

## Acceptance Evaluation of MEEGA+ to Assess Games Addressing the Theme of Sexual Violence

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**Abstract.** *Educational games uniquely address sexual violence, but standardizing their Usability and Player Experience evaluation remains challenging. This paper presents the feasibility and acceptance of the MEEGA+ model to evaluate games in this context. A study with seven Human-Computer Interaction experts analyzed two games and evaluated MEEGA+ based on Technology Acceptance Model indicators. Results show that although MEEGA+ was perceived as easy to use and useful, its general statements do not fully capture the emotional depth and pedagogical demands of sensitive themes, highlighting the need for specialized evaluation instruments.*

**Keywords** *Sexual Violence, Serious Games, Player Experience, Usability*

### 1. Introduction

Sexual violence is one of the most serious violations of human rights. Global data indicates that approximately one in three women has experienced some form of physical or sexual violence, reinforcing the magnitude and complexity of this problem [World Health Organization 2021]. According to a report published by the World Health Organization (WHO), effective actions must combine protection mechanisms with educational initiatives capable of promoting the empowerment of individuals from childhood [Finkelhor et al. 2022].

Serious games emerge as powerful tools for raising awareness and teaching self-protective behaviors in a playful and safe way. Their main characteristics include the possibility of offering personalized learning experiences, stimulating critical thinking, using flexible narratives, and simulating scenarios in controlled environments, allowing players to acquire knowledge and develop social and cognitive skills applicable to preventing real-life situations [Connolly et al. 2012].

The effectiveness of these games depends directly on their technical and pedagogical quality. For the preventive message to be transmitted adequately, the game must offer good usability and a satisfactory Player Experience (PX). Usability refers to the ability of a system to be used effectively, efficiently, and satisfactorily in a specific context [International Organization for Standardization 2018]. PX, on the other hand, encompasses the player's emotional, cognitive, and motivational perceptions during interaction with the game, influencing their engagement and the impact of learning. In games that address sensitive themes, such as sexual violence, these factors are essential to ensure a safe and effective experience [Albert and Tullis 2022].

In this scenario, the MEEGA+ model (*Model for the Evaluation of Educational Games*) is a model for evaluating educational games and is widely used in the field of educational games, integrating dimensions of usability and PX in different learning contexts [Petri et al. 2016, Petri and Gresse von Wangenheim 2016]. However, the literature still lacks evidence on the feasibility and acceptance of this model when applied to extremely sensitive and complex topics, such as sexual violence.

Therefore, the primary objective of this research is to investigate the feasibility and acceptance of the MEEGA+ model as an evaluation instrument for educational games addressing sensitive themes, specifically sexual violence. To achieve this goal, this paper presents a study conducted with Human-Computer Interaction (HCI) experts from different regions of Brazil, with experience in the academia or software industry. The experts were invited to play the games *Chuka: Break the Silence* [Gargamel Estudio 2018] and *Fique de Olho* [Instituto Ficar de Bem 2025], which address the theme of sexual violence. The experts evaluated the feasibility of using MEEGA+ as an analysis model for games with this theme, based on the indicators Ease of Use, Perceived Usefulness, and Intention to Use in the Future [Davis et al. 1989].

The results indicate that, although MEEGA+ is perceived as an easy-to-understand model with high potential for organizing evaluation criteria in academic contexts, it presents significant limitations when dealing with the emotional depth of sensitive themes. The analysis pointed out that the generality of the model's sentences can result in inaccurate evaluations for preventive games, neglecting crucial aspects such as the social impact and pedagogical support necessary in the context of sexual violence. Thus, this study contributes to the scientific community by highlighting the need for adaptations in PX and Usability evaluation instruments, proposing ways for future research to develop more specific and humanized evaluation instruments for serious games.

This paper is organized into six main sections. In addition to this introduction, Section 2 presents related works about educational games with the theme of sexual violence. Section 3 details the planning and execution of the study with HCI experts. Section 4 presents the results obtained through the quantitative and qualitative analysis. Section 5 addresses the discussions arising from the findings and the limitations of the study. Finally, Section 6 presents the final considerations and directions for future work.

