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Serious and Educational Digital Games for the Prevention, Awareness, and Combating of Sexual Violence: a Systematic Mapping Study and Benchmark

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Abstract

Serious and educational digital games addressing the issue of sexual violence are increasingly being adopted as innovative tools to tackle this complex social issue, by enabling engagement through interactive simulations and safe environments. However, there is a lack of studies that not only consolidate the state of the art of these initiatives but also assess the practical feasibility and technical quality of such resources. As an extended version of a previous study, this article has the dual objective of mapping the scientific literature through a Systematic Mapping Study (SMS) and conducting a benchmark evaluation of existing digital games focused on this theme. For this SMS, inclusion and exclusion criteria were defined. The process included searches in databases such as IEEE Xplore, ACM Digital Library, Scopus, and ERIC. Eight papers were analyzed, revealing trends in game design, such as narratives based on interactive storytelling and scenario-based learning. As an extension of this work, the games identified in the SMS, along with new games identified in the literature, were subjected to a benchmark analysis. Practical criteria such as usability, Player eXperience (PX), interaction mechanics, accessibility, language availability, and the use of emerging technologies were analyzed. A practical evaluation of 11 educational games revealed a significant disconnect between academic theory and practice. Although commercially available games primarily target adolescents (54.5%) and offer excellent usability and PX, a pedagogical limitation was identified: 72.7% lack built-in mechanisms for assessing learning. Furthermore, a significant lack of accessibility features for people with disabilities was observed. These findings provide practical recommendations for researchers, educators, and developers to integrate pedagogical validation and inclusive design into game mechanics, thereby enhancing the effectiveness and reach of future initiatives in this critical domain.

Keywords: *Systematic Mapping Study; Serious Games; Benchmark; Evaluation; Educational Games; Sexual Violence; Prevention; Awareness; Combating*

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1 Introduction

Sexual violence is defined as "any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic, or otherwise directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting" (Krug et al., 2002). It continues to represent a pressing global concern requiring innovative approaches to prevention, awareness, and combating. In Brazil, the steady rise in reported incidents underscores the critical need for primary prevention strategies (Andrade et al., 2023), calling for educational initiatives that extend beyond conventional reporting mechanisms. The World Health Organization (WHO) asserts that effective responses must integrate protective measures with educational approaches capable of empowering individuals from an early age (Finkelhor et al., 2022). In this landscape, digital tools, particularly serious and educational games, have emerged as noteworthy instruments for engaging users through interactive scenarios that simulate real-world dilemmas while cultivating critical thinking and preventive attitudes. Nevertheless, the ethical and practical deployment of such tools in educational contexts calls for careful investigation to fully realize their potential societal benefits.

Serious games, conceived for purposes extending well beyond entertainment, stand out as particularly suited for addressing sensitive subjects such as sexual violence. Research points to their capacity to foster awareness and encourage preventive behaviors through immersive narrative structures and decision-making dynamics (Djaouti et al., 2011). Despite this recognized potential, the field still lacks systematic evaluations of their effectiveness, design approaches, and long-term outcomes in the context of sexual violence prevention. This absence of consolidated evidence underscores the importance of understanding how elements such as narrative styles, game mechanics, and accessibility features, among others, shape educational outcomes and sustain user engagement.

This paper presents a Systematic Mapping Study (SMS) on serious and educational digital games applied to sexual violence prevention, awareness, and combat. Through the examination of existing research, we aim to uncover prevailing design trends, gauge effectiveness across different contexts, and offer concrete guidance to developers, educators, and policymakers alike. Ultimately, our findings seek to reinforce evidence-based practices in educational game development, fostering safer learning environments and leveraging technology to empower vulnerable populations.

A total of eight studies were retained for data extraction and analysis. Examination of the selected publications showed that serious games tackling sexual violence commonly rely on interactive storytelling and scenario-based learning as core mechanisms to boost engagement and educational effectiveness. Nonetheless, considerable gaps were brought to light: evaluations of long-term impact remain scarce, cultural adaptability is frequently overlooked, and structured frameworks for assessing educational outcomes are seldom incorporated. Furthermore, none of the games identified were designed for adolescents and women, with a strong focus on computer and mobile digital platforms. Taken together, these results indicate that, although serious games hold genuine promise as tools for addressing sexual violence, continued refinement is essential to broaden their reach and sustain their effectiveness over time.

However, mapping the academic literature in isolation is insufficient for understanding the

true impact of these tools, since digital games are fundamentally applied technologies. Many solutions proposed in academic settings may not reach the general public, and those that do often face challenges related to accessibility, engagement, and technological constraints. To bridge this critical gap between academic theory and practical reality, this article, as an extended and revised version of the work originally presented at the XIV Congresso Brasileiro de Informática na Educação (CBIE) (Costa et al., 2025), introduces three substantive contributions beyond the original publication: the design and application of a comprehensive Benchmark evaluation of 19 cataloged games (Section 4), representing the primary methodological extension of this work; the expansion of the Related Work to incorporate methodological literature on the evaluation of serious games; and the substantial expansion of the Discussion to incorporate a triangulation of the academic and practical findings.

While SMS investigates the theoretical state of the art, the Benchmark evaluates the functional reality of games currently available to society. It evaluates 11 active initiatives based on practical criteria essential for real-world adoption, including game availability, usability, Player eXperience (PX), inclusive design, language accessibility, and the ethical treatment of sensitive topics. By triangulating academic findings with this practical benchmark, this research provides a holistic view of the field. It not only identifies what is being researched but also exposes the gap between academic prototypes and market availability, offering developers, educators, and policymakers a robust and actionable guide for creating safer, more accessible, and effective preventive games.

The article is structured as follows: Section 2 reviews related work on serious games and sexual violence prevention. Section 3 details the methodology and presents the findings of SMS. Section 4 introduces the practical benchmark evaluation of the available digital games. Section 5 discusses the implications and the triangulation of the academic and practical findings. Section 6 presents the study limitations, while Section 7 outlines the conclusions and directions for future work.

2 Related Work

Barrera Yañez et al. (2023) examined digital tools oriented toward gender equality, encompassing serious games among the resources analyzed. Their findings indicated that most such initiatives target adolescents, seeking to raise awareness about gender violence through immersive narratives and exposure to critical situations. Although effective in cultivating empathy, these resources frequently suffer from an absence of rigorous empirical validation and limited accessibility. Moreover, the study does not specifically address sexual violence, constraining its direct relevance to this theme.

Asadzadeh et al. (2022) put forward a structured framework for the application of digital games and virtual reality in child abuse prevention, organizing the initiatives into six distinct categories, including screening and treatment. Despite the recognized potential of these tools, longitudinal evaluations of their effectiveness remain notably absent, and the use of games to address sexual violence involving adults or broader community contexts has received little exploration.

The SMS presented by Cardouzo et al. (2024) investigated how genre classification in games

influences player perceptions, underscoring the demand for more inclusive and representative digital experiences. Although the study did not center on sexual violence prevention, its conclusions reinforce the relevance of incorporating gender-related themes into game design, a consideration that aligns directly with the concerns motivating our research.

Other initiatives, such as *Grace's Diary* [(GP Touch, 2010)] and *Chuka* [(Gargamel Estudio, 2018)], cited by Barrera Yañez et al. (2023), illustrate the capacity of interactive narratives for confronting gender-based violence and child abuse in engaging and educational ways.

While these related works offer valuable contributions, they also expose substantial gaps, not only in the absence of longitudinal studies or their restriction to particular audiences, but above all in their thematic scope. By centering on broader categories such as "gender violence" or exclusively on "child abuse," the existing literature stops short of delivering a focused examination of the wide and complex terrain of sexual violence itself. Critical dimensions of the topic, including consent, the psychological consequences of sexual assault, mechanisms to counter victim-blaming, bystander intervention strategies, and emerging forms of digital sexual violence, frequently remain unaddressed or are diluted within broader discussions. The present study thus addresses these specific thematic gaps, offering a concentrated analysis of how digital games tackle sexual violence across its multiple dimensions and adopting a rigorous methodological approach suited to this purpose.

Furthermore, in addition to this thematic gap, no benchmarks or evaluation frameworks developed specifically for games aimed at preventing, raising awareness about, and combating sexual violence were found in the literature. To justify the adoption of a rigorous methodological approach and the proposal of a practical benchmark in this study, it is necessary to draw upon the methodological literature on the holistic evaluation of Serious Games and on mappings conducted in other areas with significant social impact.

To understand the role of digital games in related critical issues, Calvo-Morata et al. (2020) conducted a systematic review focused on the use of video games as tools for the prevention and detection of bullying and cyberbullying. The authors demonstrated that serious games can be used effectively to raise awareness, foster empathy, and teach new strategies for dealing with these social problems.

Despite evidence of the effectiveness of games in addressing sensitive topics, helping educators identify high-quality serious games remains an ongoing concern. Initially, Duvall & Shah (2024) highlighted the importance of using validated quality criteria (references) to evaluate these educational tools. However, expanding on this premise, Duvall et al. (2025) caution that simply analyzing the descriptions of serious games is insufficient to attest to their educational and technical quality. By comparing website descriptions with actual gameplay experiences, the authors emphasize that, although games may theoretically meet quality benchmarks, their practical execution often differs, making it essential to actively play and evaluate the tools. In this sense, attesting to the quality of games through a practical benchmark is an essential path to overcoming barriers to the adoption of these technologies.

Regarding the choice of quality criteria to compose a benchmark, the RAGE Framework, presented by Steiner et al. (2015), introduces a holistic and multi-perspective approach for the evaluation of serious games. The authors argue that evaluation goals should generally cover two indispensable fronts: the measurement of software quality (including usability) and the assessment

of educational effectiveness linked to user engagement and experience.

