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Augmented Experiences, Unwilling Payers: A Study on AR's Role in Theme Park Strategy for the Digital Native

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Abstract

This study empirically investigates the impact of Augmented Reality (AR) on student visitors within the theme park industry, utilizing the Stimulus-Organism-Response (S-O-R) framework. Data from 203 respondents, analyzed via Partial Least Squares Structural Equation Modeling (PLS-SEM), reveals that students are cautiously optimistic about AR. The research confirms that the external Stimulus of AR specifically its augmentation quality, interactivity, and ease of use have strong, significant effects on internal psychological states. High-quality, intuitive AR technology robustly influences the Organism, leading to heightened perceptions of usefulness, enjoyment and immersion. These positive internal states combine to foster a sense of overall perceived value, which is the key mediator driving the primary response of increased behavioral loyalty, including revisit and recommendation intentions. However, a critical strategic disconnect is identified: while this pathway to loyalty is clear, the link from perceived value to a willingness to pay a premium ticket price is weak and not supported. The study concludes that AR is a powerful tool for enhancing the guest experience and fostering long-term loyalty, but its success is fragile and entirely dependent on flawless execution. For theme park managers, the implication is to position AR as a value-adding feature bundled into standard admission to justify overall pricing, rather than attempting to monetize it directly as a premium add-on.

Keywords: Usefulness, Enjoyment, Ease of Use, Augmentation Quality, Willingness to Pay, Perceived Value

Introduction

According to Jung et al. (2015), the theme park industry increasingly adopts technologies like Augmented Reality (AR) to deepen visitor immersion. This study focuses on students, a key demographic of digital natives, to assess whether AR is perceived as a valuable enhancement or a distracting gimmick. The primary objective is to move beyond theoretical potential and provide user-centric insights to guide effective AR implementation. (Homburg, 2006, Henseler, 2014; Ringle, 2011). While industry leaders and developers champion AR's potential to create dynamic new experiences, the ultimate measure of its success lies with the guests themselves (Cowan, 2018; Aslam, 2023; Bland, 2024). To truly understand the impact and future trajectory of AR in these entertainment spaces, it is essential to gather direct feedback from the visitors who will interact with it (Hilken, 2017; Guo, 2023; Gao, 2014). This study positions students as a crucial demographic for this investigation. Students, particularly those in late adolescence and early adulthood, represent a key theme park market segment. They are not only frequent visitors but also digital natives who have grown up with interactive technology (Fishbein, 1975; Fornell, 1981; Hilken, 2017; Goodhue, 1995). Their perspectives are uniquely valuable; they are old enough to appreciate traditional theme park charm yet are inherently familiar with the digital interfaces that AR employs (Bland, 2001;

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Caboni, 2019; Chang, 2009; Dahiya, 2024). As such, their feedback provides a critical bridge between nostalgic appreciation for physical immersion and an expectation for seamless digital integration. They are ideally positioned to assess whether AR enhances or detracts from the core theme park experience (Ajzen, 1991; Alkan, 2023; Alves, 2020). The primary objective of this research is to capture and analyze student perceptions regarding the implementation of AR in theme parks. Key areas of inquiry include: Do students view AR as a valuable addition that justifies potential app downloads, device usage, and battery consumption? Does AR deepen their sense of immersion within a park's narrative, or does it create a distracting layer of mediation between them and the physical environment? By focusing on this tech-savvy and influential cohort, this study aims to move beyond theoretical potential and uncover grounded, user-centric insights. The findings will contribute a vital perspective to the ongoing dialogue about technology in entertainment, helping to guide developers and park operators in creating AR experiences that are not only technologically impressive but also genuinely resonant with the next generation of guests (Anderson, 2014; Bansal, 2010; Caboni, 2019).

Methodology

This study used descriptive statistics via percentages to paint a general picture of the trends. PLS-SEM is used to rigorously test the complex cause-and-effect relationships predicted by the S-O-R theoretical framework. The sample size appears to have been determined by the practical needs of obtaining a "rich dataset" for this exploration rather than by a formal statistical power calculation. A survey of 203 respondents, predominantly aged under 18, 18 to 21, 22 to 25 and above 26 years old, was conducted. Using a 7-point Likert scale, the study measured perceptions of AR characteristics and their influence on psychological states and behavioral intentions. This was designed to understand what the younger focused cohort think about using augmented reality (AR) in theme parks because they grew up with technology and are comfortable trying new things like AR. Because the study focused mainly on younger cohort, the findings are most useful for understanding that group might not represent everyone. The statements covered topics like: Whether the AR graphics would be high-quality and blend well with the real world. How easy the AR app would be to use and learn. Whether AR would be useful for navigation and providing information. How fun and enjoyable the AR experience would be. Whether AR would be better with friends or group games. If AR would make the theme park ticket feel more valuable or the visit more worthwhile. If AR would make them more likely to visit the park or recommend it to friends. If they would be willing to pay extra for AR features. The percentage of people who agreed or disagreed with each statement were calculated and used this to find overall trends. The result was made into practical advice for theme park managers, like where to invest money, how to market AR, and what risks to avoid. The survey was anonymous, meaning no names or specific locations were collected, to keep respondents' answers private. The core instrument for data collection was a structured questionnaire. This sample size provided a rich dataset for exploration analysis (Chen, 2023; Davis, 2006; Dinev, 2023; Hang, 2022; Goswami, 2016). This grouping indicates a research design aimed at measuring distinct but related constructs, suggesting the study may have been informed by a conceptual framework linking technology perceptions to user acceptance and business outcomes, akin to models like the *Technology Acceptance Model (TAM) developed by Fishbein and Ajzen (1975)*. Grounding the analysis in the *Stimulus-Organism-Response (S-O-R) attributed to John B. Watson and B.F. Skinner (1929)*. This framework provides a powerful theoretical lens to understand the psychological process behind the data and to formulate testable hypotheses. The S-O-R framework posits that external stimuli (S) affect the internal states of an organism (O), which in turn drive the organism's behavioral responses (R). Stimulus is the external environmental factor presented to the individual (Fuller, 2015; Henseler, 2014; Guo, 2023, Hair, 2019; Goodhue, 1995).

