Assessing the Perceived Information From a Multi-Modal Representation of Your Idol: An AI-Agent Dynamic Survey

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***Abstract*—The emergence of digital celebrities has transformed audience interactions, engagement, and evaluation of their idols. Traditional research methods often struggle to fully capture the nuanced responses these digital figures elicit. This study introduces an innovative AI-agent dynamic survey platform, enabling adaptive questioning and real-time engagement to explore audience perceptions of various virtual idols. The study's findings underscore the effectiveness of the proposed agent workflow in gaining deeper insights into audience understanding, offering a novel methodological contribution to media and consumer behavior research.**

***Index Terms*—Artificial Intelligence, Human Computer Interaction, Composite System**

I. Introduction

Digital celebrities, also known as virtual personas, have emerged as pivotal entities in modern branding strategies and consumer engagement across various sectors. Especially, their expanding role in entertainment and retail industries, characterized by the creation of emotional connections through narrative and interactivity, has further obscured the distinctions between traditional celebrity culture and algorithmic media [1], [2]. In Vietnam, virtual idols have gained significant traction in marketing, music, and online entertainment, as demonstrated by campaigns featuring digital likenesses of popular singers for hygiene products or the increasing trend of AI-generated characters serving as live-stream hosts on e-commerce platforms such as TikTok, Shopee, or Lazada. Despite this growing prominence, there is a little empirical research exploring the genuine and emotional impact of these digital entities on Vietnamese audiences. Major psychological dimensions, such as trust, interpersonal likability, and emotional appeal, remain largely unexamined in a systematic manner. Traditional methodologies, such as fixed questionnaires as described in [3]–[5], are inadequate for accessing deeper cognitive and emotional elements that are essential for understanding how audiences derive meaning and form evaluations of virtual idols.

Acknowledging the limitations inherent in static survey instruments for capturing the intricacies of human perception, this study proposes an innovative approach involving an AI-agent-driven dynamic survey. This agent workflow engages users in real-time interaction and adaptively tailors follow-up questions, thus exploring the cognitive and emotional motivations underlying the fandom of digital celebrities. The proposed AI agent survey workflow is underpinned by a hybrid framework that integrates the Technology Acceptance Model (TAM) [6] with Parasocial Relationship Theory (PSR) [7], enabling a comprehensive examination of both technological evaluation and emotional connection between users and virtual idols across multiple modalities. The rest of this paper is organized as follow: after reviewing the related works and developing hypotheses on factors influencing celebrity fandom in section II, we describe the hybrid TAM-PSR model that drives our AI agent workflow in conducting user-oriented surveys in section III; empirical findings are reported in section IV; insightful limitations and future research directions are discussed in section V; and section VI concludes our work.

II. Hypothesis Development

Early research interest in virtual idols emerged at the confluence of digital identity and media theory, exemplified by Sondheim's ethnographic and phenomenological investigation of Kyoko Date, a computer-generated idol introduced by HoriPro in [8]. During the past two decades, there has been a perceptible shift in focus from cultural analyses of symbolic identity to psychological examinations of user engagement [9]–[11]. These investigations predominantly employed conceptual or case study methodologies, frequently concentrating on iconic figures such as Hatsune Miku, yet often lacked systematic comparisons across different types of virtual idols.

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In the post-2020 era, the expansion of virtual idols has spurred a new wave of academic attention. Several research efforts have highlighted visual realism, interactivity, and narrative coherence as pivotal factors driving user engagement, alongside the necessity for conceptual distinction among virtual idols, avatars, and influencers [12]–[14]. More recently, the psychological mechanisms underpinning virtual idol engagement have been investigated, with particular emphasis on parasocial relationships (PSR) that describe the one-sided emotional connections audiences form with media figures. For example, Liu identified interpersonal attractiveness how likable and approachable a virtual idol appears to the audience, as a significant factor influencing the formation of PSR [15]. Similarly, Stein et al. in [16] demonstrated that audiences can develop PSR with virtual influencers at levels comparable to those established with real human figures.

