 27 respondents, making up 12% of the total. Other tools, including interactive media, AR/VR tools, and AI or machine learning tools, are used less frequently. The strong preference among this art university's students for digital art, photography, and music creation tools, coupled with notable but lesser usage of data processing software, suggests that they are primarily using new digital technologies for specific creative purposes rather than for business, or organisational tasks. In other words, their engagement with digital tools is closely aligned with the focus and requirements of their academic studies.

Perception of Digital Forms and Media

Perceived Value and Authenticity

Participants were then asked to evaluate their attitudes towards digital media in terms of its value and authenticity when compared to traditional or analogue media across three areas of their lives. For instance, in the 'entertainment' category, this involved valuing tablets or streaming services in comparison to books and magazines; in 'studying,' it entailed valuing

online tutorials in comparison to classroom environments; and in 'art production,' it included valuing digital art and design software in comparison to physical forms such as drawing or painting. The findings reveal that students hold an overwhelmingly positive attitude towards the value and authenticity of digital media in all categories, indicating a strong openness to the integration of more digital elements into these areas.
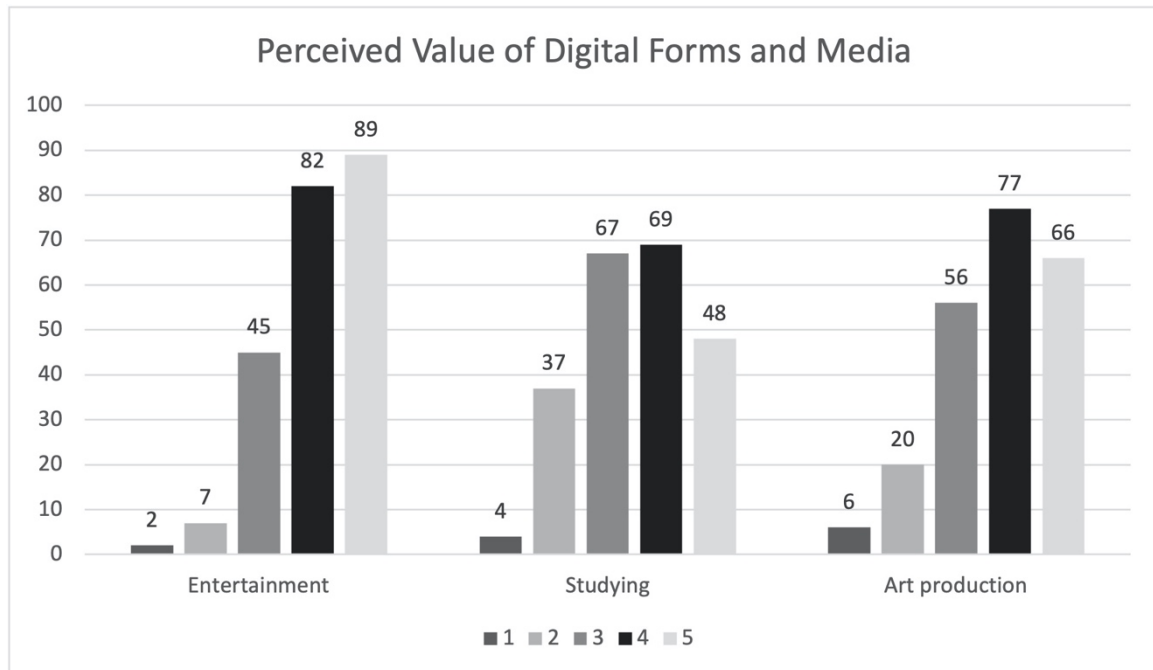

Figure 4: Participants were asked to rank their perceived value from '1: very low' to '5: very high' of digital forms and media for the purposes of 'entertainment', 'studying', and 'art production.'

Perceived Sense of 'Reality'

In our previous survey[3] (Hall & Iwasaki, 2024), 'reality' was defined as the feeling of being alive, absorbed, or immersed, whether in the physical or digital world. This concept acknowledges that the spread of digital tools has blurred the lines between traditional daily life and virtual experiences. In this context, 'reality' encompasses the sense of engagement and presence we feel, regardless of whether we are interacting face-to-face, participating online, or engaging in digital entertainment. Conversely, experiences from which we do not feel a sense of reality refer to those we recognise as fictional or are viewed with feelings of detachment.

