

實踐大學 ☐ 日間部 ☐ 進修部 112 學年度 第 1 學期 資格考試試題紙				共 20 頁 第 1 頁	
考 試 科 目	系 班 級	學生人數	備 註		
研究方法	博士班	3	☒ 1.直接作答 ☐ 2.附答案紙 ☐ 張		

*學生可否攜帶計算機、書籍、筆記或其他資料作答，請在備註欄註明【如未註明，一律不准攜帶】

考生姓名：

112 學年度第 1 學期資格考試相關事宜

於 **112 年 12 月 1 日(週五)**提供考題，以遠端電子形式舉行考試。

考試形式：

一、考試時間共計為 10 日，考卷繳交時間為 **112 年 12 月 10 日 (週日) 23:59 止**。

二、繳卷電子檔，規定如下：

檔案型態: PDF

檔案名稱: 112-1 資格考(研究方法)_姓名

第一部分：質性研究之基本功（建議用 ChatGPT 進行優化）

1. 請依據 Eisenhardt (1989) 與 Dyer & Willkins (1991) 兩篇各自發表在 Academy of Management Review 的文章，比較這兩篇對於「個案研究」之不同觀點為何，並藉此「編表」及「論述」質性這兩種個案研究之不同走向與價值(10%)。
2. 請「編表」並「說明（請用 ChatGPT 進行優化）」「研究個案、受訪者、分析單位」這三者的差異(10%)？
3. 請說明關於質化研究方法論中，相關概念名詞的說明(10%)
 - (1) 三角驗證 (Triangulation)
 - (2) 理論飽和 (theoretical saturation)

第二部分：質性研究之應用

1. 當你準備投稿了，撰寫一篇質化(定性)研究的論文時，你的論文架構與每一個章節的重點是什麼？(提示：撰寫一篇質性研究文章的格式與內容。例如：第一章、緒論。主要說明研究動機與問題形式的研究問題。第二章、文獻探討的架構與其重點…依此類推說明之)。(20%)
 - (1) 先用關鍵詞呈現各章節的重點(10%)
 - (2) 請用將重點寫成文章(10%)（請用 ChatGPT 進行優化）
2. 請挑選一篇所閱讀過的質性研究文章為例（可依選課程大綱所列的文獻）論述下列的 4 個問題。(10%)
 - (1) 這篇文章的「研究問題」是什麼(請指出是以哪一篇文章為例)？
 - (2) 敬請指該文章的「資料分析表」，並簡單說明該案例「資料分析」的過程？

- (3) 簡單說明作者在這篇文章中，主要的研究發現與論述，同時請你評論這樣的研究發現確實能回答第(1)題的「研究問題」嗎？
- (4) 簡單說明這篇文章主要的理論貢獻(Theoretical implication)與實務貢獻(Practical implication)？
- (5) 將您目前的研究構想，試著據此架構簡單說明一下「研究問題」、與可能的「研究發現」？

第三部分：請利用所附論文回答下列問題：(40%)

說明媒體互動性(media interactivity)與再體驗意圖(intention to re-experience)的觀念性定義(conceptual definition)及操作性定義(operational definition)。

說明架構中各個構念的收斂效度(convergent validity)與區別效度(discriminant validity)的評估過程及結果。

說明資料分析方法(partial least structural equation modelling, PLS-SEM)使用的合理性及模式適配度判斷依據。

資料分析常要加入控制變數(controls)，這篇文章在資料分析上並沒有加入控制變數，如果想加入控制變數，就文章提供的訊息，考慮加入那個或那些因子當控制變數？為什麼？

Factors Affecting Satisfaction with Media Art Experiences and Intention to Re-experience: Focusing on Interactivity, Presence, and Flow

Doyeon Lee

Introduction

Human life has been enriched by the incorporation of technology into various fields of everyday life. The same is true of the field of art. Media art can be viewed as a representative example of this, as it expands the concept and expression form of art by incorporating technology into art (Na and Ahn 2020). Media art is a type of art incorporating diverse channels and platforms for communicating through artwork and that expands the range of settings in which users can enjoy art through the application of media technologies such as computer systems. The artist Baek Nam-joon was the first to incorporate technology into artworks in this way, and used it to create video art in the mid-20th century when mass media such as TV and video dominated the landscape (Yoon, Kim and Chung 2020). Since then, as technology has developed rapidly, the size of media art displays has grown, and artistic and technical expressions have become increasingly elaborate, thereby providing users with a richer experience. As a representative example of a domestic media art display, take the media art made using the front screen of the Seoul Square building (Figure 1). This piece is the world's largest media art, and its images are produced by 42,000 LEDs planted throughout an area of 7,722 square meters (Pyun 2009). In addition, the introduction of stereoscopic media art, such as that in the SM Town outdoor LED display presented in Figure 2, has attracted worldwide attention (Han 2020). As media art becomes increasingly popular and expands in

FIGURE 1

SEOUL SQUARE (DESIGN HOUSE 2012)



FIGURE 2

SM TOWN (JANG 2020)



size, more and more media art cases can be encountered in daily life.

Recently, many such types of media art have also appeared in the form of exhibitions. A media art exhibition can be defined as an exhibition that consists of a media art space using media technology—rather than traditional exhibition methods—so that users can enjoy artworks throughout the space. A representative example is the media art exhibition “Bunker of Light”, which is located in Jeju Island (Figure 3). As can be seen from the figure, it is a structure in which a visitor can appreciate and experience artworks throughout the space by mapping the entire wall and floor into artworks. In addition to this case of Jeju Island’s “Bunker of Light,” media art exhibitions dealing with various topics and works are actively being presented nationwide. As the media art exhibition market expands, many changes continue to take place, including the opening of a media art museum and the growth of exhibitions dealing with socially meaningful topics. The “Super Nature” exhibition held at the Media Museum in Busan is a representative such exhibition with the theme of the importance of preserving biodiversity (Jung 2020).