To gain a comprehensive understanding of the key determinants influencing user behavior and affinity toward digital celebrity figures, it is imperative to formulate robust hypotheses. By systematically exploring these, researchers can uncover the psychological underpinnings of virtual idol engagement, offering valuable contributions to media theory, digital identity studies, and the broader understanding of a digital fandom phenomenon. In this study, we evaluate 5 hypotheses, developed from 3 different psychological factors: *Interpersonal Attractiveness*, *Trust*, and *Attitude*.

A. The Multi-Modal Representation of a Virtual Idol

We categorize virtual idols into two distinct types according to their origin and identity framework:

- ***Celebrity Virtual Avatars (CVA)*** are digital representations that emulate real-world celebrities by replicating their physical appearance, voice, and public personas. These avatars function as virtual extensions of their human counterparts, facilitating enhanced parasocial interactions through recognizable attributes and perceived authenticity. CVA are predominantly employed in entertainment and advertising sectors, thereby amplifying the celebrity's presence within digital and immersive environments.
- ***Fully Virtual Idols (FVI)*** are entirely computer-generated personas crafted to operate autonomously as performers, influencers, or social entities within digital environments. Unlike CVA, FVIs do not derive their identity or branch from real-world celebrities. Instead, they are created de novo, featuring unique appearances, personality traits, and narrative backstories.

B. Interpersonal Attractiveness, Trust, and Attitude

Interpersonal Attractiveness is acknowledged as a pivotal determinant in the development of parasocial relationships. It is typically evaluated through three distinct dimensions: *social attraction*, which pertains to the audience's inclination to engage with media figures and perceive them as potential friends; *physical attraction*, which is grounded in the appreciation of the media figure's appearance and external characteristics; and *task attraction*, which denotes the respect accorded to media figures for their perceived competence and efficacy in role performance [17]–[19].

Hypothesis H1a. *Type of CVA has an impact on the audience's perception of interpersonal attractiveness.*

Hypothesis H1b. *Type of FVI has an impact on the audience's perception of interpersonal attractiveness.*

Trust is conceptualized as the audience's perception of the virtual idol's reliability, consistency in behavior, and alignment with personal expectations during interactions. It serves as a foundational element within digital environments, where users are unable to verify information through physical experiences and must instead rely on digital cues, imagery, and represented behaviors [20], [21]. When users perceive that a virtual idol engages in communication that is sincere, amicable, and trustworthy, they are more inclined to develop a sense of security and integrate the idol's presence into their personal experience [22].

Hypothesis H2a. *Gen Z audiences perceive a sense of trust in CVAs.*

Hypothesis H2b. *Gen Z audiences perceive a sense of trust in FVIs.*

Attitude is defined as users' comprehensive evaluation, which is crucial in understanding whether they will continue to engage with a virtual idol [23]. It encompasses an overall assessment of the virtual idol, including both cognitive and affective components.

Hypothesis H3. *Interpersonal attractiveness positively affects attitude toward using.*

Hypothesis H4. *Trust positively affects behavioral intention to use.*

Hypothesis H5. *Attitude toward using positively affects behavioral intention to use.*

III. Methodology

A. The hybrid TAM-PSR theoretical framework

This study synthesizes the Technology Acceptance Model (TAM) [6] with Parasocial Relationship Theory (PSR) [7] to propose a novel TAM-PSR hybrid framework aimed at elucidating users' behavioral responses toward two digital representations of a celebrity, namely CVA and FVI (figure 1). This reconceptualization posits that users' perceptions of virtual idols are influenced not solely by perceived functional attributes but also by affective impressions and social cues. Within this framework, *Interpersonal Attractiveness* is assessed through the analysis of virtual appearance, social interaction, and engagement in popular activities. *Trust* and *Attitude* are theorized to function as potential mediators that influence behavioral intention, thereby facilitating a more nuanced and comprehensive understanding of user decision-making in virtual environments.