To gauge students' perceived sense of reality of digital forms, participants were asked to make comparisons with their closest physical counterpart. For instance, within 'entertainment,' they were asked if they feel that digital entertainment is as 'real' as physical entertainment; within 'studying,' they were asked if they think education using digital tools can be as 'real' and effective as traditional education such as face-to-face classroom instruction and textbooks; and within 'art production,' they were asked if they think digital art creations have the same level of 'reality' as physical art creations. While this method does not provide a precise scientific measurement, it offers insights into the general sentiment and perceptions students have towards the reality of IT related media and topics.
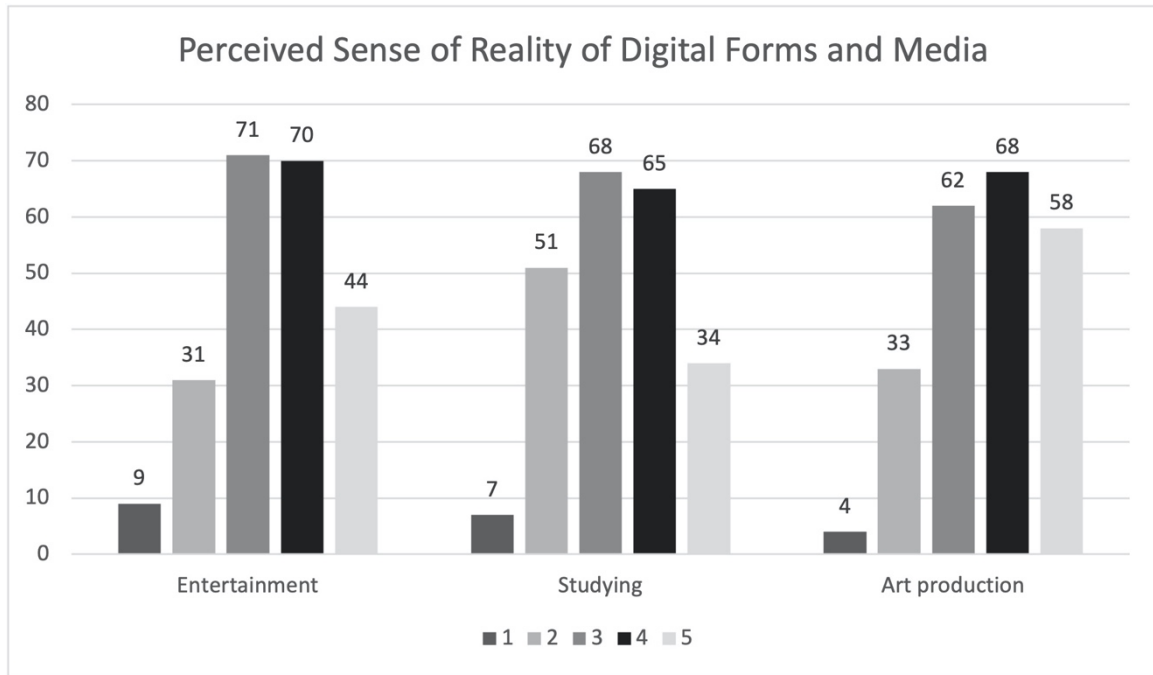
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[3] See appendix

Figure 5: Participants were asked to rank their sense of reality from '1: very low' to '5: very high' of digital forms and media for the purposes of 'entertainment', 'studying', and 'art production'.

The results show that students generally have a positive attitude towards the sense of reality associated with digital forms and media across all categories. Few participants ranked their sense of reality as 'very low' in any category, with the majority indicating a 'high' or 'very high' sense of reality. Notably, within the 'art production' category, participants rated digital forms and media very favorably in comparison to their physical equivalents in terms of perceived sense of reality. These findings highlight the evolving nature of reality among digital natives and underscore the importance of understanding how digital experiences are integrated into art university students' lives and are perceived as authentic and valuable.

