Games as tools for teaching gypsy stories: application and implementation of the game The Last Song of Birkenau.

Lucas Medeiros de Araújo Vale
ORCID: https://orcid.org/0009-0003-3261-8139

Aquiles Medeiros Filgueira Burlamaqui
ORCID: https://orcid.org/0000-0001-6754-8335

Abstract: This article presents the application and evaluation of the educational game *The Last Song of Birkenau*, developed to teach about the Romani Holocaust. The research was conducted with 9th-grade students, aiming to promote inclusive and diverse education. The methodology included the implementation of the game and data collection on students' prior knowledge, followed by an assessment of learning after the activity. The results indicate that most students recognized the effectiveness of the game in acquiring new knowledge about Nazi extermination practices and Romani history, highlighting the potential of games as pedagogical tools.
Keywords: educational games; history; romani holocaust; RPG.

1 Introduction

The Roma people constitute a diverse ethnic group present across multiple continents, sharing a history marked by violence and stigmatization imposed by surrounding societies. Various studies (Martinez, 1989; Róman, 1997; Costa, 2005) indicate that the presence of the Roma in the Western world dates back approximately to the 15th century, with several theories regarding their origins. According to Costa (2005, p. 154), they migrated "[...] at different times and for reasons that are still not well explained, from India to Europe, and most likely reached the westernmost part of Europe by the late 15th century." The presence of the Roma in urban environments has been documented over the centuries through criminal proceedings, legal decrees, and newspaper reports. The Roma genocide in Nazi concentration camps, as described by Donald Kenrick and Grattan Puxon (1995) in the book *The Gypsies Under the Swastika*, is only a small part of the long history of persecution suffered by this group, exacerbated by the Nazi regime in the first half of the 20th century. It is estimated that between 250,000 and 500,000 Roma were killed, and although more

than 70 years have passed, no war criminal has been convicted for these crimes (Moonen, 2012). According to Hancock (2019), the *Porrajmos* was one of the most significant events in Romani history in Europe, along with the *Rrobija*—the five and a half centuries of slavery in Romania. However, both seem to receive less emphasis in school curricula compared to the Jewish Holocaust, which is widely referenced in various educational media.

As a History teacher, I observed a scarcity of educational materials and media resources addressing the historical persecution of the Roma, culminating in the *Porrajmos*, within the context of primary education. Among the three textbooks used at the school where I taught in 2021, there was no mention of the Roma genocide, nor of the history of persecutions before and after Nazism in Europe. My search for additional materials was also unfruitful, as most reliable information is confined to academic works written in language unsuitable for children and young audiences.

The exclusion of the Roma from textbooks reflects a broader process of invisibilization of these peoples, both in Brazil and in other parts of the world. This highlights the difficulty of translating academic knowledge into primary education, as well as the absence of affirmative public policies that give visibility to Roma histories and cultures.

Although they are a minority group present in Brazil since the beginning of colonization, the Roma are not explicitly mentioned in the 1988 Federal Constitution, unlike other ethno-social minorities such as Indigenous and Afro-descendant peoples. This is contradictory, considering that they also made significant contributions to the Brazilian "civilizing process," as highlighted by Costa (2005).

The legal recognition of the Roma in Brazil only occurred in 2006, through a decree by President Luiz Inácio Lula da Silva, which established May 24 — dedicated to Saint Sarah, the "patron saint of the Roma"— as National Roma Day. To this day, there is no legislation mandating the teaching of Roma history, as is the case with Afro-Brazilian and Indigenous history and culture, which are required by Laws No. 10,639/03 and No. 11,645/08.

The Base Nacional Comum Curricular (BNCC), published in 2018, was the first regulatory document to include the Roma, although only three times in its 600 pages. One of these mentions appears in skill EF05ER05: "Identify elements of oral tradition in Indigenous, Afro-Brazilian, Roma, and other cultures and religious traditions." (Brazil, 2018, p. 451), to be developed within the Religious Education curriculum for the fifth grade of elementary school. The BNCC also includes, in skill EF09HI13, the requirement for students to "describe and contextualize the emergence of fascism and Nazism, the consolidation of totalitarian states, and extermination practices (such as the Holocaust)" (Brazil, 2018, p. 429), where the Porrajmos is implicitly included.

Given the lack of educational resources on this topic, I chose to develop an educational product in the form of a Role-Playing Game (RPG) as the focus of my master's

research in the Educational Technology Innovation Program at UFRN. This decision was based on the pedagogical effectiveness and the creative and interactive potential that this type of product can offer. Thus, I defined the scope of my study as the creation of an RPG about the Nazi extermination of the Roma, designed for ninth-grade students in elementary school, to be used in the History curriculum.