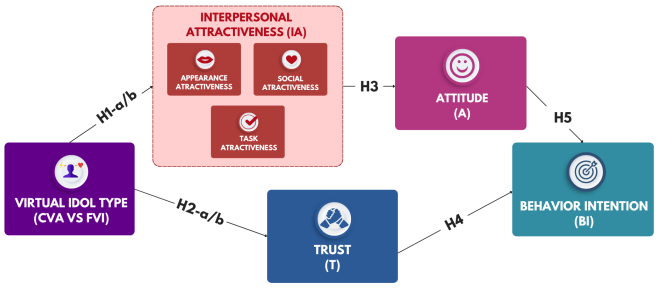

Fig. 1. The hybrid TAM-PSR framework for understanding the critical determinants influencing users' intentions toward two distinct forms of virtual idols: Celebrity Virtual Avatar and Fully Virtual Idol.

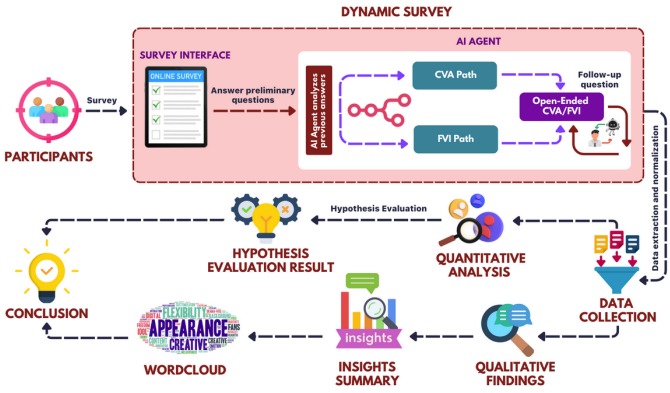

Fig. 2. **AI agent dynamic survey**. This AI-agent-based framework not only streamlines data collection but also enhances the depth and quality of insights from participant responses.

B. AI Agent Workflow for Conducting Dynamic Surveys

Our AI agent workflow was developed using the *n8n* platform, which uniquely integrates AI capabilities with business process automation, offering the flexibility of code-based customization with the efficiency of no-code. In this research, our objective is to facilitate a dynamic survey system aimed at capturing nuanced, personalized participant responses in the context of virtual idol perception. The proposed AI agent workflow integrates pre-designed questions stored in Google Sheets and manages session state, branching logic, scoring mechanisms, and external API calls to generate AI-driven responses. By utilizing these capabilities, it is able to adapt question paths based on user behavior and initial inputs, rather than imposing a rigid survey structure on participants. Furthermore, the proposed AI-driven workflow calculates an initial psychological score from early responses, facilitating the classification of participants into one of two groups: those with a predisposition toward Celebrity Virtual Avatar versus those favoring Fully Virtual Idols. This approach enables a pseudo-randomized yet psychologically informed group assignment, effectively simulating a between-group experimental design while preserving a personalized experience. Figure 2 illustrates the process of conducting a dynamic and user-oriented

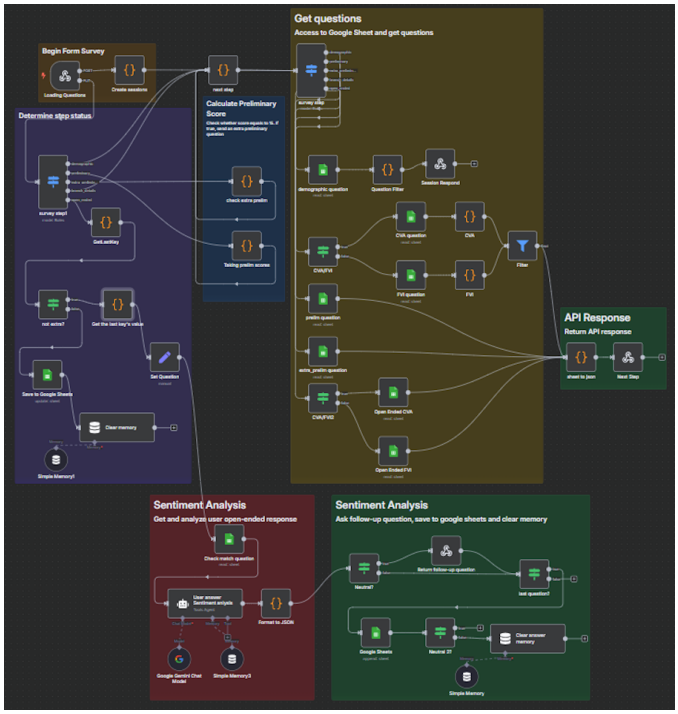

Fig. 3. The detailed workflow of our proposed AI-agent-driven dynamic survey, implemented in n8n.

survey to assess perceived utility of virtual idols, guided by the hybrid TAM-PSR theoretical framework mentioned above.