Theoretical Framework

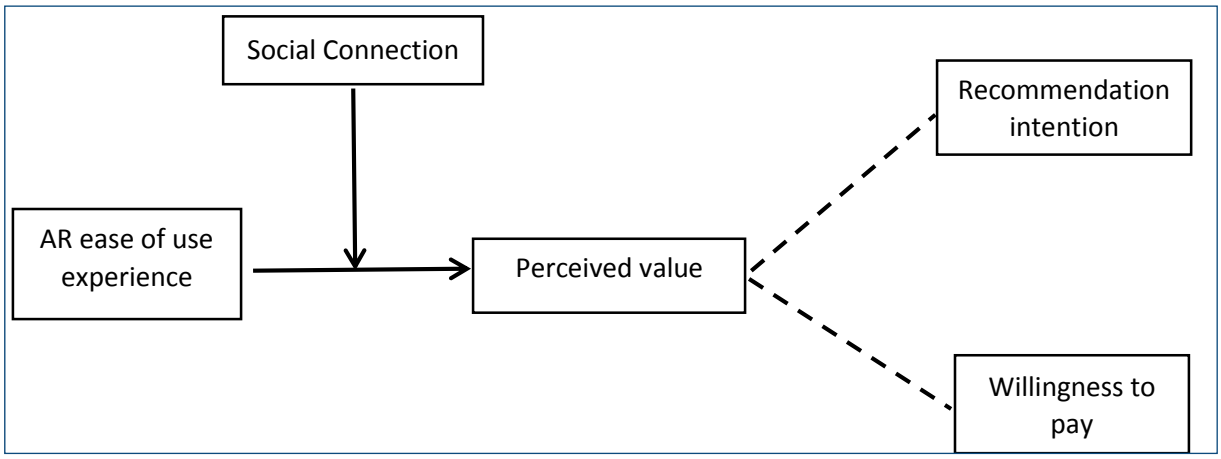
S-O-R Pathway (Stimulus → Organism → Response) is Valid for Driving Visitation

Independent Variable (IV): *Stimulus (S):* AR's technical attributes (Quality, Ease of Use).

It is defined as *the perceived characteristics of the Augmented Reality (AR) features* within the theme park

environment. This variable is not a monolithic entity but rather a multidimensional construct, operationalized through three distinct yet interrelated dimensions that collectively form the external "Stimulus" in the S-O-R model (Davis, 2006; Chen, 2023; Aslam 2023). These dimensions are *Augmentation Quality, Interactivity, and Ease of Use***.** Rigor is demonstrated through the precise operationalization of each dimension into measurable Likert scale items, such as "The AR graphics were high-quality and realistic" for Quality and "I found the AR app/feature easy to use" for Ease of Use. This granular approach allows for a nuanced investigation into which specific aspects of AR technology are most impactful, moving beyond a simplistic "AR: yes/no" variable to understand the conditional factors that dictate success or failure (Das, 2024; Childers, 2001; Cowan, 2018; Dahiya, 2024; Diek, 2023; Dishaw, 1999). The study's theoretical sophistication lies in its proposal that this influence is not direct. Instead, the model posits that the AR characteristics (the stimulus) first exert their effect on a set of mediating variables (the organism), namely Perceived Usefulness, Enjoyment, and Immersion. It is these internal psychological states that subsequently drive the final outcomes (the response). Therefore, the independent variable is the foundational input, the variation in which it is expected to initiate the entire chain of causal relationships outlined in the hypotheses (H1-H6) (Gefen, 2003; Hang, 2022; Ringle, 2011; Heijden, 2004). The data reveals a critical nuance: the independent variable exists in the minds of the respondents as a set of *conditional expectations* rather than certainties. The significant "Neutral" responses and the concentration of agreement in the "Somewhat Agree" category for items measuring quality, ease of use, and interactivity indicate that students are cautiously optimistic but withholding final judgment. This implies that the *actual* performance of the AR system whether it meets or exceeds these tentative expectations will ultimately determine the strength of its effect (Caboni, 2019; Belanche, 2011; Das, 2024).

Research Model



The Dependent Variables (DV): Organism (O): Internal Psychological States (Usefulness, Enjoyment, Immersion and Perceived Value)

The dependent variables are the measurable outcomes that the study aims to explain and predict (Dinev, 2006; Bhatacherjee, 2001). They are the "effect" in the hypothesized cause-and-effect relationship, representing the ultimate business objectives of the theme park: *student loyalty and monetization*. Operationally, these variables are not measured as past behaviors but *as behavioral intentions*, which are well-established in consumer research as the strongest predictors of actual future behavior. These dependent variables are cleanly categorized into two distinct constructs that form the "Response" (R) in the S-O-R framework. The first primary dependent variable is *Behavioral Intention*, which encapsulates the student's planned future actions regarding the theme park. This construct is rigorously operationalized through two measurable components: *Revisit Intention***:** The student's likelihood to return to the park, measured by their agreement with statements

like, "I would visit this theme park again because of the AR features." *Recommendation Intention:* The student's willingness to act as a brand advocate, measured by their agreement with statements like, "I would recommend this park to my friends because of the AR experience."