Prior Exposure to, Interest in, Perceived Benefits of, and Demand for IT Subjects

Next, students were surveyed about their prior exposure to IT subjects in high school, junior high school, or in any extracurricular activities or clubs before entering university. The results indicate that a relatively small proportion of art university students had significant pre-university exposure to IT education. Many students reported limited or no opportunities to engage with such subjects, highlighting a gap in the early integration of IT education, which contradicts the previously mentioned STEAM aspirations of recent government initiatives.

To gain a deeper understanding of students' attitudes towards IT subjects, they were asked to rank their interest in these subjects, assess the perceived benefits in terms of enhancing their skills and potential as art students or in their future careers, and express their desire for more IT-related content in their current art university curriculum. Despite the limited pre-university exposure, a substantial number of students expressed strong interest in IT education. There is a high level of perceived benefits associated with these subjects and a significant demand for more IT-related content in their art university education. Thus, while pre-university exposure to IT education is limited among art students, there is a clear and strong interest in, belief in, the benefits of, and demand for more IT-related content in their education. This indicates a

crucial need to integrate IT into art education to better align with the interests and aspirations of students today.
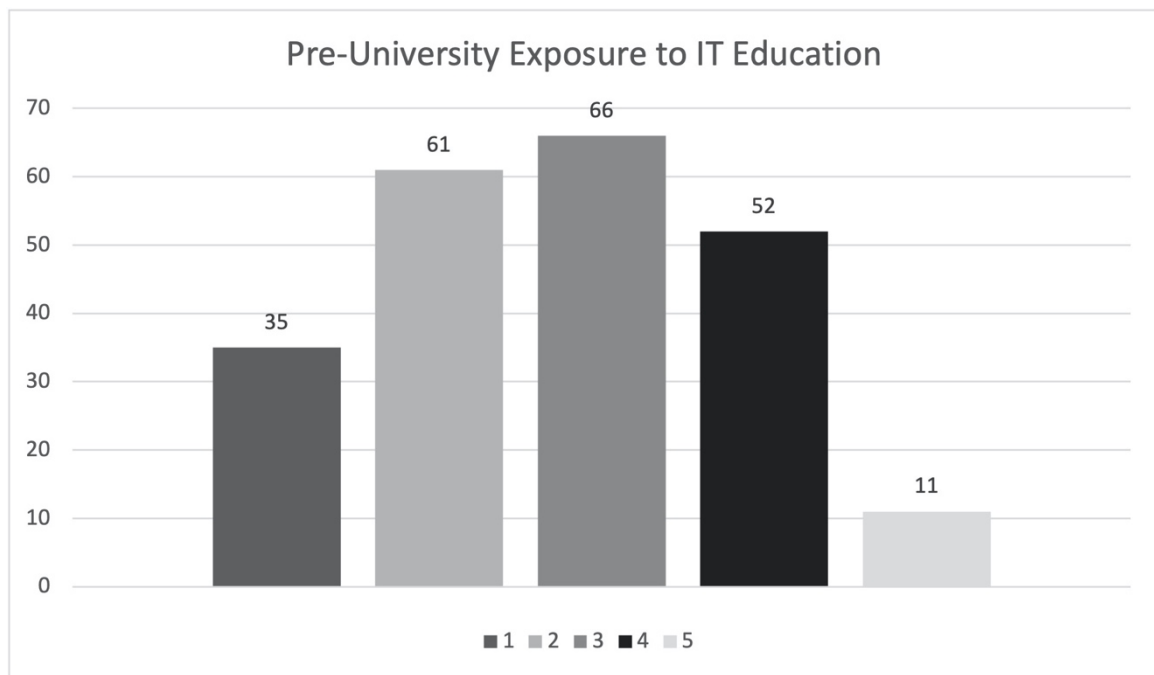