As such, the media art field is attracting attention in that demand and supply are both actively increasing, workplaces focusing solely on the media art industry are emerging, and there is a possibility of making a significant social impact. However, the existing research on the influence of media art from a macroscopic point of view or user-centered research focusing on media art

is insufficient. In general, research such as case analyses of works, composition analyses of exhibitions, and content design proposals from a micro perspective are dominant (Lee 2014; Song 2015; Yoon 2020). Since there is no existing research on media art users, this research takes an exploratory approach. Specifically, based on the characteristics of media art exhibitions as spatial experiences and immersive cultural spaces, it aims to verify the influence relationship by discovering and combining appropriate variables in related fields such as games and VR research.



Literature Review

Media Art and Interactivity

Interaction is a concept that includes all actions taking place between humans under various conditions and refers to the exchange of communication between humans and various structures (Lombard and Synder-Duch 2001; Um, Kim and Kim 2005). Here, interactivity may be defined as the degree of association of messages according to preceding messages. Since interactivity includes both simultaneous and asynchronous communication, humans have control over the speed, structure, and content of communication (Rice 1984). Therefore, in previous studies on the interactivity between users and media through media interfaces, interactivity was viewed as a characteristic of media that allows

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ABSTRACT

This study examines whether interacting with media art exhibitions leads to satisfaction and re-experience intention through presence and flow. To this end, interactivity was divided into P2S (Person to System), P2P (Person to Person), and P2A (Person to Artist) according to the interaction targets, and the impact of each type of interactivity was examined in terms of presence and flow. In addition, satisfaction—which was mediated by presence and flow—was divided into artistic and technical aspects of media art. To verify the research hypothesis informed by the theoretical basis and previous studies, 220 responses were collected and subjected to PLS-SEM analysis. The results showed that only the P2A factor of interactivity influenced presence, while the P2S and P2A factors of interactivity influenced flow; the P2P factor of interactivity did not significantly affect either presence or flow. It was found that presence had a positive effect on flow, and that presence only had a significant effect on the satisfaction with the media art system, as it did not have a significant effect on the satisfaction with the media artwork. Meanwhile, flow was found to have a significant effect on both satisfaction with media artwork and satisfaction with the media art system. Finally, it was found that both media artwork satisfaction and media art system satisfaction had positive effects on re-experience intention. At the end of this study, academic and practical contributions are discussed based on the research results.

KEYWORDS

Media art, interactivity, presence, flow, media artwork satisfaction, media art system satisfaction

users to control the content or structure of media-mediated experiences (Heeter 2000, Lombard and Ditton 1997; Steuer 1992).

With the development of technology, various new media technologies have emerged, and studies dealing with interaction with new media technologies—such as AI speakers and VR—are being actively conducted. However, the research field that has focused the most on interaction through media has been the game field. In a study by Um, Kim and Kim (2005) that synthesized the discussions of previous studies, the interactivity of online games was divided into three categories: Player to Computer (P2C) refers to player-computer interaction that aids movement, screen switching, etc., naturally and without delay when manipulating a game through a character. Player to Player (P2P) refers to interaction between players through game functions such as text and voice chat. Player to Game (P2G) refers to player-game interactions such as level-up events and items given as rewards when a quest is achieved within the game. Considering that this classification comprehensively structures the interactivity discussed in previous studies and that it considers interactive media, it was judged to be suitable for use in this study.

Since this study is based on media art, the three interactions described above have been modified accordingly. Among the interactions used in game research, P2C was modified to P2S (Person to System) and defined as user-system interactions that facilitate the movement of works and screen transitions in media art displays in a natural manner with no delay. The concept of P2P used in gaming research was modified to P2P (Person to Person) in media art research, and is defined as an interaction between experienced people who share information and value with others using voice and gestures while experiencing media art. Finally, P2G was deleted because it is not relevant to media art, and replaced with Person to Artist (P2A), a variable suitable for media art, was added in its place. P2A is defined as a user-writer interaction that mediates artworks expressed through media art while a person experiences media art. This P2A variable is optimized for the media art field in that it deals with the interaction by which users and writers communicate through artworks expressed through media technology. The adaptation of variables is summarized in Table 1.

Presence

Consumers form their own preferences and expectations based on their existing experiences with products, such as content, whose value

FIGURE 3



FIGURE 4



TABLE 1

MEDIA ART INTERACTIVITY VARIABLES	
Variables used in gaming theory (Um, Kim and Kim 2005)	Variables adapted for use in this study
P2C (Player to Computer)	P2S (Person to System)
P2P (Player to Player)	P2P (Person to Person)
P2G (Player to Game)	P2A (Person to Artist)

cannot be judged before the consumer tries it for themselves. Consumer Culture Theory (CCT) is a theory that attempts to explain this consumption culture (Askegaard and Linnet 2011). CCT explains consumption choices and behaviors from a cultural and social perspective. This study aims to investigate the concept of forming preferences and expectations from existing empirical data relevant to the media art field. In this study, presence and flow are examined as concepts that can be used to synthesize positive empirical data regarding preferences and expectations as a result of media art experiences.

Presence refers to a strong illusion experienced by the user in a medium-mediated world wherein they forget their physical environment and feel that it exists in the mediated environment (Steuer 1992). In a study by Lombard and Snyder-Duch (2001), the presence felt in a mediated environment was divided into four types. First, there is spatial presence which recognizes that the physical environment in which the user exists is separate from the mediated environment but which exists in the mediated environment. Second, there is sensory presence which forgets the function of media technology in a media-mediated environment experienced by users and recognizes that it actually exists in that environment. Third, there is a psychological sense of presence in which users focus on the medium-mediated environment and move away from stimuli such as objects and people in the real world. Finally, there is social presence, which recognizes that communication which takes place in the process of interacting with media technology is done by real people, not machines. The present study mainly focuses on sensory presence, the second of the previous four types of media-mediated environmental presence that are proposed to be experienced while engaging with media art. In the case of media art, its use was deemed appropriate because of the existence of a physical space (spatial presence), the object/person (psychological presence), and the object of communication (social presence). In addition, media art can be considered to be deeply related to sensory presence in that it maximizes sensory elements in the process of humans enjoying artworks through a medium.

