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Extending the Technology Acceptance Model with Telepresence: Drivers of Behavioral Intention in Virtual Reality Tourism at Taman Pintar Yogyakarta

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Abstract

Background. Virtual reality is increasingly deployed by educational tourism destinations to enrich the pre visit experience, yet evidence on how immersive attributes convert into visitor intention in Indonesian science parks remains limited.
Objective. This study extends the Technology Acceptance Model by positioning telepresence as an experiential mediator, and examines the effect of perceived ease of use on telepresence and perceived usefulness, and the effect of telepresence and perceived usefulness on behavioral intention.
Method. A quantitative survey was administered after a standardized virtual reality exposure in the Popular Technology Zone of Taman Pintar Yogyakarta. One hundred visitors were drawn through proportionate stratified random sampling by gender and age, responses were captured on a seven-point Likert scale, and the data were analyzed using descriptive statistics and path analysis in SPSS.
Results. Perceived ease of use significantly influenced telepresence and perceived usefulness. Telepresence significantly influenced perceived usefulness and behavioral intention, and perceived usefulness significantly influenced behavioral intention. The three models explained 30.8, 50.1, and 28.5 percent of the variance respectively.
Conclusion. Telepresence operates as an experiential mechanism that complements the cognitive route of the Technology Acceptance Model, so effortless interaction shapes intention both through judged benefit and through the felt sense of being inside the mediated environment. Managers of Taman Pintar should prioritize interface simplicity, headset comfort, guided onboarding, and immersive local content, while virtual reality developers should treat telepresence quality as an explicit design target rather than a byproduct of hardware specification.

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INTRODUCTION

Virtual reality is an immersive technology that places the user inside a computer generated environment which can be explored and manipulated in real time (Skorenkyy et al., 2021). In tourism it has moved from a promotional novelty to an experiential product, because a destination can now be sampled before, and sometimes instead of, a physical visit (Jiang et al., 2023). Whether visitors accept and reuse such a device is therefore no longer a hardware question but a behavioral one, and it is that behavioral question this study addresses. Virtual Reality is considered very useful for many fields, including the tourism sector, because virtual reality is one of the innovations of the development of industry 4.0 technology (Lozano & Vijayan, 2020).

This is because virtual reality offers many possibilities that are useful for the tourism sector to create or expand virtual experiences, which can be accepted and used by tourists as an alternative to real visits, where this phenomenon is known as virtual tourism (Jagatheesaperumal & Rahouti, 2022). The tourism sector in Central Java, especially in the Special Region of Yogyakarta (D.I.Y Yogyakarta) has great potential to grow the tourism sector, recorded during the pre- and post-pandemic period Yogyakarta is still one of the destinations frequently visited by both local and foreign people, although in terms of numbers not as many as in previous years, including in the number of museum visits. The Taman Pintar Yogyakarta Museum is a tourist attraction located in the center of Yogyakarta, precisely on Jalan Panembahan Senopati No.1-3 Yogyakarta. Recent evidence sharpens this picture. Tourist volume in the Special Region of Yogyakarta has recovered to and exceeded its pre pandemic level, and museum and educational attractions have absorbed a rising share of that recovery as venues added digital and immersive facilities to their offer. Experimental evidence shows that a destination previewed through virtual reality generates significantly stronger visit intention than the same destination previewed through conventional two-dimensional media Skard et al. (2021), and review evidence confirms that interactivity and telepresence are the two attributes most consistently linked to tourist response (Jiang et al., 2023). What remains unclear is whether those effects hold in a museum based educational setting in a developing economy, where most visitors meet a headset for the first time and the content is didactic rather than scenic.

Taman Pintar combines recreational and educational tourist attractions in one location. It is recorded that Taman Pintar has at least a playground as well as educational facilities divided into several zones, as well as direct access to the former shopping center book center. The many rides offered by Taman Pintar Yogyakarta are expected to be an attraction for visitors to visit Taman Pintar as an alternative place for a vacation. Realizing the development of technology and industrial progress in the era of the industrial revolution 4.0, in mid-2020, the Taman Pintar Yogyakarta Museum presented a new demonstration tool in the form of Virtual Reality (VR) which is located on the second floor of the Taman Pintar Yogyakarta oval building. Taman Pintar is an appropriate research object for three reasons. First, it is a public science park rather than a commercial arcade, so adoption is not driven by prior enthusiast interest, and the sample approximates a general population of first-time users. Second, the Popular Technology Zone operates a single standardized installation, which holds hardware and content constant across respondents and removes a confound common in field studies of immersive technology. Third, as a municipally managed destination it works under the budget and staffing constraints typical of public educational tourism in Indonesia, so its findings translate directly into decisions comparable institutions must make.