Reinforcing the need to evaluate not only the content but also the gameplay, the Gaming Educational Balanced (GEB) Model, proposed by Martinez et al. (2022), criticizes the fact that many evaluation models lack a good balance between playful and learning requirements. The model is based on the Mechanics, Dynamics, and Aesthetics (MDA) framework, offering a metric to evaluate the game's instructional capacity while giving equal importance to the fun and mechanics offered to players.

Thus, to address both the thematic and methodological gaps identified in the literature, this study adopts a twofold approach. Building upon the SMS designed to investigate these games, this study proposes and applies a practical benchmark. Driven by the urgent need for technical quality and gameplay standards supported by the literature, this benchmark evaluates the identified games based on fundamental criteria such as usability, PX, accessibility, and interaction mechanics.

3 Systematic Mapping Study

The protocol of this Systematic Mapping Study (SMS) was conducted in accordance with the guidelines established by Kitchenham and Charters (2007). The objective of this SMS, grounded in the Goal-Question-Metric (GQM) paradigm (Basili & Rombach, 1988), is to **examine** scientific publications, **with the purpose of** identifying and characterizing, **regarding** the design, development, and evaluation of serious and/or educational digital games employed for raising awareness of, preventing, and combating sexual violence, **from the perspective of** researchers working with serious and educational digital games, **in the context of** primary sources available in the ACM, IEEE Xplore, Scopus, and ERIC databases. In addition, a supplementary search was conducted in the SOL/SBC database using the same protocol adopted in the main SMS, aiming to cover relevant national publications. Details of this complementary search are presented in Section 4.

The central research question guiding this SMS is: "*What serious and/or educational digital games have been designed, developed, and/or evaluated for the purposes of raising awareness of, preventing, and combating sexual violence?*" Beyond this main question, subquestions pertaining to the environment of the analyzed games were formulated and are summarized in Table 1, which presents each subquestion alongside its possible answers and the distribution of games according to those answers and their respective percentages. The selected search languages were Portuguese and English. English was prioritized given that the majority of academic publications are disseminated in this language, while Portuguese was included as the native language of the authors.

The search string was constructed following the PICOC (*Population, Intervention, Comparison, Outcome, and Context*) criterion (Kitchenham & Charters, 2007), built around three core components: (1) **Population** - Represents the study's thematic context, namely sexual violence; (2) **Intervention** – Refers to serious and/or educational digital games; and (3) **Outcome** – Encompasses the contributions of the identified initiatives, covering aspects related to the design, development, and evaluation of games focused on sexual violence prevention, combat, and awareness. Given that the goal of this SMS is to characterize rather than contrast the identified initiatives, the Comparison and Context components of PICOC were not incorporated into the search string.

Research Subquestions	Possible Answers	Games	Percentage
SQ1. What type of game?	Simulation	4	66.67%
	Puzzle	1	16.67%
	Slot Machine	1	16.67%
	Board Game	1	16.67%
SQ2. What is the educational purpose of the game?	Awareness	6	100%
	Prevention	4	66.67%
	Combating	1	16.67%
	Skill and Competency Development	2	33.33%
SQ3. What is the target audience of the game?	Children	3	50.00%
	Parents	1	16.67%
	University Students	1	16.67%
	University Professors	1	16.67%
	University Staff	1	16.67%
	Adults with Disabilities	1	16.67%
	Healthcare Professionals	1	16.67%
	Adolescents	0	0.00%
	Women	0	0.00%
SQ4. What is the game genre?	Adventure	4	66.67%
	Trivia or Quiz	1	16.67%
	Virtual Board Game	1	16.67%
	Augmented Reality Game	1	16.67%
SQ5. What narrative is adopted in the game?	Linear	1	16.67%
	Branching	3	50.00%
	Interactive	2	33.33%
SQ6. What is the identified game format?	Pixel Art	0	0.00%
	Realistic Graphics	1	16.67%
	Stylized Graphics	5	83.33%
SQ7. What platform does the game run on?	Computers	4	66.67%
	Mobile Devices	3	50.00%
	Web	1	16.67%
	Not Specified	1	16.67%
SQ8. Did the game undergo a quality evaluation?	Yes	6	100.00%
	No	0	0.00%
SQ8.1. What quality criteria were evaluated in the game?	Usability	6	100.00%
	User Experience	3	50.00%
	Accessibility	1	16.67%
SQ9. Does the game address ethical, cultural, and sensitivity issues when dealing with the theme of sexual violence?	Yes	6	100.00%
	No	0	0.00%

Table 1: Distribution of responses for each subquestion. This table presents the final data extracted from the primary studies selected after the 2nd filter

The search string adopted in this SMS was organized as follows: ("sexual violence" OR "sexual assault" OR "sexual abuse" OR "sexual violence against" OR "sexual exposure" OR "sexual exploitation") AND ("educational games" OR "serious games" OR "learning games" OR "instructional games") AND ("design" OR "implementation" OR "development" OR "evaluation" OR "assessment").

For the selection of papers, inclusion criteria (IC) and exclusion criteria (EC) were established. Papers were included when they addressed the design, development, and/or evaluation of serious or educational games in the context of preventing, combating, and raising awareness of sexual violence **(IC1)**, or when they presented experimental studies of such games within that same context **(IC2)**. Papers were excluded when they failed to satisfy the inclusion criteria **(EC1)**, were written in a language other than English or Portuguese **(EC2)**, were unavailable for consultation or open-access download **(EC3)**, appeared as duplicates already retrieved from another database **(EC4)**, or had not been subjected to peer review, as is the case with gray literature **(EC5)**.

The paper selection process unfolded across two stages: the first filter and the second filter, both carried out by three researchers. In the first filter, the title and abstract of each paper were examined against the inclusion and exclusion criteria, and a justification was recorded for every excluded paper. In the second filter, the papers retained in the previous stage were read in full and reassessed using the same criteria to determine their definitive inclusion in this SMS. All searches were performed in April 2024.

Both stages were conducted using the Porifera tool (Campos et al., 2022). In each phase, the three researchers independently evaluated the retrieved papers and subsequently convened to resolve any divergences. Whenever disagreement arose, consensus was required before a final decision on acceptance or rejection could be reached. The first filter yielded an inter-rater agreement of 67.42%, with a Kappa index (Fleiss, 1971) of 0.635, rated as “good.” The second filter produced an agreement of 85.71%, with a Kappa index of 0.7341, likewise considered “good.”

3.1 Quantitative Results

Applying the search string to the selected digital libraries returned a total of 132 papers (43 from ACM Digital Library, 74 from IEEE Xplore, 12 from Scopus, and 3 from ERIC). During the first filter, all 132 papers were screened for relevance based on titles, abstracts, and keywords, resulting in the retention of 42 papers (8 from ACM, 25 from IEEE Xplore, 8 from Scopus, and 1 from ERIC). In the second filter, these 42 papers were subjected to a deeper evaluation of their methodology, objectives, and results, ultimately yielding 8 papers for data extraction.

The retained studies span the period from 2010 to 2023. Publication frequency was highest in 2014 and 2020 (2 papers each), followed by 2010, 2018, 2021, and 2023 (1 paper each). A notable surge in publications occurred between 2018 and 2021, a period marked by heightened interest in serious games for training and awareness, particularly on topics related to safety and violence prevention. The most recent study dates from 2023, while the earliest was published in 2010, underscoring the field’s evolution over more than a decade.

An analysis of publication venues revealed no concentration in any single conference or journal, with each event and periodical accounting for only one paper. Conferences represented include *CHI EA ’23*, *ASSETS ’20*, and *BCS-HCI 2010*. Journals include *Child Abuse & Neglect*,

Computers in Entertainment (CIE), *Malaysian Journal of Nursing*, *International Journal of Inclusive Education*, and *Frontiers in Psychology*. Full venue details for each paper are available in the Technical Report of this SMS, published at https://doi.org/10.6084/m9.figshare.28807169.

3.2 SQ1. Types of Games Identified

The games identified in this SMS fall into four main categories: "simulation", "puzzle", "slot machine", and "board game" (Table 1). The "simulation" type predominates, appearing in 66.67% (N = 4) of the analyzed games, while "puzzle", "slot machine", and "board game" are equally distributed, each accounting for 16.67% (N = 1).

It is worth noting that some games span more than one category. *Orbit*, for instance, combines "simulation" and "puzzle" elements, offering a more varied and interactive experience in which players navigate simulated scenarios while engaging with logical challenges. According to Jones et al. (2020), Scholes et al. (2014), and Stieler-Hunt and Jones (2014), *Orbit* is a serious game designed to prevent child sexual abuse and has been recognized as an effective approach to teaching children how to identify and avoid risky situations, with this hybrid structure contributing to more dynamic and engaging learning. The complete results for SQ1 are presented in Table 4 and Figure 3 of the SMS Technical Report.

3.3 SQ2. Educational Purpose of the Game

All examined games (100%, N = 6), *StepUp & StepIn*, *Boundaries*, *Caixa de Pandora*, *Orbit*, *Being Safety Smart*, and *Snake and Ladder*, were classified under the educational purpose of promoting "awareness" of sexual violence, demonstrating a consistent emphasis on sensitizing players to the existence and impact of this form of violence.

Regarding "prevention", two-thirds of the games (66.67%, N = 4) were also assigned this objective. *StepUp & StepIn* (Schlesener et al., 2023) and *Orbit* (C. Jones et al., 2020), for example, aim to equip players with the ability to recognize and avoid situations involving sexual violence. Conversely, *Boundaries* and *Caixa de Pandora* were not classified under "prevention", pointing to variation in the degree to which this dimension is emphasized across the analyzed games.

