

Digitizing Art History: New Pedagogical Possibilities Through Virtual Galleries

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DOI: <https://doi.org/10.47772/IJRISS.2026.1026EDU0582>

Received: 27 August 2026; Accepted: 01 September 2026; Published: 22 September 2026

ABSTRACT

The quick advancement of digital technologies has opened up new avenues for art history research, instruction, and appreciation. Virtual galleries are one of these innovations that give users the chance to interact with digital exhibition spaces, view artwork, and discover cultural materials outside the time and space constraints. With a focus on accessibility, usage patterns, user happiness, engagement, and perceived learning efficacy, this study investigates the instructional use of virtual galleries in art history. Respondents with exposure to, or expertise with, virtual gallery platforms were given an online questionnaire as part of a quantitative survey design. The descriptive analysis had 70 replies in total. The results show that opinions of virtual galleries are usually favourable, especially when it comes to accessibility, user happiness, learning utility, motivation, and their potential contribution to art education. The results, however, also show that virtual galleries are still not regularly included into teaching methods, with some respondents seldom using them. The significance of digital skills, technology infrastructure, and cooperation between educational and cultural organisations was also noted by respondents. According to the results, virtual galleries might be a useful supplemental tool for teaching art history, rather than a whole substitute for in-person instruction. The results should be viewed as representative of participants' perspectives rather than as broadly applicable proof of educational efficacy due to the sample size and the preponderance of student responders. By addressing opportunities and implementation issues related to the use of virtual galleries, the study adds to the academic discourses on digital innovation in Malaysian art education.

Keywords: Art Education, Art History, Digital Technology, User Experience, Virtual Gallery

INTRODUCTION

For many years, the study, preservation, and dissemination of information regarding artistic traditions and cultural legacy have been accomplished by the field of art history through the use of tangible archives, museum collections, and live exhibitions. The development of digital technologies has greatly broadened the scope of art historical study, even though these traditional methods are still very useful. The way that academics, students, and the general public interact with art has changed in the last few decades due to digitisation initiatives, internet databases, and multimedia archives (Jos & Mat Salleh, 2023). The creation of virtual galleries is one of the most revolutionary means of fusing art and technology (Rosli & Kamaruddin, 2021).

Virtual galleries are interactive, they are the digital exhibition platforms that allow artworks to be viewed, studied, and experienced in immersive formats beyond geographical and temporal limitations. They act as

virtual galleries' equivalents, giving users access to treasures that are rare, delicate, or located far away (López Rodríguez, 2024). In addition to improving accessibility, virtual galleries offer art historians additional methodological opportunities like collaborative partnerships, multimedia resource integration, and comparative research using high-resolution imaging. These platforms are part of a larger movement in the digital humanities where technology is being used to rethink research, education, and public participation, in addition to serving as a medium for preservation (An, 2024).

Virtual galleries are important because they can make art history more accessible to a wider audience (Nwankwo, 2024). They support inclusive cultural exchange and international discourse by facilitating greater participation from a variety of audiences, such as students, scholars, and general art lovers. Furthermore, virtual galleries serve as essential archives that protect cultural heritage for future generations in situations where institutional, budgetary, or environmental constraints make it difficult to preserve real artefacts. This dual function emphasises their increasing significance in the digital age by serving as both instructive and archival (Onyenokulu, 2024).

Despite these developments, there are still unanswered questions about the use of virtual galleries in art historical research (Li et al., 2022; Mateos-Rusillo, & Gifreu-Castells, (2017). Their scholarly significance lies in how they change research methodologies, impact art interpretation, and change the interaction between audiences and artworks—has received less attention than their technological and curatorial features, which have received a lot of attention in the current conversation. Furthermore, art historians and museum professionals are still debating issues of authenticity, sensory experience, and striking a balance between virtual and in-person interactions (Smets & Euser, 2025).

The study on digital advances in art history learning in Malaysia has found several emerging issues. These challenges reflect the digital environment in Malaysia in the field of visual arts. Among the issues facing virtual art galleries in Malaysia are related to infrastructure technology and accessibility, where most galleries and museums in Malaysia still lack advanced digital infrastructure, such as servers, high-resolution scanning tools, VR/AR equipment (Hairul Anuar, 2016). There is also a gap in Internet connectivity in rural or underdeveloped areas, further limiting public access to virtual galleries. Platforms provided usually not optimized for mobile use, even though mobile is the primary Internet device in Malaysia (Jos & Mat Salleh, 2023).

Another issue that can be identified is the limitation of funding and development resources. These virtual gallery projects are short-term initiatives launched during the COVID-19 pandemic. At a time when human movement physically has been limited, it is expected to have a major impact on the economy (Tunnikmah, 2020). Starting from this situation, the use of virtual applications is increasingly being developed, but it goes without continuous financial support. Limited budgets for digitization, licensing, software and trained digital staff are factors that prevent continuous development. In the education industry, art institutions are very dependent on government funding or grants, which may be inconsistent in creating appropriate platforms (Jos & Mat Salleh, 2023).