The storyline of the RPG *The Last Song of Birkenau* revolves around the life and resistance of the Roma in the Birkenau concentration camp, where players take on the roles of characters facing Nazi oppression. The setting is based on a historically accurate context, incorporating elements that reflect Roma cultural diversity and the violence suffered by this ethnic group.

The main characters—Tina, Kako, Hillie, Max, Darko, and Carmen—represent Roma from different subgroups, interacting in an environment of tension and struggle for survival. Throughout the game, players explore themes such as anti-Roma discrimination (Antigypsyism), resistance, and the appreciation of Roma histories and cultures.

This article aims to present the main results of the implementation and evaluation of this educational product. The relevance of this topic lies in the need to bring visibility to a population that has been historically excluded from educational materials and school curricula. By creating and applying a pedagogical resource that addresses the history of the Roma, we seek to contribute to a more inclusive and diverse education, aligned with the principles of equality and respect for cultural rights.

The methodology of this research is based on the projective and epistemological paradigm of Design, with the goal of organizing knowledge, creating new artifacts, and evaluating their impact on human activities (Gomes & Gomes, 2020). According to Gomes and Gomes (2020, p. 8), "[...] the knowledge advanced by this paradigm corresponds to the very artifact in construction, its mode of production, and all dimensions of the relationship between it and its users." Furthermore, the authors state that "[...] in the epistemology of Design, hypotheses take the form of evolving material versions of possible solutions. These are subject to evaluation and, after successive refinements, result in practical solutions to human and everyday problems." (Gomes & Gomes, 2020, p. 8).

Our study followed the Design Science Research (DSR) model (Hevner, 2007), an applied research approach that seeks to solve problems through artifacts—in this case, an educational RPG game—and generate new scientific knowledge from this process.

Design Science Research is structured into three interrelated research cycles, as discussed by Pimentel, Filippo, and Santoro:

> The Knowledge Cycle (or Rigor Cycle) aims at developing and evaluating theoretical conjectures related to human or organizational behavior; the Design Cycle (or Engineering Cycle) focuses on designing an artifact to solve a real problem in a

specific context; and the Relevance Cycle investigates the acceptance of the results achieved with the artifact (Pimentel, Filippo, & Santoro, 2020, p. 14).

To evaluate the pedagogical effectiveness of *The Last Song of Birkenau* and determine whether we achieved the main research objectives, we planned and executed the implementation of the game in a 9th-grade class (the primary target audience) and established instruments and criteria for data collection and assessment.

Action research, which prioritizes practice and the active role of the researcher in generating evaluation and improvement of a practice or product, was the chosen research method for the implementation phase of *The Last Song of Birkenau*. According to Tripp (2005, p. 445), "[...] educational action research is a strategy for the development of teachers and researchers so that they can use their research to enhance their teaching and, consequently, their students' learning."

For the evaluation of the game and its pedagogical potential, we used the model proposed by Savi et al. (2010), which provides data on player motivation, user experience, and learning. We also defined several data collection instruments, such as: surveys, interviews, photographic records, and field journal entries.

The fieldwork was divided into four stages: 1) technical visit and discussion with the pedagogical management; 2) conversation with the History teacher; 3) implementation of the RPG; and 4) RPG evaluation. The subjects of this research were: a member of the pedagogical management, a History teacher, and 14 9th-grade students.

2 About the Game Implementation

Our first major challenge was finding a 9th-grade class to implement the RPG, as I was not teaching any classes at this grade level during the year the research was conducted. To address this, we conducted a search using Google Maps to locate the nearest public schools and reached out to three institutions, of which only one responded and agreed to participate in our research: Escola Estadual Vigário Bartolomeu, located in the Morro Branco neighborhood in the city of Natal/RN.

Founded in April 1958, in an old mansion granted by the city's Freemasons, Escola Estadual Vigário Bartolomeu brought together students of various ages in its corner building with a blue façade. At the time of the research, the school offered classes for the final years of elementary school (6th to 9th grade) in the afternoon and for young people and adults (EJA) at night. The first contact with the school was mediated by the pedagogical director, Roseli da Silva, who facilitated the contact with the History teacher, Nadson Gutemberg, who promptly agreed to participate in the research.

During our first contact, our goal was to present the project in greater detail to the school administration and better understand the institution's reality, as well as the teachers' and students' needs. To do this, we developed an interview script and planned to take photographic records.