The ease of use of virtual reality can create a perception by users of the ease of using a tool, or what can be called perceived ease of use is an important feature that leads to a positive attitude towards the use of technology and thus to a higher intention to use it (Oyman et al., 2022). While in virtual reality, the perceived ease of use of the community in Indonesia is the reason why virtual reality can be accepted in Indonesia with its widespread distribution (Skorenkyy et al., 2021). In addition to the ease of use of virtual reality, there is also the perception of usefulness or what is called perceived usefulness. The perceived usefulness is the extent to which someone believes that using a specific technology will improve their task performance (Jang et al., 2021). Perceived usefulness also has a direct influence on the intention to use technology.

This fact assumes that information systems that offer user efficiency benefits will be used repeatedly by users. In addition to perceived ease of use and perceived usefulness, the use of VR is widely used by marketers because it provides telepresence . Telepresence is a feature that includes customers in a medium (J. H. Kim et al., 2021). A user can feel the perceived ease of use, perceived usefulness, and telepresence in the VR, encouraging the emergence of a behavioral intention in the user when using the VR. Behavioral intention refers to future behavior that can be done by the customer (Sprenger & Schwaninger, 2021).

The conceptual chain examined here follows from the Technology Acceptance Model and from the presence literature. Perceived ease of use lowers the cognitive and physical effort required to operate the headset, and effort not spent on operating the device becomes attentional capacity available for the mediated environment, which is the mechanism by which ease of use should raise telepresence. Telepresence in turn supplies the vivid first-person evidence on which

a judgement of usefulness is formed, so it should raise perceived usefulness. The felt sense of being there and the judged benefit then both feed behavioral intention, the first through affective engagement and the second through the cognitive route specified in the original model (Huang et al., 2023).

Previous empirical work on virtual reality acceptance does not converge, and the divergence is summarized in Table 1.

Table 1

Comparison of Previous Empirical Findings on Virtual Reality Acceptance and Behavioral Response

Study	Context and sample	Analytical approach	Finding relevant to the present model
Sagnier et al. (2020)	Aeronautical assembly task in VR, 89 users, France	Extended TAM, SEM	Perceived usefulness predicted intention to use, but perceived ease of use showed no significant direct effect on intention
M. J. Kim, Lee, & Jung (2020)	VR tourism consumers, Republic of Korea	Extended stimulus organism response, SEM	Authentic experience and affective response drove visit intention, with presence acting as an experiential antecedent
Skard et al. (2021)	Nature destination preview, laboratory experiment, Norway	Randomized experiment	VR raised travel intention relative to two-dimensional images through mental imagery
Huang et al. (2023)	Recreational VR users, Taiwan	Extended TAM with flow theory, SEM	Both TAM beliefs were significant, and the experiential state strengthened the path to intention
Hoang et al. (2023)	Nature based tourism, 512 tourists, Vietnam	TAM with telepresence, SEM	Telepresence raised perceived enjoyment and increased both VR use intention and real travel intention

Source: Compiled by the authors, 2026

The inconsistency is instructive. Sagnier et al. (2020) report that perceived ease of use loses significance once usefulness is controlled, whereas Huang et al. (2023) recover a significant effect in a recreational setting, and Hoang et al. (2023) locate the decisive mechanism in telepresence rather than in either belief of the original model. Taken together these results suggest that ease of use may act on intention indirectly, through experiential states, rather than directly. That indirect route has not been tested with telepresence as the intervening construct in an educational tourism setting, and this is the gap the present study addresses.

The contribution is therefore theoretical as well as contextual. Rather than appending another external variable to the Technology Acceptance Model, this study repositions telepresence as an experiential mediator seated between the two original beliefs, so that perceived ease of use can reach behavioral intention along an affective path as well as the conventional cognitive one. Testing that structure in a public science park, where users are not self-selected technology enthusiasts, provides a deliberately conservative test of the extended model.

This research is very relevant not only from an academic aspect, but also in supporting regional and central government policies to advance the technology-based education ecosystem and educational tourism destinations. The government, through agencies such as the Education Office, Tourism Office, and Communication and Information Office has great potential to be involved in developing content, infrastructure, and educational digitalization policies that are in line with community needs (Lnenicka et al., 2024). The objective of this study is to test five hypothesized relationships: perceived ease of use on telepresence, perceived ease of use on perceived usefulness, telepresence on perceived usefulness, telepresence on behavioral intention, and perceived usefulness on behavioral intention. The benefits follow on two levels. Theoretically, the study extends the Technology Acceptance Model by specifying telepresence as an experiential mediator and by quantifying the indirect route from perceived ease of use to behavioral intention, which addresses the divergence reported in Table 1. Practically, the results indicate where a constrained public budget yields the largest return: interface simplification and staff assisted

onboarding raise perceived ease of use, the strongest single predictor in the model, while investment in immersive local content raises telepresence, which carries the larger of the two effects on behavioral intention. For the Education Office, the Tourism Office, and the Communication and Information Office of Yogyakarta the same evidence supports prioritizing usability and guided onboarding over sheer hardware volume when digitalizing informal education venues.