Figure 6: Participants were asked to rank their pre-university exposure to IT education (such as computer programming, code creation, internet usage, robotics, data analysis, etc.) from '1: very low' to '5: very high.'
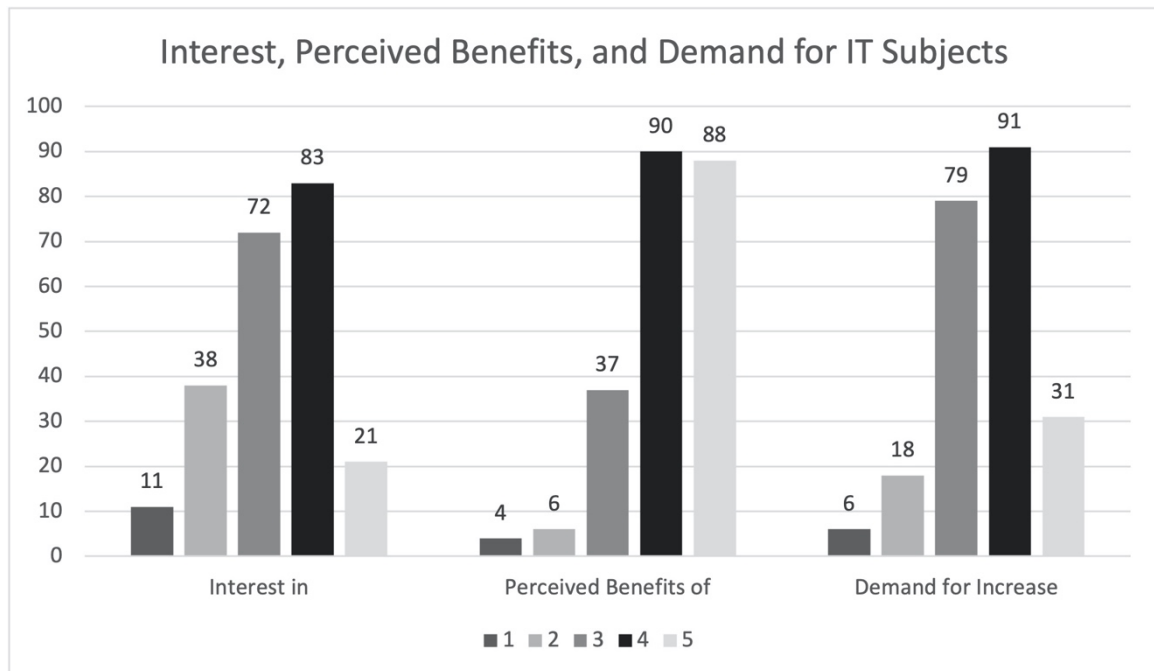

Figure 7: Participants were asked to rank their interest in, perceived benefits of, and demand for more IT education in the current art university curriculum from '1: very low' to '5: very high.'

Impact of Pre-university IT Education

Cross-analysis of the data reveals insights into the impact of prior exposure to IT education on art students' interest in IT subjects, their belief in the benefits of IT education, and their demand for more IT-related content in their current curriculum. The analysis grouped students based on their prior exposure to IT education, with lower exposure represented by the columns on the left of the charts and higher exposure on the right (Figs. 8, 9, & 10). These groups were then compared with participants' attitudes towards and perceptions of IT education.