The art industry in Malaysia also still lacks the expertise in digital curation because this field is less explored, and even conventional curation expertise and curatorial fields are still far behind compared to that in the western world, as the field of art history management is less known (Hairul Anuar, 2016). Since curators and art historians are still accustomed to traditional exhibition practices, there is lack of trained professionals in digital humanities, "user experience" (UX) design and virtual exhibition creation. Public awareness among consumers is also still low, compared to physical exhibitions, considering that it as a temporary way to visit real galleries. This may be attributed to the lack of development of interactive, 3D immersive, virtual reality (VR) tours which results in a lack of appeal to audiences to use virtual exhibitions

The most important issues highlighted in this study are integration of technology and the study of art history. The virtual gallery in Malaysia is usually associated with its function as a promotional or tourism tool rather than as an academic source (Rosli et al., 2021). This certainly led to limited cooperation between universities,

where researchers restricted their scientific impact. There is, thus, a significant gap in using a systematic virtual gallery for teaching, curriculum integration and critical art history research.

One of the reasons relates to the absence of comprehensive national policies or standard frameworks created to digitise and present virtual artwork. On the other hand, different institutions of museums, galleries, and even universities function on their own, leading to different initiatives and no integration. This is where we see a lack of central database for Malaysian art history that can suppress international visibility and scientific cooperation (Jos & Mat Salleh, 2023).

The use of virtual galleries in art history teaching has received less attention, especially in the Malaysian context, despite their growing popularity as digital venues for exhibition, cultural preservation, and public participation. The majority of the current literature in publication has examined virtual exhibitions from the perspectives of technology, curators, accessibility, or cultural heritage (Fauzi et al., 2022). Even though these studies show how digital platforms can increase access to artworks and cultural resources, more research is still needed to determine how users view their educational value, engagement, satisfaction, and contribution to art history education (Rahim et al., 2021).

This disparity is especially significant in Malaysia, where institutional resources, digital skills, technological infrastructure, and the accessibility of relevant digital information continue to impact the adoption of digital approaches to art education (Samsuddin et al., 2024). The promise of online resources and digital museums for appreciating art has been discussed in Malaysia, and yet, there is still a lack of empirical data about users' experiences using virtual galleries as educational tools.

Therefore, by looking at respondents' experiences, views, satisfaction, and perceived learning effectiveness, the current study focuses on the educational aspect of using virtual galleries. The study takes into account how users assess virtual galleries as learning resources and what institutional factors may affect their sustained acceptance, rather than assuming that digital access inevitably results in educational gains.

Two research goals are addressed in this study:

1. To investigate the perceived advantages and educational value of using virtual galleries for teaching and learning art history.
2. To investigate users' opinions of the efficacy of virtual galleries for learning, as well as their experiences, satisfaction, and engagement.

LITERATURE REVIEW

This overview of the literature covers a number of topics pertaining to virtual galleries, including user experience (UX) design, cultural heritage preservation, ethical and practical issues, and worldwide advancements and their use in art history education. The scenario in Malaysia, where virtual gallery deployment is still in its infancy and faces obstacles related to infrastructure, funding, expertise, and academic integration, is also highlighted (Amir et al., 2021). The knowledge gap between the creation of virtual galleries as a marketing technique and their potential as scholarly resources and academic platforms in the subject of art history may be found through this review. The foundation for comprehending how virtual galleries might improve access, instruction, and research in regional and international art contexts is an evaluation of the existing literature.

The emergence of virtual galleries on a global scale demonstrates how digital technology has transformed how people engage with art. Art organizations including The British Museum, The Louvre, and The Metropolitan Museum of Art have employed virtual platforms to reach a worldwide audience with their collections (Anderson, 2022). Users can visually browse artworks with extensive descriptions and high-resolution photographs using apps like Google Arts & Culture. This phenomenon demonstrates how government regulations, funding, and the community's degree of digital literacy, all play a significant role in the

development of virtual galleries. This global strategy might serve as a template for Malaysia to create a more comprehensive and well-equipped virtual galleries.

According to studies by Almurbati (2021), virtual galleries serve as interactive learning tools in addition to being exhibition venues. Nowadays, it is considered one of the best ways to disseminate digital artefacts information in any area, including art, heritage, design, special museum or temporary exhibition collections. Without being restricted by location, art students can closely examine the artistic pieces, read historical contexts, and engage with visual resources. Virtual galleries are still not widely used in Malaysian educational institutions for art instruction. The majority of art history instruction still relies on traditional techniques like slideshows and still photos. Virtual galleries can enhance students' visual literacy and facilitate experiential learning strategies when used effectively (Li, 2024).