## 2. Related Work

"Boundaries" [Conde 2020] is a game developed in English for the MacOS system, with the goal of promoting sex education among adults with intellectual disabilities, especially those aged 20 to 35. Through choice-based stories, the game encourages reflection on boundaries, consent, and interpersonal interactions in an accessible and inclusive way. The game experience is individual and not collaborative. The game was evaluated through an ad-hoc post-gameplay survey with 10 adults (five men and five women, aged 20–35), without a validated instrument, reporting a 78.8% improvement in boundary awareness and a 1.54-point increase on the interpersonal perception scale.

"Caixa de Pandora" [Almeida et al. 2018], created in Portuguese and available for Android, is aimed at healthcare professionals who work with women experiencing violence. The game presents simulated situations and narratives designed to promote active listening, empathy, and ethical care for these women in primary healthcare

services. The game was evaluated through a pre-test/post-test design using a purpose-built questionnaire covering cognitive and affective dimensions, applied to 84 health professionals including physicians, nurses, and community health agents, which found an 11.3% increase in theoretical knowledge about care for violence victims after the intervention.

“Chuka: Break the Silence” [Gargamel Estudio 2018] was created by UNODC and is available in Spanish for Android and iOS. This game is aimed at teenagers aged 15 and up. It addresses sexual, physical, and psychological violence through interactive comic strips, allowing players to reflect on emotions, limits, and coping strategies. The game is accessible on mobile devices and via the web. It has levels where the main character faces monsters, using a mix of emojis to fight and defeat the game’s enemies. No evaluative study of this game was identified in the scientific literature.

“Fique de Olho” [Instituto Ficar de Bem 2025] is available in Portuguese for web use and deals with various forms of violence, such as sexual, physical, and psychological violence, as well as child labor. It can be played directly in a browser and presents interactive situations to help children and teenagers learn to recognize abuse and know where to seek help. The game is individual and can be used in educational contexts. It is also divided into phases, and as the game progresses, phases are unlocked. The objective of the game is to relate the situation to the type of violence addressed. To relate the type of violence, the player must analyze the situation and interact with the environment, selecting what would indicate a situation of risk or violence. No evaluative study of this game was identified in the scientific literature.

Although all the games presented are relevant and potentially useful proposals for their respective target audiences, in most cases it was not possible to test them or verify their functionality in practice. During the survey of existing solutions, it was observed that a large part of the games addressing the theme of sexual violence are technologically outdated or unavailable for use: Boundaries requires a discontinued MacOS environment, and Caixa de Pandora’s Android version is no longer maintained. Chuka: Break the Silence [Gargamel Estudio 2018] and Fique de Olho [Instituto Ficar de Bem 2025] were the only two titles among those identified that remained functional and accessible for hands-on evaluation, which made them the only methodologically viable choice for a study requiring direct gameplay by the participants. This practical constraint also coincided with a gap in the literature, since, as noted above, neither game had a prior evaluation report, reinforcing the relevance of subjecting them to a structured assessment.

Beyond the games directly addressing sexual violence, the literature presents several studies applying the MEEGA+ model to evaluate educational games in different contexts, which helps situate the methodological focus of this work. Silva et al. (2020) applied MEEGA+ to evaluate the GreaTest Card Game, an educational card game for teaching software testing concepts to undergraduate students. The results indicated positive perceptions across most player experience dimensions, particularly fun and social interaction, demonstrating the model’s effectiveness in neutral, technically oriented educational contexts. Similarly, Nipo et al. (2026) used MEEGA+ to assess Computational Fables, a digital game designed to evaluate Computational Thinking skills in elementary school students. The evaluation yielded favorable results regarding aesthetics, relevance, and pedagogical alignment, further confirming the model’s

robustness in structured, content-driven learning scenarios.