As for "combatting sexual violence", only *Caixa de Pandora* received this classification, corresponding to 16.67% (N = 1) of the games (Almeida et al., 2018). This finding exposes a gap in approaches directed at actively confronting sexual violence, as the majority of games prioritize "awareness" over concrete intervention strategies.

Concerning "skills and competencies development", only *Being Safety Smart* and *Snake and Ladder* were assigned this purpose, representing 33.33% (N = 2) of the analyzed games (C. M. Jones & Pozzebon, 2010; Saleha et al., 2021). These games concentrate on building practical abilities, particularly those associated with personal safety and risk management.

These results indicate that while all games address "awareness" of sexual violence, there is a lesser focus on aspects such as "prevention" and "combating", as well as a limited emphasis on the development of "practical skills". The complete results for SQ2 are presented in Table 5 and Figure 4 of the SMS Technical Report.

3.4 SQ3. Target Audience of the Game

The SQ3 results show that 50% of the analyzed games, *Orbit*, *Being Safety Smart*, and *Snake and Ladder*, primarily target "children", reflecting a pronounced focus on educating and safeguarding younger audiences through accessible and interactive approaches to personal safety.

Additional target groups were each represented by 16.67% (N = 1) of the games, comprising "Parents", "University Students", "University Professors", "University Staff", "Adults with Disabilities", and "Healthcare Professionals". In the study by Schlesener et al. (2023), *StepUp & StepIn* was developed specifically for university students, faculty, and staff in the United States, with the aim of fostering bystander intervention in campus sexual harassment scenarios (Schlesener et al., 2023). *Boundaries*, in turn, targets individuals with disabilities, guiding them in understanding relationship boundaries (Conde, 2020).

None of the identified games directly focused on "Adolescents" or "Women", indicating a possible gap in addressing audiences that could also benefit from awareness and prevention tools. The complete results for SQ3 are presented in Table 6 and Figure 5 of the SMS Technical Report.

3.5 SQ4. Game Genre

The "Adventure" genre is the most prevalent among the analyzed games, accounting for 66.67% (N = 4) of the sample, as seen in *Boundaries*, *Caixa de Pandora*, *Orbit*, and *Being Safety Smart*. These games employ narrative-driven structures combining exploration and interaction, features characteristic of the adventure genre. The "Trivia or Quiz" genre is present in 16.67% (N = 1) of the games, represented by *Caixa de Pandora*, which incorporates question-and-answer dynamics to engage players and promote learning about violence against women.

"Virtual Board Games" also account for 16.67% (N = 1), exemplified by *Snake and Ladder*, which adapts a board-based format to convey personal safety skills to children. "Augmented Reality Games" are likewise present in 16.67% (N = 1) of the analyzed games, as seen in *Step Up & Step In*, which leverages immersive technology to simulate sexual harassment scenarios and train players in bystander intervention.

These results indicate a clear preference for the "Adventure" genre, while other categories such as "Trivia or Quiz", "Virtual Board Games", and "Augmented Reality Game" appear in a more specific manner, depending on the target audience and the game's purpose. The complete results for SQ4 are presented in Table 7 and Figure 6 of the SMS Technical Report.

3.6 SQ5. Narrative Style adopted in the Game

The narrative styles employed across the analyzed games fall into three categories: "Linear", "Branching", and "Interactive". Half of the games (50%, N = 3) (*Orbit*, *Caixa de Pandora*, and *Boundaries*), adopt a "Branching" narrative, enabling players to make choices that shape the course of the game, thereby deepening immersion and facilitating the internalization of educational content through exposure to varied consequences.

The "Interactive" narrative style is present in 33.33% (N = 2) of the games, including *Step Up & Step In* and *Being Safety Smart*. This approach encourages active participation in decision-

making processes, heightening engagement by grounding interactions in real-world safety and intervention scenarios. The remaining 16.67% (N = 1), represented by *Snake and Ladder*, follows a "Linear" narrative, in which progression occurs in a fixed, predetermined sequence with no meaningful variation in player choices. This structure can be well-suited for conveying information in a controlled and predictable manner, particularly when addressing sensitive content.

These findings indicate that the choice of narrative style varies according to the game's objectives and target audience, with a preference for "Branching" and "Interactive" approaches, which can enhance player engagement by presenting diverse and participatory scenarios. The complete results for SQ5 are presented in Table 8 and Figure 7 of the SMS Technical Report.

3.7 SQ6. Identified Game Format

The results for game format indicate a clear preference for visual styles that balance engagement with accessibility. The majority of games (83.33%, N = 5) employ "Stylized Graphics", as seen in *Orbit* and *Boundaries*, combining visual appeal with simplicity to facilitate comprehension and interaction, especially among younger audiences and in educational settings.

"Realistic Graphics" appear in 16.67% (N = 1) of the games, specifically in *Step Up & Step In*, where a higher degree of visual realism enhances proximity to real-life situations and strengthens the impact of the educational message. No games in the sample utilized "Pixel Art" as their graphical style, an absence that likely reflects a tendency to avoid overly simplified or retro-styled aesthetics, which could undermine the perceived seriousness of the subject matter. The visual choices observed appear to be guided by the need to balance player engagement with the respectful and effective treatment of sensitive content.

These findings indicate a clear preference for "Stylized Graphics", which allow for an attractive and accessible visual presentation while maintaining an educational focus. Meanwhile, the use of "Realistic Graphics" remains a specific choice to enhance realism and impact for particular audiences. The complete results for SQ6 are presented in Table 9 and Figure 8 of the SMS Technical Report.

3.8 SQ7. Platforms on which the games run

The predominant platform among the analyzed games is "Computers" (66.67%, N = 4), with *Boundaries*, *Caixa de Pandora*, *Orbit*, and *Being Safety Smart* all developed for this environment, taking advantage of its graphical and processing capabilities to deliver richer experiences. "Mobile Devices" rank second (50.00%, N = 3), represented by *Caixa de Pandora*, *Being Safety Smart*, and *Step Up & Step In*, reflecting the growing tendency to leverage the portability and reach of smartphones and tablets to broaden the accessibility of educational content.

The "Web Platform" appears in 16.67% (N = 1) of the games, represented by *Being Safety Smart*, whose browser-based access removes the need for software installation and facilitates distribution across different devices and contexts. The platform for *Snake and Ladder* was not explicitly reported in the source paper, representing 16.67% (N = 1) of cases with incomplete information.

These results indicate a clear preference for versatile platforms, such as "Computers" and

"Mobile Devices," which combine accessibility with technical capabilities, while "Web" platforms and cases with missing data appear less frequently. The complete results for SQ7 are presented in Table 10 and Figure 9 of the SMS Technical Report.

3.9 SQ8. Game Quality Evaluation

All games in the sample (100%, N = 6) underwent some form of quality evaluation, reflecting a shared commitment among developers to validating the effectiveness and user experience of their products. *Step Up & Step In*, an augmented reality game, was assessed for its applicability in training bystander intervention in university sexual assault scenarios. The study involved faculty and students (sample size not disclosed) and reported a 27% improvement in perceived intervention effectiveness.

Orbit was subjected to a randomized experimental study assessing its effectiveness in preventing child abuse, involving 139 children aged 6–10, with 34 assigned to the control group. Results demonstrated a meaningful gain in prevention-related knowledge, with a delta of 31.5% in the experimental group compared to 4.2% in the control group. *Being Safety Smart* focused on knowledge retention regarding abduction prevention, enrolling 107 children aged 6–8; the experimental group achieved an average score of 31/35, compared to 24/35 in the control group.

Boundaries, designed to promote reflection on interpersonal boundaries among people with disabilities, was evaluated with 10 adults (5 men and 5 women, aged 20–35), yielding a reported 78.8% increase in boundary awareness and an improvement of 1.54 points on the perception scale. *Caixa de Pandora* was evaluated for its effect on healthcare professionals' behavior when supporting victims of violence, involving 84 professionals including doctors, nurses, and community agents, and producing an 11.3% increase in theoretical knowledge following the intervention. Even *Snake and Ladder*, whose scope focuses on teaching personal safety skills to children, underwent quality assessment. A comparison between two teaching methods in 107 preschoolers aged 3–6 showed that the group using the board game achieved an average gain of 2.33 points, versus 1.70 points for the group using a book.

These data show a positive scenario, where all the games underwent some form of validation, enhancing their credibility and effectiveness as educational tools. The complete results for SQ8 are presented in Table 11 and Figure 10 of the SMS Technical Report.

3.10 SQ8.1. Quality Criterion Evaluated in the Games

"Usability" emerged as the most frequently assessed quality criterion, present across all analyzed games (100%, N = 6). As defined by the ISO 9241-11:2019 standard, usability refers to "the degree to which a product can be used by specific users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specific context of use." All games, including *Step Up & Step In*, *Orbit*, and *Being Safety Smart*, were assessed to verify that their interactions and functionalities were intuitive and appropriate for their intended audiences.

"User Experience (UX)" was evaluated in 50% (N = 3) of the games, namely *Boundaries*, *Caixa de Pandora*, and *Being Safety Smart*. As characterized by ISO 9241-210:2019, user experience encompasses "a person's perceptions and responses resulting from the use or anticipation of the use of a product, system, or service," reflecting a concern with the emotional and perceptual

dimensions of gameplay beyond mere functional performance.

"Accessibility" was addressed in 16.67% (N = 1) of the games, specifically in *Boundaries*. Following Barbosa et al. (2021), accessibility pertains to the user's capacity to access and interact with a system free from interface-imposed barriers, ensuring that individuals with diverse needs can engage with the product. This criterion underscores the importance of inclusive design in games addressing sensitive topics for varied audiences.