The efficacy of a virtual gallery is greatly influenced by the design of the User Experience (UX). According to Grau (2020), interactive features like virtual reality (VR), augmented reality (AR), and 3D navigation can boost user engagement and create a more immersive visual experience. Advanced technology plays a key role in many immersive art experiences, incorporating high-resolution projections, VR, AR, motion sensors, spatial sound, touch screens, and many more, as the use of advanced technology is an important aspect of these art exhibitions. These experiences can be presented in a variety of formats, such as art installations in museums, multimedia projections in public spaces, live performances, VR experiences, or even temporary installations at cultural events (López Rodríguez et al., 2024). The majority of virtual galleries in Malaysia continue to function at a rudimentary level, without interactive features that could draw in a younger audience. This illustrates how technology specialists and art curators must work together to create platforms that are entertaining, easy to use, and mobile-friendly.

Virtual galleries also play an important part in the preservation of cultural heritage. According to Kalay et al. (2021), the digitization process is more than just paperwork; it also serves to preserve identity and pass on cultural values to future generations. In Malaysia, the initiatives to digitize traditional arts such as *songket*, *batik*, *wayang kulit*, and Baba Nyonya beaded shoes can be bolstered by the creation of virtual galleries dedicated to local heritage. This step can also raise the public awareness of traditional arts and increase access to cultural assets for students, researchers, and the general public.

Another way to look at virtual galleries is through the lens of digital humanities, a discipline that blends digital technology and art research techniques. Berry (2019) asserts that digital humanities alter how scholars evaluate, interpret, and share information in addition to making art more widely available. It creates chances for study based on visual data, image analysis, and cooperative networks between academic institutions and the arts, and this approach is highly relevant to the field of art history in Malaysia. Virtual galleries offer a lot of promise to expand the scope and revitalize methods used in art historical studies. They provide possibilities for experiential learning in an educational setting that enhances the visual comprehension and the historical background of works. Virtual galleries have gained international recognition as cutting-edge venues that promote more in-depth and engaging user interactions in addition to democratizing access to art (Ceccoti et al., 2024).

Although virtual galleries have numerous advantages, there is ongoing debate about authenticity, copyright, and sensory experience. According to Benjamin (2008), digital images can replace the visual function of artworks but cannot entirely capture the atmosphere and tactile presence of genuine artworks. This viewpoint contends that the aesthetic experience gained from direct connection with tangible artworks cannot be completely replaced by the digital media. This issue has grown in importance in Malaysia as many art and academic institutions have begun to employ virtual platforms for exhibition and art education (Zulkifli et al., 2025). While this development has improved accessibility and public interaction with visual arts, there are still worries regarding the authenticity of works and copyright protection. Local art institutions must look into data ownership, artwork licensing, and the risk of information loss or misuse caused by rapid technological improvements. As a result, the administration of virtual galleries in Malaysia must strike a balance between the benefits of digital innovation and the necessity to preserve the authenticity and integrity of artworks (Fauzi et al., 2022).

Although the development of virtual galleries is gaining attention, its implementation in Malaysia continues to confront various challenges, including limited digital infrastructure, a lack of financing, and the absence of a national policy that organizes efforts to digitize art holistically. Furthermore, public awareness and academic institutions' involvement in exploring the potential of virtual galleries remain restricted. As a result, more research is urgently needed to better understand how virtual galleries can be used not only as exhibition platforms, but also as a learning and research medium that promotes art education, cultural heritage preservation, and the development of methodologies in art history studies.

METHODOLOGY

This study employed a quantitative cross-sectional survey design to examine respondents' experiences and perceptions regarding the use of virtual galleries in art history education. The survey approach was selected because the study sought to describe patterns of virtual gallery usage and to measure respondents' perceptions of accessibility, user experience, satisfaction, engagement, and perceived learning effectiveness.

Data were collected using a structured online questionnaire administered through Google Forms. The questionnaire consisted of demographic questions, screening and usage questions, user experience and satisfaction items, perceived learning effectiveness items, and questions concerning future use and institutional readiness.

Table 1: Survey Instrument Design

Section	Construct Variable /	Sample Item(s)	Measurement Scale
A1	Demographics & Background	Age, gender, education, and occupation	Nominal / Ordinal
B1	Screening & Consent	"Have you used a virtual gallery in teaching or learning?"	Yes/No
B2	Accessibility / Reach	"What type of virtual gallery, did you used?"	Open-ended / Categorical
B3	Accessibility / Reach	"Please state other platform of virtual gallery, other that options above?"	Open-ended / Categorical
B4	Frequency Visit / Reach	"How often do you browse virtual galleries in class?"	Open-ended / Categorical
B5	Accessibility / Reach	"Have you ever visited a virtual gallery abroad?"	Yes/No
B6	Accessibility / Reach	"What other types of technology do you use in teaching or learning?"	Open-ended / Categorical
B7	Satisfactory / Reach	"How satisfied are you with the use of virtual galleries in teaching or learning art history?"	4-point Likert (1 = Very Satisfy → 4 = Not Satisfy)
B8	Overall Satisfaction / Intention	"How does you rate, your experience in using virtual art galleries as part of learning art history?"	4-point Likert (1 = Very Positive → 4 = Negative)
B9	Responding to B1	"If, NO, why?"	Open-ended / Categorical
C1	Benefit	"What benefits do you get from the use of virtual art galleries?"	Open-ended / Categorical