However, when MEEGA+ is applied beyond its original scope, limitations begin to emerge. Candiotti et al. (2024) employed MEEGA+ to assess HERL-Town, an educational board game addressing transportation barriers for mobility device users, a context involving a socially vulnerable population with specific functional and emotional demands. Although the game achieved a good quality score (60.15), the authors explicitly acknowledged that MEEGA+ may only partially capture the features of games designed for vulnerable populations, as the instrument was originally developed for digital-based games and does not adequately address dimensions such as accessibility for users with physical limitations or the emotional complexity of the learning context. This finding resonates directly with the concern motivating the present study: whether MEEGA+, despite its methodological robustness, is sufficiently sensitive to evaluate games addressing themes as emotionally and socially complex as sexual violence. To date, no study has investigated the feasibility and acceptance of MEEGA+ specifically in this context, representing a gap this work aims to fill.

### **3. Study Planning and Execution**

#### **3.1. Population and Sample**

The study was conducted with seven HCI experts (numbered P1 to P7), selected via convenience sampling from a social media group of approximately 15 HCI specialists, with professional experience in either academia or the software industry. Regarding the gender of the experts, 71.43% (N = 5) are female, while 28.57% (N = 2) are male. In relation to age range, it is observed that 42.86% (N = 3) of the participants are between 20 and 30 years old, 42.86% (N = 3) are between 31 and 40 years old, and 14.29% (N = 1) are between 51 and 60 years old, with no representatives in the other age ranges. As for qualifications, the majority have a Master's degree (85.71%, N = 6), and 14.29% (N = 1) have a Doctorate. Regarding the area of activity, 42.86% (N = 3) work in academia as researchers, 28.57% (N = 2) in academia as professors, 14.29% (N = 1) work in both academia and the private sector, and 14.29% (N = 1) work exclusively in the private sector.

Regarding experience in the HCI field, 14.29% (N = 1) have 1 year of experience, 14.29% (N = 1) have 3 years, 14.29% (N = 1) have 4 years, 14.29% (N = 1) have 5 years, 14.29% (N = 1) have 8 years, 14.29% (N = 1) have 10 years, and 14.29% (N = 1) have 13 years, demonstrating a balanced group between beginner and experienced experts in the field. As for prior knowledge of Player Experience (PX) questionnaires, 85.71% (N = 6) stated that they were not familiar with any instrument before MEEGA+, while 14.29% (N = 1) stated that they had already had contact with questionnaires in the field. Among those who reported prior knowledge, the Game Experience Questionnaire (GEQ) [IJsselstein et al. 2013] and the Player Experience of Need Satisfaction (PENS) [Ijaz et al. 2020] were cited.

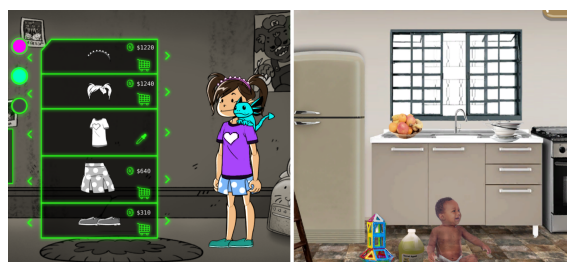
#### **3.2. Ethical Practices**

The study presented in this work was approved by the Research Ethics Committee (CEP) of the Universidade Federal do Paraná (Federal University of Paraná – UFPR) and can be accessed through CAAE 90125925.3.0000.0102 on Plataforma Brasil, the Brazilian national research ethics database. Thus, the study was prepared following the

established ethical procedures rigorously, through the signing of the Informed Consent Form (ICF) and the presentation of risks and benefits. Regarding ethical considerations to minimize risks such as fatigue or emotional discomfort, a humanized support approach was adopted, granting participants a flexible seven-day period to complete the assessments at their own pace and providing direct communication channels with researchers via messaging applications for individualized support. Additionally, the availability of a psychology professional for remote support was guaranteed should the sensitive topic trigger any issues, as well as ensuring the privacy and anonymity of participants through data encryption, with data stored with restricted access to the responsible researcher for a period of five years.

### 3.3. Data collection instruments and procedures

Among the games identified in Section 2, Chuka: Break the Silence [Gargamel Estudio 2018] and Fique de Olho [Instituto Ficar de Bem 2025] were selected for this study due to their accessibility and functional availability, as detailed above. HCI experts who agreed to participate signed the ICF and completed a questionnaire to characterize their participant profile. Subsequently, the lead researcher, in a meeting via Google Meet, briefly presented both games, as well as the study's objectives, and the experts were invited to play them in order to experience educational games addressing the theme of sexual violence awareness. Figure 1 presents the games used in the study.