Many previous studies have verified that interactivity has a positive effect on presence. For example, Um, Kim and Kim (2005) found that interactivity in online games had a significant effect on presence. Meanwhile, Sundar (2009) saw that interaction in an online environment causes the user to become the subject of communication behavior, and that interactivity is used to project their appearance online. Here,

projecting one's appearance online can be understood as a sense of presence in a wide range of way. Yoon and Kim (2018) verified that online interaction had a positive effect on the presence experience. Park et al. (2018) experimentally showed that presence can be increased through interaction between users in immersive virtual reality environments. As such, it can be inferred that interactivity has a positive effect on presence by providing conditions for independently experiencing a specific behavior. In this study, since media interaction was classified into P2S, P2P, and P2A according to the interaction target, I will examine whether each interaction has a positive effect on presence. Accordingly, the following hypotheses were established.

H1. Media art interactivity has a positive effect on presence.

H1-1. P2S (Person to System) has a positive effect on presence.

H1-2. P2P (Person to Person) has a positive effect on presence.

H1-3. P2A (Person to Artist) has a positive effect on presence.

Presence is a psychological indicator that can help understand users' attitudes and behaviors in a media-mediated environment and is also considered a predictor of satisfaction. A number of studies have verified the influence of presence on satisfaction. For example, Choi and Kweon (2015) confirmed that the social presence felt in the social viewing experience had a positive effect on both program satisfaction and communication behavior satisfaction. Similarly, Ahn and Park (2017) experimentally verified that the social presence felt in the social viewing experience of TV dramas has a positive effect on viewing satisfaction. In another study, Kim and Park (2019) showed in a real-time SNS video service study that the mediating effect of presence on usage satisfaction varies depending on personal characteristics. This study aims to predict and verify that the presence felt during the media art experience has a positive effect on media art satisfaction based on the influence relationship verified in many of these previous studies. Specifically, in this study, satisfaction with media art is divided into two categories: satisfaction with the work and satisfaction with the system according to the artistic and technical aspects. Accordingly, the following hypotheses were established.

H2. Presence has a positive effect on media art satisfaction.

H2-1. Presence has a positive effect on media artwork satisfaction.

H2-2. Presence has a positive effect on media art system satisfaction.

Flow

Flow, which was first developed by Csikszentmihalyi (1975), is a concept that refers to an optimal psychological experience state. The concept of transportation theory (Green and Brock 2000) is also mentioned as a similar concept to flow. Transportation theory focuses on explaining the cause and effect of an individual being immersed in a story or being transported to a narrative world. Immersion in an experience is explained by both flow and transportation theories, but there is a distinction between immersion in a narrative (transportation theory) and immersion in an experience (flow). In this study, the concept of flow is used to explain immersion in media art experiences.

Before considering the concept of flow, it is necessary to examine the experiential approach initiated by Holbrook and Hirschman (1982). They described consumption experiences by emphasizing fantasies, feelings and fun (three Fs). In various studies, the concept of experience, which focuses primarily on affective states, was supplemented, and flow emerged as a result (Chaney, Lunardo and Mencarelli 2018). From a 'cognitive-only' perspective, flow describes experiences. The concept of flow can be understood through the work of a number of researchers: Ghani, Supnic and Rooney (1991) explained flow as full concentration on a specific behavior while obtaining pleasure from that specific behavior. Trevino and Webster (1992) defined the degree to which users perceive control, concentration, curiosity, and interest in computer-mediated interactions as flow. Lutz and Guiry (1994) defined a specific event, object, and action as a state of being deeply involved and experienced. A person's performance of a specific action is characterized by being completely immersed in the action, not being aware of changes in the surrounding environment, experiencing a distortion of time, and forming positive emotions (Novak and Hoffman 1996). Csikszentmihalyi (1990) presented the prerequisites of flow as well as its effects along eight dimensions. The prerequisites for flow include clear goals, immediate feedback, and level-matching of challenges and skills, while the outcomes of experienced through flow include attention, control, loss of self-consciousness, time distortion, and self-purpose behavior.

According to Ghani and Deshpande (1994), flow is a key variable that explains the interaction between humans and computers in a computer-mediated online environment. The association can also be confirmed through the relationship between interaction and flow as verified through many previous studies. Kwak, Yim and Kwon

(2012) subdivided interaction through mobile applications into corporate-consumer interaction, consumer-consumer interaction, and content-consumer interaction, and they found that the interaction between companies and consumers did not have a positive effect on flow. A study in the field of gaming verified that interactions between users as well as with users and operators have positive effects on flow (Kim and Park 2012). The personal broadcasting study by Kang and Son (2020) showed that interactivity—including two-way communication, reactivity, and active control—has a positive effect on flow. According to the positive influence of interaction on flow that has been revealed in prior studies in various fields, this study expects that the perceived interaction between media art experiences will have a positive effect on flow and attempts to verify the influence relationship. Accordingly, the following hypotheses were established.

H3. Media art interactivity has a positive effect on flow.

H3-1. P2S (Person to System) has a positive effect on flow.

H3-2. P2P (Person to Person) has a positive effect on flow.

H3-3. P2A (Person to Artist) has a positive effect on flow.

Based on the information above, it can be inferred that presence, which means a strong illusion that a user forgets the physical environment and feels real in the mediated environment, will affect the flow state, an experience wherein one is completely immersed in the action. The influence relationship of presence on flow has already been verified in a number of studies. For example, a study by Um, Kim and Kim (2005) verified that the presence felt in an online game environment had a positive effect on the flow experience. Chun and Park (2015) found that perceived presence while using smartphone-based augmented reality content also has a positive effect on flow. Lee, Cho and Oh (2018) conducted a survey on screen baseball users and found that the presence felt while using screen baseball had a positive effect on flow. In addition, a number of studies in various fields have confirmed that presence has a positive effect on flow (Um, Yoon and Han 2017). Therefore, this study expects that the presence felt during the media art experience will have a positive effect on flow and attempts to verify this expectation. Accordingly, the following hypothesis was established.