C2	Engagement Presence /	“I feel engaged when using a virtual gallery.” / “Virtual galleries influenced my creativity and inspiration to create art.”	4-point Likert (1 = Very Influenced → 4 = No Influence)
C3	Engagement Presence /	“I can access virtual galleries easily from my location.” / “Challenge in accessing virtual art gallery.”	Open-ended / Categorical
D1	Learning Effectiveness Pedagogy /	“How do you assess the effectiveness of the use of virtual galleries in art teaching?.”	4-point Likert (1 = Very Effective → 4 = Not Effective)
D2	Learning Effectiveness Pedagogy /	“Using virtual galleries improved my understanding of the artworks’ historical context.” / “Virtual galleries are useful for academic study of art history.”	4-point Likert (1 = Very Helping → 4 = Not Helping)
D3	Agreement Perception /	“Do you agree, the use of virtual art galleries enhance art appreciation ability”	4-point Likert (1 = Strongly Agree → 4 = Not Agree)
E1	Suggestion Opinion /	“In your opinion, does the concept of a virtual art gallery help improve the teaching of art history education?.”	Yes/No
C6	Authenticity Trust /	“Virtual representations reflect the artwork’s authenticity accurately.” / “I trust the curatorial information presented in virtual galleries.”	5-point Likert (1 = Strongly Disagree → 5 = Strongly Agree)
E2	Suggestion Opinion /	“Should institutions improve technological infrastructure in schools / colleges / universities for the development of virtual art galleries?.”	Yes/No
E3	Suggestion Opinion /	“Is there good/high potential of virtual art gallery as the main tool of art education in the future?”	Yes / No / Unsure
E4	Suggestion Opinion /	“Is there a need for collaboration between institutions (galleries and museums) in the preparation of digital materials or resources?”	Yes/No
E5	Suggestion Opinion /	“Are technological skills required by teachers and students in education using virtual art galleries?”	Yes/No
E6	Suggestion Opinion /	“Could the reduction in face-to-face interaction make the teaching and learning of art history less interesting and effective?”	5-point Likert (1 = Strongly Agree → 5 = Strongly Disagree)

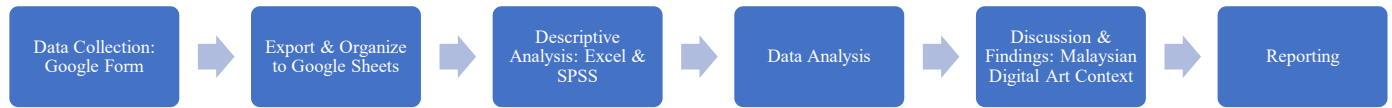
The questionnaire was developed to measure five broad areas: demographic characteristics, virtual gallery access and usage, user experience and satisfaction, perceived learning effectiveness, and future adoption and institutional readiness.

The original questionnaire included categorical questions, Yes/No questions, open-ended questions, and Likert-scale items. The questionnaire should be reviewed for grammatical clarity, conceptual consistency, and alignment between each item and its intended construct.

For Likert-scale items, response directions should be standardised throughout the instrument. Higher scores should consistently represent either greater agreement/positive perception or lower agreement/negative perception. Mixing scales such as “1 = Very Satisfied to 4 = Not Satisfied” and “1 = Strongly Agree to 5 = Strongly Disagree” should be avoided unless there is a clear methodological justification.

Survey Research Design and Questionnaires' Instrument

Table 2: Theoretical framework of the study.



The use of virtual galleries in art history education can be understood through three interconnected dimensions: accessibility, user engagement, and perceived learning effectiveness. Accessibility refers to the extent to which digital platforms enable users to reach artworks and exhibition resources regardless of geographical and temporal limitations. User engagement concerns the extent to which users interact with, explore, and respond to, digital exhibition environments. Perceived learning effectiveness refers to users' assessments of whether virtual galleries support one's understanding, interest, motivation, art appreciation, and academic learning.

The relationship among these dimensions provides a conceptual basis for examining virtual galleries as educational resources. Greater accessibility may provide users with more opportunities to encounter artworks and supporting information. Effective digital presentation and interactive features may subsequently influence engagement, while sustained engagement may contribute to users' perceptions of learning usefulness and effectiveness. However, these relationships should not be interpreted as evidence of direct causal effects due to the fact that the present study is based on cross-sectional self-reported survey data.

The conceptual framework of the study therefore positions virtual gallery use as the central context and examines four related dimensions: (1) accessibility and usage, (2) user experience and satisfaction, (3) perceived learning effectiveness, and (4) future adoption and institutional readiness. Demographic characteristics are treated as contextual variables that may help describe the differences among respondent groups.