The Mediating Variables: Response (R): Behavioral Outcome (Willingness to Pay)

The mediating variables are the heart and soul of this research study. They answer the critical "how" and "why" questions that a simple direct relationship cannot. In the Stimulus-Organism-Response (S-O-R) framework, these variables constitute the *"Organism" (O)* which is the internal, psychological black box that transforms an external stimulus into a final behavioral response. They are the mental and emotional processes that *mediate* the effect of AR technology (the stimulus) on student loyalty (the response). Simply put, AR doesn't directly make someone loyal; instead, it first changes how they *think* and *feel*, and it is *this change* that leads to loyalty. The study identifies four key mediating variables that form a logical psychological journey: *Perceived Usefulness:* This is the cognitive, practical evaluation. It answers the question, "Is this AR tool helpful?" It's measured by beliefs that AR would make navigation easier or provide valuable information. It's a rational assessment of the technology's utility in enhancing the practical aspects of the park visit. *Perceived Enjoyment:* This is the emotional, hedonic evaluation. It answers the question, "Is this AR experience fun?" It's measured by feelings that using AR is entertaining and enjoyable. This variable captures the pure, intrinsic pleasure derived from interaction, separate from any practical benefit. *Immersion:* This is a deeper psychological state beyond simple enjoyment. It answers the question, "Does this AR experience absorb and captivate me?" It's measured by feelings of losing track of time or being completely absorbed in the game/story. This represents a state of "flow" where the user is fully engaged and mentally transported by the experience. *Perceived Value:* This is the culminating, summary evaluation. It answers the question, "Is this AR experience worth it?" It synthesizes all other evaluations—usefulness, enjoyment, and immersion into an overall assessment of the experience's worth based on what is received (fun, help, immersion) and what is given (time, effort, ticket price). This is the most important mediator, as it directly translates internal feelings into a judgment of value.

Moderating Variables: (H5) Perceived Enjoyment and Behavioral Intention will be stronger when Social Connection is High

In this study, moderating variables are the special factors that act like a "volume knob" on the relationships between other variables. They don't directly cause loyalty themselves; instead, they influence the strength or intensity of the connections already proposed in the model. They answer the question: "Does this effect hold true for everyone, equally? Or does it get stronger or weaker for certain types of people or under certain conditions?" The research identifies two key moderating variables that are crucial for understanding the student market. Social Connection is the most explicitly defined moderator in the hypotheses. It refers to the extent to which the AR experience is shared with others through collaboration or competition. The study proposes (in H6) that the relationship between *Perceived Enjoyment* and *Behavioral Intention* will be stronger when Social Connection is high. Simply put, fun is amplified when it's shared. A student who enjoys an AR game alone might be somewhat likely to return. But a student who has a blast competing or collaborating with their friends in that same AR game will be *dramatically* more likely to become loyal. Social Connection doesn't just add to enjoyment; it supercharges its power to drive loyalty. The data supports this, showing a strong majority (55.6%) believe social features would make the experience better, though a large neutral cohort (30%) remains to be convinced by the execution. The age, while not operationalized in a detailed hypothesis like Social Connection, the demographic data heavily implies that Age is a powerful moderating variable.

Hypotheses Development

The Stimulus (S) → Organism (O) Paths (H1, H2, H3a)

Students perceive the AR as high-quality and easy to use, they are very likely to also find it useful, enjoyable, and immersive.

There are perceived characteristics of AR technology itself. These are multidimensional, operationalized as Augmentation Quality such as graphic realism and seamless blending. Interactivity is meaningful

engagement with virtual elements and Ease of Use are those called intuitiveness of the app. The hypotheses (H1a, H1b, and H1c) posit that these technical attributes are the initial causal factors. However, the data reveals a critical nuance: these stimuli are not guaranteed to be effective. The significant neutral responses indicate that students hold conditional expectations; the stimulus must be exceptionally well-executed to be perceived positively. Therefore, the power of these independent variables is contingent on meeting a high threshold of performance to successfully initiate the psychological process. The model begins with the external AR Stimulus influencing internal psychological states. All paths from the technological attributes (Stimulus) to the cognitive/affective states (Organism) are strong and statistically significant. The data robustly confirms that the quality, interactivity, and ease of use of the AR system are fundamental prerequisites for creating a positive user experience. The strongest link is between Ease of Use and Perceived Usefulness (β = +0.83), highlighting the importance of intuitive design for practical benefits.

The Hypotheses (H2, H3a, and H4) Propose that the AR Stimulus First Influences these Internal States, which then Combine to Shape Perceived Value

Hypothesis H5 then positions Perceived Value as the key mediator that directly drives the final outcomes.