METHOD

The research used a quantitative survey design combined with a standardized virtual reality exposure. This study explained the phenomenon using numerical data, which were then processed in a data processing system. The design was deliberately not described as a true experiment. There was no control group, no random assignment to conditions, and no manipulation of an independent variable: every participant received the same virtual reality exposure and then completed the questionnaire, which made this a single-group post-exposure survey . The distinction was stated explicitly because the absence of a comparison condition limited causal inference; therefore, the path coefficients reported below should be read as associations consistent with the hypothesized structure rather than as experimental effects. This exposure session was conducted by asking participants to watch the content using virtual reality in the Popular Technology Zone of Taman Pintar Yogyakarta, and visitors were then asked to complete a self-administered questionnaire referring to the session they had just experienced.

This quantitative research was used to test a research framework regarding the effect of perceived ease of use of virtual reality on perceived usefulness and telepresence, and its impact on behavioral intention in the Popular Technology Zone of Taman Pintar Yogyakarta. This study used two types of variables, namely independent and dependent variables (Purwanto et al., 2021). The independent variable was a variable that influenced, caused changes in, or led to the emergence of the dependent variable. The independent variable in this study was perceived ease of use (X). The dependent variable was a variable that was influenced by, or resulted from, the presence of the independent variable (Fischer et al., 2023). The dependent variables in this study were telepresence (Y1), perceived usefulness (Y2), and behavioral intention (Z).

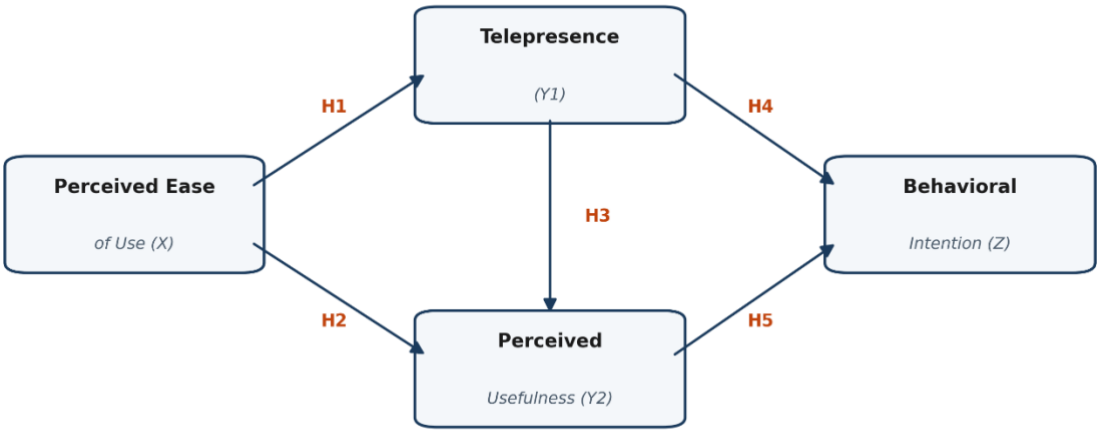

Figure 1. Research Model and Hypotheses

The measurement scale in this study used a Likert scale. The Likert scale was used to measure the attitudes, opinions, and perceptions of a person or group of people regarding social phenomena (Surucu & Maslakci, 2020). The scale used in this study was a seven-point Likert scale with an interval of 1–7. Each construct was measured with multiple indicators adapted from previously validated instruments, and the full operationalization is reported in Table 2. All items were translated into Indonesian and back-translated to confirm equivalence before administration.

Table 2
Construct Operationalization, Number of Indicators, and Sources of Adaptation

Construct	Code	Items	Example indicator	Adapted from	Reliability
Perceived ease of use	X	4	The virtual reality device was easy to operate without assistance	(Davis, 1989; Sagnier et al., 2020)	…
Telepresence	Y1	4	While wearing the headset I felt that I was inside the environment shown	(Hoang et al., 2023; J. H. Kim et al., 2021)	…
Perceived usefulness	Y2	4	Using virtual reality helped me understand the content more effectively	(Davis, 1989; Huang et al., 2023)	…
Behavioral intention	Z	3	I intend to use the virtual reality facility again on a future visit	(Sagnier et al., 2020; Skard et al., 2021)	…

Source: Compiled by the authors, 2026

Path analysis estimated by ordinary least squares regression in SPSS was selected in preference to covariance-based or variance-based structural equation modelling for two reasons. First, every construct was operationalized as a composite score of its indicators rather than as a latent factor with freely estimated loadings, so the measurement model was fixed by design and the additional apparatus of structural equation modelling was not required. Second, with a sample of 100 and a structure containing three regression equations, the ratio of observations to estimated parameters was adequate for ordinary least squares path estimation but marginal for maximum likelihood estimation, where small samples inflated standard errors and destabilized the fit indices (Purwanto et al., 2021). The trade-off was acknowledged: because measurement error was not modelled, the coefficients reported here were conservative, and a latent-variable replication on a larger sample is a natural extension of this work.