This framework is consistent with the literature reviewed in this study, which identifies accessibility, interactivity, user experience, cultural engagement, and educational usefulness as important considerations in the development and adoption of virtual exhibition environments. It also recognises that technological affordances alone may not determine educational value, as institutional infrastructure, digital skills, content quality, and the relationship between virtual and physical learning experiences may influence users' perceptions.

Ethical Consideration

The study's participation was entirely voluntary. Before filling out the questionnaire, respondents were made aware of the study's objectives and given the opportunity to give their informed consent. Respondents were advised that their answers would be used for scholarly research, and there was no requirement to answer questions they did not want to. Unless it was absolutely necessary for the research process, no personally identifiable information was asked. Survey information was kept private and utilised exclusively for the objectives specified to respondents.

DATA ANALYSIS AND FINDINGS

This chapter analysis quantitative data obtained from an online questionnaire created using Google Forms. The purpose of this study was to look into the perceptions, levels of use, satisfaction, and perspectives on the usefulness and potential of virtual galleries in Malaysian art education. Data were analyzed using descriptive statistics in SPSS/Excel software, with a focus on frequency distribution, percentage, mean, and standard

deviation. The findings of this analysis were then interpreted narratively in order to respond to the study objectives and provide a full knowledge of the phenomena of virtual gallery use among art students and educators.

Part A: Demographic Profile of Respondents

This section presents the descriptive statistics summarizing the demographic and profile characteristics of the study participants, as collected in Section A. The analysis covers gender, age, educational background, and current role in art education.

Table 3: Frequency Distribution of Respondents' Demographics (N=70)

Variable	Category	Frequency (N)	Percentage (%)
Gender (A1)	Male	37	52.9
	Female	33	47.1
	Total	70	100
Age (A2)	< 20 years	35	50.0
	20-30 years	32	45.7
	31-40 years	0	0
	41-50 years	3	4.3
	Above 50 years	0	0
	Total	70	100
Education (A3)	High school	8	11.4
	Diploma	47	67.1
	Bachelor's Degree	10	14.3
	Master's Degree	4	5.7
	PhD	1	1.4
	Total	70	100
Role (A4)	Student	64	91.4
	Lecturer/ Teacher	4	5.7
	Administrator	0	0
	Others	2	2.9
	Total	70	100

The study was completed by 70 respondents. The descriptive analysis of the sample reveals the following characteristics:

Gender Distribution:

The sample exhibited a largely balanced distribution across gender categories. A slight majority of participants were Male (52.9%, n=37), while Female (47.1%, n=33) respondents comprised nearly half of the sample. This distribution suggests that the findings are not skewed towards any single gender.

Age Profile:

The respondents were predominantly from the younger age groups. The largest group was the less than 20 years old, accounting for exactly half of the sample (50.0%, n=35). This was followed closely by the 20-30 years old (45.7%, n=32). The respondents were predominantly young adults, with 95.7% aged 30 years or below. This age distribution indicates that the sample was largely composed of younger respondents; however, age alone should not be interpreted as evidence of digital competence or digital literacy.

Educational Background:

The analysis of academic qualifications, based on the user's specific corrections, shows a major concentration at the Diploma level. The largest group holds a Diploma, accounting for 67.1% (n=47) of the sample. This is followed by Bachelor's Degree, which accounts for 14.3% (n=10), and High School (11.4%, n=8). Respondents with a Master's Degree represent 5.7%, while PhD holders constitute the smallest fraction at 1.4% (n=1). This profile indicates a study primarily focusing on individuals with a Diploma background in art education.

Role in Art Education:

Consistent with the educational data, the core finding is that the majority of participants were students, representing an overwhelming 91.4% (n=64). The remaining participants were categorised as teacher or lecturer (5.7%, n=4) and others (2.9%, n=2). Consequently, the study's conclusions and findings on virtual galleries are predominantly drawn from the experiences and perceptions of students in art education.

Part B: Accessibility and Usage of Virtual Galleries

The analysis of Part B addresses the extent to which respondents have utilized and are familiar with virtual art gallery platforms. The total number of respondents for this section is 70.

Table 4: Usage and Familiarity with Virtual Galleries

Question	Category	Frequency (N)	Percentage (%)	Valid Percent (%)
B1: Ever used a virtual gallery?	Yes	44	61.4	-
	No	26	38.6	-
	Total	70	100	-
B5: Familiar with virtual galleries?	Yes	32	45.7	64
	No	18	25.7	36
	Missing (Non-Response)	20	28.6	N/A
	Total	70	100	100

Prior Usage:

The data shows that a significant majority of respondents (61.4%, n=43) have previously used a virtual art gallery in their learning or teaching process. This figure indicates a strong openness to, and initial experience with, the technology within the sample. However, a substantial minority (38.6%, n=27) reported no prior usage, suggesting a need for broader introduction and training.