H4. Presence has a positive effect on flow.

The biggest feature of experiencing flow when performing a specific action is that one feels that the action itself is enjoyable, even if

the action has no reward. From this logic, it can be inferred that flow acts as a source of internal motivation for that particular behavior, and that people who have experienced such flow feel relatively more positive about the particular behavior than those who have not. Flow is a variable used in various fields of research explaining human behavior, and there are many studies examining the flow that occurs in the usage of media. In particular, a number of previous studies have verified the relationship whereby the flow occurring during media use has a positive effect on satisfaction. Kim (2019) verified that the increasing flow with the specialization of e-sports has a positive effect on viewing satisfaction. Kim and Han (2016) examined whether the flow experienced according to one's motivation to use Instagram brand accounts has a positive effect on satisfaction with this use. In addition to research examining media use, there are studies that have verified that satisfaction increases as users experience flow in relation to leisure and cultural activities in which they actively participate. Kim (2011) conducted a survey of people attending a professional baseball game and found that the flow experienced while watching baseball had a positive effect on viewing satisfaction. Based on these existing research results, the present study aims to examine whether the flow felt during the media art experience has a positive effect on media art satisfaction. Accordingly, the following hypotheses were established.

H5. Flow has a positive effect on media art satisfaction.

H5-1. Flow has a positive effect on media artwork satisfaction.

H5-2. Flow has a positive effect on media art system satisfaction.

Satisfaction and Re-experience Intention

The concept of satisfaction refers to the extent to which a consumer's needs are met through the use of a specific service or product (Oliver 1996). The purpose of this study is to examine how satisfaction is experienced when visiting media art exhibitions or exhibits where media technology is applied to art. Even though it is not exactly the same environment, it has been established through a number of previous studies that the presence of a digital mediation device allows users to perceive advantage in real time while experiencing the museum (Ben Nasr, Hallem and Lagier 2017; Jarrier 2015 ; Jarrier, Bourgeon-Renault and Belvaux 2019).

Accordingly, there is a difference in satisfaction with the experience depending on whether digital technology is present or not. Therefore, this study intends to utilize the satisfaction variable in media art in which media technology is used in art.

Satisfaction affects repetitive consumption behaviors such as reuse, revisit, and re-experience, and it directly and indirectly affects financial profits such as sales and costs of service and product providers (Atkins, Marshall and Javalgi 1996; Hesket et al. 2008; Hwang 2014; Lee, Na and Kim 2015). Accordingly, many studies have examined reuse, revisit and re-experience intentions based on satisfaction, as these relationships could provide practical implications. As it gives these major academic and practical implications, it can be seen that it has been universally studied in various research fields rather than in specific fields. Han and Ahn (2015) found that patients' satisfaction with nurses in hospitals had a positive effect on their willingness to revisit hospitals. Ahn and Lee (2021) found that if a visitor feels satisfied with the essential and complementary service elements of a water park, this positively affects their revisit intention. Lee (2021) examined whether customers intend to reuse the same international courier service based on whether they felt satisfied. In addition, a number of studies have shown that re-use, revisit and re-experience intentions increase when one is experiencing satisfaction with specific services and products (Jeon and Kim 2020; Jeong, Hwang and Lee 2020).

Accordingly, many studies use satisfaction to explore academic and practical implications, and this study intends to explore the concept of satisfaction in relation to media art exhibitions. After appreciating a work of art, individual feelings and opinions may vary, but the satisfaction felt in response to those feelings and opinions can be measured. However, in this study, the assumption is that the two areas of media art, technical and artistic, are distinct, and the levels of satisfaction are divided accordingly. People will be satisfied not only with the art that they see through media art, but they will also be satisfied with the technology that enables them to see it splendidly. Since it is believed that tying these two satisfactions together prevents the possibility of rich interpretations, in this study I intend to split satisfaction into two main dimensions: artwork satisfaction and system satisfaction. This work further explore the influence on the intention to re-experience. The following hypotheses were established as a result.

H6. Media art satisfaction has a positive effect on media art re-experience intention.

H6-1. Media artwork satisfaction has a positive effect on media art re-experience intention.

H6-2. Media art system satisfaction has a positive effect on media art re-experience intention.



Research Method

Data Collection

The survey in this study was conducted from May 21, 2021 to May 26, 2021. The survey was commissioned by a specialized survey agency and conducted through an online survey provided through a web questionnaire platform. In total, 220 copies of the responses were collected and used for PLS-SEM analysis. PLS-SEM was used because it is a technique that takes an exploratory approach, as not many user studies have been conducted in the media art field. According to the purpose of this study, responses were solicited from users who had experience with media art exhibitions and media art exhibits. As there are many media art exhibitions, those who have visited an exhibition can participate in the survey regardless of what exhibition they experienced. By selecting respondents based on their experience with media art as a condition for participating in the survey, the following demographic characteristics of the response sample were identified. In terms of gender, there were 67 males (30.5%) and 153 females (69.5%). Regarding age, there were 79 people in their 20s (35.9%), 68 in their 30s (31.3%), 52 in their 40s (23.6%), 17 in their 50s (7.7%), and four in their 60s (1.8%). For education, there were 21 high school graduates (9.5%), 18 university students (8.1%), 143 university graduates (65%), 10 graduate students (4.5%), and 28 graduate graduates (12.7%).