These data highlight a primary focus on "usability" as a fundamental quality criterion, with additional attention given to "UX" and "accessibility" in selected games, according to the game's purpose and target audience. The complete results for SQ8.1 are presented in Table 12 and Figure 11 of the SMS Technical Report.

3.11 SQ9. Ethical, cultural, and sensitivity issues

All analyzed games (100%, N = 6) demonstrated attention to ethical, cultural, and sensitivity considerations in their treatment of sexual violence, reflecting a shared concern among developers with addressing the topic responsibly and ensuring that the conveyed messages are appropriate for their target audiences and cultural contexts.

Orbit approaches the teaching of protective skills against child sexual abuse through narratives calibrated to children's developmental stage. *Step Up & Step In* addresses bystander intervention in university sexual harassment contexts, incorporating cultural diversity and an emphasis on empathy. *Caixa de Pandora* and *Boundaries* tackle violence against women and relationship boundaries respectively, employing narrative and graphic strategies that ensure the ethical and culturally sensitive treatment of these themes throughout.

These results indicate that developers have demonstrated significant attention in ensuring that the games not only educate players but also approach the topic of sexual violence with due sensitivity, respecting the social and cultural context. The complete results for SQ9 are presented in Table 13 and Figure 12 of the SMS Technical Report.

4 Benchmark

As a methodological extension to the SMS, the practical benchmark evaluation was conducted on digital games focused on the prevention, awareness, and combat of sexual violence. The objective of this Benchmark was to practically evaluate the viability and technical quality of the games available to the public, analyzing criteria such as usability, PX, interaction mechanics, accessibility, language availability, and the use of emerging technologies.

As detailed in Table 2, the sample of 19 games gathered for this evaluation was composed of three distinct sources. First, 6 games were identified directly from the articles retrieved in the SMS from international databases (ACM, IEEE Xplore, Scopus, and ERIC). Next, aiming to capture the national scenario and expand the practical scope, a complementary search was conducted in March 2026. This search employed exactly the same search string defined in the SMS in the Digital Library of the Brazilian Computer Society (SOL/SBC), returning 2 additional games.

Origin	ID	Game
Manual and exploratory searches via search engines, AI tools, and institutional portals (e.g., UNICEF, UNODC).	1	Chuka: Break the Silence
	2	Fique de Olho
	3	Se liga em ficar bem
	4	Adrift
	5	PlaySafe
	6	Festa do Brincar
	7	Stop la violence
	8	Gentopia
	9	Grace's Diary
	13	CONVEY - Not a Game
	18	Ninguém me ensinou
Systematic Mapping Study (SMS) in digital libraries.	10	Orbit
	11	Caixa de Pandora
	14	StepUp & StepIn
	15	Boundaries
	16	Being Safety Smart
	17	Snake and Ladder
Searches in the SBC Open Lib (SOL) database.	12	PROTECA
	19	Infância Segura

Table 2: Origins of the analyzed games

The largest portion of the sample (11 games) was gathered through a complementary manual and exploratory web search, conducted with the objective of identifying digital games that, although potentially relevant to the investigated theme, may not be described in indexed scientific articles. This stage included queries in general search engines (Google), institutional websites, and organizations related to child protection, education, and violence prevention, such as the United Nations Children's Fund (UNICEF) and the United Nations Office on Drugs and Crime (UNODC), as well as the exploration of specific game pages and materials identified through cross-referencing between websites. The search terms employed combined keywords in both Portuguese and English related to the theme, including: "sexual violence serious game", "sexual abuse prevention game", "consent educational game", "child sexual abuse prevention game" and "gender-based violence game". The process was iterative and exploratory in nature: newly identified games led to the consultation of related pages, institutional recommendations, and cross-references. Additionally, generative AI tools, specifically ChatGPT and Gemini, were employed as a complementary support for the initial identification of potential games and related terms. All results obtained through these tools were subsequently verified manually via the official pages of the games or institutional websites before being included in the analysis.

To ensure the methodological rigor of the selection process, explicit inclusion and exclusion criteria were defined prior to the cataloging phase. A game was considered eligible for the benchmark when it satisfied all of the following inclusion criteria: (IC1) it explicitly addressed the theme of sexual violence, encompassing prevention, awareness, consent, child sexual abuse, sexual exploitation, sexual harassment, or sexual violence in online or offline environments; (IC2) it presented a serious or educational character, distinguishing it from purely entertainment-oriented

products; (IC3) it was publicly available or possessed accessible documentation online, such as an official website, institutional page, academic publication, or sufficient descriptive material to support analysis; (IC4) it allowed the identification of minimum information regarding its objectives, target audience, mechanics, or interaction dynamics; (IC5) it constituted an interactive digital game, thereby excluding exclusively informational materials, booklets, videos, static campaigns, or non-playable resources; and (IC6) it presented a direct or complementary relationship with sexual violence, even when embedded within correlated themes such as consent, gender-based violence, child body safety, or abusive relationships. Conversely, a game was excluded when it was a purely commercial product without an educational purpose (EC1), when no accessible documentation or description was available to support its analysis (EC2), or when its central theme concerned general violence, bullying, or well-being without an explicit connection to sexual violence (EC3).

This result was carefully considered and reviewed with the advisor. The detailed data and individual evaluations for each game across the 19 questions can be consulted in the Table 13 of Benchmark Technical Report, published at https://doi.org/10.6084/m9.figshare.32096386.

4.1 Overview of the Cataloged Games

The final consolidated sample for this Benchmark consists of 19 serious and educational digital games. Below is an objective presentation of the premise and general idea of each game analyzed in the benchmark, highlighting the diversity of approaches used for the prevention and awareness of sexual violence:

1. **Chuka: Break the Silence**[1]**:** An interactive action-adventure game where the player, controlling the protagonist Chuka, fights monsters using *emoji* combinations. The objective is to help girls and adolescents develop assertive responses against gender-based, physical, psychological, and sexual violence.

2. **Fique de Olho**[2]**:** A *web-based* investigative game focused on children and adolescents. The player explores everyday scenarios to identify risky situations, addressing multiple forms of violence (such as sexual, physical, and neglect) and learning about available support networks.

3. **Se liga em ficar bem**[3]**:** A casual puzzle game aimed at children and youth. Through dynamic challenges, it teaches players to safely handle everyday problems, including neglect, sexual exploitation, and *bullying*.

4. **Adrift**[4]**:** A sci-fi *visual novel* aimed at children and youth. It uses the metaphor of interacting with a spaceship's artificial intelligence to teach about consent, bodily boundaries, trust, and communication, without explicit mentions of sexual acts.

[1] https://www.unodc.org/e4j/zh/primary/e4j-tools-and-materials/chuka.html
[2] https://ficardebem.org.br/publicacoes/
[3] https://ficardebem.org.br/publicacoes/
[4] https://consent.games/consent-game-adrift-on-itchio/

5. **PlaySafe**[5]**:** A mobile application consisting of a series of interactive minigames created by UNICEF. Targeted at adolescents and youth, it aims to familiarize them with appropriate responses to recognize, intervene, and protect themselves against online gender-based violence and harassment (cyberbullying).

6. **Festa do Brincar**[6]**:** A narrative-focused game anchored in the children's universe and everyday life. It uses plausible social situations to teach about bodily boundaries and prevention, omitting aggressive visual strategies.

7. **Stop la violence**[7]**:** An investigative adventure in a school setting. The player takes on the role of a detective who must interview witnesses and gather clues to fully understand the impact of real cases of *bullying* and cyberbullying.

8. **Gentopia**[8]**:** A simulation game focused on adolescents, where the alien Mia visits Earth. By exploring scenarios like school and home, the player debates gender stereotypes, consent, coercive control, and harassment through minigames.

9. **Grace's Diary**[9]**:** A branching narrative game aimed at preventing teen dating violence. The player makes dialogue choices playing as Grace, who tries to help a friend recognize abusive behaviors in her relationship.

10. **Orbit**[10]**:** An adventure and puzzle game set in realistic and safe scenarios. It teaches protective skills to children aged 8 to 10, addressing topics such as bodily privacy, communication, and identifying the risk of sexual abuse (C. Jones et al., 2020; Scholes et al., 2014; Stieler-Hunt et al., 2014).

11. **Caixa de Pandora**[11]**:** A clinical case simulator game focused on healthcare professionals. The objective is to train the active listening and ethics of doctors and nurses while providing care for women experiencing violence in primary healthcare (Almeida et al., 2018).

12. **PROTECA**: A *point & click* adventure against child grooming. The game alternates between a real world and a magical world, using narrative puzzles to teach safe behaviors in physical and digital environments(Junior et al., 2025).

13. **CONVEY - Not a Game**[12]**:** An investigative game that alternates between minigames and real testimonies. The player acts as a detective investigating gender-based crimes and combating misogynistic stereotypes in society.

14. **StepUp & StepIn:** A game set in a university environment that uses decision-making to promote and train "bystander intervention" (students and staff) in cases of sexual harassment on campuses (Schlesener et al., 2023).

[5] https://www.unicef.org/greece/en/press-releases/play-safe-new-digital-game-app-against-online-gender-based-violence-diotima-and
[6] https://defenda-se.com/festadobrincar/
[7] https://www.stoplaviolence.net/en/game/
[8] https://www.gegame.eu/
[9] https://jag.itch.io/graces-diary
[10] http://orbit.org.au/play/
[11] http://www.de.ufpb.br/~labteve/projetos/pandora.html
[12] https://notagame.eu/

15. **Boundaries:** A *visual novel* aimed at the sexual education of adults with intellectual disabilities. Through choice-based stories, it proposes accessible and inclusive reflections on interpersonal boundaries and consent (Conde, 2020).

