



## **Impact of a Student-Designed Videogame on Students' Perceptions of Sexual Genre-Based Violence Risks**

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The study aimed to assess the impact of a student-created videogame on university students' perceptions of the risk of sexual gender-based violence (SGBV) against women. It was based on two research questions: (1) to what extent the game 'Un día a la vez' (UDALV) impacts students' perceptions of SGBV? (2) How do students perceive the game's efficiency to change their perception of SGBV? This mixed study included the qualitative analysis of the game and, quantitative and qualitative techniques to assess and understand its impact on students' perception. The sample consisted of 51 students aged between 17 and 24. The game showed easygoing narrative and mechanics with varied dynamics. Quantitative results indicated a positive effect of UDALV on all students' perceptions of the risks of SGBV with a statistically significant difference between the pretest and posttest for the overall sample:  $t(50) = 9.050$  ( $p = .000$ ;  $d = .497$ ). However, no differences were observed for the impact between males and females:  $t(47) = .581$  ( $p = .564$ ;  $d = .167$ ). The interviews indicated that students find the game effective. In the context of this research, the results seem to be beneficial for gender-equity education programs addressed to young people.

**Keywords:** serious games; university students; higher education; gender-equity education; students' perception

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## INTRODUCTION

Education on gender equality is essential to improve society (Barrera et al., 2020; Osuna-Rodríguez et al., 2020). It is an arduous task in Latin American countries where the male culture is so deeply rooted and even supported (consciously or not) by women, who justify some violent actions as normalized behaviors, projecting women as beings naturally subjected to men's will (Silva et al., 2021; Tsapalas et al., 2021). It may happen in the family context (Okafor, 2020), however, Quispe et al. (2018) observed a growing trend of violence against women in scenarios other than the intimate environment.

Genre-based violence (GBV) is deeply rooted in the Peruvian context. It is not limited to socially marginalized sectors and people with lower levels of formal education. In their study conducted with Peruvian college students, Velásquez et al. (2020) observed a lower rejection of GBV and a higher prevalence of physical, sexual, and economic violence experienced by women from private universities compared to public ones. That situation shows the need for mechanisms contributing to transforming some sociocultural patterns to build social relationships based on equity among women and men (Ramírez et al., 2020). The literature shows that video games can be part of these tools (Barrera et al., 2020; González-Sancho, 2020; Manzano-Zambruno & Paredes-Otero, 2021; Sánchez, 2018) because they enhance learning. Moreover, the use and recommendation of video games as main or complimentary didactic resources to address is something that educators are expected to do because, as claimed by Hazaymeh (2021), instructors must embrace technology as part of their practice and teaching should not be limited just to curriculum and content, but also to values like equality and respect.

Video games are currently considered a phenomenon with massive acceptance among young people (Burrows & Blanton, 2018; González-Sancho, 2020; Ndulue & Orji, 2021; Şimşek & Direkci, 2019) and can transcend ludic (Manzano-Zambruno & Paredes-Otero, 2021) to use its communicative potential to contribute to individual and social transformations. In this sense, some experts have proposed to rethink their socio-educational possibilities (Martínez-Oña & Muñoz-Muñoz, 2021) and have incorporated them in formal and informal settings to promote changes in social behaviors. For example, Marengo et al. (2021) proposed the use of videogames to produce socio-political learning whereas Perko and Mendiwelson-Bendek (2018) explored their potential to increase social responsibility in young people and concluded that “video games could be an efficient tool to develop individual skills, practice cooperation, and explain relations between the paradigms of the real world” (Perko and Mendiwelson-Bendek, 2018, p. 41). Regarding particular social behaviors (Sánchez, 2018) studied videogames to control aggression and violence among young people, and Barrera et al. (2020) proved the effect of videogames on GBV.