**Figure 1. Chuka: Break the Silence (left) and Fique de Olho (right).**

Next, the experts were invited to evaluate the MEEGA+ instrument [Petri et al. 2016, Petri and Gresse von Wangenheim 2016], a standardized and statistically validated model for analyzing the quality of educational games from the learner's perspective. MEEGA+ evaluates educational games through nine dimensions: Attention, Relevance, Confidence, Satisfaction, Immersion, Social Interaction, Challenge, Fun, and Competence. Usability indicators are partially captured within specific items addressing interface design appeal, operational adequacy to the learner's style, and ease of understanding the game [Petri et al. 2016]. Table 1 presents an excerpt of the instrument's dimensions and its respective items.

The choice of the MEEGA+ model over generic Usability or Player Experience (PX) instruments is justified by its specific suitability for educational games and its methodological robustness [Petri et al. 2016, Petri and Gresse von Wangenheim 2016]. The literature indicates that a significant portion of serious games evaluations lacks rigor, often relying on ad-hoc questionnaires [Connolly et al. 2012]. In contrast, MEEGA+ was systematically developed using the Goal/Question/Metric (GQM) approach [Basili et al. 1994] and has been statistically validated through a large-scale evaluation involving 60 case studies, 24 educational games, and approximately

1,000 students, confirming its internal consistency reliability and construct validity [Petri et al. 2016]. It stands out by integrating dimensions of PX and Usability with Perceived Learning. Furthermore, its quick application format (one-shot post-test) reduces intrusiveness, strengthening the methodological coherence for the context of this study.

**Table 1.** Excerpt from the MEEGA+ (-2: Strongly disagree, +2: Strongly agree)

| Statements                                                                             | -2                       | -1                       | 0                        | +1                       | +2                       |
|----------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| The game design is attractive (interface or objects, such as cards or boards).         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The way the game works suits my way of learning.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| It was easy to understand the game and to start playing.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| As I played the game, I felt confident that I was learning.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| This game is properly challenging for me, the tasks are not too easy or too difficult. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I had fun with the game.                                                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The questionnaire for evaluating the acceptance of MEEGA+ as an instrument for assessing games with the theme of raising awareness of sexual violence was based on the indicators of the TAM (*Technology Acceptance Model*) [Davis et al. 1989], which are Perceived Ease of Use, Perceived Usefulness, and Intention to Use in the Future. The complete instruments used in this study are available in <https://doi.org/10.6084/m9.figshare.32390526>.

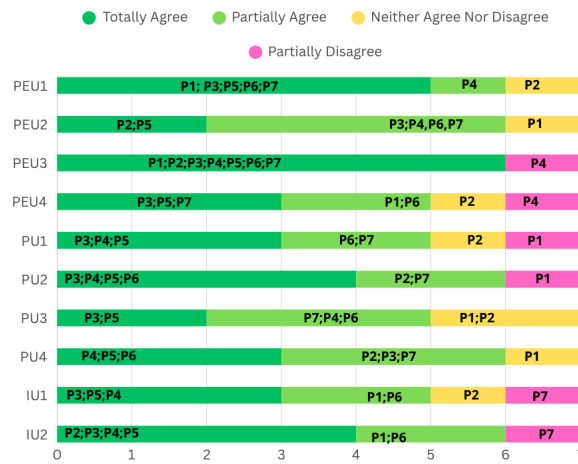
## 4. Results

### 4.1. Quantitative Analysis

The TAM evaluation questionnaire collected responses related to the 3 indicators of the model, which assessed the acceptance of MEEGA+. Responses were obtained using a five-point Likert scale (totally agree, partially agree, neither agree nor disagree, partially disagree, and totally disagree). The TAM results will be described below.