16. **Being Safety Smart:** A game aimed at children aged 6 to 10 focused on personal safety, using interactive activities to teach them how to identify inappropriate touches and act in dangerous or kidnapping situations (C. M. Jones & Pozzebon, 2010).

17. **Snake and Ladder:** A virtual board game that adopts the traditional "snakes and ladders" play dynamic to teach child protection and safety skills (Saleha et al., 2021).

18. **Ninguém me ensinou:** A digital game for adolescents anchored in real stories. It seeks to directly and interactively foster discussions on sexual education, gender, and consent (Santos et al., 2022).

19. **Infância Segura:** A 2D educational game aimed at children aged 5 to 8. The player explores environments such as a hospital, school, and the internet through minigames (memory, puzzles) to learn about body parts, reporting channels (Disque 100), and online safety (Fava et al., 2024).

4.2 Quantitative Overview

Table 3 presents the questions of Benchmark and the absolute and percentage distribution of the responses for the evaluated games, and the findings are organized and discussed in the following subsections.

Benchmark Questions	**Possible Answers**	**Games**	**(%)**
Q1. Is the game accessible/playable? (of 19 games)	Yes	11	57.9%
	No	8	42.1%
Q2. Does it require account creation?	Yes	2	18.2
	No	9	81.8
Q3. Which platforms and operating systems are available?	Web	7	63.6
	Android	1	9.1
	iOS	2	18.2
	Windows	3	27.3
	Linux	0	0.0
	MacOS	2	18.2
Q4. Does the game provide tutorials, guides, or documentation?	Tutorial	7	63.6
	Pedagogical Guide	5	45.5
	PDF	2	18.2
	Support Site	7	63.6
Q5. Does the game use emerging technologies?	Yes	0	0.0
	No	11	100.0

Benchmark Questions	**Possible Answers**	**Games**	**(%)**
Q6. How does the user interact with the game?	Touch	3	27.3
	Mouse/Keyboard	10	90.9
	Multimodal	0	0.0
Q7. What are the main mechanics and genre of the game?	Adventure	3	27.3
	Point & Click	5	45.5
	Puzzle	3	27.3
	Board Game	0	0.0
	Simulation	6	54.5
	Trivia	2	18.2
Q8. Does it allow avatar/profile customization?	Yes	2	18.2
	Partially	2	18.2
	No	7	63.6
Q9. Can narrative or difficulty be adapted?	Interactive	7	63.6
	Branching	2	18.2
	Linear	2	18.2
Q10. Can the player control the learning pace?	Yes	9	81.8
	No	2	18.2
Q11. Does the game have good usability (heuristics)?	Excellent	7	63.6
	Good	3	27.3
	Poor	1	9.1
Q12. Does the game provide a good Player eXperience (PX)?	Excellent	8	72.7
	Poor	3	27.3
Q13. Does it support accessibility features for PWD?	Yes	2	18.2
	Partially	4	36.4
	No	5	45.5
Q14. In which languages is the game available?	PT	5	45.5
	EN	7	63.6
	ES	2	18.2
	FR	3	27.3
	IT	1	9.1
	DE	1	9.1
	EL	1	9.1
	GL	1	9.1
	HU	1	9.1
	RO	1	9.1
	TR	1	9.1
	FA	1	9.1

Benchmark Questions	Possible Answers	Games	(%)
Q15. Is the game transparent and does it avoid triggering content?	Yes	11	100.0
	No	0	0.0
Q16. What is the main target audience?	Children	5	45.5
	Adolescents	6	54.5
	Young	2	18.2
	Adults	4	36.4
Q17. For which educational level was the game designed?	Early Childhood	3	27.3
	Elementary I	5	45.5
	Elementary II	7	63.6
	High School	6	54.5
	Higher Education	2	18.2
Q18. What is the main learning objective?	Awareness	10	90.9
	Prevention	10	90.9
	Intervention	2	18.2
	Skills	2	18.2
Q19. Does it include learning assessment mechanisms?	Yes	3	27.3
	No	8	72.7

Table 3: Distribution of responses for each benchmark question (absolute values and percentages).

4.3 Game Availability (Q1)

Out of the 19 digital games initially cataloged, the availability verification stage (Q1) revealed that only 11 of them (57.9%) were accessible and playable at the time of the evaluation. For this reason, the extraction of practical data for the Benchmark and subsequent analyses focused exclusively on this functional subsample. It is important to note that this evaluation reflects the assessment of the researcher, based on direct interaction and individual analysis of the established criteria for each game. The eleven games available were: Chuka: Break the Silence, Fique de Olho, Se liga em ficar bem, Adrift, PlaySafe, Festa do Brincar, Stop la violence, Gentopia, Grace's Diary, Orbit, and Caixa de Pandora. The visual representations of the games cataloged are illustrated in Figure 1.

4.4 Access, Platforms and Support Resources (Q2, Q3, Q4)

The analysis of the ease of access (Q2) (Table 3) to the games reveals that 81.8% (N = 9) of the evaluated titles, such as *Fique de Olho*, *Se liga em ficar bem*, and *Adrift*, do not require the creation of an account to be accessed (Q2). Only 18.2% (N = 2) demand mandatory registration, among them *Chuka: Break the Silence* and *Orbit*. This result demonstrates that the vast majority of games prioritize open access. The complete results for Q2 are presented in the Table 14 of Benchmark Technical Report.

Regarding platforms (Q3) (Table 3), the Web is the dominant distribution channel, running

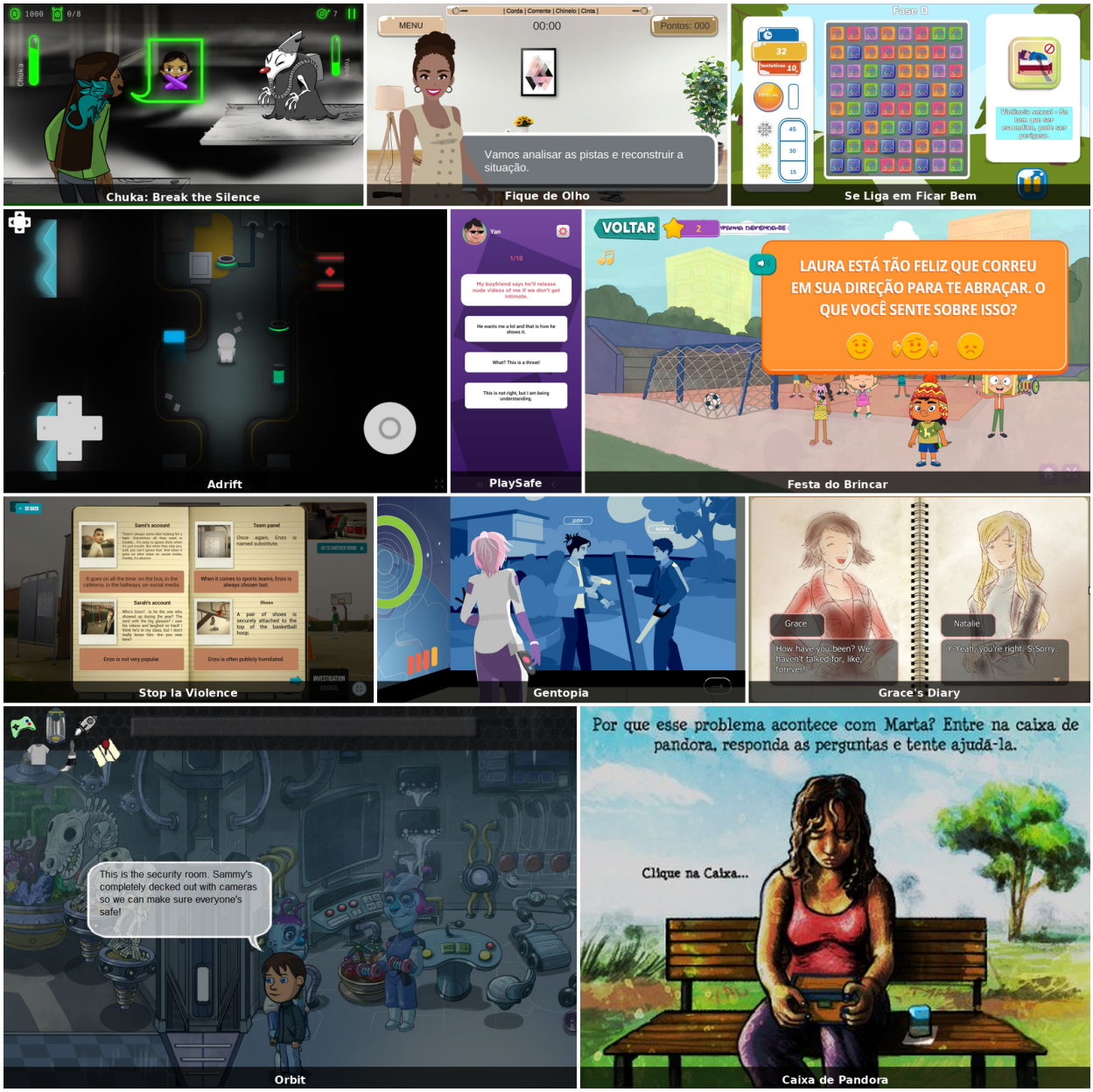

Figure 1: Visual overview of the digital games analyzed in the benchmark evaluation.

directly in browsers for 63.6% (N = 7) of the games, including *Festa do Brincar* and *Stop la violence*. Computer operating systems also represent a significant portion, with Windows reaching 27.3% (N = 3) and macOS 18.2% (N = 2). Mobile applications are present in a smaller fraction, with iOS at 18.2% (N = 2) and Android at 9.1% (N = 1). This indicates a clear preference for browser-based distribution, which eliminates the need for specific hardware or complex installations. The complete results for Q3 are presented in the Table 15 of Benchmark Technical Report.