Correlation With Interest in IT

Students with the highest pre-university exposure to IT subjects overwhelmingly show a strong interest in IT education, with the majority rating their interest as 'high' or 'very high' (Fig. 8). Those with moderate exposure also exhibit significant interest, though their responses are more varied, indicating more diverse levels of enthusiasm. Interestingly, even students with minimal or no prior exposure display a notable interest in IT education, with more than 80% of the lowest exposure group expressing moderate or higher levels of interest. This suggests that while prior exposure positively correlates with interest, there is a broad recognition among students of the value and importance of IT education, regardless of their background. This widespread interest highlights the potential for expanding IT education within the curriculum to meet students' apparent interest.
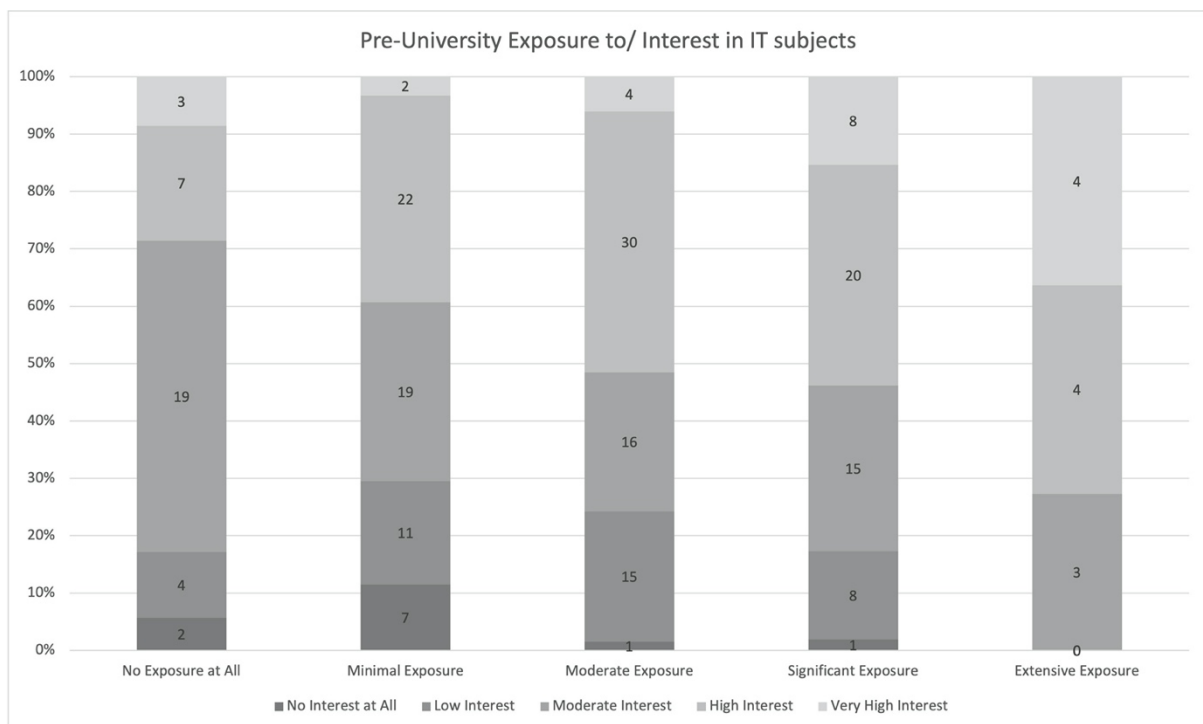

Figure 8: Impact of pre-university IT education exposure on art students' interest in IT subjects.

Correlation With Perceived Benefits of IT

There is a clear positive correlation between pre-university exposure to IT subjects and the perceived benefits of IT education among students (Fig. 9). As the level of exposure increases,