Burrows and Blanton (2018) state that video games can influence the individual so that after the escape from reality they entail, they return and can face situations and make decisions based on the experiences, values, and learning acquired in the game. This potential has been harnessed, for example, to modify behaviors associated with health in

general (Burrows & Blanton, 2018) and patients with systemic and chronic diseases (de Brito et al., 2021; de la Hera, 2018). Also, several authors have studied video games and have tested their potential to promote positive behaviors to eradicate violent behaviors in different contexts (Costa et al., 2021; Gonzalez et al., 2022; Martínez-Cano et al., 2019; Martínez-Oña & Muñoz-Muñoz, 2021; Schrier, 2017).

Those games designed with educative purposes (either academic or social) are interchangeably called serious games and persuasive games. The literature has documented their potential for the development of various competencies in formal and informal contexts (Schrier, 2017; Şimşek & Direkci, 2019). Persuasive games aim to subtly promote changes in the player besides having fun (Ndulue & Orji, 2021). They pursue an educative purpose (a change in behavior) as a primary goal rather than entertainment (van der Lubbe et al., 2021). Some authors have studied their potential for educative purposes regarding different social issues like health (Burrows & Blanton, 2018; de Brito et al., 2021; de la Hera, 2018; Gertrudis-Casado et al., 2022; Ndulue & Orji, 2021; Pisco et al., 2018), vulnerability in different social scenarios (van der Lubbe et al., 2021), gender equity (Barrera et al., 2020; Heritage, 2020), peace (Costa et al., 2021; Martínez-Cano et al., 2019; Sánchez, 2018; Schrier, 2017) and GBV (Díez, 2009; Gonzalez et al., 2022; Manzano-Zambruno & Paredes-Otero, 2021; Pisco et al., 2018).

Regarding research on serious games and sexual violence in the context of GBV, (Pisco et al., 2018) described the process of a videogame aiming to promote awareness about violence in intimate relationships (abusive situations, beliefs on the topic, and skills to manage this sort of violence). A systematic review conducted in Scopus by van der Lubbe et al. (2021) reported an absence of studies to empower women against GBV and a lack of studies in the Latin-American context where sexual abuse and femicides are frequently reported in the news. Moreover, there are not studies assessing videogames effectiveness to contribute to changes in perception of SGBV.

There is evidence that Peruvian college students show a high risk of becoming victim of GBV in its different forms, including sexual violence (Velásquez et al., 2020). Nevertheless, no study has been reported to assess the impact of videogames on Peruvian private college students' perceptions of risks of sexual gender-based violence (SGBV) which is one of the GBV types commonly reported in the country (Instituto Nacional de Estadística [INEI], 2021). This context confirms that research in this vein as a must.

Students majoring in videogames design in a Peruvian higher education institution participated in a 48-hour institutional Game Jam and designed a game called 'Un día a la vez' (i.e., a day at the time). This game is expected to help young people to be aware of the risks of SGBV. However, its design and effectiveness have not been assessed to know whether this student-created game contributes to approaching the social problem as expected. In this context, the authors conducted a study aiming to assess the impact of the videogame 'Un día a la vez' (UDALV, henceforth) on university students' perceptions of the risk of sexual violence against women. Two research questions guided this mixed-method study: (1) to what extent the game UDALV impacts students'

perceptions of SGBV? (2) How do students perceive the game's efficiency to change their perception of SGBV?

### **METHOD**

This was a mixed study supported on the philosophical statements of Pragmatism and eclectic methodology (Creswell & Plano, 2017). In terms of prevalence of methods, the research was an equal status mixed methods research, as defined by Johnson and Onwuegbuzie (2007). In other words, the researchers evenly combined elements of qualitative and quantitative rationales and data collection techniques in a continuum to comprehensively explore the issues and answer the research questions.

The design was explanatory sequential (Creswell & Plano, 2017; Hernández et al., 2014). According to this design, the results of one step are useful to move forward to the next analysis for further and deeper explanation. Hence, the study included the qualitative analysis of the game as proposed in previous studies (Hunicke et al., 2004; Martínez-Cano et al., 2019). Then, to assess and understand its impact on students' perception, quantitative and qualitative techniques were used. Details for quantitative and qualitative procedures and techniques for data collection are given below.