In terms of support resources (Q4) (Table 3), 63.6% (N = 7) of the games offer embedded tutorials and support websites. Furthermore, nearly half of the games (45.5%, N = 5) provide specific pedagogical guides aimed at educators or parents, as observed in *Gentopia* and *Chuka: Break the Silence*. These findings indicate a strong concern from developers not only to make the game available but also to provide the necessary pedagogical support structures to effectively mediate the learning process. The complete results for Q4 are presented in the Table 16 of Benchmark Technical Report.

4.5 Technologies, Interaction, and Game Mechanics (Q5, Q6, Q7, Q8, Q9, Q10)

The benchmark reveals that 100% (N = 11) of the playable games do not use emerging technologies such as Virtual or Augmented Reality (Q5) (Table 3), maintaining traditional 2D/3D game design. Consequently, the main mode of interaction (Q6) occurs via keyboard and mouse, representing 90.9% (N = 10) of the games, while touch interaction accounts for 27.3% (N = 3), present in mobile options like *PlaySafe* and *Adrift*. The complete results for Q5 and Q6 are presented in the Table 17 and Table 18 of Benchmark Technical Report.

Regarding game mechanics and genres (Q7) (Table 3), the "Point & Click" and "Simulation" styles predominate, both appearing in 45.5% (N = 5) of the analyzed games. Examples include *Fique de Olho* and *Orbit*. This prominence corroborates the findings from the Systematic Mapping Study (SQ1), which also identified "Simulation" as the leading game type in the academic literature, present in 66.67% of the studies. The ”Adventure" and "*Puzzle*" genres follow, with 27.3% (N = 3) each. The frequent use of "Adventure" elements also mirrors the SMS results (SQ4), where it was the most common genre (66.67%). This consistent distribution between scientific literature and practical availability suggests that developers favor mechanics that encourage exploration, scenario analysis, and logical problem-solving to address the sensitive theme of sexual violence. The complete results for Q7 are presented in the Table 19 of Benchmark Technical Report.

Regarding the customization of avatars and profiles (Q8) (Table 3), 63.6% (N = 7) of the games do not offer this feature, while only 18.2% (N = 2) allow full customization, such as *Orbit* and *Chuka: Break the Silence*. In terms of narrative structure (Q9), 63.6% (N = 7) employ interactive narratives where player choices exist but do not significantly alter the overall flow of the story (e.g., *Caixa de Pandora*). Branching narratives with different endings are present in only 18.2% (N = 2), highlighting a tendency towards controlled educational stories. Positively, the vast majority of the games (81.8%, N = 9) allow the player to control their own learning pace (Q10), offering options to pause and replay dialogues, which is a crucial feature for processing delicate information. The complete results for Q8, Q9 and Q10 are presented in the Table 20, Table 21 and Table 22 of Benchmark Technical Report.

4.6 Game Usability (Q11)

According to ISO 9241-11, usability refers to the effectiveness, efficiency, and satisfaction with which users achieve their goals in a specified context of use. In the context of digital games, this relates to how players interact with the interface and understand the proposed mechanics. It is important to emphasize that the data presented in this and the following subsection are based on heuristic and qualitative evaluation conducted by the researcher, based on direct interaction with each of the 11 available games.

In this criterion (Q11) (Table 3), the majority of the games demonstrated high technical quality, with 63.6% (N = 7) classified as having ”Excellent" usability. Games focused on visual exploration or direct Point & Click mechanics, such as *Fique de Olho* and *Grace's Diary*, stood out for allowing any user, regardless of prior video game experience, to interact with ease. Other games achieved excellence by providing consistent feedback: *Festa do Brincar* immediately confirms user choices and allows undoing mistakes, *Caixa de Pandora* employs appropriate language with constant feedback, *Stop la violence* responds agilely during scenario investigations, and *Se liga em ficar bem* fluidly inserts informational cards every three completed matching phases. The game *Orbit* also achieved excellence with integrated tutorials and NPC assistance, but it was the only one in this category to present a notable limitation: restricting the player who wishes to review accidentally skipped information.

The "Good" usability category (27.3%, N = 3) grouped initiatives that function competently but present specific design obstacles. *Adrift* has great usability, but it requires basic reading skills that can act as an interaction barrier for younger children. *Play Safe* provides initial support and good instructions, but restricts user control by lacking features to undo actions after a mistake. Meanwhile, *Chuka: Break the Silence* ensures freedom of action and simple visuals, but fails to provide clear feedback on the decisions made, lacks error prevention, and presents few initial gameplay instructions.

Finally, only 9.1% (N = 1) of the sample was evaluated with "Poor" usability. In the *Gentopia* game, which, despite using appropriate language, provides guidance only at the beginning of the game and fails to maintain a continuous help channel, frequently resulting in player disorientation during minigame resolution.

4.7 Player eXperience (Q12)

While usability evaluates the barriers in the interface, Player eXperience (PX), based on the ISO 9241-210, measures emotional engagement, immersion, and the effectiveness with which the narrative captivates the user. Again, this metric (Q12) (Table 3) reflects the researcher's individual critical perception during the *playtest* sessions.

The findings reveal that 72.7% (N = 8) of the games provide an "Excellent" PX. Immersion based on emotions and interpersonal connections proved to be a powerful strategy: *Grace's Diary* strongly engages the player through the narrative weight of their choices, while *Adrift* builds a unique experience based on trust and direct communication with a virtual partner. Another highly effective approach is the investigative design; *Fique de Olho* and *Stop la violence* stood out by placing the user in an active search for clues to rights violations, resulting in deeply engaging sessions. Narratives anchored in plausible everyday situations guaranteed the immersive success

of *Caixa de Pandora* (aimed at healthcare professionals) and *Festa do Brincar* (aimed at the children's environment). Completing the excellent evaluations, *Se liga em ficar bem* achieved good engagement by pairing casual puzzle mechanics with learning, and *Orbit* succeeded in combining a well-organized story with moments that promote cooperation between the child and a trusted adult.

In contrast, 27.3% (N = 3) of the games did not reach the expected engagement, delivering a PX classified as "Poor" (no game received a "Good" rating in this criterion). The lack of narrative dynamism hindered two games: *Chuka: Break the Silence* presented a confusing and monotonous story structure, while *Play Safe*, despite being very well-organized in content delivery, opted for a repetitive quiz dynamic that failed to maintain the player's deep interest. The most critical PX failure, however, occurred due to mechanical punishments in *Gentopia*; the game forces the user to replay extensive portions of a phase upon failing a minigame, resulting in boredom, frustration, and a complete breakdown of immersion. This comprehensive analysis of the 11 games highlights that the practical success of a prevention game requires both understandable narratives and the elimination of overly punitive or exhaustive mechanics.

4.8 Accessibility and Languages (Q13, Q14)

Accessibility for People with Disabilities (PWD) (Q13) (Table 3) assesses the presence of features that ensure the inclusion of users with diverse needs in the educational experience. The benchmark findings reveal that inclusive design remains a critical gap in the development of games for the prevention of sexual violence.

The analysis indicates that nearly half of the sample, corresponding to 45.5% (N = 5) of the analyzed games (*Chuka: Break the Silence*, *Fique de Olho*, *Se liga em ficar bem*, *Adrift*, and *Play Safe*), present no visible accessibility features. Support classified as "Partial" was identified in 36.4% (N = 4) of the games, predominantly limited to the provision of basic subtitles, as observed in *Stop la violence*, *Gentopia*, *Orbit*, and *Caixa de Pandora*. Only 18.2% (N = 2) of the games presented robust accessibility features. The game *Grace's Diary* succeeded by supporting single-button interaction and possessing a dedicated accessibility report, while *Festa do Brincar* ensures inclusion through audio description options and specific subtitles for deaf users. This practical lack of inclusive features corroborates the findings of the Systematic Mapping Study (SQ8.1), which also identified accessibility evaluation in only 16.67% of the academic literature (*Boundaries*).

Regarding language availability (Q14) (Table 3), linguistic multiplicity is an essential factor to ensure the democratization of access to these initiatives. The English language is the most prevalent, offered in 63.6% (N = 7) of the games, such as *Adrift*, *Grace's Diary*, and *Orbit*. Portuguese follows as the second most frequent language, present in 45.5% (N = 5) of the sample, encompassing projects of national origin such as *Fique de Olho*, *Se liga em ficar bem*, *Festa do Brincar*, and *Caixa de Pandora*, in addition to the international title *Chuka: Break the Silence*.

The French language appears in 27.3% (N = 3) of the sample (*Chuka: Break the Silence*, *Play Safe*, and *Stop la violence*), and Spanish in 18.2% (N = 2) (*Chuka: Break the Silence* and *Gentopia*). A localization effort for less frequent languages is also noted in comprehensively funded projects: *Play Safe* supports Greek, Farsi, and Italian, whereas *Gentopia* expands its reach to Galician, Hungarian, Turkish, and Romanian, and *Stop la violence* includes German. Despite these positive exceptions, the overwhelming concentration of options in the English-Portuguese

axis highlights the continuous need for further translation and localization of the other games to reach vulnerable populations across different cultural contexts.