The Perceived Ease of Use indicator defines the degree to which a person believes that using a specific technology would be easy through the following questions: (PEU1) My interaction with MEEGA+ was clear and understandable; (PEU2) Interacting with MEEGA+ does not require much mental effort; (PEU3) I consider MEEGA+ easy to use; and (PEU4) I consider it easy to use MEEGA+ to do what I want it to do, evaluate PX and usability. In Figure 2, the vertical axis of the graph represents the statements of the TAM indicators and the horizontal axis refers to the degree of acceptance of the participants. The participant codes (P1 to P7) were added to the bars of the graph. Regarding the Ease of Use indicator (PEU1 to PEU4), it can be observed that P4 partially disagrees with sentences PEU3 and PEU4, demonstrating some difficulty in use and difficulty in evaluating the PX of games with the use of MEEGA+. This aligns with P4's qualitative feedback (Section 4.2), which associated the instrument's ease of use with the superficiality of the analysis it generates. Overall, even with some difficulties, it can be observed that most participants were optimistic about accepting MEEGA+, demonstrating that it was easy to use.

The Perceived Usefulness indicator defines the degree to which a person believes that technology can improve their performance by means of the following questions:



**Figure 2. TAM results for the Ease of Use indicator.**

(PU1) Using MEEGA+ improves game evaluation performance, (PU2) MEEGA+ contributes to making game evaluation more efficient, (PU3) Using MEEGA+ helps me obtain a more accurate analysis of PX and usability, and (PU4) I consider MEEGA+ a useful model for game evaluation. Figure 2 also presents the participants' perception regarding the Perceived Usefulness indicator. A higher level of agreement is observed in statements PU3 and PU4, which may indicate that MEEGA+ is a model that can be useful and provide a more accurate analysis of games. However, in this same indicator, P1 partially disagrees with statements PU1 and PU2. In one of their responses, P1 highlighted that MEEGA+ is easy to use, but the generality of its statements can result in inaccurate evaluations for games with preventive educational purposes.

Finally, the Future Use Intention indicator defines the degree to which a person believes they would use the technology in the future through the following questions: (IU1) Assuming I have access to MEEGA+, I intend to use it again to evaluate games; and (IU2) Considering that I have access to MEEGA+, I foresee that I will use this model in future evaluations. Figure 2 shows that the vast majority of participants are interested in using MEEGA+. In this indicator, only P7 partially disagreed with these statements, demonstrating doubts about the future use of MEEGA+.

#### 4.2. Qualitative Analysis

The perception of the viability of the MEEGA+ model was assessed through a questionnaire based on the Technology Acceptance Model (TAM), focusing on the indicators of Ease of Use, Perceived Usefulness, and Intention to Use. To capture deeper insights, open-ended questions were included at the end of each TAM section, prompting experts to freely comment on the benefits, difficulties, perceived usefulness, and future use of the instrument. The qualitative data generated from these responses were analyzed using an inductive Grounded Theory approach, following the open and axial coding procedures defined by Corbin and Strauss (2014), in which the evaluative categories regarding MEEGA+'s feasibility were allowed to emerge organically from the text rather than from a pre-existing framework. Selective coding was not performed, as the aim was not to develop a new theory but to understand the feasibility of MEEGA+ from the

perspective of the participating HCI experts. The qualitative synthesis and coding were managed via ATLAS.ti software, organizing the data into macro-categories and codes that systematically mapped the technical benefits and limitations identified by the HCI experts, reflecting their perceptions of the viability of MEEGA+ for evaluating games with the theme of sexual violence awareness. The emerging categories are presented below, accompanied by an interpretative synthesis and representative excerpts from the participants' statements, identified by alphanumeric codes (e.g., [P1], [P2]).

In the Model Scope and Depth macro-category, it was identified that the experts perceive MEEGA+ as an instrument that offers a satisfactory overview of PX [P3], encompassing different dimensions of the evaluation. The participants highlighted that the model is not limited to a strictly superficial analysis, being able to direct the evaluation mainly towards the player experience (PX) [P7]. However, it was also noted that the ease of use of the instrument may be associated with less analytical depth, especially when seeking a more detailed assessment of games with sensitive themes [P4].