#### **Analyses of the game**

The analysis of the game was helpful for a comprehensive understanding of how players perceived it from the perspective of the narrative and design. It implied a qualitative approach as previously stayed in the literature (Gonzalez et al., 2022; Martínez-Cano et al., 2019). In this sense, first, the authors approached the narrative with the categories proposed by Martínez-Cano et al. (2019): identity construction, archetypes for identification, videogame narratives, and imaginary register of social reality.

Secondly, the design of the game was analyzed based on the MDA (Mechanics, Dynamics and, Aesthetics) model. According to Hunicke et al.'s (2004) model: (a) mechanics refers to the players' actions and behaviors in the game, (b) dynamics are actions and activities proposed to the players so that they experience the aesthetic features that make the game entertaining or fun, and (c) aesthetics is composed of specific features (sensation, fantasy, narrative, challenge, fellowship, discovery, and submission) associated with how much fun the game can be. The researchers prepared a table to register information. They played the game and registered all these elements in both scenarios: winning and losing.

#### **Impact on student's perception**

Assessing the impact of UCALV on students' perceptions of sexual GBV was conducted through quantitative and qualitative methods and techniques. In the first place, to quantitatively assess the impact of the game UDALV on students' perception of sexual GBV, a pretest-posttest study without a control group was performed. This design is commonly used in similar contexts (Osuna-Rodríguez et al., 2020; Thongchalem & Jarunthawatchai, 2020). For this quantitative phase, the authors hypothesized that the videogame would positively change students' perceptions with differences in results between women and men.

*Sample for quantitative assessment*

The videogame was designed for young people. In that sense, to properly define the unit of study, the authors followed the parameters of the United Nations: young people are those aged between 15 and 24 years (Naciones Unidas [ONU], 2010). Hence, a non-probabilistic sample of Peruvian first-semester students majoring in Business Administration aged up to 24 years was randomly recruited. This sample was incidental, the researchers visited the courses and students who attended to class that day were invited to participate.

*Data collection techniques in quantitative assessment*

A 10-item questionnaire was designed to assess the perception of SGBV. The questionnaire was based on the variable risk of sexual violence in the context of GBV. It was validated by three experts (coefficient for content validity= .93). Reliability was calculated in a pilot study through the Cronbach test;  $\alpha = .82$ .

*Qualitative assessment: technique and sample*

The qualitative approach to the issue was performed through interviews. This qualitative technique was useful for a comprehensive view of the impact of the game on students' perception of SGBV. After the experiment was conducted, students from the initial sample were randomly invited to answer some questions about how they perceived the game and its impact on their perception of risk for SGB. Saturation of answers was reached after interviewing 27 students.

**Procedures for qualitative and quantitative data gathering and analysis**

All the students gave their informed consent to participate in the study. For the quantitative study, they were approached simultaneously during class time to avoid bias due to exchange of information on the questionnaire or the game. Students answered the pretest and, when they all finished they were asked to play the game (a researcher witnessed that they actually played). After that, they answered the posttest. For the qualitative approach, they were invited to participate voluntarily to be interviewed after the experiment was conducted. The interviews were held by a single researcher and video recorded.

Quantitative data were analyzed with the software IBM SPSS (v. 27). Considering that it was an experimental design; descriptive and inferential analyses were conducted. Descriptive analysis included mean and standard deviations. To assess the hypothesis, the normality of data was calculated with Shapiro Wilk test ( $p = .103$ ); hence, the  $t$ -test set at a 95 % confidence interval was performed. Cohen's method was used to calculate the effect size. The authors calculated the gain score ( $g$ ) to know the quantitative impact of the video game. This score is recommended for pretest-posttest designs to assess the impact of treatments (Coletta & Steinert, 2020).

Qualitative analysis started with the transcription of the interviews after saturation of answers. The technique used to process information was content analysis (Kyngäs, 2020). This technique was selected because it is content-sensitive and suitable to the

design selected to explain students' perceptions about the game and its effectiveness. All answers were reviewed manually by independent researchers and categories related to their perceptions emerged.