Figure 3 shows our AI-driven workflow, implemented in the *n8n* platform, which employs a sentiment analysis agent subsequent to each participant submission. Specifically, the participant's input is transmitted to the Gemini large language model, which interprets the content and formulates a contextually pertinent follow-up question designed to elicit deeper insights. The *Gemini 1.5 Flash 8B 001* model, developed by Google, is a generative artificial intelligence framework based on the Transformer architecture [24] and functions as a surveyor assistant. Within our workflow, the participant's response and the pre-formulated question are extracted as input variables and embedded within a customized prompt. This prompt also includes contextual information about the survey and key terminologies, such as CVAs and FVIs, to guide the model in generating pertinent follow-up questions. This framework ensures that each follow-up question is both contextually relevant and theoretically informed. On average, each prompt submitted to the AI agent comprises approximately 400 tokens in length, which incorporate fixed context, definitions, and dynamic elements such as the pre-formulated question and the participant's response. Our web-interface subsequently presents one open-ended question at a time, thereby simulating a responsive, iterative interaction akin to a live interview. All participant responses and outputs are systematically recorded in Google Sheets, with transient memory being cleared after each interaction to maintain data integrity.

IV. Results

A. Quantitative Analysis

In this study, a total of 182 questionnaires were distributed and all were returned as valid responses, yielding a response rate of 100%. The data collected were systematically entered and analyzed using the Statistical Package for the Social Sciences (SPSS v26). Two inferential analyses were conducted: *a one-sample t-test* for hypothesis testing and *thematic content analysis* for qualitative responses. The demographic profile of the 94.0% respondents primarily consisted of young adults aged 18–24, aligning with the Gen Z cohort targeted by this study. Female participants constituted 72.5% of the sample, suggesting a potential gender-related interest in virtual idols. Additionally, 92.9% of the respondents were university students, indicating a high level of digital literacy and media exposure. A significant majority reported daily access to online content, approximately 94.5%, highlighting their familiarity with digital environments where AI agents and virtual idols are prevalent. This demographic composition underscores the relevance of the study's findings to a digitally native and socially active audience, which is essential when evaluating emotional trust and interpersonal perceptions of AI personas.

TABLE I
A ONE-SAMPLE T-TEST RESULTS FOR ALL CONSTRUCTS IN OUR STUDY.

Construct	**N**	**Mean**	**Std. Dev.**	**Std. Err. Mean**	**t-value**	**Sig. (2-tailed)**
Interpersonal Attractiveness (CVAs)	116	3.7371	0.6969	0.0647	11.391	0.000
Trust Toward (CVAs)	116	3.6121	0.7345	0.0682	8.975	0.000
Interpersonal Attractiveness (FVIs)	66	3.3598	0.8935	0.1100	3.272	0.002
Trust Toward (FVIs)	66	3.2879	0.7649	0.0942	3.058	0.003
Interpersonal Attractiveness $\rightarrow$ Attitude	182	3.7005	0.7490	0.0555	12.617	0.000
Trust $\rightarrow$ Behavioral Intention	182	3.2198	0.8433	0.0625	3.516	0.001
Attitude $\rightarrow$ Behavioral Intention	182	3.3901	0.8630	0.0640	6.098	0.000