General Familiarity:

The analysis of general familiarity with virtual art galleries revealed that 50 of the total 70 respondents provided a valid answer, with 20 responses (28.6%) recorded as missing due to non-response. Among the valid respondents, a significant majority (64.0%, n=32) reported that they were familiar with virtual art galleries (either domestic or international). This finding is crucial as it demonstrates that nearly two-thirds of the actively responding participants are aware of the technology, establishing a good baseline for its potential adoption. In contrast, 36.0% (n=18) stated that they were not familiar.

Table 5: Platform Usage and Frequency (Among Users Only)

Question	Category	Frequency (N)	Valid Percent (%)
B2: Main Platform Used (N=44 users)	Google Arts & Culture	12	27.3
	ArtSteps	0	0
	ART.SPACES	2	4.5
	Google Slides	24	54.5
	All above	6	13.6
	Total	44	100
B4: Frequency of Use (N=49 users)	Daily	8	16.3
	Weekly	15	30.6
	Monthly	9	18.4
	Rarely	17	34.7
	Total	49	100

Platform Dominance:

Among those who used virtual galleries (N=44), Google slides emerged as the dominant platform, utilized by 54.5% (n=24) of the users. The next most popular platform was Google Arts & Culture (27.3%, n=12), suggesting that user experience is heavily concentrated on Google's offering.

Usage Frequency:

The analysis of how often valid users interact with virtual galleries (N=49) reveals that engagement is primarily infrequent, suggesting the platforms are used for specific tasks rather than as a core, daily learning resource. The largest group of users reported interacting rarely (34.7%, n=17), indicating a strong presence of sporadic usage. This was followed closely by weekly usage (30.6%, n=15), demonstrating that a significant portion integrates the platforms on a regular schedule. Conversely, daily use was reported by 16.3% (n=8), while monthly usage was the least common category, accounting for 18.4% (n=9). This distribution suggests that the greatest potential for increasing integration lies in moving the 'rarely' users into the 'weekly' cohort.

Table 6: User Experience and Satisfaction

Question	Category	Frequency (N)	Valid Percent (%)
B7: Satisfaction Level (N=48 users)	Very Satisfied	15	31.3
	Satisfied	32	66.7
	Dissatisfied	1	2.1
	Very Dissatisfied	0	0
	Total	48	100
B8: Experience Assessment (N=49 users)	Very Positive	20	40.8
	Positive	22	44.9
	Neutral	7	14.3
	Negative	0	0
	Total	49	100

Satisfaction Level:

The satisfaction level with virtual galleries (N=48) was exceptionally high. The vast majority of users, representing a combined 98.0%, reported positive satisfaction, with satisfied being the dominant category (66.7%, n=32). Those who were very satisfied accounted for 31.3% (n=15). Crucially, very dissatisfied received 0% of responses, and only a minimal 2.1% (n=1) reported being dissatisfied. These figures strongly suggest that the platforms effectively meet or exceed user expectations.

Experience Assessment:

Similarly, the assessment of the overall experience (N=49) was highly positive. The combined percentage for a positive experience (very positive and positive) was 85.7%. The most frequent response was positive (44.9%, n=22), while those reporting a very positive experience made up 40.8% (n=20). Only a small fraction of users reported a neutral experience (14.3%, n=7), and none reported a negative experience. This high consensus on a positive experience indicates that virtual galleries offer an engaging and favourable learning environment for students and educators.

Other Platforms Used

Table 4: Thematic Categorisation of Other Platforms Used

Category	Description	Frequency (N)	Percentage (%)
1. Social Media & Community Portfolios	Platforms used for public sharing, display, and community engagement.	7	23.3
2. Design & Creation Software	Professional and personal tools used to create/edit art, often used for virtual display.	11	36.7
3. General Digital Tools	Broadly accessible office, communication, or basic web search tools.	6	20
4. External Galleries & Databases	Specific non-local/institutional art databases or galleries.	3	10
5. Communication Platforms	Tools primarily used for virtual meetings and collaboration.	3	10
Total		30	100

The analysis of other platforms used (B3, N=30) reveals that respondents heavily rely on software and general digital spaces, rather than dedicated gallery platforms, to engage with art. The largest category was Design & Creation Software (36.7%, n=11), which includes tools like Adobe and Procreate. This suggests that students often consider the creation and editing environment itself as a form of "gallery" or primary viewing space. This is followed by Social Media & Community Portfolios (23.3%, n=7), demonstrating that platforms like ArtStation and Pinterest are vital for viewing contemporary work and building art communities. The presence of General Digital Tools (20.0%, n=6) and Communication Platforms (10.0%, n=3) indicates that the term "virtual gallery" is broadly interpreted by students to include any digital space where art is displayed or discussed, extending beyond formal gallery websites to include everyday tools like Google and Zoom.

Part D: Effectiveness and Utility

This section uses a Likert scale to assess the perceived effectiveness and overall utility of virtual galleries in art education. The results show exceptionally high levels of agreement across all measures, confirming the platform's positive perceptual impact.