*[P7]: MEEGA+ is not limited to a superficial analysis.*

*[P3]: MEEGA+ primarily directs the evaluation towards PX.*

*[P4]: The ease of use of MEEGA+ is directly related to the superficiality of the analysis it generates.*

In the Application Effort macro-category, participants indicate that applying MEEGA+ requires a high level of effort, mainly due to its length and level of detail, which makes the evaluation process more time-consuming and tiring [P7]. Furthermore, it is highlighted that the player's cognitive effort may end up being directed towards completing the instrument, to the detriment of concentration on the learning and reflection content proposed by the game, which compromises the evaluation experience [P3].

*[P7]: The questionnaire can be quite lengthy and detailed, which may make the evaluation process more time-consuming.*

*[P3]: Considering the sensitive nature of the games, I believe that the player's mental effort should be more focused on the proposed learning and reflection content, not just on the task of answering the questionnaire.*

In the Emotional Impact, Reflection, and PX macro-category, participants highlight that the experience with games addressing the theme of sexual violence can mobilize intense emotions, such as worry and anxiety, by recalling sensitive memories and experiences, which requires care in how the content is presented [P5a]. In this sense, the importance of the evaluation considering whether the game treats the theme with seriousness and responsibility, promoting a safe environment that favors learning and critical reflection by the player, is emphasized [P5b]. Despite this reflective potential, it is observed that MEEGA+ presents limitations in adequately capturing feelings and emotional reflections arising from the experience, which may restrict the understanding of PX in sensitive games [P3].

*[P5a]: [...] Addressing the topic, even indirectly and playfully, can bring back difficult memories or emotions, making concentration on the game an act of emotional processing, not just a simple distraction."*

*[P5b]: The evaluation should consider whether the game addresses the topic seriously and carefully, creating a safe environment for learning and self-reflection.*

*[P3]: since after interacting with heavy content, the player tends to experience feelings and reflections that are not properly captured by the instrument.*

In the Limitations of the Model macro-category, participants point out that MEEGA+ adopts a predominantly general approach, without delving into specific dimensions of evaluation, which may limit its applicability in certain educational game contexts [P3]. This generality is perceived as a factor that can result in less precise evaluations, especially in games with preventive purposes or sensitive themes, in which nuances of content and player experience are fundamental [P5]. Furthermore, it is observed that some criteria of the model may be difficult to understand when the game does not fit the model's examples, which may hinder the evaluation process [P7].

*[P3]: MEEGA+ collects relevant data, but does not delve into any specific dimension.*

*[P5]: The generality of its sentences may result in inaccurate evaluations for games with preventive educational purposes.*

*[P7]: In some cases, it is also difficult to interpret certain criteria, especially when the evaluated game does not perfectly fit the examples that the model proposes.*

Regarding the subcategory Limitations in Sensitive Themes, participants highlight that MEEGA+ does not adequately consider how the sensitivity of the theme can profoundly alter the player's experience, limiting its ability to evaluate games that address sexual violence [P5]. In this context, it is noted that the model appears superficial in the face of the seriousness of these themes, neglecting crucial aspects such as prevention, combating, and the educational dimension of the content [P3a]. Furthermore, the need to evaluate specific emotional, educational, and social impacts of this type of game is pointed out, elements that are not sufficiently addressed by MEEGA+, restricting its suitability for this application scenario [P3b].

*[P5]: Its sentences do not consider how the sensitivity of the theme profoundly alters the player's experience.*

*[P3a]: These factors are crucial and are often neglected, but they are decisive for the real impact and relevance of the game.*

*[P3b]: In these situations, a deeper exploration of dimensions more closely linked to the emotional, educational, and social transformation impact on the player would be necessary.*

In the Potential, Expansion and Evolution of MEEGA+ macro-category, participants recognize that the model has the flexibility to be updated and adapted to technological transformations and new forms of interaction in games, which extends its longevity and relevance [P7]. MEEGA+ is also perceived as a consistent reference for structuring and validating issues related to PX, which strengthens its application in both research and evaluation processes [P3].