The study assessed Gen Z respondents' perceptions of the interpersonal attractiveness and trustworthiness of virtual idols. For the CVA group, the mean score for perceived interpersonal attractiveness was 3.7371, with a standard deviation of 0.697 and a standard error mean of 0.0647. When comparing to a neutral test value of 3, this resulted in a mean difference of 0.7371. A one-sample t-test indicated a statistically significant positive perception of CVAs' attractiveness, with a t-value of 11.391 ($p < 0.001$). Similarly, trust in CVAs yielded a mean score of 3.6121 with a standard deviation of 0.735, and a computed t-value of 8.975 ($p < 0.001$), confirming a significant level of trust among Gen Z participants. For the FVI group, the results demonstrated a moderately positive perception among Gen Z respondents. The mean score for interpersonal attractiveness was 3.3598 ($t(65) = 3.272$, $p = 0.002$), significantly higher than the neutral benchmark of 3, indicating that although FVIs are perceived positively, their attractiveness is rated lower than that of CVAs. Trust in FVIs also yielded a positive result, with a mean score of 3.2879 ($t(65) = 3.058$, $p = 0.003$), confirming a moderate level of trust toward fully virtual characters (table I).

These findings further validate the hypothesized psychological relationships within the hybrid TAM-PSR framework. Interpersonal attractiveness significantly influences attitudes toward virtual idols, as evidenced by a mean score of 3.7005 ($t(181) = 12.617$, $p < 0.001$). This suggests that higher perceived attractiveness, encompassing appearance, social appeal, and task competence, leads to more favorable attitudes toward virtual idols among Gen Z audiences. Moreover, both trust and attitude were found to significantly predict the behavioral intention to interact with virtual idols. Trust exhibited a moderate positive effect ($M = 3.2198$, $t(181) = 3.516$, $p = 0.001$), while attitude demonstrated a stronger predictive influence ($M = 3.3901$, $t(181) = 6.098$, $p < 0.001$). Collectively, these results support all hypotheses suggesting that positive emotional and relational perceptions are crucial determinants of audiences' willingness to engage with AI-based idols.

B. Qualitative Findings

Upon analyzing participants' initial responses concerning Virtual Idols, the AI-agent demonstrated a notable proficiency in unveiling intricate perceptions and delving into consumer psychology. In our study, the proposed agent workflow dynamically formulated follow-up questions tailored to the content of each participant's response, thereby enabling a more profound exploration of underlying attitudes. For instance, when participants suggested that a CVA could enhance its appeal by exhibiting novel skills beyond those of the original persona, the AI-agent astutely followed up with: *"In your view, what specific skills could a CVA display to distinguish itself from the original model?"*. This approach facilitated the identification of particular attributes that consumers associate with innovation and sustained engagement. Similarly, when participants noted that a CVA's realistic visual features augmented its attractiveness, our workflow adaptively inquired: *"What specific elements embody 'beauty' and 'liveliness' in this context? For example, could these include hairstyle, clothing, or facial expressions?"*. Such probing allowed participants to articulate concrete aesthetic elements that might otherwise remain unexpressed.

In the context of FVI, participants conveyed heightened trust due to the algorithmic consistency of these entities' behavior. Leveraging this insight, the agent workflow posed the follow-up: *"Do you believe the involvement of algorithms and professional developers renders the FVI more or less trustworthy than a real human? Why or why not?"*. Furthermore, when participants indicated that their trust in FVIs were heavily influenced by the credibility of the publishing or development team, the AI-agent probed further: *"Could you provide specific examples of criteria you use to assess the credibility of the teams behind an FVI?"*. This line of questioning facilitated the identification of granular factors affecting trust, such as brand transparency, technological expertise, and ethical standards.

Through dynamic follow-up questioning, our agent workflow successfully elicited deeper cognitive and emotional

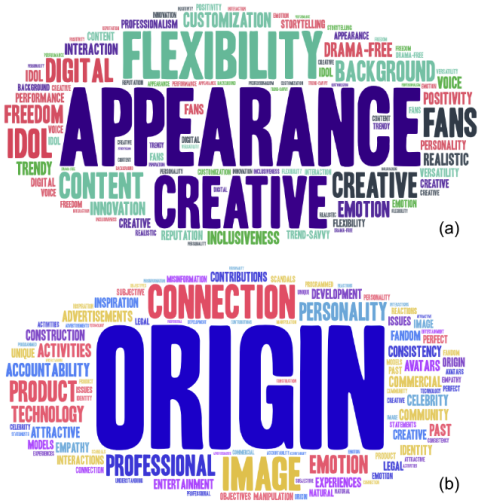

Fig. 4. **(a)** Emerged themes for "in your opinion, what makes a Virtual Idol more appealing or easier to create a favorable impression?"; **(b)** prominent factors for "What influences you to feel Virtual Idols trustworthy or not?".