Table 5: Perceived effectiveness and overall utility of virtual galleries in art education

Question	Strongest Agreement	Combined Percentage
D1: Overall Effectiveness	Very Effective (30.4%) + Effective (68.1%)	98.5%
D2: Increase Interest & Motivation	Very Helps (37.1%) + Helps (60%)	97.1%
D3: Agreement on Usefulness	Strongly Agree (40%) + Agree (54.3%)	94.3%

The findings for Part D are overwhelmingly positive, with consensus approaching 100% on the platform's value. For overall effectiveness (D1), an impressive 98.5% of respondents view the use of virtual galleries as effective or very effective (N=69). Next, for increase interest and motivation (D2), nearly all respondents (95.7%, N=70) agreed that the platforms help increase students' interest and motivation towards art. Last but not least, under general usefulness (D3), there was near-universal consensus, with 98.6% (N=70) strongly agreeing or agreeing that the use of virtual galleries is beneficial and useful in the context of art education. This high and consistent agreement across all three effectiveness measures strongly validates the study's core objective that virtual galleries are perceived to be highly successful in enhancing the learning process.

Part E: Suggestions and Future Potential

Table 6: Summary of Findings for Part E

Question	Type	Positive/Agreement %	Strongest Response
E1: Improve Teaching & Learning	Yes/No	100	Yes
E2: Improve Technological Infrastructure	Yes/No	100	Yes
E3: Potential as a Primary Tool	Yes/No/Unsure	77.1	Yes
E4: Collaboration Necessary	Yes/No	100	Yes
E5: Technological Skills Required	Yes/No	95.7	Yes
E6: Reducing face to face is Less Effective	Likert	60	Neutral (34.3%)
E7: Increase Motivation & Interest	Likert	75.3	Agreed (56.5%)

Institutional Readiness (Confirmation Questions: E1, E2, E4, E5, E3)

This group of questions reflects the respondents' clear demand for systemic changes and institutional commitment to fully integrate virtual galleries. The results for E1, E2, and E4 function as definitive mandates from the study population.

Table 7: The results for E1, E2, and E4 function as definitive mandates from the study population.

Universal Consensus (E4, E1, E2):	There was 100.0% agreement (n=70) that:
E1 (Improve Teaching & Learning):	All respondents agreed that virtual galleries help to improve the teaching and learning process.
E2 (Improve Technological Infrastructure):	All respondents agreed that institutions must improve technological infrastructure to support virtual galleries. This result is the strongest evidence linking the challenges in Part C to a required solution.
E3 (Primary Tool Potential):	A significant 77.1% (n=54) saw the potential for virtual galleries to become a primary tool in the future. The remaining 18.6% were neutral, showing that while most are optimistic, a quarter of the sample is yet to be convinced of its central role.

E4 (Collaboration is Necessary):	All respondents agreed that collaboration between institutions is essential for providing digital resources.
E5 (Required Skills):	A massive majority of 95.7% (n=67) agreed that technological skills are required by both teachers and students to successfully integrate virtual galleries into the curriculum.

Conclusion for Institutional Readiness: The findings clearly demonstrate that the study population is fully convinced of the pedagogical benefits (E1) and is ready for adoption, provided that the institutions address the immediate need for infrastructure upgrade (E2) and inter-institutional collaboration (E4).

Personal and Pedagogical Impact (Likert Scale Items: E7, E6)

These questions measure the direct impact on the user's experience and attitudes toward traditional vs. virtual learning.

E6 (Role of Face-to-Face Interaction): This question, which explores attitudes toward learning effectiveness, showed mixed results. While 60.0% (combined Strongly Agree/Agree) believe that reducing face-to-face interaction can cause learning to be less effective and engaging, the largest single response was Neutral (34.3%). This suggests that while virtual galleries are highly valued, the sample recognises that physical interaction remains important to the overall learning experience.

E7 (Motivation and Interest): The use of virtual galleries was strongly supported as a tool for driving engagement. 75.3% of the valid respondents (N=69) agreed or strongly agreed that virtual galleries increase motivation and interest in learning about Malaysian fine art. This confirms the platform's high efficacy as a tool for personal engagement.

DISCUSSION

These findings provide an overview of respondents' experiences and perceptions of the use of virtual galleries in art education. Overall, respondents expressed positive perceptions of virtual galleries in relation to accessibility, satisfaction, learning utility, motivation and future educational potential. However, these findings should be interpreted as respondents' perceptions and not direct evidence that virtual galleries produce measurable improvements in learning outcomes.

The demographic profile shows that the sample was predominantly composed of students, representing 91.4% of the respondents. In addition, 95.7% of respondents were aged 30 and below, while 67.1% reported a Diploma level educational background. This composition is important when interpreting the findings as the results primarily reflect the experiences of students rather than lecturers, museum professionals, researchers and other potential users of virtual galleries. The relatively small number of respondents from these other groups limits the extent to which comparisons between user categories can be made.