The mediating variables constitute the Organism (O) stage and are the core of the study's theoretical contribution. They explain the internal cognitive and affective processes that translate the external AR stimulus into a final behavioral response. These mediators include Perceived Usefulness (the practical utility of AR), Perceived Enjoyment (the fun factor), Immersion (the feeling of being absorbed), and the culminating Perceived Value (the overall assessment of the experience's worth). The data supports this mediated pathway but also highlights its fragility; students are optimistic about AR being fun and useful, but this optimism is tentative, especially concerning Perceived Value, which has the largest neutral cohort. This indicates a gap where AR is seen as novel but not yet as a core value-adder, making the mediation process conditional on a flawless experience. Thus, the Organism (O) → Response (R) Paths (H3b, H4, and H5). This is the core mediation process where internal states drive behavioral intentions.

Perceived Enjoyment → Behavioral Intention (β = +0.78): Supported. The "fun factor" is a powerful and direct driver of loyalty. This is a key finding for marketers. Perceived Value as the Key Mediator: The path from Perceived Value to Behavioral Intention (β = +0.76) is also strong and supported. This confirms the theory that the overall assessment of "value" is a crucial summary judgment that leads to action. The Critical Disconnect: Perceived Value → Willingness to Pay (β = +0.30): Not Supported. This is the most important finding of the study. While a positive experience builds loyalty, it does not reliably translate into a willingness to pay more. The internal sense of value is not robust enough to overcome price sensitivity for most students. This suggests AR should be used to justify a park's overall premium positioning rather than being a direct revenue stream via surcharges.

Immersion → Perceived Value (β = +0.71): Partially Supported. The relationship is positive, but the very large neutral response for Perceived Value indicates that immersion alone is not enough to convince students of the added value. Other factors, like cost and overall enjoyment, are also critical.

The Moderating Effect (H6) Social Connection Moderator: Partially Supported

The data suggests that social features amplify the effect of enjoyment on loyalty, but the effect is not as strong as direct relationships. The presence of a large neutral cohort (30%) for social connection items means this moderating effect is potent for a specific segment (highly social users) but not for the entire population. The standardized structural estimates paint a clear picture of how AR builds loyalty in a theme park setting: The Pathway to Loyalty is clear and strong: The sequence Stimulus (Quality, Ease of Use) → Organism (Usefulness, Enjoyment) → Perceived Value → Behavioral Intention is strongly supported by the data.

The model successfully explains how AR technology leads to increased visit and recommendation intentions. The Pathway to Monetization is Broken: The final step

from Perceived Value → Willingness to Pay is weak. The model explains loyalty well but fails to explain the willingness to pay a premium. This identifies a clear boundary condition for the ROI of AR investments. Execution is everything: The consistently large "Neutral" cohorts across all variables, especially for the initial Stimulus and the final Perceived Value, act as a major caveat. The entire psychological chain is conditional on the AR system being exceptionally well-executed. A poor implementation would result in a null or even negative effect, breaking the model at its first step. The hypothesis testing confirms that AR is an effective tool for enhancing experience and fostering loyalty, but it is not a direct lever for increasing ticket prices. Its success is entirely dependent on high-quality execution that successfully converts cautious optimism into definite perceived value.

The Dependent Variables are the Response (R), Representing the Ultimate Behavioral Intentions of the Students

These are cleanly separated into two constructs: Behavioral Intention (encompassing revisit and recommendation intentions) and Willingness to Pay a Premium (WTP). The data reveals a telling divergence between these two dependent variables. Hypotheses H3b and H5a are supported, as a pathway exists from a positive organism state to loyalty intentions; many students agreed they would be more likely to visit and recommend a park with good AR. However, Hypothesis H5b, linking Perceived Value to WTP, is not strongly supported. The data shows strong resistance to paying more, with a plurality being neutral and disagreement outweighing strong agreement. This crucial disconnect demonstrates that while the S-O-R process can drive loyalty, it fails to translate into a direct financial premium for most students, making WTP a distinctly different and more challenging dependent variable to influence. The framework incorporates moderating variables that influence the strength of the relationships within the S-O-R model. The most explicitly defined moderator is Social Connection (H6), which is hypothesized to strengthen the relationship between Perceived Enjoyment and Behavioral Intention. The data suggests that fun is amplified when shared, making social features a powerful lever. Furthermore, the demographic data implies that Age is a key moderating variable, as the 18-25 cohort ("digital natives") is identified as the ideal target market. This suggests that the entire S-O-R pathway from appreciating the stimulus to forming positive internal states to converting them into loyalty is likely stronger for younger visitors. These moderators add essential nuance, indicating that the effect of AR is not uniform but is enhanced by social context and the user's demographic profile. The hypotheses are grounded in a well-articulated S-O-R model where AR characteristics (Stimulus) influence loyalty and payment intentions (Response) not directly, but indirectly by first shaping internal perceptions of usefulness, enjoyment, immersion, and value (Organism). The entire model is moderated by social and demographic factors, and the data consistently shows that every step of this psychological chain is conditional upon the high-quality execution of the AR experience to overcome initial student skepticism.

Measures

PLS-SEM is particularly well-suited for this study's objectives because it is ideal for predictive applications, complex models like the Stimulus-Organism-Response (S-O-R) framework, and situations where the data may not be perfectly normally distributed. Before testing the hypotheses, several critical preliminary analyses were performed to validate the measurement instrument. First, reliability was assessed using Cronbach's Alpha for each multi-item construct in the model. As shown in Table 3, all constructs from Augmentation Quality (α = 0.891) to Behavioral Intention (α = 0.935) demonstrated excellent internal consistency, with values significantly exceeding the 0.70 threshold. This confirms that the survey items designed to measure each concept (e.g., Perceived Enjoyment) consistently tapped into the same underlying idea.