*[P7]: I also see the possibility of MEEGA+ being adapted and updated, keeping up with technological changes and new forms of interaction.*

*[P3]: I recognize that the model has value in structuring and validating important issues about the player experience.*

In the macro-category Suggestions for Improvement, participants point to the need for adaptations to the MEEGA+ to better address sensitive contexts, highlighting the importance of specific statements aimed at evaluating reflection and the emotional impact of the player's experience [P5a]. In this sense, it is suggested that the model be deepened to encompass emotional and hedonic dimensions, going beyond a simple reinterpretation of the current sentences [P5b]. It is emphasized that some questions in the MEEGA+ need to be adjusted according to the context of the game being evaluated, in order to increase the accuracy and suitability of the instrument in different application scenarios [P6].

*[P5a]: In this context, for example, where gaming experiences are intrinsically linked to reflection and emotional impact, it is crucial to use more focused statements that can measure these specific aspects.*

*[P5b]: [...] requiring a reformulation that goes beyond a simple reinterpretation.*

*[P6]: I suggest that some questions from MEEGA+ need to be adapted according to the context of the game being evaluated.*

In the Usefulness and Application Context of MEEGA+ macro-category, participants indicate that the model is more suitable for evaluating educational games of a general nature or in more neutral formative contexts, where the evaluative demands are less complex [P3a] [P3b]. In situations involving greater thematic complexity, the need to use MEEGA+ in a complementary way to other evaluation instruments is highlighted, in order to broaden the understanding of learning processes and experiences [P3c].

*[P3a]: Thus, I would intend to use MEEGA+ in more general or formative educational games.*

*[P3b]: which makes it useful in many contexts, especially in educational games focused on more neutral content, such as mathematics or logic.*

*[P3c]: but in more complex themes I would assess the need to complement it with other analytical tools to better capture the proposed effects and learning outcomes.*

## 5. Discussion and Limitations

The results obtained through the application of the TAM model show that MEEGA+ presents a duality in its acceptance by HCI experts. On the one hand, the model was widely recognized for its logical structure and clarity. The quantitative analysis of the "Ease of Use" indicator demonstrated that most participants considered the interaction clear and understandable, validating the instrument as an accessible tool even for evaluators with different levels of experience. The perception that the model carefully organizes the evaluation, integrating dimensions of gameplay, usability, and learning, reinforces its "Perceived Usefulness" as a guide for evaluating educational games in general.

However, the in-depth discussion of the qualitative data exposes a critical gap when the object of evaluation is games with sensitive themes, such as games focused on the prevention of sexual violence. The simplicity of the model and its lack of analytical depth were observed. Experts pointed out that the generality of the sentences, although facilitating use, results in a superficiality that neglects crucial aspects of emotional and

reflective impact. Unlike games focused on neutral content (e.g., logic or mathematics), games about sexual violence require an evaluation that considers pedagogical support, emotional safety, and the ability to raise awareness and change behavior.

Furthermore, the qualitative analysis revealed an apparent contradiction between participants regarding the ease of use and the application effort of the instrument, notably between P4 and P7. While P4 associated the instrument's ease of use with its superficiality, suggesting that its generic sentences demand little cognitive effort but fail to generate deep analysis for sensitive themes, P7 highlighted that the application of MEEGA+ requires high effort due to its length, making the process time-consuming and tiring. This divergence can be explained by the distinct perspectives adopted by the experts: P4 focused on the cognitive effort of interpreting broad statements, whereas P7 evaluated the mechanical and temporal effort needed to complete an extensive questionnaire. Both perspectives, however, converge on the conclusion that the instrument's current structure presents practical and analytical barriers for evaluating sensitive contexts.

A relevant limitation identified concerns the difficulty of MEEGA+ in capturing the Player Experience (PX) in its emotional complexity. Participant reports indicate that games like Chuka and Fique de Olho evoke feelings of anxiety, worry, and empathy, which are not adequately addressed by the standardized metrics of "fun" or "challenge" present in MEEGA+. Furthermore, the high cognitive effort required to complete an extensive questionnaire can compete with the emotional processing necessary for reflection on the themes addressed, making the evaluation process tiring and, to some extent, disconnected from the educational purpose of the game.