Through an interview with the pedagogical director, Roseli da Silva, we learned that the school has about 190 students, divided into eight classes: four in the afternoon and four at night. The teaching team consists of 23 teachers from various areas of knowledge, who rotate between the four classrooms of the institution.

Although small, the school has a library, computer lab, a small gym for physical activities, two projectors, internet access in the classrooms, a printer for educational use, and tablets for student use. The classrooms are equipped with whiteboards and are cooled by two fans.

Roseli shared that one of the school's biggest challenges is student dropout and lack of engagement. According to her, parents are very present, especially those of younger students. When asked about how teachers were adapting to the BNCC, the director mentioned that since 2019, the school has been investing in lectures and training sessions about the BNCC for its teaching staff.

During our conversation, I explained that the product of my master's research would be a game about the Roma theme and asked if the school had any practice of working with this topic. Roseli mentioned that the use of games had already been integrated into the school's teaching practice, and that once the Religious Education teacher had conducted a class mentioning the Roma. The proposal for implementing the game A Última Canção de Birkenau was very well received by the school, which provided us with all the necessary support for its implementation.

The conversation with the History teacher, Nadson Gutemberg, was conducted through WhatsApp. Roseli had already informed him about the purpose of the conversation, but I took the opportunity to further explain the research objectives and the justification for the work. We faced some difficulty in finding a date to implement the game due to holidays, field trips organized by the school, school events, and unforeseen circumstances (which occurred on both sides).

On November 11, 2022, I arrived at Escola Estadual Vigário Bartolomeu at around 12:30 PM. I arrived a little earlier than the scheduled time, and the projector I had requested was already set up in the classroom. A school staff member provided the Wi-Fi password, and the free time until the class started was used to organize the materials.

 For the implementation, a slide presentation (which explained the project), the player's gamebook, the teacher's gamebook, a six-sided die, and the six character cards (which were printed and laminated) were used.

Figures 1 and 2 – Character cards.

Source: Lucas Vale (2022).

Around 1:00 PM, the History teacher and the students arrived in the classroom and began to settle in. Professor Nadson confessed that he was having severe back pain, but still decided to come to school to avoid canceling the implementation session once again. He asked for the first 15 minutes of the class to work on other content with the students, and also used the initial moment of the class to introduce the students to the theme developed by the project.

Fourteen students were present that day, aged between 14 and 16 years old. The students were studying revolts that took place during the First Brazilian Republic. The teacher wrote some topics on the board and asked them to take notes in their notebooks. From what could be observed, all the students took notes, and as soon as the designated time ended, the teacher suggested that the implementation of the game begin.

The session began with a brief presentation about the project, and after this introduction, a diagnostic assessment activity was conducted to understand the students' prior knowledge about: 1) the Holocaust; 2) the Roma people; 3) the "Gypsy Holocaust." The activity consisted of responding in a few words, using a post-it, to the questions projected on the board: 1) What do I know about the Holocaust?; 2) What do I know about the Roma?; 3) What do I know about the "Gypsy Holocaust"? The students were encouraged to be honest

in their responses. There was no resistance from them in expressing what they knew and did not know about the topics.

Figures 3, 4 and 5 – Application.

Source: Lucas Vale (2022).

Through this activity, the following responses were obtained from the students:

Table 1 – Students' Responses in the Diagnostic Assessment Activity.

| What do I know about the Holocaust?	What do I know about the Roma?	What do I know about the "Roma Holocaust"?
Don't know	0	Nothing
Nothing	Nothing	Nothing
Nothing	Don't know	Nothing
Persecution of Jews	They wore long clothes	Don't know
Nothing	They wore long clothes	0
Don't know	A people who believe in black magic, who can read palms, see the future, etc.	It is the persecution of the Jews.
It was the persecution of the Jews under the Nazi regime.	Nothing	Nothing
Don't know	Not much, just the stereotypes.	Nothing
It was the extermination of the Jews during World War II.	Nothing	It is the persecution of the Roma (Gypsies).
I don't remember.	Nothing	Don't know

I don't remember, mister.	I don't remember.	Nothing, I didn't know there was one.
The Holocaust was the perse-cution of the Jews in Europe.	Nothing	Nothing
It's the persecution of the Jews.	I don't remember.	Don't know
I don't remember.	Nothing	I don't remember.

Source: prepared by the authors themselves.