students' recognition of the benefits shifts markedly towards 'high' and 'very high'. Notably, students with significant or extensive exposure overwhelmingly rate the benefits as 'high' or 'very high', while those with minimal or no exposure display more varied perceptions, albeit with a substantial number still recognising moderate or higher benefits. Though the responses are more diversified at the lower exposure levels, there is a consensus on the importance of IT education among the art students surveyed and a clear link between exposure to, and perceived benefits of, IT education.
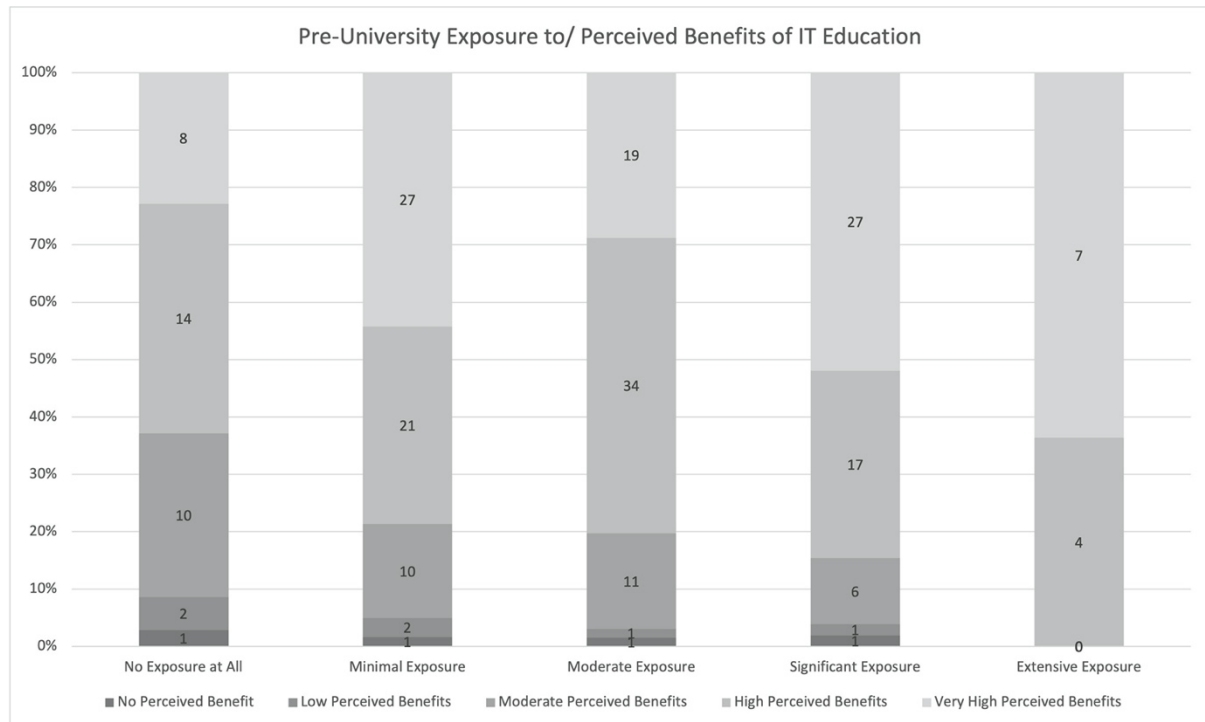

Figure 9: Impact of pre-university IT education exposure on art students' perceived benefits of IT education.