The population was the generalization area consisting of objects or subjects that had certain qualities and characteristics determined by the researchers to be studied and from which conclusions were drawn. The population in this study comprised all visitors to the Popular Technology Zone of Taman Pintar Yogyakarta who used the virtual reality facility during the data collection period. The sampling frame was the daily visitor log maintained by the zone attendant, from which the average daily number of virtual reality users was established and used as the reference population. Sampling in this study used the probability sampling method, a sampling technique that provided equal opportunities for each element, or member, of the population to be selected as a sample member (Liu et al., 2020). Furthermore, the sample was distributed using proportionate stratified random sampling based on grouping by gender and age. Two strata were applied. Gender formed the first stratum and age formed the second, with three age bands corresponding to the visitor profile of an educational science park: school-age visitors, young adults, and adults. Within each cell, the target count was set proportionally to that cell's share of the reference population, and respondents were then drawn by systematic random selection of every third visitor leaving the zone until the cell quota was filled. The resulting allocation is reported in Table 3. Data were collected by conducting a survey. The instrument was then tested through validity and reliability tests, and the data were analysed using path analysis. Path analysis is a statistical method used to test the causal relationship between variables (Sarker et al., 2024).

Table 3
Proportionate Stratified Sampling Allocation by Gender and Age (n = 100)

Stratum (age band)	Male	Female	Sub total	Share of sample
Under 18 years (school age)	…	…	…	…
18 to 30 years (young adult)	…	…	…	…
Over 30 years (adult)	…	…	…	…
Total	…	…	**100**	**100.0%**

Source: Processed field data, 2026

RESULTS AND DISCUSSION

Results

The participants in this study were 100 visitors to the Popular Technology Zone of Taman Pintar Yogyakarta who used virtual reality. Their characteristics are summarized in Table 4. Path analysis aims to determine the extent of the influence of independent variables on dependent variables, both directly and indirectly. The independent variable in this study is perceived ease of use (X), while the dependent variables are telepresence (Y1), perceived usefulness (Y2), and behavioral intention (Z). The results of the path analysis were calculated using SPSS 21 for Windows.

Table 4
Characteristics of Respondents (n = 100)

Characteristic	Category	Frequency	Percentage
Gender	Male	…	…
	Female	…	…
Age	Under 18 years	…	…
	18 to 30 years	…	…
	Over 30 years	…	…
Education	Primary or junior secondary	…	…
	Senior secondary	…	…
	Diploma or bachelor and above	…	…
Visit frequency	First visit	…	…
	Second visit or more	…	…
Prior VR experience	Never used VR before	…	…
	Has used VR before	…	…

Source: Processed field data, 2026

Table 5
Recapitulation Results of Path Regression Model I Perceived Ease of Use Towards Telepresence

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	7.931	1.487		5.335	0.000
Perceived Ease of Use	0.396	0.060	0.555	6.607	0.000
Dependent Variable = Telepresence					
R = 0.555					
R Square = 0.308					
Sig F = 0.000					

Source: Processed data, 2026

In the recapitulation results of the path regression model I perceived ease of use towards telepresence in Table 5, the probability significance value of the perceived ease of use variable is 0.000 or a probability smaller than 0.05. This provides the conclusion that the results of the path

regression recapitulation model I perceived ease of use towards telepresence have a significant effect. Then, the value of R Square is 0.308, this shows that the contribution of the influence of perceived ease of use towards telepresence is 30.8%, while the remaining 69.2% is the contribution of other variables not included in the study. Then, the beta coefficient of the perceived ease of use variable towards telepresence is 0.555. An R Square of 0.308 is moderate for a single predictor model in behavioral research and should be read as such: ease of use is a substantial but far from exclusive determinant of the sense of being present in the mediated environment. Content vividness, headset field of view, session duration, and individual imaginative ability are all documented antecedents of telepresence that lie outside this model M. J. Kim, Lee, & Jung (2020) and they plausibly account for much of the unexplained variance.

Table 6

Results of the Path Regression Equation of Model II Perceived Ease of Use and Telepresence Towards Perceived Usefulness

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
Constant	10.159	2.056		4.941	0.000
Perceived Ease of Use	0.416	0.088	0.409	4.744	0.000
Telepresence	0.561	0.123	0.394	4.565	0.000
Dependent Variable	= *Perceived Usefulness*				
R	= 0.708				
R Square	= 0.501				
Sig F	= 0.000				

Source: Processed data, 2026

In the results of the regression equation of the path model II perceived ease of use and telepresence towards perceived usefulness in Table 6 the probability significance value of the perceived ease of use variable is 0.000 or a probability smaller than 0.05 and the probability significance value of the telepresence variable is 0.000 or a probability smaller than 0.05. This provides the conclusion that the results of the regression equation of the path model II perceived ease of use towards perceived usefulness have a significant effect, as well as telepresence towards perceived usefulness has a significant effect. Then, the value of R Square is 0.501, this shows that the contribution of the influence of perceived ease of use and telepresence towards perceived usefulness is 50.1%, while the remaining 49.9% is the contribution of other variables not included in the study.