4.9 Ethical Transparency and Safety Approaches (Q15)

Addressing the prevention of sexual violence requires extreme methodological care to avoid exposing players to emotional triggers or revictimization. Question Q15 (Table 3) evaluated whether the games are transparent and handle the theme safely. The quantitative analysis revealed that 100% (N = 11) of the games achieved this ethical objective. During the *playtest* sessions, the qualitative evaluation allowed for observing in practice the different ways developers addressed this challenge.

One notable approach was the use of metaphors and symbolic representations to abstract the violence. Games like *Chuka: Break the Silence* and *Orbit* use the figure of "monsters" to represent abusive threats, successfully focusing on prevention without the need to expose children to graphic or literal content. Creatively, *Adrift* employs the experience of a spaceship crew to teach about bodily boundaries, consent, and mutual respect.

Another observed trend focuses on constructing plausible scenarios while strictly omitting any aggressive visual elements. Games such as *Festa do Brincar* and *Gentopia* illustrate everyday situations, whereas *Caixa de Pandora* and *Grace's Diary* focus on the weight of abusive relationships, using only clean visual and narrative strategies to guide learning.

Finally, there are games that base their ethical safety on providing direct support and information. *Play Safe* adopts an empathetic stance, providing practical guidance on where users can seek real-life support. Games like *Fique de Olho*, *Se liga em ficar bem*, and *Stop la violence* follow a similar path, keeping the experience strictly focused on raising awareness about rights violations. Thus, the qualitative observations demonstrate that narrative abstraction and a focus on preventive behavior are sufficient to treat the topic responsibly, eliminating the need for any explicit representation.

4.10 Target Audience and Educational Levels (Q16, Q17)

Defining the target audience (Q16) and adapting to educational levels (Q17) are fundamental steps in the design of games in the theme of sexual violence. Regarding the target audience (Q16), the benchmark analysis reveals that adolescents comprise the primary group for the active initiatives, encompassing 54.5% (N = 6) of the sample. Games such as *Fique de Olho*, *Grace's Diary*, *Play Safe*, *Stop la violence*, and *Gentopia* are designed for this age group, addressing complex topics such as abusive relationships, investigation of rights violations, and online gender-based violence. It is crucial to note that this practical finding contrasts highly positively with the results of the Systematic Mapping Study (SQ3), which identified a complete absence (0%) of games dedicated to adolescents in the scientific literature. This demonstrates that developers in the practical landscape are actively filling a critical gap pointed out by academia.

Children form the second largest demographic group (Q16) (Table 3), being the primary focus of 45.5% (N = 5) of the initiatives. Titles such as *Chuka: Break the Silence*, *Adrift*, *Festa do Brincar*, and *Orbit* seek to introduce concepts of bodily boundaries and consent in a playful, symbolic, and age-appropriate manner. Finally, the audience classified as Young/University Stu-

dents represents 18.2% (N = 2) of the sample, and the group of Adults, Parents, or Professionals encompasses 36.4% (N = 4). The inclusion of adults frequently occurs as support figures in tools designed for younger audiences, as observed in *Gentopia* and *Stop la violence*. More exclusively, *Caixa de Pandora* directs its narrative strictly to adults, with the practical purpose of training healthcare professionals.

Consequently, this audience distribution directly reflects the structure of the educational levels contemplated by the developers (Q17) (Table 3). Aligning with the strong presence of games for adolescents, Lower Secondary Education / Middle School (63.6%, N = 7) and High School (54.5%, N = 6) emerge as the school stages most targeted by the analyzed tools. In parallel, to cater to the child audience, Early Childhood Education is covered by 27.3% (N = 3) of the games, while Elementary School I is the focus of 45.5% (N = 5). For older audiences, the Higher Education level totals 18.2% (N = 2) of the overall sample, driven by professional training initiatives. Additionally, the flexibility of the game *Se liga em ficar bem* stands out due to its universal puzzle mechanic based on tile-matching; it projects its reach transversally across all ages and educational levels.

4.11 Learning Objectives and Assessment Mechanisms (Q18, Q19)

Regarding the objectives (Q18) (Table 3), the analysis reveals that "Awareness" and "Prevention" are the absolute priorities, both encompassing 90.9% (N = 10) of the sample. Games such as *Fique de Olho*, *Orbit*, *Grace's Diary*, and *Adrift* concentrate their efforts on sensitization and direct instruction of the player. In contrast, more complex actions aimed at direct "Intervention" and practical "Skills Development" are the focus of only 18.2% (N = 2) of the initiatives. This applied approach is observed exclusively in *Caixa de Pandora*, which aims to train healthcare professionals in combating sexual violence, and *Chuka: Break the Silence* focused on practical and continuous response training for children. This strong asymmetry confirms the findings of the Systematic Mapping Study (SQ2), where awareness was also the unanimous objective, while combating and practical training remained underrepresented gaps.

Despite the strong educational focus, the qualitative evaluation of learning assessment mechanisms (Q19) (Table 3) exposes a significant weakness in the current landscape. The vast majority of the games (72.7%, N = 8) do not include formal internal systems to measure whether the player has actually understood or retained the content. Critical analysis of the evaluations reveals that titles such as *Grace's Diary*, *Festa do Brincar*, *Orbit*, *Se liga em ficar bem*, and *Fique de Olho* are limited to conveying information through their narratives or mechanics, without applying tests or learning measurements. Some of these initiatives attempt to address this absence indirectly: *Stop la violence* does not score formally but requires the continuous exercise of critical thinking during its investigations; *Adrift* lacks traditional assessments, but the system penalizes the player in the narrative flow if consent concepts are not applied correctly; meanwhile, *Play Safe* provides specific feedback and a score based on prior knowledge through quizzes, encouraging the repetition of stages to improve the score.

On the other hand, only 27.3% (N = 3) of the games implement concrete and integrated evaluative systems (Q19). The game *Caixa de Pandora* stands out for incorporating a scoring system that conditions progression through the stages, actively evaluating the user's understanding of the addressed topic. Similarly, *Gentopia* uses a progression system with rewards, where the player

receives a badge for each successfully completed stage. Finally, *Chuka: Break the Silence* links its evaluation to a point system obtained by confronting and defeating the "monsters" that represent abuses, which translates into the practical application of the taught skills. In summary, the qualitative findings demonstrate that, although current games are excellent vehicles for instruction and awareness, they still lack integrated design methodologies capable of attesting and validating the pedagogical effectiveness of the experience lived by the player.

5 Discussion

Regarding SMS, the findings indicate that serious and educational games oriented toward the prevention, awareness, and combat of sexual violence predominantly rely on simulations (66.67%) and adventure-based narratives (66.67%), strategies that prioritize immersion in realistic or interactive scenarios as a means of sustaining player engagement. The near-universal emphasis on awareness (100%) reflects an educational philosophy centered on sensitization, as illustrated by games such as *Orbit* and *Caixa de Pandora*, which guide children and healthcare professionals in recognizing risk situations. Nevertheless, the limited presence of games focused on direct combat (16.67%) or the development of practical skills (33.33%) points to a critical gap: the need for mechanics that move beyond sensitization to equip players with concrete capabilities, such as real-world intervention strategies. It is worth noting, however, that these trends derive from a reduced sample of eight studies, and should thus be interpreted as indicative tendencies rather than definitive characterizations of the field, as further discussed in Section 6.

The examination of target audiences reveals that children constitute the primary demographic (50%), while adolescents and women, populations disproportionately affected by sexual violence, remain without dedicated games. This absence opens space for projects addressing themes such as consent in adolescent relationships or female empowerment. The predominance of stylized graphics (83.33%) over realistic visuals (16.67%) reflects an effort to balance engagement with age-appropriateness, though games such as *Step Up & Step In* demonstrate that realism can be highly effective in preparing adults to navigate complex situations, such as bystander intervention in campus harassment.

The quality evaluation dimension emerged as a notable strength: all games in the sample underwent some form of validation, with a consistent focus on usability (100%) and, to a lesser extent, user experience (50%). Outcomes such as a 31.5% gain in prevention knowledge (*Orbit*) and a 27% improvement in perceived intervention efficacy (*Step Up & Step In*) reinforce the educational potential of these tools. The absence of longitudinal studies, however, constrains the understanding of sustained impacts over time, a gap that is further compounded by the fact that the analysis of evaluation methodologies employed in the primary studies, including the types of instruments used and their validity, was not deeply explored in the studies of SMS Finally, the ethically and culturally sensitive approach observed across all analyzed games (100%) reflects a commitment to avoiding stereotypes and retraumatization, consistent with international guidelines for responsible design in sensitive contexts. Despite this progress, meaningful gaps persist: immersive technologies such as virtual reality remain underexplored, games targeting marginalized groups are largely absent, and the integration of active strategies for directly combating violence has yet to receive adequate attention.

Furthermore, the integration of the results of the SMS and the benchmark reveals a significant disconnect in the current landscape, particularly between user engagement and pedagogical validation. Although practical evaluation has shown that developers excel at creating interfaces with high usability and immersive Player eXperience (PX), with over 63.6% of games rated as excellent in these heuristics, there is a severe deficit in learning assessment. The benchmark revealed that 72.7% of active games lack internal mechanisms to assess knowledge retention. This indicates that, while current games are highly capable of capturing players' attention and conveying information effectively, they often fail to provide developers and educators with concrete data on their educational effectiveness.