Measurements

Measures of interactive P2S and P2P consisted of three questions each, which were based on the research of Um, Kim and Kim (2005) who proposed a way to classify game interaction into P2C, P2G, and P2P. In the case of P2A, since it was not covered in previous studies, three new questions were added through modification of P2S and P2P questions. Presence questionnaires were modified from the research of Um, Kim, and Kim (2005) as it was thought that the composition of the questions in the study of game interactivity's

FIGURE 5

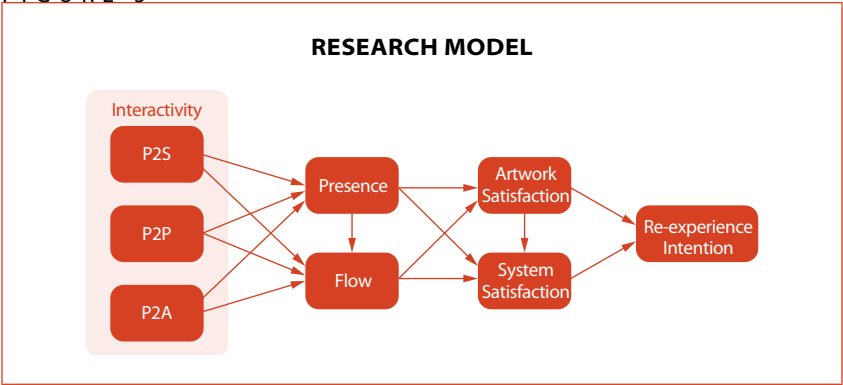


TABLE 2

DEMOGRAPHIC CHARACTERISTICS			
		Frequency	Rate
Gender	Male	67	30.5%
	Female	153	69.5%
Age	20s	79	35.9%
	30s	68	31.3%
	40s	52	23.6%
	50s	17	7.7%
	60s	4	1.8%
Education	High school graduates	21	9.5%
	Undergraduate students	18	8.1%
	Undergraduates	143	65%
	Graduate students	10	4.5%
	Postgraduates	28	12.7%
Total		220	100

influence on presence was suitable for use in this study. Flow was measured by combining and modifying items suitable for this study from several studies, such as Han and Park (2000), Park, Yoon and Choi (2003) and Lee and Hong (2006). Satisfaction with the work and satisfaction with the system respectively consisted of four and three questions, which were based on the research of Jang and Kim (2018), who proposed a way to classify VR satisfaction into content satisfaction

and system satisfaction. Finally, the re-experience intention consisted of five questions based on the study by Yoon (2008). Given that it is a study that examines the intention to revisit a tourist destination, it was found that it could be understood in a similar manner as the intention to re-experience a media art exhibition, and therefore Yoon (2008) study’s measurement was adopted. All questions were revised appropriately for this study. The variables and measurement questions are listed in Table 3.



Results

Measurement Model Evaluation

Reliability

In the analysis, using PLS-SEM, the internal consistency reliability evaluation is based on the Cronbach’s alpha coefficient and the synthetic reliability (Dillon-Goldstein’s rho: DG. rho) value. The Cronbach’s alpha values of all latent variables (Latent Variable) were determined to exceed the reference value of 0.70 (Nunnally and Bernstein 1994) and the DG. rho values were determined

TABLE 3

MEASUREMENTS			
Variable		Items	References
Interactivity	P2S	I did not have difficulty appreciating media art due to the delay in the system response time. I did not experience a delay in the movement of the work due to a system problem when viewing the media art. I did not experience a media art screen switching error due to a system problem when viewing the media art.	Um, Kim, and Kim 2005
	P2P	I was able to talk to my companion while enjoying the media art. I was able to interact with others while enjoying the media art. I think positively that I will be able to communicate with others while enjoying media art.	–
	P2A	I was able to communicate with the artist through the media artworks. Through the media art, I was able to examine the artist’s world of art. I think positively of being able to communicate with the artist through the media art.	–
Presence (PRE)		The media art system gives a natural feeling as if it were in the real world. The sensory characteristics of the media art system feel similar to those felt in the real world. While appreciating media art, I forgot about the media technology and fully accepted the environment.	Um, Kim, and Kim 2005
Flow (FLO)		I felt joy while enjoying media art. It’s fun for me to experience something new through media art. I fell in love with the media art without realizing it. I forgot about what was around me while I was experiencing the media art. While watching the media art, I was unaware of the passage of time.	Han and Park 2000; Lee and Hong 2006; Park, Yoon and Choi 2003
Satisfaction	Artwork Satisfaction (AWS)	The works I saw through the media art gave me satisfaction as a whole. I was satisfied with being able to see various works through the media art. The creativity of the works I saw through the media art gave me satisfaction. The aesthetic elements of the works I saw through the media art gave me satisfaction.	Jang and Kim 2018
	System Satisfaction (SYS)	The media art system overall gave me satisfaction. The grandeur of the media art system influenced my satisfaction. Enjoying the work through a system called Media Art influenced my satisfaction.	
Re-experience Intention (REI)		I am thinking of appreciating media art again. If I have a chance, I will enjoy media art again. I will try various types of media art in the future.	Yoon 2008

to exceed the reference value of 0.70 (Bagozzi and Yi 1988) ensuring internal consistency reliability. The values of Cronbach's alpha and DG. rho are summarized in Table 4.

The indicator reliability of measurement indicators is verified through standardized estimates by calculating standardized coefficients. The standardized loading value should exceed 0.70 (Chin 1998; Hair et al. 2012). The results of the analysis showed that the standardized loading values excluding FLO4 were found to be greater than 0.70, and it was confirmed that the index reliability of the measurement index was secured. In this study, 0.60—the standard allowed in many studies—was used without removing FLO4 as a reference (Yoon and Choi 2015). The standardized loading values are summarized in Table 4.

TABLE 4

RELIABILITY			
Variable		Cronbach's α	DG. rho
Interactivity	P2S	0.889	0.931
	P2P	0.828	0.897
	P2A	0.785	0.875
PRE		0.801	0.883
FLO		0.840	0.887
Satisfaction	AWS	0.878	0.916
	SYS	0.866	0.918
REI		0.922	0.941

Validity

Concentrated validity is evaluated based on the statistical significance of the loading value for the measurement index and the average variance extraction (AVE) of the latent variable. It can be seen that the t-value of the loading value for the measurement index, presented in Table 5, exceeded the reference value of 1.96 (Gefen and Straub 2005). The average variance extraction (AVE) of all the latent variables exceeds the reference value of 0.50 (Fornell and Larcker 1981). It can be evaluated that the Concentration validity has been secured as it exceeds the two criteria. The average variance extraction (AVE) values are summarized in Table 6.