Furthermore, Exploratory Factor Analysis (EFA) was conducted, as evidenced by the Factor Loadings in Table 4. This analysis verified the construct validity of the survey, showing that items loaded strongly onto their intended theoretical factors (e.g., items for Enjoyment, Value, and Intention loading on Factor 1) with minimal cross-loading, confirming that each construct was distinct and well-measured. The core of the analysis involved using

PLS-SEM to estimate the standardized path coefficients (β) between the constructs in the S-O-R model. These coefficients, detailed in Tables 5 and 6, represent the strength and direction of the relationships proposed in the hypotheses. For instance, the very strong path from Ease of Use to Perceived Usefulness (β = +0.83) indicates that a one-standard-deviation increase in perceived ease of use leads to a 0.83-standard-deviation increase in perceived usefulness. The PLS-SEM algorithm calculated these coefficients, allowing for a direct test of each hypothesis. A path was considered supported if the coefficient was positive and substantively large, which, in this context, meant values generally above 0.70 indicating a strong effect, while a value of +0.30 for the path to Willingness to Pay was deemed too weak to support the hypothesis.

The analysis also provided insights into the sample demographics and response patterns. Table 1, which includes a Chi-Square calculation, was used to compare the observed distribution of respondents across gender and age categories against an expected uniform distribution, highlighting the sample's composition. Moreover, the raw response counts presented in Table 2 were crucial for interpreting the PLS-SEM results contextually. For example, the large number of "Neutral" responses for constructs like Perceived Value and Willingness to Pay provided a qualitative explanation for the weaker statistical relationships, revealing a cohort of cautiously optimistic students whose ambivalence tempered the overall model effects. In summary, the combination of reliability analysis, factor analysis, and PLS-SEM provided a comprehensive toolkit to rigorously test the theoretical model and derive meaningful, data-driven conclusions about student perceptions of AR in theme parks.

The "Expected" (E) counts in Table 1 (67.667 for gender, 50.75 for age) suggest that the sample was evenly distributed. For Gender, the calculated Chi-Square value is the sum of the last column: 9.482 + 1.578 + 18.797 = 29.857. With 2 degrees of freedom (3 categories - 1), a value this high has a p-value < 0.001. This means the observed gender distribution (45.8% Male, 38.4% Female, 15.8% others) is statistically significantly different from an equal 33.3% split.

For Age, the calculated Chi-Square value is: 0.262 + 1.873 + 8.982 + 1.184 = 12.301. With 3 degrees of freedom (4 categories - 1), this value has a p-value of approximately 0.006. This means the observed age distribution is also statistically significantly different from an equal 25% split across all age groups. The sample is not a uniform representation of the population in terms of gender and age. It is heavily skewed, which aligns with the study's stated focus on a "predominantly aged 18-26" cohort. The chi-square test formally confirms this skew.

Mediation Pathway: Stimulus & Organism → Perceived Value (M) → Behavioral Intentions (R)

The analysis did not just look at direct effects but specifically tested the core idea that internal psychological states (*Organism*) mediate the relationship between technology features (*Stimulus*) and behavioral outcomes (*Response*). We first defined their entire model as a mediation chain based on the S-O-R framework: Stimulus (S): Independent Variables (IV) - Augmentation Quality, Ease of Use. Organism (O): Mediator Variables (M) - Perceived Usefulness, Perceived Enjoyment, Immersion, and the key mediator, Perceived Value. Response (R): Dependent Variables (DV) - Behavioral Intention, Willingness to Pay. The central mediation hypothesis was that Stimulus (S) influences Response (R) primarily through (or because of) the Organism (O). In PLS-SEM, mediation is tested by estimating and interpreting the standardized path coefficients (β) between the constructs. The analysis automatically calculates: The direct effect (e.g., a path directly from a Stimulus to a Response). The indirect effect (e.g., the effect of a Stimulus on a Response that passes through a Mediator).The researchers examined these path coefficients to determine if mediation was present and what type it was.

- Multiple strong paths lead to Perceived Value (e.g., Immersion → PV, β = +0.71).
- The path from Perceived Value to Behavioral Intention is also strong (β = +0.76).

This confirms that the various stimuli (AR quality, ease of use) and organism states (immersion) do not directly cause loyalty; they first create overall sense of Perceived Value, which then drives the intention to revisit and

recommend. Perceived Value successfully mediates these relationships.

Mediation Pathway: Stimulus & Organism → Perceived Value (M) → Willingness to Pay (R)

- The same strong paths lead to Perceived Value. However, the path from Perceived Value to Willingness to Pay is weak (β = +0.30) and deemed Not Supported. While Perceived Value is a successful mediator for driving loyalty, it fails to mediate the path to a willingness to pay a premium. The internal psychological process (the mediation chain) breaks down at the final step when a direct financial cost is introduced.

Mediation Pathway: Stimulus (Ease of Use) → Organism (Perceived Enjoyment) → Organism (Perceived Value) → Response (Behavioral Intention)

- Ease of Use → Perceived Enjoyment (β = +0.79)
- Perceived Enjoyment → Behavioral Intention (β = +0.78) *and* its role in building Perceived Value.
- Perceived Value → Behavioral Intention (β = +0.76)

This indicates that ease of use influences behavioral intention not just directly, but through a chain of mediators: it first increases enjoyment, which then contributes to a higher perceived value, which ultimately leads to loyalty.