Then, the beta coefficient of the perceived ease of use variable towards perceived usefulness is 0.409 and the beta coefficient of the telepresence variable towards perceived usefulness is 0.394. This is the best explained of the three equations, and the reason is theoretically informative: usefulness is judged jointly from how little effort the device costs and from how convincing the mediated experience feels, so specifying both routes captures half the variance where either alone would capture considerably less. Because perceived ease of use also predicts telepresence, part of its influence on perceived usefulness travels indirectly through telepresence. The direct, indirect, and total effects are decomposed in Table 8.

Table 7
Results of the Path Regression Equation of Model III Telepresence and Perceived Usefulness Towards Behavioral Intention

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	4.409	2.103		2.097	0.039
Telepresence	0.371	0.121	0.335	3.064	0.003
Perceived Usefulness	0.199	0.085	0.257	2.346	0.021
Dependent Variable = *Behavioral Intention*					
R = 0.534					
R Square = 0.285					
Sig F = 0.000					

Source: Processed Data, 2026

In the results of the path regression equation of model III telepresence and perceived usefulness towards behavioral intention in Table 7, the probability significance value of the telepresence variable is 0.003 or a probability smaller than 0.05 and the probability significance value of the perceived usefulness variable is 0.021 or a probability smaller than 0.05. This provides the conclusion that the results of the path regression equation of model III telepresence towards behavioral intention have a significant effect, as well as perceived usefulness towards behavioral intention has a significant effect. Then, the value of R Square is 0.285, this shows that the contribution of the influence of telepresence and perceived usefulness towards behavioral intention is 28.5%, while the remaining 71.5% is the contribution of other variables not included in the study.

Then, the beta coefficient of the telepresence variable towards behavioral intention is 0.335 and the beta coefficient of the perceived usefulness variable towards behavioral intention is 0.257. The comparatively low R Square of this final equation deserves comment rather than silence. Behavioral intention in a tourism setting is shaped by price, accompanying group, travel distance, queue length, and prior attachment to the destination, none of which enters an acceptance model. A model restricted to technology beliefs that nevertheless explains 28.5 percent of intention is performing as the literature would predict Sagnier et al. (2020), and the figure should be interpreted as the ceiling of what perception of the technology alone can account for.

Table 8
Decomposition of Direct, Indirect, and Total Standardized Effects

Path	Direct effect	Indirect effect	Total effect	Route of the indirect effect
X → Y1	0.555	—	0.555	No intervening variable
X → Y2	0.409	0.219	0.628	X → Y1 → Y2
X → Z	—	0.347	0.347	X → Y1 → Z, X → Y2 → Z, and X → Y1 → Y2 → Z
Y1 → Y2	0.394	—	0.394	No intervening variable
Y1 → Z	0.335	0.101	0.436	Y1 → Y2 → Z
Y2 → Z	0.257	—	0.257	No intervening variable

Source: Processed data, 2026

Note: X = perceived ease of use, Y1 = telepresence, Y2 = perceived usefulness, Z = behavioral intention. Indirect effects are the products of the standardized coefficients along each route, summed where more than one route exists. The decomposition shows that telepresence carries a substantial share of the influence of perceived ease of use, and that the total effect of telepresence

on behavioral intention (0.436) exceeds that of perceived usefulness (0.257).

Path Coefficient of Perceived Ease of Use to Telepresence

The first path coefficient in this study, analysing the influence of perceived ease of use on telepresence, is shown in Table 5. The first hypothesis in this study is:

H1: Perceived ease of use has a positive effect on telepresence.

The results of the path coefficient test in Table 5 indicate an effect of perceived ease of use on telepresence, with a standardised beta coefficient of 0.555 and a probability of 0.000 ($p<0.05$). The probability in Table 5 is less than 0.05, thus, the decision is to reject H0. This means that the hypothesis stating that perceived ease of use has a significant effect on telepresence is accepted. The coefficient is interpreted in standard deviation units: a one standard deviation increase in perceived ease of use is associated with a 0.555 standard deviation increase in telepresence. It is not a percentage contribution, and the proportion of variance accounted for is given separately by the R Square of the equation.

Path Coefficient of Perceived Ease of Use to Perceived Usefulness

The second path coefficient in this study is the analysis of the influence of perceived ease of use on perceived usefulness as shown in Table 6. The second hypothesis in this study is:

H2: Perceived ease of use has a positive effect on perceived usefulness.