Although the students had already studied the Holocaust and Nazi extermination practices, as previously informed by Professor Nadson, only 35.7% of them expressed prior knowledge of the topic proposed in the question "1) What do I know about the Holocaust?" This is a very low number compared to the sum of the other 42.9% who did not know how to respond and the 21.4% who did not remember, as illustrated in the following graph:

Graph 1 – "What do I know about the Holocaust?".

1) What do I know about the Holocaust?

Had prior knowledge
35.7%

Did not have prior knowledge
42.9%

Do not remember having prior knowledge
21.4%
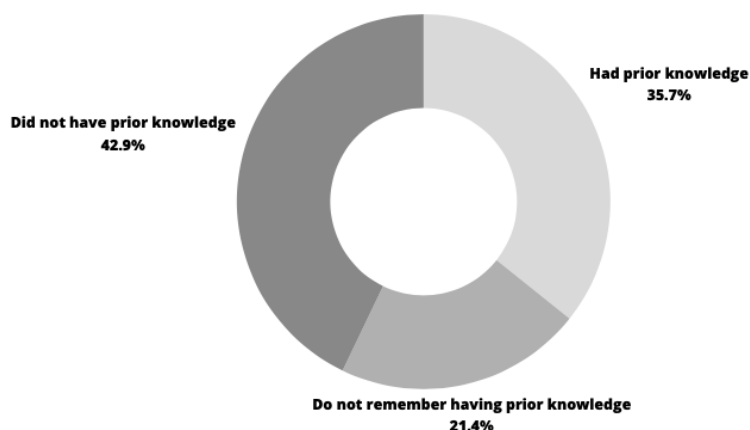
Source: prepared by the authors themselves.

Although the percentage was low, when analyzing the responses of the students who claimed to have prior knowledge of the first question, it is possible to see that all of them were able to associate the word "Holocaust" with the persecution and extermination suffered by the Jewish people, carried out by the Nazis in the past century. The second graph illustrates the prior knowledge regarding the question: "What do I know about the Roma people?".

Graph 2 – "What do I know about the Roma people?"

2) What do I know about the Roma people?

Do not know
42.9%

Answered
35.7%

Do not remember
21.4%
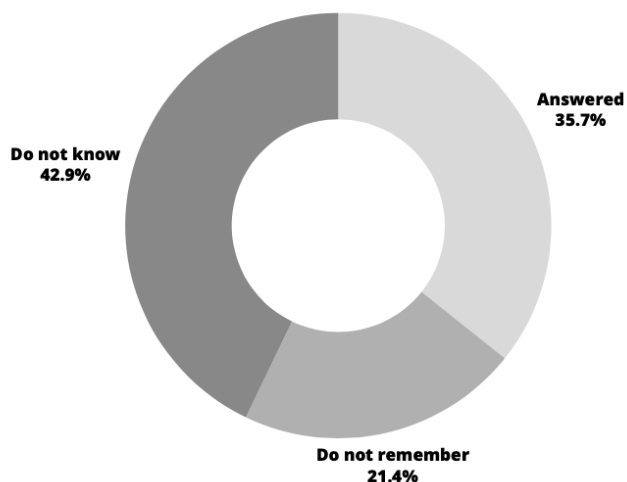
Source: prepared by the authors themselves.

As illustrated above, only 28.6% of the students demonstrated any prior knowledge about the Romani people. Their knowledge was related to stereotypes, highlighting long clothing and the idea that Romani people practice magic and divination arts. A total of 14.3% of the class did not remember having any prior knowledge about them, while the majority, 57.1%, knew absolutely nothing.

The third chart presents the prior knowledge regarding the question: "3) What do I know about the Romani Holocaust?".

Graph 3 – "What do I know about the 'Romani Holocaust'?".

3) What do I know about the "Romani Holocaust"?

Had prior knowledge
14.3%

Do not remember having prior knowledge
7.1%

Did not have prior knowledge
78.6%
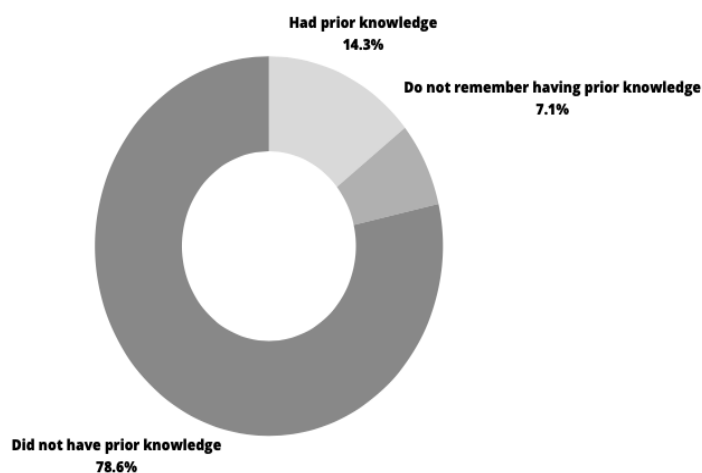
Source: prepared by the authors themselves.