## **FINDINGS**

### **Game analyses**

#### *Analysis of the narrative in UDALV*

1.- Identity construction (the idea of building an identity in the user through the characters presented in the video game): The main character is a female rabbit representing a young woman. She performs everyday activities, facing several risks of SGBV. The player needs to identify the risks and has the responsibility to help her to be safe 'one day at a time' (that is the meaning of its name in Spanish). If the player does not make the right decisions, the female rabbit will eventually die.

2.- Archetypes for identification: The female rabbit triggers a connection with the player because she is an independent female character struggling with decisions to keep herself safe from SGBV during everyday routines. Other archetypes do not generate empathy but deliver a message to the user: we need to achieve preventive actions in some scenarios to protect women from SGBV because there are men whose behaviors may be dangerous for women.

3.- Videogame narratives: The game shows a simple linear narrative to evidence the risks of SGBV and ways to protect women from them.

4.- Imaginary register of social reality: It reproduces a realistic social context in which women may become victims of SGBV in daily situations. The game provides a context that elicits the idea of self-protection (in the female player) and the sense of protection for women, as well as the need to change minds for a healthier masculinity.

#### *MDA analysis*

The authors designed a table for the MDA analysis based on the proposal of Hunicke et al. (2004) to offer a full view of the game according to its mechanics, dynamics, and aesthetics (Table 1). This analysis summarizes the game and the feelings or emotions it triggers in the player.

Table 1  
Results of the MDA analysis

Videogame: 'Un día a la vez'	
M: Mechanics	
	<ul style="list-style-type: none"> <li>• Move across all the game settings.</li> <li>• Choose the main character's clothing for each day and activity.</li> <li>• Identify risks for violence and protect the protagonist.</li> <li>• Take decisions according to some instructions on the screen (text) in a specific time.</li> <li>• Monitor how much life the main character still has through a life bar.</li> </ul>
A:	D: Dynamics associated to the aesthetics identified in the analysis
Aesthetics	
Sensation	<p>Fear: the female rabbit looks scared and vulnerable. The player needs to help her to feel and be safe.</p> <p>Awareness: the players get aware of risks in situations that may be considered normal.</p> <p>Frustration: when the player does not identify the risks and does not make the right decisions, the female rabbit gets weaker and even dies. It elicits a feeling of frustration. Also, the fact that she is not safe (because of being is a female) triggers this feeling of frustration, injustice, and inequity.</p> <p>Need for protection: if the player does not act as expected, the protagonist stays unprotected and may die.</p>
Fantasy	Humanization of characters: Animals play roles as if they were humans.
Narrative	<p>Achievement: he player protects the main character and helps her to be safe during the week a day at a time. Succeeding in each context is an achievement.</p> <p>The satisfaction of having her safe at the end of the week is the real motivation of the game. Like in real life, you need to identify the risks and make the right decisions to be safe or to help a woman to be safe; the prize is safety itself (own or another's).</p>
Challenge	SGBV risk detection and girls' safety: The whole game implies detecting risks and protecting the female character from them.
Fellowship	Empathy: he user empathizes with the female rabbit and helps her to protect herself from the risks of SGBV. This feeling of empathy is projected to women in general.
Discovery	Challenges: To advance in the game, the player needs to identify risks and make the right decisions to keep the character safe from SGBV.
Submission	Vulnerability: the female rabbit looks vulnerable because she faces many risks of SGBV that she may or may not identify.
Fun	Characters: it is funny to see the animals performing human activities. People who like playing without competition may like it and find it fun.

**Impact on student's perception of SGBV**

*Quantitative analysis*

Initially, 57 students agreed to participate in the study. However, six were eliminated because they did not complete both tests. Then, 51 students aged between 17 and 24 constituted the sample (M= 19.43; SD= 1.952). Details by gender are shown in Table 2.

Table 2  
Details of the sample sorted by gender

Gender	n	%	Age		
			Min-Max	M	SD
Male	21	41	17-24	19.43	2.014
Female	28	55	17-24	19.43	2.022
Prefer not to indicate gender	2	4	19	19	0.000

Descriptive analyses were conducted for pretest and posttest. Results are shown in Table 3.