To secure discriminant validity, the square root of the average variance extract of the latent variable must be higher than the correlation coefficient with other latent variables (Gefen and

Straub 2005). The results of the analysis showed that the mean variance extraction square roots of all latent variables in this study were higher than the absolute values of the correlation coefficient with other latent variables, which indicates that discriminant validity has been secured. In Table 7, the mean variance extraction square root of latent variables is summarized in the correlation matrix between latent variables.

Model fit

Unlike covariance-based structural equations, PLS-SEM does not present model suitability. Therefore, in this study, explanatory power is reviewed based on the coefficient of determination (R^2) value of the endogenous latent variable and Goodness-of-Fit (GoF). The coefficients of

TABLE 5

INDICATOR RELIABILITY				
Variable		Measurement	Original	t-value
Interactivity	P2S	P2S1	0.887	29.019
		P2S2	0.910	43.180
		P2S3	0.910	43.009
	P2P	P2P1	0.840	22.591
		P2P2	0.834	21.251
		P2P3	0.910	44.338
	P2A	P2A1	0.744	15.958
		P2A2	0.871	42.081
		P2A3	0.880	56.385
PRE		PRE1	0.817	23.426
		PRE2	0.871	34.981
		PRE3	0.842	27.497
FLO		FLO1	0.843	44.375
		FLO2	0.768	24.918
		FLO3	0.861	35.067
		FLO4	0.658	11.982
		FLO5	0.755	17.007
Satisfaction	AWS	AWS1	0.881	56.861
		AWS2	0.853	38.232
		AWS3	0.818	25.313
		AWS4	0.868	41.757
	SYS	SYS1	0.904	63.461
		SYS2	0.849	38.030
		SYS3	0.911	67.467
REI		REI1	0.860	45.465
		REI2	0.866	49.286
		REI3	0.880	48.654
		REI4	0.881	49.623
		REI5	0.879	47.993

TABLE 6

AVERAGE VARIANCE EXTRACTED (AVE)		
Variable		AVE
Interactivity	P2S	0.815
	P2P	0.743
	P2A	0.696
PRE		0.712
FLO		0.609
Satisfaction	AWS	0.732
	SYS	0.790
REI		0.763

determination of each latent variable are presented in Table 8. Although there is no absolute criterion, previous studies have shown that 0.19 is a weak level, 0.33 is an intermediate level, and 0.67 is a strong level (Chin 1998). In addition, the GoF value was confirmed to be 0.545. It can be seen that it exceeds the recommended standard of 0.36 (Tenenhaus et al. 2005).

Hypotheses verification

Path coefficients were used to verify the hypotheses. Path coefficient evaluation explains the causal relationship between latent variables, and it is evaluated at the level of statistical significance (p-value). The statistical significance level is interpreted as significant at the $p < 0.05$ level if the t-value of the path coefficient is 1.96 or higher, significant at the $p < 0.01$ level if it is 2.58 or higher, and significant at the $p < 0.001$ level if it is 3.29 or higher. Table 9 summarizes the path coefficients and t-values used to verify the research model hypothesis.

As a result of the analysis, H1—which was set to have an effect on presence—was partially supported. Specifically, through H1-3, it was confirmed that P2A had a positive (+) effect on presence ($p < 0.001$). However, it was found that H1-1, which was set for P2S to have a positive (+) effect on presence, and H1-2, which was set for P2P to have a positive (+) effect on presence, did not have a significant effect. H2—which was set to have a positive effect on satisfaction—was partially supported. The effect of presence, set as H2-2 on system satisfaction, was found to be significant at the $p < 0.05$ level, while presence did not significantly affect artwork satisfaction (H2-1).

H3, which was set to affect the flow of interactivity, was also partially supported. Specifically, it was verified that H3-1 ($p < 0.01$), which was

TABLE 7

MATRIX OF SQUARE ROOT OF AVE AND CORRELATION COEFFICIENTS								
	P2S	P2P	P2A	PRE	FLO	AWS	SYS	REI
P2S	0.903*							
P2P	0.425	0.862*						
P2A	0.254	0.295	0.834*					
PRE	0.178	0.088	0.280	0.844*				
FLO	0.384	0.220	0.513	0.524	0.780*			
AWS	0.421	0.307	0.488	0.367	0.773	0.855*		
SYS	0.423	0.297	0.456	0.439	0.730	0.812	0.888*	
REI	0.353	0.305	0.429	0.351	0.672	0.718	0.694	0.873*

* square root of AVE

set for P2S to have a positive (+) effect on flow, and H3-3 ($p < 0.001$), which was set for P2P to have a positive (+) effect on flow, both had significant effects. On the other hand, H3-2, which was set for P2A to have a positive (+) effect on flow, was rejected as it was found to have no significant effect. In addition, H3, which was set to have a positive (+) effect on flow, was found to be significant at the $p < 0.001$ level and supported. H4, which attempted to examine the influence of presence on flow, was supported with significance at the $p < 0.001$ level. H5, which was set to affect satisfaction, was confirmed. Specifically, flow was found to have a significant effect on artwork satisfaction at the $p < 0.001$ level, and it was found to have a significant effect on system satisfaction at the $p < 0.01$ level.