This limitation has important pedagogical consequences. The absence of internal assessment mechanisms prevents educators and developers from obtaining concrete evidence of whether the game has effectively promoted knowledge retention, attitudinal change, or behavioral impact, the three dimensions most commonly associated with educational effectiveness in sensitive topic interventions. Without such mechanisms, these tools remain difficult to integrate into formal educational settings, where accountability for learning outcomes is typically required. Furthermore, the reliance on narrative immersion and engagement as proxies for learning, while valuable for motivation, does not constitute sufficient evidence of pedagogical effectiveness. Future initiatives in this domain should consider incorporating validated instruments, such as pre and post-test questionnaires, progress-sensitive scoring systems, or narrative branching consequences tied to conceptual understanding, as design requirements rather than optional features. It should be acknowledged, however, that these evaluations are grounded in heuristic analysis and direct interaction conducted by the researcher, thereby introducing a degree of subjectivity inherent to individually conducted qualitative assessments.

Another key finding emerges from the demographic targeting of these tools. The SMS identified a concerning blind spot in the academic literature, with a complete absence (0%) of primary studies dedicated to adolescent audiences. However, the practical benchmark directly contrasts with this academic gap, showing that adolescents are actually the primary target audience in the market, encompassing 54.5% of the available games. This divergence suggests that the practical development sector is actively addressing a critical social demand, such as online gender-based violence and emotionally abusive relationships, that academia has yet to formally explore and validate through longitudinal studies. This practical trend is further evidenced by recent Brazilian initiatives published in Brazilian Computing Society (Sociedade Brasileira de Computação - SBC) venues, such as *Ninguém me ensinou* (Santos et al., 2022), a digital game specifically targeting adolescents aged 12 to 16 that addresses sexual consent, gender identity, and sexuality through choice-based narratives anchored in real-life stories. The existence of such initiatives reinforces the perception that practical developers are actively responding to a social demand that the academic literature has yet to formally investigate and validate.

A similar disconnect between academia and the practical reality is observed with respect to technological implementation. Although the scientific literature explores the potential of emerging technologies, such as the use of Augmented Reality for bystander intervention training in *Step Up & Step In*, the benchmark found that 100% of publicly accessible games rely on traditional 2D/3D interactions without emerging tech. This highlights a significant barrier in translating cutting-edge academic prototypes into scalable, widely accessible public solutions. It is important to note, however, that the instability of digital platforms represents a temporal constraint on these

findings, given that a portion of the initially cataloged games became inaccessible during the evaluation period.

Finally, the persistent lack to implement inclusive design remains one of the most critical gaps in the field. Accessibility was evaluated by only 16.67% of the studies in the SMS, a gap reflected in practice, where 45.5% of the benchmarked games lacked any accessibility features for People with Disabilities (PWD). Given that individuals with disabilities are statistically more vulnerable to abuse (Badakhshiyan et al., 2024), the absence of inclusive features such as screen readers, multimodal interactions, or simplified mechanics severely limits the democratization of these preventive tools, indicating an urgent priority for future developments in serious games targeting sexual violence. This gap is corroborated by Fava et al. (2024), whose practical evaluation of *Infância Segura* revealed accessibility barriers faced by players who were not fully literate. The children had difficulty understanding the game's dialogues and hearing the audio instructions due to ambient noise, requiring external assistance from the researchers to progress. This suggests that the absence of inclusive design features, such as robust multimodal feedback adapted to different literacy levels and operating environments, represents a systemic challenge across all Brazilian initiatives in this area, rather than an isolated finding of this benchmark study.

6 Limitations

The SMS has some limitations. The restriction to specific databases and languages may have led to the exclusion of relevant research published in other cultural and linguistic contexts. Also, the small sample size (8 papers) reflects a noteworthy limitation that must be considered when interpreting the findings of this SMS. Although this result reflects the genuine scarcity of formal academic initiatives dedicated specifically to the design, development, and evaluation of serious games addressing sexual violence, it constrains the generalizability of the observed trends. Patterns identified throughout this mapping, such as the predominance of simulation-based games (66.67%, N = 4) or the complete absence of titles targeting adolescents and women (0%, N = 0), should therefore be understood as indicative tendencies rather than definitive characterizations of the field. This limitation is further corroborated by the benchmark of the present study, which cataloged 19 games in total, of which 11 were identified exclusively through manual and exploratory searches conducted outside the academic databases, suggesting that a substantial portion of existing initiatives in this domain remains absent from the indexed scientific literature. Furthermore, the absence of any concentration in specific publication venues reinforces the perception that this research area remains fragmented and relatively immature within the academic community, underscoring the need for future reviews to broaden the search scope by including additional databases, gray literature repositories, and a wider range of languages.

A further limitation concerns the temporal distribution of the retained studies, which span from 2010 to 2023. Two of the six games identified in this SMS, namely *Being Safety Smart* (C. M. Jones & Pozzebon, 2010) and *Orbit* (C. Jones et al., 2020; Scholes et al., 2014; Stieler-Hunt et al., 2014) , were developed in a technological context considerably different from the current landscape. Conclusions drawn from these studies regarding preferred platforms, predominant interaction mechanics, and accessibility features may therefore reflect the technological constraints of their time rather than deliberate design choices, given that smartphone consolidation as

an educational platform, inclusive design standards, and adaptive narrative mechanics were considerably less developed during that period. Furthermore, the pedagogical approaches employed in older studies, particularly *Being Safety Smart*, may no longer align with contemporary best practices in sexual violence prevention education, which have since evolved toward frameworks centered on active consent, bodily autonomy, and the inclusion of emerging threats such as online grooming and digital sexual exploitation. These temporal factors should thus be considered when interpreting the trends identified in this mapping, as they may partially limit the applicability of its conclusions to the current educational and technological context.

With regard to Benchmark, one of the main limitations lies in the qualitative and heuristic nature of the usability and PX evaluations. These evaluations were based on direct interaction and the researcher's critical perception, thereby introducing a certain degree of subjectivity. Furthermore, the instability in the availability of digital platforms constitutes a time-related limitation for the evaluation of market-oriented tools. This problem became evident upon observing that 8 of the 19 games initially cataloged were no longer accessible during the evaluation period.

7 Conclusions and Future Work

This article presented the results of a Systematic Mapping Study (SMS) that aimed to answer the following central research question: "Which serious and educational digital games have been designed, developed, or evaluated with a focus on raising awareness, preventing, and combating sexual violence?" To address this question, a formal protocol was followed, and automated searches were conducted in the ACM, IEEE Xplore, Scopus, and ERIC databases. A total of 132 publications were initially retrieved, of which only 8 met the inclusion criteria after a two-stage selection process conducted independently by three researchers. The process achieved Kappa indices ranging from 0.635 to 0.7341, indicating good inter-rater agreement.

The selected studies identified six serious and educational digital games that directly address the theme of sexual violence: StepUp & StepIn, Boundaries, Caixa de Pandora, Orbit, Being Safety Smart, and Snake and Ladder. These games have been designed, developed, or evaluated with the intent to raise awareness, promote prevention strategies, and support educational efforts to combat sexual violence. Notably, three of the included articles focus on the game Orbit, emphasizing its relevance and prominence in this field.

To bridge the gap between academic theory and practical reality, this study expanded its scope through a comparative evaluation of 19 cataloged games, 11 of which were actively available to the public. The triangulation of the SMS and the benchmark revealed a significant disconnect between what is researched and what actually reaches society. This disconnect is particularly evident regarding the target audience and technological implementations. While academia gives little attention to adolescents (0% in the SMS), the practical market actively targets this demographic (54.5% of available games). Technologically, although academic studies explore immersive solutions such as Augmented Reality, 100% of games accessible to the public rely on traditional 2D/3D interactions on web platforms, PCs, and mobile devices. Furthermore, the practical analysis highlighted a stark contrast between technical execution and pedagogical validation. Current games excel in Usability and Player eXperience (PX), with most providing engaging and safe environments. However, they exhibit a serious pedagogical deficiency, as 72.7% lack internal

mechanisms to assess knowledge retention or educational effectiveness.

For future work, based on the identified gaps, we propose the development of new games or the significant enhancement of existing ones. Specifically, future games should incorporate practical combat mechanics, such as realistic decision-making scenarios where players can practice intervention techniques (e.g., de-escalation strategies, how to support a victim, or how to safely report an incident), moving beyond awareness to empower users with actionable skills. The use of immersive technologies, such as Virtual Reality (VR), could be implemented on multi-platform approaches (e.g., standalone VR headsets or mobile-based AR) to create emotionally resonant and safe environments for practicing these skills, thereby potentially increasing engagement and knowledge retention. It is crucial to prioritize underrepresented audiences, such as adolescents and women, through interactive narratives focused on themes like consent, identifying signs of abusive relationships, and empowerment. Additionally, longitudinal studies are essential to assess the sustained impact of these games, and the creation of culturally adaptive evaluation frameworks is recommended to ensure that the solutions are sensitive to diverse sociocultural contexts.

To address the critical gaps identified in the practical evaluation, future developments should prioritize the integration of learning assessment mechanisms within the game. Establishing design frameworks that incorporate pedagogical validation directly into gameplay will allow developers to generate concrete data on effectiveness without disrupting immersion. Furthermore, the persistent lack of inclusive design must be addressed urgently; with nearly half of the practical sample lacking accessibility features, future research and development should apply universal design principles to ensure that these preventive tools are accessible to people with disabilities. Finally, researchers are encouraged to leverage games already on the market, particularly those aimed at adolescents, to conduct practical longitudinal studies, directly linking scientific rigor with widely used educational solutions.

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Author Contributions

Yan Oliveira da Costa: Conceptualization, Methodology, Formal analysis, Investigation, Writing - Original Draft. **Vincent Tomio:** Methodology, Formal analysis, Investigation, Validation, Writing - Original Draft, Writing - Review & Editing. **Natasha Malveira Valentim:** Supervision, Project administration, Validation, Writing - Review & Editing.

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