Table 3

Descriptive results for pretest and posttest in the overall sample and by gender

Sample		n	Min	Max	M	SD
Overall	Pretest	51	4	20	14.08	3.509
	Posttest	51	8	20	17.80	2.946
Female	Pretest	28	4	20	15	3.377
	Posttest	28	14	20	19	2.349
Male	Pretest	21	8	18	12.9	3.321
	Posttest	21	8	20	17	3.491

The normality of data was calculated through the Shapiro-Wilk test ( $p = .103$ ). Then, the t-test set at a 95 % confidence interval was performed to determine statistically significant differences. There was a statistically significant difference between the pretest and posttest for the overall sample:  $t(50) = 9.050$  ( $p = .000$ ;  $d = .497$ ). The observed power ( $d = .497$ ) indicated a medium (almost strong) positive effect of the video game UDALV on all students' perceptions of the risks of SGBV. Regarding the hypothesis, no differences were observed for the impact between males and females:  $t(47) = .581$  ( $p = .564$ ;  $d = .167$ ).

The impact on students' perception of SGBV risks was calculated through gain score (g) which is expressed as a percentage. This score represents the share of ideas regarding SGBV learned by students after playing the videogame UDALV. The gain was calculated with the formula proposed by (Thongchalem & Jarunthawatchai, 2020):  $g = (\text{posttest} - \text{pretest}) / (\text{maximum possible score} - \text{pretest}) * 100$ . Table 3 shows the gain scores (overall and per gender).

Table 4

Gain scores for the overall sample and sorted by gender

Sample	Pretest average	Posttest average	Posttest – pretest	Maximum score	Gain
Overall	14.08	17.80	3.72	20	18.6 %
Male	12.9	17	4.1	20	20.5 %
Female	15	19	4	20	20 %

#### Qualitative analysis

For a qualitative understanding of the impact of the video game UDALV on the students, 27 of them were interviewed. Some answers have been translated verbatim to share in this article. First, they were asked whether they believed the game to have any impact on how they perceived SGBV. Only one student told the researchers that the game had not impact on her. The other students indicated that there are situations they considered 'normal' (e.g., remaining silent and doing nothing when sitting beside a man with inappropriate behaviors on the bus). However, after playing, they realized that they were not normal but a risk of SGBV. The following excerpt is an example of the answers: "maybe I did not think some situations were dangerous, but I know it now. The

*game showed me that there are other risks*". One of the men expressed that the game had a positive impact because *"it illustrates the constant risks faced by women."*

They were asked how they felt when they watched the situations faced by the female rabbit in the game. Two categories emerged from their answers: empathy and frustration. Some female students indicated that they identified themselves with the main character because they had experienced some of these situations. Some male students expressed empathy towards the female rabbit in the game and toward real women. Here are some of their answers: *"It is sad that women are exposed to those situations in real life"*; *"I felt bad for the rabbit in the game. I was very concerned about her"*; *"I was surprised that women can be threatened in many ways."* On the other hand, frustration was also expressed by women. Here are some excerpts of their answers: *"It is frustrating to see how many risks we (women) face every day"*; *"It was a game, but I felt afraid and nervous. It felt real because is similar to what we face in real life"*.

Finally, students answered about the potential of the game to call players' attention to the different risks of SGBV. They all agreed that it helps people to become aware of some risks that may be confused with non-risky situations; for example, some boss or colleagues' behaviors at work. Besides, they considered that the game informs and elicits awareness. One girl said: *"I noticed that some situations are not as normal as I thought. Now I know I must be careful and ask for help when needed"*. Many interviewed students just celebrated the idea of dealing with this social issue through a simple and easy video game: *"I think it is a perfect way to do it"*. *"It is good because it can reach many persons."*

## DISCUSSION

Serious games have been seen as a powerful tool in educational contexts. However, few studies have addressed the potential of student-created video games to impact other young people regarding social issues like SGBV. UDALV was designed by students in the context of a 48-hour game jam at their college.