Finally, H6—which was set to verify the intention to re-experience media art according to artwork satisfaction and system satisfaction—was also confirmed. Specifically, it was found that artwork satisfaction had a significant effect on re-experience intention at the $p < 0.001$ level, and

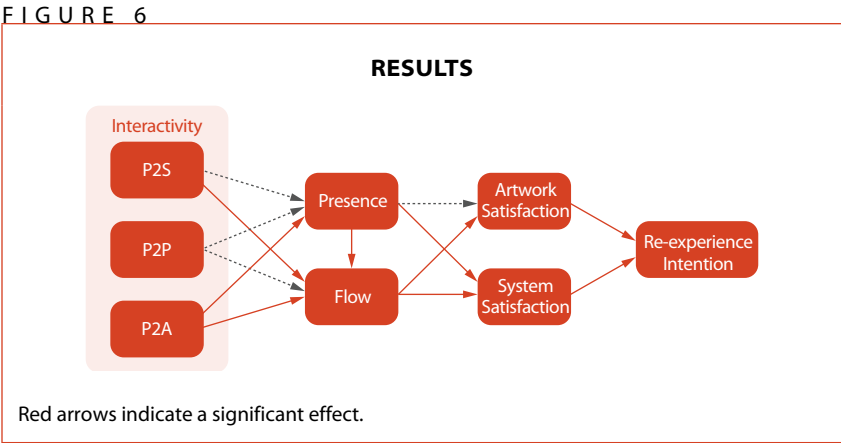
TABLE 8

COEFFICIENTS OF DETERMINATION						
Variable		R ²	Mean.Boot	Std.Error	Perc .025	Perc .975
Interactivity	P2P	0.179	0.179	0.057	0.071	0.297
	P2A	0.099	0.109	0.041	0.038	0.200
PRE		0.103	0.115	0.046	0.036	0.211
FLO		0.443	0.454	0.059	0.335	0.571
Satisfaction	AWS	0.668	0.679	0.038	0.593	0.749
	SYS	0.765	0.772	0.032	0.705	0.827
REI		0.603	0.621	0.045	0.532	0.707

that system satisfaction had a significant effect on re-experience intention at the $p<0.01$ level. The results of this study are summarized in Figure 6.

Discussion and Conclusion

In this paper, I examined whether the interaction of media art exhibitions and exhibits leads to satisfaction and re-experience intention through presence and flow. To this end, interactivity was split into P2S, P2P, and P2A, according to the interaction target, to examine the relationship between presence and flow. Satisfaction was divided into the artistic and technical aspects of media art and satisfaction with the system. To this end, a survey was conducted, which yielded a total of 220 responses, and these responses were subjected to PLS-SEM analysis. The results showed that only the P2A factor of interactivity influenced presence, while the P2S and P2A factors of interactivity influenced flow. The P2P factor of interactivity was found to have no significant effect on either presence and flow. Presence was found to have a positive effect on flow, and presence only had a significant effect on satisfaction with the media art system, while it did not have a significant effect on satisfaction with the artwork. On the other hand, flow was found to have significant



effects on both artwork satisfaction and system satisfaction. Finally, both artwork satisfaction and system satisfaction felt through media art were found to have positive effects on intention to re-experience.

The results of this study offer three main discussion points. The first point is about the influence of interactivity on presence and flow. The research results have shown that only P2A has a significant effect on presence, which can be interpreted as a result of the nature of media art, in that it does not intend to permeate space or structure on the same plane as the real world, but maps artworks rather than reality. Therefore, it can be seen that the smoothness of this system

TABLE 9

HYPOTHESES VERIFICATION								
H		Path	Original	Mean. Boot	Std. Error	t-value	Result	
H1	1	P2S -> PRE	0.049	0.054	0.073	0.675	Rejected	Partially supported
	2	P2P -> PRE	-0.068	-0.065	0.078	-0.867	Rejected	
	3	P2A -> PRE	0.322	0.317	0.076	4.223***	Supported	
H2	1	PRE -> AWS	-0.030	-0.026	0.048	-0.631	Rejected	Partially supported
	2	PRE -> SYS	0.095	0.094	0.042	2.255*	Supported	
H3	1	P2S -> FLO	0.140	0.144	0.062	2.258**	Supported	Partially supported
	2	P2P -> FLO	0.000	0.008	0.068	0.000	Rejected	
	3	P2A -> FLO	0.364	0.361	0.060	5.984***	Supported	
H4		PRE -> FLO	0.402	0.400	0.059	6.818***	Supported	
H5	1	FLO -> AWS	0.704	0.703	0.055	12.815***	Supported	Supported
	2	FLO -> SYS	0.181	0.178	0.068	2.652**	Supported	
H6	1	AWS -> REI	0.315	0.317	0.093	3.369***	Supported	Supported
	2	SYS -> REI	0.240	0.238	0.097	2.474**	Supported	

and the presence that P2S and P2P—which means communication with others—feels real in the space, did not have a significant effect. On the other hand, P2S and P2A were found to have significant effects on flow, and it can be seen that the smoothness of the system had positive effects on immersion and appreciation of media artworks, unlike presence. In addition, P2A, which means interaction with the artist, can be seen as affecting the sense of immersion in that visitors examine media artworks more deeply in the process of interacting with the artist through the artworks. It should be noted that P2P did not have a significant effect on either presence or flow. It is necessary to further examine whether exchanges with people while appreciating artworks due to the nature of media art seen through future research instead interfere with appreciation and do not have a significant influence. For example, if communication with others is divided into media art appreciation and after appreciation, it is judged that a specific interpretation of this will be possible.

The second point is about the influence of presence on flow. As a result of this study, it was shown that presence affects flow in accordance with the hypothesis established based on the theoretical background and previous research. This demonstrates that the stream that goes from presence, which refers to forgetting media-mediated system while using media-mediated content and feeling like reality, to flow, which refers to the condition that someone completely forget surroundings and become immersed in the content, is correct. Therefore, this can be referred to as a re-verification of the results of previous studies, and shows that this trend also exists in the field of media art.

The third point is about the influence of presence and flow on work satisfaction and system satisfaction. The results of this study showed that the presence of media art did not have a significant effect on satisfaction with media artworks, only on system satisfaction. This can be interpreted according to a logic similar to that described in the first discussion point. Media art is more likely to be expressed in a grand way than to permeate the real world, or to map artworks to an entire space such as ceilings, walls, and floors, so that the presence felt in the real world can be satisfied with systematic grandeur or one can experience a space differently. Accordingly, presence can be interpreted as having a significant effect only on satisfaction with the system. However, flow has a significant positive effect on the overall satisfaction with the artwork and system. Therefore, it can be inferred that those who have experienced a sense of presence also

feel satisfaction with the media artwork through the flow state.