Table 6 shows the effect of perceived ease of use on perceived usefulness with a standardised beta coefficient of 0.409 and a probability of 0.000 ($p<0.05$). The probability in Table 6 is less than 0.05, thus H0 is rejected. This means that the hypothesis stating that perceived ease of use has a significant effect on perceived usefulness is accepted. The relationship is the effort to benefit link specified in the Technology Acceptance Model: a system that costs the user little effort is credited with more of the benefit it delivers, because attention that would otherwise be consumed by operating the device is available for the task itself (Davis, 1989; Sagnier et al., 2020).

Path Coefficient of Telepresence on Perceived Usefulness

The third path coefficient in this study, analyzing the effect of telepresence on perceived usefulness, is shown in Table 6. The third hypothesis in this study is:

H3: Telepresence has a positive effect on perceived usefulness

Table 6 shows the effect of telepresence on perceived usefulness, with a standardised beta coefficient of 0.394 and a probability of 0.000 ($p<0.05$). The probability in Table 6 is less than 0.05, thus H0 is rejected. This means that the hypothesis stating that telepresence has a significant effect on perceived usefulness is accepted.

Path Coefficient of Telepresence on Behavioural Intention

The fourth path coefficient in this study, analysing the effect of telepresence on behavioural intention, is shown in Table 7. The fourth hypothesis in this study is:

H4: Telepresence has a positive effect on behavioral intention.

Table 7 shows the effect of telepresence on behavioural intention, with a standardised beta coefficient of 0.335 and a probability of 0.003 ($p<0.05$). The probability in Table 7 is less than 0.05, thus H0 is rejected. This means that the hypothesis stating that telepresence has a significant effect on behavioural intention is accepted.

Path Coefficient of Perceived Usefulness to Behavioral Intention

The fifth path coefficient in this study is the analysis of the influence of perceived usefulness on behavioral intention as shown in Table 7. The fifth hypothesis in this study is:

H5: Perceived usefulness has a positive effect on behavioral intention.

Table 7 shows the effect of perceived usefulness on behavioral intention, with a standardised beta coefficient of 0.257 and a probability of 0.021 ($p<0.05$). The probability in Table 7 is less than 0.05, thus rejecting H0. This means the hypothesis stating that perceived usefulness has a significant effect on behavioral intention is accepted. Behavioral intention was measured across three distinct facets rather than as a single undifferentiated construct: the intention to use the virtual reality facility again on a subsequent visit, the intention to recommend it to others, and the intention to seek out further immersive content of the same kind. Distinguishing them matters for management,

because continued use is driven mainly by the quality of the session itself whereas recommendation additionally depends on how easily the experience can be described to someone who has not had it (Skard et al., 2021). The value of e1 can be calculated using the formula:

e1= √ ((1-0.308)) = 0.832

The value of $\mathbf{e_2}$ can be found using the formula:

e2= √ ((1-0.501)) = 0.706

The value of $\mathbf{e_3}$ can be found using the formula:

e3= √ ((1-0.285)) = 0.846

Thus, the following path diagram of the II structure model is obtained.

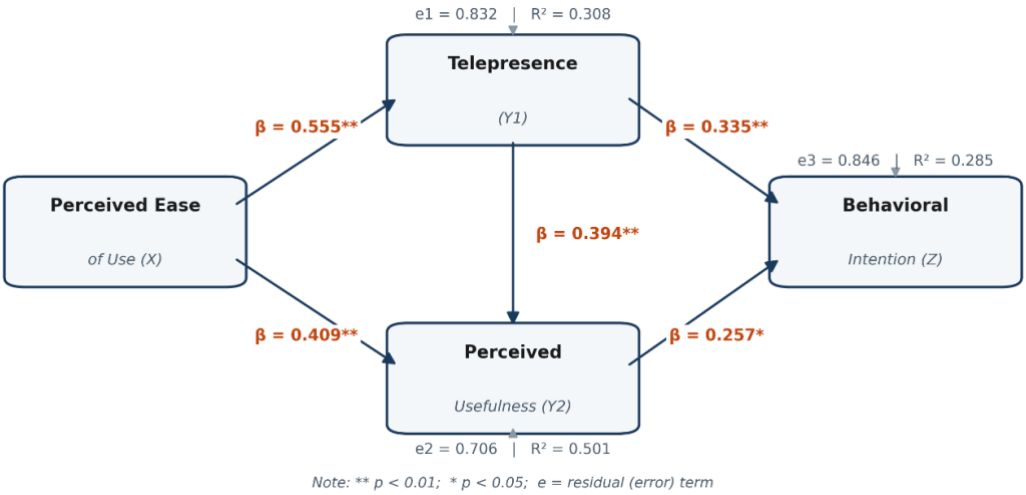

Figure 2. Path Diagram of the Structural Model

The Influence of Perceived Ease of Use (X) on Telepresence (Y1)

Perceived ease of use exerted the strongest single effect in the model on telepresence, and the mechanism is a matter of cognitive economy rather than preference. A headset that is straightforward to fit, focus, and operate consumes little working memory, and the attentional capacity released by that simplicity is what the mediated environment can then occupy. Where the device demands conscious management, attention stays anchored on the interface and the sense of being elsewhere never forms.