This mixed-approach study aimed to answer two research questions. First, a quantitative design was developed to know to what extent the game UDALV impacted students' perceptions of SGBV. Based on the statistically significant differences and the knowledge gain observed, the present research provides evidence on the positive impact of UDALV on students' perception of SGBV. Then, through qualitative techniques it was studied how students perceived the game's efficiency to change their perception of SGBV. Students considered that the game elicits empathy and awareness of SGBV risks.

Most studies have focused on either the effect of the intervention or how players perceived it (van der Lubbe et al., 2021). Others have studied the videogames in terms of their design and other characteristics (Martínez-Cano et al., 2019). This study included qualitative and quantitative data to know the impact of the video game for changing students' perception of SGBV. For the quantitative phase of the study, the hypothesis was that the videogame UDALV would change their perceptions with differences in results between women and men because previous research shows higher

scores for SGBV risk perception in women (Osuna-Rodríguez et al., 2020). However, results showed that gain reflecting a change of perception was equal for male and female young students.

UDALV was found to accomplish the basic characteristics of a video game according to the MDA model. Results also indicated that the game has a positive quantitative and qualitative impact on young students. Quantitatively, it showed statistically significant differences between pre and post-test, representing an improvement in students' knowledge on SGBV. Qualitatively, students felt that the game helped them to develop empathy, become aware of risky situations and to differentiate them from normal ones. These findings are consistent with Gonzalez et al.'s (2022); they also found a change in perception in the students with a video game dealing with GBV. Unlike their game, UDALV was designed by students in a game jam instead of a team of professional designers. Then, more attention should be paid to the products in college-promoted game jams because they may address social issues like GBV preventively. In this sense, it is considered appropriate to analyze those games and, if proven effective, promote them as part of preventive campaigns based on education.

Some students stated that the game helped them to identify dangerous situations in situations they considered normal. This normalization of some behaviors that constitute risk or violence is frequent among young university students in Lima (Gauna et al., 2021), so promoting the game UDALV would benefit college students to be aware of them.

The analyses of this game created by college students shows a simple narrative as well as simple mechanics and dynamics associated to different aesthetics. It has proven to generate identity which, as expressed by Martínez-Cano et al. (2019), is a main issue to trigger empathy in the user. When the user develops empathy, there is more involvement in the game and hence, there is more chance for learning what the game is trying to teach. Students expressed that the game triggers empathy towards the character and real women. This may be the main strength of the game which, even being very simple, had a positive impact on players. As indicated by Burrows and Blanton (2018), UDALV may, influence students beyond the fictional situation, leading them to properly behave in real contexts based on decisions they have learned to make in the game.

The low knowledge gain may be due to the amount of information included in the game. As observed by Manzano-Zambruno and Paredes-Otero (2021) for other game, UDALV is limited to some risks of SGBV and does not cover all of them. It focuses on three environments: public transportation, work, and at parties. New or complementary versions of this game should include other contexts in which women face other risks for SGBV. Nevertheless, the fact of being a simple short game and the evidence of its impact on the perception of SGBV makes UDALV an appropriate choice to be included as part of non-formal prevention programs for young people in Perú where SGBV is considered a public health problem. A similar proposal was presented by Pisco et al. (2018) for the game UNLOVE to elicit awareness of dating violence as a manifestation of GBV.

## CONCLUSIONS

In sum, UDALV is a simple student-created video game helpful for helping young students to identify SGBV. Technically, it presents an easygoing narrative and mechanics. There is coherence between the video game's purpose, its dynamics, and aesthetics. This kind of student-created resource helps promote awareness of SGBV risks and empathy, leading to more careful and empowered women and responsible masculinities. The results can be generalized in the context of this research. They are beneficial for decision making regarding the use of this ludic material as part of gender equality programs for young people.

## SUGGESTIONS

Even when the sample was higher than others reported in the literature (Ndulue & Orji, 2021), future quantitative studies with larger samples are recommended. Also, further research might include an experimental design with control groups to assess the effectiveness of this kind of videogames compared to traditional proposals (e.g., lectures and brochures) to change young students' perceptions. A suggestion for videogame designers regarding GBV or SGBV is to include normalized behaviors and show them like they are: risks of GBV, risks of SGBV or violent actions.

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