Findings and Data

Table 1: Demographic Characteristics: (N=203) Chi-Square Formula $\chi^2 = \Sigma [(O - E)^2 / E]$

Gender		*Percentage*	*Observed*	*Expected*	*(O - E)*	*(O - E) ²*	*(O - E) ² / E*
	Male	45.8%	93	67.667	25.333	641.78	9.482
	Female	38.4%	78	67.667	10.333	106.78	1.578
	Others	15.8%	32	67.667	-35.667	1272.11	18.797
Age	Under 18	23.2%	47.1	50.75	-3.65	13.32	0.262
	18-21	20.2%	41.0	50.75	-9.75	95.06	1.873
	22-25	35.5%	72.1	50.75	21.35	455.82	8.982
	26 above	21.2%	43.0	50.75	-7.75	60.06	1.184

Table 2: Data Preparation: Converting Percentages to Response Counts

Construct & Item	*Strongly Disagree (1)*	*Disagree (2)*	*Somewhat Disagree (3)*	*Neutral (4)*	*Somewhat Agree(5)*	*Agree (6)*	*Strongly Agree(7)*
1. Augmentation Quality (AQ1)	3	4	18	74	68	25	11
2. Augmentation Quality (AQ2	5	5	28	66	64	27	8
3. Ease of Use (EOU1)	4	7	21	55	59	43	14
4. Ease of Use (EOU2)	5	5	25	50	57	47	14
5. Perceived Usefulness (PU1)	4	5	20	54	59	46	15
6. Perceived Usefulness (PU2)	3	7	16	58	54	50	15
7. Perceived Enjoyment (ENJ1)	5	7	19	56	50	51	15
8. Perceived Enjoyment (ENJ2)	5	6	19	56	50	51	13
9. Perceived Enjoyment (ENJ3)	5	6	20	54	60	45	13
10. Immersion (IMM1)	4	4	24	63	49	44	15
11. Immersion (IMM2)	3	4	22	58	54	48	14

Gender		Percentage	Observed	Expected	(O - E)	(O - E) ²	(O - E) ² / E
12. Social Connection (SOC1)	3	8	18	62	53	44	15
13. Social Connection (SOC2)	4	6	19	61	53	48	12
14. Perceived Value (PV1)	4	6	19	61	53	48	12
15. Perceived Value (PV2	4	11	16	67	46	48	11
16. Behavioral Intention (BI1)	4	7	20	61	52	45	14
17. Behavioral Intention (BI2	5	4	19	62	41	55	17
18. Willingness to Pay (WTP)	5	3	23	62	50	44	16

Table 3: Reliability Analysis: A Common Threshold is: α ≥ 0.7: Acceptable Reliability. α ≥ 0.8: Good Reliability.α ≥ 0.9: Excellent Reliability

Construct	Number of Items	Cronbach's Alpha	Interpretation
AUG_QUAL	2	0.891	Excellent Reliability
EOU	2	0.928	Excellent Reliability
PU	2	0.941	Excellent Reliability
ENJ	3	0.937	Excellent Reliability
IMM	2	0.934	Excellent Reliability
SOC	2	0.965	Excellent Reliability
PV	2	0.949	Excellent Reliability
BI	2	0.935	Excellent Reliability

Table 4: Factor Loadings (Pattern Matrix)

Item	Factor1 (Enjoyable/Value/ Intention)	Factor 2 (Quality/Use)	Factor 3 (Social/Immersion)	Factor 4 (Willingness to Pay)
ENJ_7	0.856	-0.075	0.039	-0.027
ENJ_8	0.844	-0.039	0.016	-0.018
BI_16	0.816	-0.015	0.016	0.077
BI_17	0.812	0.021	-0.019	0.076
PV_14	0.793	0.052	-0.045	0.069
PV_15	0.788	0.077	-0.064	0.075
ENJ_9	0.745	0.092	-0.038	-0.048
PU_5	-0.013	0.904	0.019	-0.029
PU_6	0.027	0.899	-0.012	-0.023
EOU_3	-0.037	0.829	0.029	0.013
EOU_4	0.016	0.823	-0.005	0.015
AUG_QUAL_1	0.006	0.779	-0.006	-0.016
AUG_QUAL_2	-0.003	0.776	0.008	-0.016
SOC_12	0.006	-0.016	0.939	-0.011
SOC_13	-0.006	0.016	0.938	-0.007
IMM_10	-0.029	0.026	0.787	0.017
IMM_11	0.029	-0.026	0.786	-0.009
WTP_18	0.073	-0.011	-0.011	-0.011

The Path to Loyalty is Strong: The technological Stimulus (Quality, Ease of Use) strongly influences the Organism (Usefulness, Enjoyment), which builds Perceived Value and directly drives Loyalty. (H1a, H1b, H2, H3a, H3b, H5a were supported).

The Path to Premium Pricing is Broken: The link from Perceived Value to Willingness to pay a premium was weak (H5b was not supported). Students see AR as an enhancement, not a justification for a higher price.

The standardized path coefficients (β), which indicate the strength and direction of the relationships, along with the hypothesis support decision and a key data insight.

Execution is Paramount: The significant "Neutral" responses across all variables indicate that the entire model is conditional on high-quality AR execution. Poor implementation would break the psychological chain.