Correlation With Demand for IT Related Subjects

Fig. 10 also reveals a significant relationship between students' pre-university exposure to IT subjects and the demand for more IT related content in their university curriculum. Students with extensive prior exposure to IT overwhelmingly show 'moderate', 'high' or 'very high' demand for IT education, indicating a strong desire for its inclusion. Those with moderate exposure similarly express substantial demand, though with a more varied distribution. Even students with minimal or no prior exposure to IT subjects demonstrate a considerable demand, with a notable portion expressing 'moderate' to 'high' and 'very high' demand. This widespread demand highlights the importance of integrating IT education at earlier educational stages, in order to not only foster appreciation but also generate a robust desire for further IT learning opportunities. These findings suggest that enhancing pre-university IT exposure could play a crucial role in meeting student demand and better preparing them for future technological advancements in creative fields.
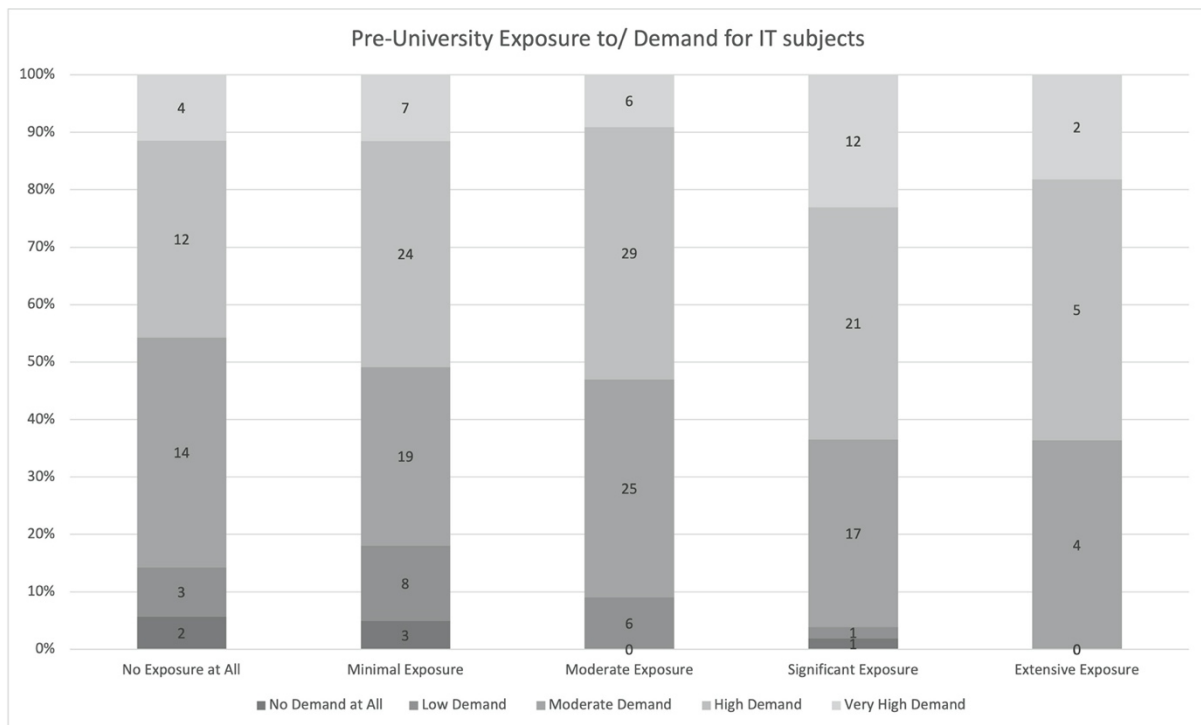
Figure 10: Impact of pre-university IT education exposure on art students' demand for IT subjects.

The results of the cross-analysis overwhelmingly show that prior exposure to IT education positively influences art students' interest in IT topics, their perception of the benefits of IT education, and their demand for more IT-related content in their current studies. Students with higher exposure to IT education are more likely to appreciate its value and express a stronger desire for its integration into their curriculum. These findings suggest that incorporating more IT education at various educational levels could yield positive outcomes for art students, fostering greater appreciation and engagement with the curriculum.

Discussion

Our survey reveals some interesting insights into how art students interact with digital technology and media. They are already using digital tools extensively in their daily lives, for entertainment, studying, and creating art, and they are open to integrating them more into their education. Even though many students lack significant exposure to IT education before university, there is apparently significant interest in incorporating more of it into the current curriculum. Art university students believe that IT skills can significantly boost their abilities and potential as artists and designers. Furthermore, a higher exposure to IT subjects at a young age seems to promote sustained interest throughout university and possibly beyond.

The findings suggest several considerations for the future of art education. Firstly, curriculum development requires immediate attention. A significant gap exists in IT education prior to university. While government initiatives may help to bridge this gap by offering new or supplementary opportunities to learn IT subjects in school, art universities must also enhance their offerings by incorporating more IT-related courses, such as programming, digital design, data analysis, and emerging technologies. These skills can complement traditional art training and foster creative thinking. Adopting a STEAM approach will better prepare students for a future where these skills are increasingly interconnected and important.

Enhanced learning experiences are another important aspect. According to the survey results, not only are the benefits of IT education clearly recognised by students, but interest in such subjects is overwhelmingly positive. Accordingly, incorporating such subjects, and interacting with digital tools and technologies, can make learning more interesting and ultimately effective. Online resources and digital art software can supplement classroom learning, making it more interactive and engaging. The non-physical aspect of digital media, which requires minimal materials and studio space, makes it very suitable for online teaching and collaborative activities, despite physical, geographical, or financial restrictions.