The academic contributions of this study are as follows. First, in the existing media art field, case analysis, structure analysis, and content design proposal were mainly conducted, and in a situation where empirical analysis for media art users was insufficient, this study conducted a survey on users by applying quantitative methodology and derived generalizable results. In this study, as prior research in the existing media art field was insufficient, research in fields similar to media art, such as the gaming and VR fields, was reviewed with an exploratory approach to identify variables and construct a suitable research model. Accordingly, it contributes academically by expanding the scope of research in the media art field, which has to this point been limited to qualitative and case analysis. Second, in this study, interactivity variables adapted to media art were proposed through the process of modifying and adding variables from gaming research. It can therefore be seen that this study thus contributes academically by providing measures that can be used in future media art research.

In practice, this study contributes by providing basic marketing data applicable to media art industry marketing in that it collected and analyzed responses from those who experienced media art exhibitions. Specifically, given that I looked at how users perceive presence and flow based on their interaction with systems, others, and writers, I will be able to focus on marketing factors to provide rich experiences to users. In addition, given that media art satisfaction was split into artwork satisfaction and system satisfaction, these two dimensions can be examined regarding experience factors to be provided to potential users when planning media art exhibitions.

This paper has several limitations. First, it is limited by the number of responses collected. Although the survey responses were collected by a specialized survey agency, it was difficult to secure a sample of those who experienced media art, so only 220 respondents could ultimately be secured. Accordingly, although it was expected that there would be a difference between the media art exhibition and the experience of using media art exhibits, the two types were integrated according to the limitations of sample acquisition to collect responses from users. Since this paper is an initial study focusing on users in the media art field, it used an exploratory approach, but future studies are expected to examine differences according to media art types and verify the impact relationship. Second, the research methodology has a limitation in that it has not been able to derive

abundant results for individual users. This is a common limitation of research applying quantitative methodology. It also provides meaningful academic implications for practically deriving generalizable results by conducting surveys on multiple samples for other specific social phenomena. However, since this research on users in the media art field remains in its early stages, it is expected that we will be able to discover new variables specialized in the media art field and examine interesting influences by collecting and analyzing rich answers from individual users through methodologies such as in-depth interviews. Lastly, this study has a limitation in that it does not take into consideration the attitude that is formed after encountering media art. Because media art is a type of art, the perceived experience after consuming each artwork will be different. It is therefore possible to add explanatory variables that lead to re-experience intentions. There could be an attitude variable, which may relate directly to behavioral intentions. In future research, it may be possible to add these explanatory variables in order to increase the explanatory power. As well, the explanation of satisfaction, which is a preceding variable of re-experience intention, could be developed in more detail. In the present study, the satisfaction variable was split into two dimensions: artwork satisfaction and system satisfaction. If any condition can be added to the equation, satisfaction may be further divided. It is also possible for users to prioritize artwork satisfaction over system satisfaction, or to compare the relative importance of those two satisfactions.

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A SURVEY OF MEDIA ART EXHIBITION VISITORS

First of all, I would like to thank you for taking the time to complete this survey.

The purpose of this survey is to explore users' experiences with media art exhibitions.

Your responses will not be used for any purposes other than statistical analysis for academic purposes.

Your honest responses will be used as valuable material for this study.

Thank you again for participating.

Art created using media technologies, such as computer systems, is known as media art. In recent years, it is possible to find spaces that combine such media art through exhibitions. 'Bunker of Light' held in Jeju Island, South Korea, 'The Forest' held in Yeosu, South Korea, 'Flower by Naked' held in Seoul, South Korea, etc. Recently, media arts exhibitions addressing major social issues such as environmental issues have taken place.

0. Do you have any experience in media art?

① Yes

② No

1. How often have you visited media art exhibition?

2. What is the title of your most recent media art exhibition?

3. Answer the following questions.

Not at all ↔ Very much

1 I did not have difficulty appreciating media art due to the delay in the system response time.

2 I did not experience a delay in the movement of the work due to a system problem when viewing the media art.

3 I did not experience a media art screen switching error due to a system problem when viewing the media art.

4. Answer the following questions.

Not at all ↔ Very much

1 I was able to talk to my companion while enjoying the media art.

2 I was able to interact with others while enjoying the media art.

3 I think positively that I will be able to communicate with others while enjoying media art.

5. Answer the following questions.

Not at all ↔ Very much

1 I was able to communicate with the artist through the media artworks.

2 Through the media art, I was able to examine the artist's world of art.

3 I think positively of being able to communicate with the artist through the media art.

6. Answer the following questions.

Not at all ↔ Very much

1 The media art system gives a natural feeling as if it were in the real world.

2 The sensory characteristics of the media art system feel similar to those felt in the real world.

3 While appreciating media art, I forgot about the media technology and fully accepted the environment.

(continued on next page)

APPENDIX (continued)

7. Answer the following questions.		Not at all		↔		Very much
1	I felt joy while enjoying media art.					
2	It's fun for me to experience something new through media art.					
3	I fell in love with the media art without realizing it.					
4	I forgot about what was around me while I was experiencing the media art.					
5	While watching the media art, I was unaware of the passage of time.					
8. Answer the following questions.		Not at all		↔		Very much
1	The works I saw through the media art gave me satisfaction as a whole.					
2	I was satisfied with being able to see various works through the media art.					
3	The creativity of the works I saw through the media art gave me satisfaction.					
4	The aesthetic elements of the works I saw through the media art gave me satisfaction.					
9. Answer the following questions.		Not at all		↔		Very much
1	The media art system overall gave me satisfaction.					
2	The grandeur of the media art system influenced my satisfaction.					
3	Enjoying the work through a system called Media Art influenced my satisfaction.					
10. Answer the following questions.		Not at all		↔		Very much
1	I am thinking of appreciating media art again.					
2	If I have a chance, I will enjoy media art again.					
3	I will try various types of media art in the future.					
11 ~ 13. Below is a demographic question.						
11. Which gender are you?						
Male						
Female						
12. What is your birth year?						
13. What is your final educational level?						
Less than high school graduation						
High school graduation						
In university						
University graduate						
In graduate School						
Graduate school graduate						
Thank you very much for responding to the survey.						

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