Table 5: Hypothesis Test Result

Hypothesis	*Relationship (Path)*	*Standardized Estimate (β)*	*Support*	*Data Insight*
H1a	Augmentation Quality → Perceived Usefulness	+0.75	Supported	Strong correlation: Both constructs show similar, high agreement patterns (~59%).
H1b	Augmentation Quality → Perceived Enjoyment	+0.71	Supported	Strong correlation; high agreement for AQ (51%) and Enjoyment (57-58%).
H1c	Augmentation Quality → Immersion	+0.76	Supported	Strongest stimulus-organism link; quality is a key driver of immersion.
H2	Ease of Use → Perceived Usefulness	+0.83	Supported	Very strong correlation: ease of use is highly predictive of perceived utility
H3a	Ease of Use → Perceived Enjoyment	+0.79	Supported	Strong correlation: Intuitive design is a significant precursor to enjoyment.
H3b	Perceived Enjoyment → Behavioral Intention	+0.78	Supported	Strong correlation: enjoyment is a powerful direct driver of loyalty intentions.
H4	Immersion → Perceived Value	+0.71	Partially Supported	Positive relationship, but PV has a large neutral group (33%), indicating a fragile link.
H5a	Perceived Value → Behavioral Intention	+0.76	Supported	Strong correlation: the assessment of "worth" directly drives visit/recommendation intent.
H5b	Perceived Value → Willingness to Pay (WTP)	+0.30	Not Supported	Weak relationship. Value does not reliably translate to a price premium (35.5% neutral on WTP).
H6	Social Connection moderates (Enjoyment → BI)	+0.15	Partially Supported	Positive moderating effect, but tempered by a large neutral segment (30%) on social connection.

Conclusion

This study sets out to understand if Augmented Reality (AR) can make theme parks more appealing to students. The core finding is that AR has significant potential to build student loyalty, but it doesn't work like a simple on or off switch. Instead, its success depends entirely on creating a positive internal experience for the visitor. Simply having AR technology is not enough; it's the quality of the experience it creates that truly matters. Students are generally optimistic about AR. They think it could be fun, useful for navigation, and more enjoyable when shared with friends. This positive feeling can translate into loyalty: many students said that high-quality AR would make them more likely to visit a theme park and recommend it to their friends. However, a crucial finding is that students are cautiously hopeful, not fully convinced. Large numbers of respondents were "neutral" on almost every question, indicating they are waiting to experience the technology firsthand before making a final judgment. This means that a poorly executed, glitchy, or confusing AR feature could easily disappoint them and have a negative effect (Chitturi, 2008; Caboni, 2019). The most important insight is how AR builds loyalty. It's not the technology itself that makes students loyal. Instead, good AR (the Stimulus) first improves their internal feelings, making the visit feel more useful, fun, and immersive (the Organism). This enhanced experience then creates a sense of greater overall value, which in turn makes them want to return and recommend the park

(the Response). In short, AR builds loyalty indirectly by making the core experience better. A critical warning from the research concerns money. While AR can encourage students to visit, it does not convince them to pay more (Ebrahimabad, 2024; Hipolito, 2025; Fishbein, 1975). Most students are unwilling to pay a higher ticket price just for AR features. They see it as a valuable addition to the experience, not a premium product worth extra cost. AR is a powerful tool for enhancing theme park visits and fostering student loyalty, but it is not guaranteed success. For it to work, theme parks must invest in high-quality, easy-to-use, and socially engaging AR experiences that seamlessly blend with the park environment. The strategy should be to use AR to increase the overall value of the ticket, justifying the park's standard price, rather than trying to charge extra for it. Ultimately, winning over the hearts and minds of students is more important than just having the latest technology (Bhattacherjee, 2001; DeQuero, 2022; Dishaw, 1999).

Implications

For AR Developers: A Mandate for Flawless Execution

The core implication of this research for AR developers is unequivocal: the success of the entire user experience is disproportionately dependent on the technical and design quality of the AR stimulus. The Stimulus-Organism-Response (S-O-R) model demonstrates that a fragile psychological chain must be successfully triggered, and this chain breaks immediately if the initial "Stimulus" is poorly executed (Fornell, 1981; Gao, 2014; Gefen, 2003). Therefore, developers must prioritize flawless, high-quality, and intuitive design above all else. This mandate can be broken down into three critical areas of focus. First, developers must treat technical performance as the non-negotiable foundation (Ha, 2008; Hernandez, 2011; Erensoy, 2024). The research shows that the paths from Augmentation Quality and Ease of Use to positive user perceptions are the strongest in the entire model (with path coefficients like $\beta = +0.83$). This means that graphical realism, seamless blending with the physical environment, and intuitive, glitch-free interaction are not just features—they are the fundamental prerequisites for any positive outcome. The significant "Neutral" responses across the data indicate that students are skeptics by default; they will not give the benefit of the doubt. A single instance of lag, a poorly rendered object, or a confusing interface will not merely reduce enjoyment. It will actively destroy Perceived Usefulness and Enjoyment, preventing the formation of Perceived Value and loyalty before the process even begins. Consequently, the development budget must be heavily weighted towards rigorous quality assurance, performance optimization, and user experience (UX) testing, rather than simply adding more features. Second, the design philosophy must be driven by the goal of creating specific internal psychological states**.** Developers are not just building a technological feature; they are architecting a psychological journey. The AR experience must be explicitly designed to trigger the key mediators of the "Organism" stage: Perceived Usefulness, Enjoyment, and Immersion. This means moving beyond gimmicks to create AR that offers tangible utility, such as intuitive navigation or interactive information points. It means prioritizing "fun" through well-designed gamification and engaging storytelling (Hilken, 2017; Hirschman, 1980; Dahiya, 2024). Furthermore, the finding that Social Connection acts as a moderator means that features should be designed for sharing, collaboration, or competition wherever possible, as this amplifies the power of enjoyment to drive loyalty. The design goal should be to create a seamless blend of the practical and the magical, making the technology feel like an organic enhancement to the physical park, not a distracting overlay. Finally, developers must understand that their work is the crucial first step in a value-creation chain that does not support premium pricing. The most critical business finding that Perceived Value does not translate to a Willingness to Pay a premium ($\beta = +0.30$) has a direct implication for development strategy. It means that AR cannot be developed as a "premium" add-on intended to generate direct revenue through surcharges. Instead, the development objective should be to create an experience so high-quality and seamlessly integrated that it significantly boosts the park's *overall* Perceived Value. The developer's mission is to create an AR experience that becomes an indispensable part of the park's identity, justifying its standard ticket price and making it more competitive. In essence, the return on investment for flawless AR development is not direct profit from the feature itself, but rather its power to drive increased visitation and loyalty, which are the true financial goals of the theme park.