Career preparation is another factor to consider. As the creative and technology worlds merge, having IT skills will open up new career paths for art students. The practical experience of experimenting with emerging technologies imparts transferable skills and knowledge that can be readily adapted to future developments. Moreover, this hands-on engagement equips students with the essential creative, technical, and critical abilities necessary for starting a career in the continuously changing area of digital art and design. Preparing students for jobs that require both creativity and technical skills is an urgent responsibility of art universities today. Through encouraging student to take part in interdisciplinary projects or collaborations with the creative industry, they can gain hands-on experience, and appreciate the real-world applications of their skills.

However, it is also worth noting that the integration of new technology into art education comes with a range of challenges connected to technological issues, resource limitations, and concerns related to accessibility and inclusivity. Both educators and students may struggle with unfamiliarity when using new tools, underscoring the importance of initial training and gradual incorporation into the educational system. This can be a huge burden on already limited resources. An unfamiliarity with the media can also be intimidating for students and faculty alike. For this reason, the kind of technology and IT content to introduce should be selected and integrated with careful consideration.

Conclusion

Our preliminary survey highlights the important role of IT education in art schools today. Despite many students lacking significant IT exposure before entering university, they are eager to learn it now and recognise its value. Integrating more IT content into the curriculum is essential to meet their needs and prepare them for the continually evolving digital workplace.

As more STEAM-oriented government initiatives are announced, art universities need to align their education to meet such exciting and forward-thinking projects. Ensuring students are not just creative but also technologically skilled is a pressing duty of art universities today.

For these reasons, conducting comprehensive research into the state of digital art education in Japan is vital. While the aim of the research is to improve standards within Japanese art universities, it should also encompass pre-university education in high schools and junior high schools due to their interconnected nature. Furthermore, to develop a comprehensive model of digital education at Japanese art universities, there is a need for comparative investigation into art education at international institutions.

Appendix

Results of Previous Surveys of Students

Survey data on students' attitudes towards reality within art and other related media reveals several key changes influenced by digitalisation. Firstly, digital tools have expanded the scope of artistic expression, enabling artists to explore new forms that blend physical and digital worlds. Secondly, the perception of the digital realm has shifted; once viewed as a secondary or false reality, it is now embraced as an integral part of everyday life and artistic practice, often holding equal or greater significance than physical reality.

The survey results indicate that, for art students, films are perceived as the most immersive and realistic form of media. Conversely, opinions on games, comics, animation, and digital idols are divided, likely influenced by individual usage frequency. Non-digital experiences, such as viewing artworks in museums, are generally perceived as more realistic by a significant proportion of respondents. Notably, the experience of artworks in museums is overwhelmingly seen as more realistic compared to viewing artworks in digital spaces such as Instagram.
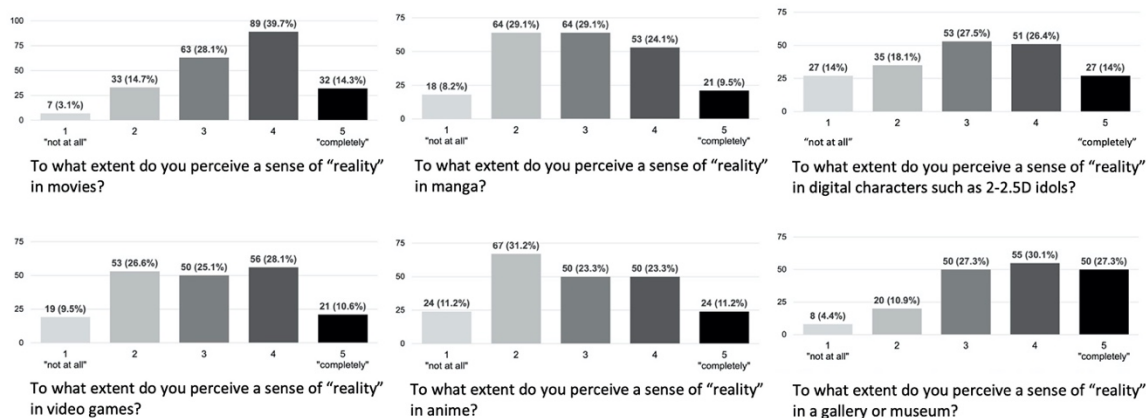

Figure 11: Previous survey data regarding student attitudes towards reality within art and related media.

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