With regard to usage, 61.4% of respondents reported having previously used virtual galleries in teaching or learning. Among respondents who provided valid information on platform use, Google Slides and Google Arts & Culture were among the most frequently identified platforms. Findings on frequency of use indicated that virtual galleries had yet to be a consistently integrated learning component for all respondents, with "rare" and "weekly" use representing the largest categories. This suggests that exposure to virtual gallery resources may not necessarily translate into ongoing or routine educational use.

However, respondents reported generally encouraging experiences and satisfaction. Satisfaction results indicated that almost all valid respondents selected either "satisfied" or "very satisfied." Similarly, overall experience ratings were mostly positive. These findings indicate that participants generally perceived the

virtual gallery experience positively. However, satisfaction should be distinguished from learning effectiveness, as a positive user experience does not in itself prove that learning outcomes have improved.

Findings on perceived educational effectiveness were also very positive. Respondents generally indicated that virtual galleries can support the interest, motivation, understanding, and appreciation of art. These results are consistent with previous literature showing that digital exhibition environments can broaden the access to artworks and provide opportunities for visual exploration and experiential engagement. However, as this study relied on self-reported perceptions collected at a single point in time, the results cannot be interpreted as evidence of a causal relationship between the use of virtual galleries and improved learning performance.

An important finding concerns the relationship between virtual and face-to-face learning. While respondents generally valued virtual galleries, a significant proportion also indicated that reduced face-to-face interaction could negatively impact the effectiveness or attractiveness of learning. These findings support the view that virtual galleries are complementary rather than substitutes. Virtual environments can provide additional access to artworks, contextual information and interactive resources while physical encounters with artworks and direct interaction with instructors and peers continue to contribute to art history learning.

Findings on institutional readiness further indicate that respondents consider infrastructure, digital skills and institutional collaboration to be essential conditions for effective implementation. This perception is consistent with the Malaysian context discussed in the literature review, where technological infrastructure, funding, digital curation expertise and institutional coordination remain significant challenges.

Overall, these findings suggest that virtual galleries have educational potential, but their value depends on how they are integrated into teaching and learning practices. Rather than considering virtual galleries as a replacement for conventional art education, institutions could consider integrating them with classroom discussions, physical exhibitions, instructor guidance, and other forms of experiential learning. Future studies should examine whether these perceived benefits are associated with measurable learning outcomes using larger and more diverse samples.

CONCLUSION

The views and experiences of respondents about the usage of virtual galleries in art history education were investigated in this study. In terms of accessibility, satisfaction, engagement, motivation, and perceived educational utility, the results generally show positive opinions of virtual galleries. Additionally, respondents noted that the collaboration between institutions, digital skills, and technological infrastructure is the critical prerequisites for the ongoing advancement of virtual gallery-based learning.

The results also imply that virtual galleries would be best suited as supplementary materials in art history instruction. Respondents acknowledged the ongoing value of in-person connection even if digital platforms can increase the access to artworks and offer flexible options for visual exploration and learning. Therefore, virtual galleries should be seen as supplementary tools that can enhance current pedagogical methods rather than as a replacement for physical exhibitions or traditional classroom instruction.

Several limitations should be considered when interpreting the findings. First, the sample consisted of only 70 respondents, which limits the statistical power and generalisability of the findings. Second of all, 91.4% of the respondents were students, meaning that the findings predominantly reflect students' perceptions rather than those of lecturers, museum professionals, researchers, and other stakeholders. Thirdly, the study relied on self-reported perceptions rather than objective measures of learning achievement. Fourthly, the use of an online questionnaire and the distribution of respondents across different usage categories may introduce sampling and response biases.

Larger and more varied samples, including increased representation from educators, museum staff, researchers, and other art-related practitioners, should be used in future studies. Whether using virtual galleries results in quantifiable improvements in students' knowledge, visual literacy, appreciation of art, engagement, or

academic achievement, this could potentially be investigated through longitudinal or experimental study. Studies that compare traditional digital resources, immersive virtual settings, and actual exhibitions could shed more light on the educational value of virtual galleries.

Within these constraints, the current study offers preliminary empirical evidence that respondents in the Malaysian art education environment have a favourable opinion of virtual galleries and that they could serve as additional resources for learning art history. However, more thorough research approaches and larger responder populations are needed for an ongoing assessment of their long-term educational value.

Conflict of Interest Declaration

The author and all co-authors declare that this manuscript is an honest, true and original research, and none of the named authors carry any conflict of interest regarding this work. This manuscript is substantiated through precise data and references. All authors read and approved the final manuscript for publication, as well as agreeing with the findings and interpretations of this study reported in this manuscript. They also declared that they have no conflicts of interest regarding the content, materials or issues discussed in this study. Last but not least, this manuscript has never been published, submitted or considered for publication in any other established journal or publication.

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