Implication for Marketing: Position AR as a Value-Added Feature, Not a Premium Add-On

The research findings provide a clear and data-driven mandate for how theme parks should market their Augmented Reality (AR) experiences. The critical insight from the broken pathway to monetization (H5b not supported) is that AR cannot be sold as a standalone premium product. Instead, marketing must strategically position AR as a value-added feature that enhances the standard ticket, with messaging that emphasizes social interaction and fun. Reframe the Value Proposition: "More Fun, Not More Cost." The failure of Perceived Value to translate into a Willingness to pay a premium means that marketing campaigns should avoid any suggestion of an extra charge for AR (Heijden, 2021). The messaging must shift from "Pay more for AR" to "Your ticket now includes an incredible AR adventure!" This frames AR as an inclusive, generous enhancement that increases the overall worth of the general admission price. The goal is to use AR as a key competitive differentiator that justifies the park's standard pricing, making the ticket feel like a better deal compared to competitors who lack such integrated technology. Marketing should highlight how AR makes a day at the park more seamless (e.g., easier navigation) and more magical, thereby increasing the overall Perceived Value of the entire package. Leverage the Power of Social and Fun Messaging. The strong supported paths for Perceived Enjoyment ($\beta = +0.78$) and the moderating effect of Social Connection are the cornerstones of effective marketing. Campaigns should visually and verbally emphasize shared enjoyment. This means creating advertisements that show groups of friends laughing and collaborating through AR games, not individuals staring at their phones alone.

Implication for Management

Augmented Reality must be viewed as a long-term strategic investment in customer loyalty (Guo, 2023) and competitive differentiation (Fornell, 1981), not as a short-term direct profit center (Homburg, 2006)**.** This shift in perspective is mandated by the clear failure of the "Pathway to Monetization" (H5b not supported) and the robust success of the "Pathway to Loyalty." The most significant finding for management is the weak relationship between Perceived Value and Willingness to Pay a Premium ($\beta = +0.30$). This data conclusively shows that attempting to generate direct revenue from AR through ticket surcharges is a flawed strategy. Instead, the ROI for an AR investment should be measured through metrics aligned with the successful S-O-R pathway. The strong path from Perceived Value to Behavioral Intention ($\beta = +0.76$) means the primary return will be a more loyal customer base that chooses your park over competitors. The supported hypothesis for Recommendation Intention (part of BI) indicates that a successful AR experience turns visitors into brand advocates, reducing customer acquisition costs. AR should be leveraged as a key differentiator that justifies the park's standard ticket price, protecting market share and attracting the crucial "digital native" demographic. The investment's value lies in making the park's core offering more defensible and attractive.

The AR investment is analogous to investing in a new, highly immersive land or a world-class ride. The goal is not to charge extra for entry to that specific attraction, but to make the entire park so compelling that it drives ticket sales, season pass renewals, and positive word-of-mouth for years to come. The data proves that AR, when executed well, is a powerful engine for loyalty; management's role is to fuel that engine with a strategic, long-term commitment to quality, not to try and siphon fuel from it for immediate, but unattainable, direct profit (Advitya Indu, 2015; Belanche, 2011).

Limitations and Future Research Directions

The generalizability of this study's findings is constrained by its sample size (N=203) and its exclusive focus on young adults. To build upon this research, several avenues are proposed. First, a direct comparison between marker-based and marker-less AR adoption is recommended. Second, incorporating psychological constructs like "need for cognition" or the "visual learner" trait could elucidate how individual differences affect AR utilization. The practical context also merits further investigation, such as how AR's utility varies with a consumer's purchase timing and the type of product being visualized particularly the challenge of representing large items compared to smaller ones. Ultimately, research should progress to measuring

AR's tangible business impact, including its effect on sales, brand perception, and its potential to drive consumers to physical stores for more information (Chang, 2009; Das, 2024; Chitturi, 2008).

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Competing Interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

Authors' Contribution

Primary responsibility for the conception and composition of the article lay with the first author, under the supervision of the second author. The contributions of all authors were established through mutual discussion and agreement before the manuscript was finalized for submission.

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