To clarify the specific gaps in the MEEGA+ model, it is necessary to highlight which characteristics of serious games about sexual violence are not adequately covered by its current dimensions. The qualitative responses revealed that MEEGA+ evaluates PX predominantly through metrics such as "fun" (associated with relaxation and distraction) and "focused attention" (associated with losing track of time). However, in games addressing sexual violence, the experience is rarely characterized by traditional fun; instead, it often involves a necessary reflective discomfort, empathy, and complex emotional processing. Synthesizing findings across three macro-categories identified through the axial coding process (Section 4.2), Emotional Impact, Reflection, and PX; Limitations in Sensitive Themes; and Suggestions for Improvement, three cross-cutting dimensions emerge as consistently absent from MEEGA+'s current structure: (1) *Reflective Engagement and Awareness*, meaning the game's capacity to stimulate critical thinking and identification rather than mere immersion; (2) *Emotional Safety*, assessing whether the game provides a welcoming and safe environment that supports the player when triggering anxious or painful memories; and (3) *Attitudinal Change and Social Transformation*, measuring the concrete educational impact in teaching self-protective behaviors or encouraging players to seek help. These dimensions echo design considerations already identified in prior child sexual abuse prevention games, which emphasize structured opportunities for reflection, a psychologically safe delivery environment, and a theory of change guiding behavioral outcomes [Stieler-Hunt et al. 2014]. By relying on generic statements, MEEGA+ fails to capture these essential pedagogical and psychological impacts, which are the true indicators of

success for games dealing with sensitive themes.

Regarding limitations, the small sample size and the restriction to two games prevent statistical generalization. Furthermore, the participants' predominantly academic profile and the lack of evaluation with the final target audience (children and adolescents) limit the understanding of the instrument's performance in real learning experiences. Another methodological limitation relates to the evaluation procedure of the model itself. The experts were only required to read and critically review the MEEGA+ model rather than practically applying it to evaluate the games. Considering that the majority of participants had no prior experience with the instrument, the lack of practical application may have limited a deeper understanding of its actual feasibility and usability in this specific context.

Another limitation may be related to English proficiency, since "Chuka: Break the Silence" is in English and the participants are not native speakers of English-speaking countries. Given that participants hold advanced degrees, they are expected to demonstrate, at a minimum, reading proficiency in academic English, a skill frequently required in Brazilian master's and doctoral programs.

Taken together, the findings and limitations of the present study echo patterns already signaled in the related literature. The perception that MEEGA+ is easy to use and useful for organizing evaluation criteria aligns with results reported by Silva et al. (2020) and Nipo et al. (2026), who found positive PX outcomes in neutral educational contexts. However, the limitations identified here, particularly the model's inability to capture emotional depth, reflective engagement, and social transformation impact, resonate directly with the concerns raised by Candiotti et al. (2024), who acknowledged that MEEGA+ only partially captures the features of games designed for vulnerable populations.

## **6. Conclusions and Future Work**

This paper presented an exploratory study with HCI experts to evaluate the feasibility and acceptance of the MEEGA+ model in assessing games aimed at raising awareness, preventing, and combating sexual violence. To address this objective, a mixed-methods study was conducted using TAM indicators and a qualitative analysis based on the user experience of the games Chuka: Break the Silence and Fique de Olho. The results indicate that, although MEEGA+ is a robust and well-structured tool for standardizing the evaluation of educational games, it is insufficient to address the complexity of sensitive themes. The model has limitations in measuring critical dimensions such as emotional impact, ethical reflection, and social transformation.

For future work, the development of an extension of the MEEGA+ model is proposed, or the development and validation of a new usability and PX evaluation technology specifically designed for games addressing sexual violence. This technology aims to fill the gaps identified in this study, integrating criteria that assess not only educational effectiveness but also emotional safety and the development of practical coping skills for dealing with sexual violence.

## Generative Artificial Intelligence Use Statement

The Artificial Intelligence tools ChatGPT and Claude were used to spell check the article, while DeepL was used for translation support. The authors take full responsibility for the content of this publication, including accuracy, integrity, and the absence of plagiarism, and have reviewed and validated all AI-assisted contributions.

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