patterns, such as the dependency of trust on real-world figures for CVAs or the perceived reliability of FVIs, which may not have emerged under more rigid, closed-ended survey designs. Figure 4 presents the word cloud visualization that highlight the most frequently mentioned attributes, with the prominence of each term reflecting its relative importance according to respondents. For example, figure 4(a) shows that *"Appearance"* and *"Creativity"* emerge as the most significant factors, suggesting that visual presentation and innovative characteristics critically shape public perception. *"Flexibility"*, *"Content"*,*"Fans"*, and *"Freedom"* indicate that adaptability, quality of produced material, community engagement, and a sense of autonomy also play essential roles. The word cloud in figure 4(b) underscores *"Origin"* as the most prominent concern among respondents, suggesting that the background, authenticity, and the entity responsible for a Virtual Idol are central to shaping users' trust perceptions. *"Connection"*, *"Professional"*, *"Image"*, and *"Personality"* are also featured prominently, indicating that emotional bonds, professional conduct, visual representation, and consistent character traits are critical components in building trust.

V. Discussion

The comprehensive analysis of primary data substantiates the statistical support for all proposed hypotheses. Participants from Generation Z exhibited markedly positive perceptions of both Celebrity Virtual Avatar (CVA) and Fully Virtual Idol (FVI), concerning interpersonal attractiveness and trust. Moreover, interpersonal attractiveness was demonstrated to exert a positive influence on attitudes toward virtual idols, while both trust and attitude emerged as significant predictors of behavioral intention to engage with these digital entities. These findings affirm the validity of the hybrid TAM-PSR framework introduced in this study, highlighting the pivotal role of emotional and relational constructs in shaping user engagement with AI-mediated media.

Despite the promising outcomes, several limitations warrant attention. First, the demographic profile of the sample, which consisted predominantly of Vietnamese Gen Z university students - 72.5% of whom were female - may have introduced gender and cultural biases in perception, particularly in variables related to interpersonal attractiveness and emotional resonance. This gender-skewed sample may not fully reflect the attitudes of broader, more diverse populations. Additionally, cultural context, media familiarity, and societal norms in Vietnam may shape unique responses toward AI-mediated interaction, thus limiting the generalizability of the findings to other regions. Second, data privacy and algorithmic bias pose ethical considerations. Although no personally identifiable information was collected, reliance on a large language model introduces risks related to embedded biases in language generation, which could inadvertently influence participant responses. Appropriate safeguards and bias-mitigation strategies should be considered in future designs. Third, the survey questions exhibited a tendency for repetition, and the automatically generated answer options introduced potential biases due to their lack of specificity and granularity. The variability in the AI agent's question generation is notably contingent upon the expertise and experience of the survey conductor, thus posing challenges to maintaining consistency across the survey process. To address these limitations, it is imperative to design and implement a tailored AI agent specifically for the purpose of semi-automated dynamic surveying, with particular attention to Vietnamese communities. Future research should also consider the development of a suite of specialized agents, each dedicated to distinct tasks, to enhance the precision and efficiency of the survey process. Such advancements could significantly bolster the capacity to capture nuanced insights and ensure the reliability of the research findings.

VI. Conclusion

In conclusion, this study introduces an innovative AI agent framework aimed to understand virtual idol perception in the Vietnamese digital landscape, leveraging an AI-driven dynamic survey approach. While traditional survey methods often fall short in capturing the dynamic emotional and cognitive responses of participants, our AI-agent-based dynamic survey provides a more adaptive and responsive approach, offering valuable initial insights into the broader patterns of virtual celebrity engagement. These findings underscore the potential of the proposed agent workflow in conducting user-oriented focus groups or case studies. Moving forward, there is a promising avenue for developing more customized and task-specific AI agents to collaboratively enhance ecological validity by providing a more authentic representation of participant engagement and responses within digital settings.

Acknowledgments

This research is funded by University of Economics and Law, Vietnam National University, Ho Chi Minh City, Viet-

nam.

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