The finding is consistent with M. J. Kim, Lee, & Preis (2020), who report that the experiential states preceding tourist response are conditioned by how effortlessly the technology is handled, and with Wu & Lai (2021), who show that the sense of presence generated by a 360-degree tour depends on navigational ease as much as on visual fidelity. It also helps reconcile the divergence noted in Table 1: Sagnier et al. (2020) found no direct path from ease of use to intention, and the present result suggests why, since the influence travels through an experiential state rather than reaching intention unmediated. Based on the explanation according to Davis (1989), perceived ease of use refers to the extent to which someone believes that using a particular system will be free from effort, while if there is a sense of trust in the citizens of Yogyakarta City and other tourists that it will be easy to use virtual reality, indirectly making the citizens of Yogyakarta City and other tourists will continue to use virtual reality because of the sense of ease that makes the citizens of Yogyakarta City and other tourists free from the feeling of effort.

The relationship between perceived ease of use and telepresence has been examined in earlier work, though under different labels and in different settings. Hoang et al. (2023) model telepresence as the pivot between virtual reality attributes and travel intention, Huang et al. (2023) treat the equivalent experiential state because of frictionless interaction, and Wu & Lai (2021) link navigational ease to the formation of presence. What has not previously been tested is the specific configuration examined here, in which telepresence mediates between the two beliefs of the Technology Acceptance Model in a public educational tourism setting with first time users. The contribution is therefore a matter of structure and context rather than of an entirely unexamined relationship.

The Influence of Perceived Ease of Use (X) on Perceived Usefulness (Y2)

Perceived ease of use also raised perceived usefulness, which is the effort to benefit link at the core of the Technology Acceptance Model. Davis (1989) defines perceived usefulness as the degree to which a person believes that using a system will enhance performance, and defines perceived ease of use as the degree to which using it is expected to be free of effort. The two are not independent: a system whose operation is costly consumes the very attention needed to extract value from it, so the benefit delivered is systematically underestimated. In this setting, visitors who fitted the headset quickly and navigated the content without assistance spent their session attending to the material rather than to the equipment, and consequently credited the technology with more educational value. The result aligns with Huang et al. (2023) and Sagnier et al. (2020), both of whom recover a significant ease of use to usefulness path even where the direct path to intention is weak or absent, and it reinforces the interpretation that ease of use operates on intention through intermediate judgements rather than on its own. This definition demonstrates that perceived usefulness is a belief about a person's perception of technology use. If Yogyakarta residents and tourists believe virtual reality is useful, they will use it to view game content. Conversely, if Yogyakarta residents and tourists believe virtual reality is less useful, they will not use it.

The Influence of Telepresence (Y1) on Perceived Usefulness (Y2)

Telepresence significantly raised perceived usefulness. Telepresence is the psychological state in which a mediated environment is experienced as the immediate environment, so that attention is directed at the represented world rather than at the medium representing it (M. J. Kim, Lee, & Preis, 2020). The mechanism running from presence to usefulness is evidential: a visitor who feels situated inside the depicted environment acquires direct experiential evidence about what the technology delivers, and a judgement grounded in that evidence is firmer than one inferred from a description.

This is why immersive content is credited with more educational value than the same material presented on a flat screen. If Yogyakarta residents and tourists experience the experience of visiting the Popular Technology Zone of Taman Pintar when viewing using virtual reality and feel the experience of viewing game content more real than physical, Yogyakarta residents and tourists can feel more satisfied from the experience. And if feeling more satisfied because of the experience of being in the game world when viewing video games through virtual reality, it can indirectly make Yogyakarta residents and tourists feel the importance or usefulness of virtual reality for Yogyakarta residents in viewing the game content. The result corroborates Hoang et al. (2023), who identify telepresence as the construct through which virtual reality attributes are converted into evaluative judgements, and M. J. Kim, Lee, & Preis (2020), who report the same ordering in a virtual reality tourism context.

The Effect of Telepresence (Y1) on Behavioral Intention (Z)

Based on the results of the previously conducted path analysis, a significance value of 0.003 ($p<0.05$) was obtained. Therefore, it can be concluded that telepresence has a significant direct effect on behavioral intention. Behavioral intention refers to a person's expressed readiness to perform a future behavior, in this case to use the facility again, to recommend it, or to seek out comparable content (Kang et al., 2021).

Interpreting this path requires attention to what the installation does rather than a general appeal to immersion. Three features of the Popular Technology Zone plausibly generate the telepresence that drives intention. The first is enclosure: a head mounted display removes the surrounding gallery from view, and in a busy museum the removal of ambient distraction is itself a substantial contributor to presence. The second is the first-person perspective of the content, which positions the visitor as a participant rather than a spectator and produces the sense of occupying the depicted space. The third is the brevity and single session structure of the experience, which sustains attention for its full duration and avoids the fatigue that erodes presence in longer exposures. Because a science park visit is discretionary and repeated visits are common among school groups and families, an experience that felt vivid is precisely the kind that is retold and sought out again, which is the behavioral route from presence to revisit intention (Skard et al., 2021; Talwar et al., 2023). When virtual reality includes content associated with a

higher level of telepresence, Yogyakarta residents and tourists are likely to have a strong desire to visit or revisit, to recommend to others, or to try to find out more about virtual reality tourism in the Popular Technology Zone of Taman Pintar Yogyakarta.

The Influence of Perceived Usefulness (Y2) on Behavioral Intention (Z)

Based on the results of the previously conducted path analysis, a significance value of 0.021 ($p<0.05$) was obtained. Therefore, it can be concluded that perceived usefulness has a significant effect on behavioral intention. Behavioral intention is understood here as an action tendency formed by the service already experienced, and it is measured across continued use, recommendation, and information seeking (Kang et al., 2021). Meanwhile, perceived usefulness is defined as the extent to which someone believes that using a particular system will improve their job performance (Davis, 1989). It is worth noting that the effect of perceived usefulness on intention (0.257) is the smallest of the five paths and smaller than that of telepresence (0.335).

This ordering is theoretically meaningful rather than incidental. In a leisure and education setting the experience is consumed for its own sake, so the felt quality of the session weighs more heavily on the decision to return than an assessment of instrumental benefit. The same reversal is reported by Huang et al. (2023) and by Hoang et al. (2023), and it marks a boundary condition of the Technology Acceptance Model: in hedonic and experiential contexts the cognitive route loses ground to the affective one. When virtual reality can make Yogyakarta city residents and tourists believe because it can provide benefits in evaluating or getting impressions in the world of games, Yogyakarta city residents and tourists will always use virtual reality to get other benefits. Therefore, Yogyakarta city residents and tourists will tend to have the intention to use virtual reality again or will have the intention to recommend the virtual reality of the Popular Technology Zone of the Taman Pintar Yogyakarta to others in order to facilitate other users in getting impressions or being able to evaluate other video content when using virtual reality.

CONCLUSION

This study tested an extended Technology Acceptance Model in which telepresence is specified as an experiential mediator between perceived ease of use and the downstream constructs of perceived usefulness and behavioral intention, using data from 100 users of the virtual reality facility in the Popular Technology Zone of Taman Pintar Yogyakarta.

All five hypothesized paths were supported. Perceived ease of use significantly influenced telepresence and perceived usefulness; telepresence significantly influenced perceived usefulness and behavioral intention; and perceived usefulness significantly influenced behavioral intention.

The theoretical contribution follows from the pattern of those coefficients rather than from their individual significance. Telepresence carries a larger total effect on behavioral intention (0.436) than perceived usefulness does (0.257), and perceived ease of use reaches intention entirely through indirect routes with a combined effect of 0.347. Taken together these results support treating telepresence not as an additional external variable bolted onto the Technology Acceptance Model, but as an experiential mechanism operating in parallel with the cognitive route the model originally specified. In hedonic and educational settings, the affective path appears to be the stronger of the two, which marks a boundary condition of the standard model and is where this study makes its scientific contribution.

Three practical recommendations follow for the management of Taman Pintar. First, because perceived ease of use is the strongest single antecedent in the model, the largest return on a limited budget comes from usability rather than hardware: simplified headset fitting, a short, standardized briefing delivered by an attendant, and clear in view navigation prompts. Second, because telepresence carries the greater effect on intention, content investment should prioritize immersive quality and local relevance, such as first-person material on Yogyakarta heritage and science themes, over an expanded catalogue of generic titles. Third, session design should protect immersion by controlling queue noise and limiting exposure length to the interval over which attention is sustained. For the Education Office, the Tourism Office, and the Communication and Information Office, the same evidence supports funding usability and guided onboarding before funding additional units.

The study has limitations that also indicate where it should be extended. The design is a single group post exposure survey without a comparison condition, so the coefficients are associations consistent with the hypothesized structure rather than experimental effects. The sample is confined to one installation at one site, which bounds generalization. Constructs were treated as composite scores rather than as latent variables, so measurement error is not modelled. Future work should replicate the model with latent variable estimation on a larger multi-site sample, add a two-dimensional comparison condition, and test whether prior virtual reality experience moderates the path from ease of use to telepresence.

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