Of the two students (14.3% of the class) who demonstrated prior knowledge about the "Porajmos" (the Romani Holocaust), only one provided a satisfactory response, correctly associating the term with the extermination of the Romani people during the Nazi period. The majority of the class (78.6%) had no knowledge of the topic, while 7.1% stated they did not remember anything about it. This activity was crucial for identifying students' prior knowledge and later comparing it with the learning outcomes from the game-based activity. It became evident that only a few students were familiar with the game's theme, even though they had already studied the historical period in which it is set.

After the diagnostic assessment activity, the digital version of the player's gamebook was projected for the class, and its content was summarized. At certain moments, some students were asked to read aloud so that the entire class could follow along.

Figure 6 – 9th-grade student reading the gamebook *The Last Song of Birkenau.*

Source: Lucas Vale (2022).

After learning about the story behind the game and general aspects of the mechanics of the characters and places that could be explored in the narrative, it was explained to the students that they should form groups to play, as the game only has six characters. They were asked whether they would like the division to be done by drawing lots or if they preferred to form the groups themselves. They chose the latter option.

Once the groups were formed, the characters were drawn, and we prepared to start the game. The teacher's game-book was opened on the teacher's computer to assist in narrating the adventure, and suspenseful music was played on YouTube to help immerse the students in the atmosphere of the adventure.

The adventure began with a dramatic reading of the prelude available on page nine of the teacher's game-book:

> The main inhabitants of Birkenau are neither the Gypsies nor, even less so, the Jews... Most people know them by the names Fear and Pain, others call them Terror and Suffering, but there are many other ways to refer to them. Some say they are invisible, but that's a mistake! Anyone can see them clearly, with their own eyes, anywhere in Birkenau. If you walk through the camp, you will find them everywhere, almost like omnipresent figures. Most of the time, they are together! Fear and pain live inside each of the prisoners. They are feelings that consume the body and devour the soul. Perhaps, also, for this reason, the Gypsies call the Holocaust "devouring." Fear and pain seem unbeatable; they transcend the existence of the bodies and grow stronger with death. But despite this, there are courageous and fearless souls in Birkenau, who are like sparks of hope in the midst of darkness, and you are one of them! No matter what happens, today you woke up with the goal to escape this place, and you won't give up until you succeed.

After situating the students, we conducted a draw to determine where each character would start the game. Hillie and Darko began in the infirmary, Max and Tina started in the gas chamber, while Carmem and Kako began in the crematorium.

The first scene to be narrated was that of the crematorium. The introductory reading of the place was carried out as instructed on page 16 of the teacher's gamebook:

> You have been assigned to help clean the crematorium. There are two other people with you. One of them is a woman. She wears a striped uniform with the emblem of two overlapping yellow triangles, forming a star. You know this is the symbol used to identify Jews. She has a skeletal body, shaved hair, and a fragile appearance. It seems she has not eaten in a long time. The other person is an elderly man with gray hair and a green triangle, which you have never seen before. You are cleaning the ashes from the crematorium, and you notice the young woman next to you is crying. What will you do?

The students playing as the characters Carmem and Kako decided that their characters would also cry, and so they did. Carmem and Kako were in tears until the narrative continued, with the dramatic reading of the girl's line, also available on page 16 of the teacher's book: "These ashes... These ashes are my people. My flesh. My faith. My history. My memories... They have no right to do this to us. You also seem sad. Have you lost someone here?".

The players controlling Carmen told the girl that they too had lost relatives in the concentration camp, which showed they had paid attention to the story of their character. The players controlling Kako decided to focus on the task of cleaning the crematorium and were the ones responsible for finding a gold ring at the site, after succeeding in a wisdom test. When asked what they would do with the gold ring, the players decided to leave it where it was, which avoided the combat that was supposed to happen if their characters had refused to give the ring to the girl or the elderly man with gray hair.

I told the students that they had just avoided a physical conflict, and they celebrated enthusiastically. The second scene narrated was that of the characters Max and Tina, who were in the gas chamber. The introductory reading was done, available on page 15 of the teacher's book:

> You have been summoned by a guard to work in a different facility today. You are to help collect the bodies from the gas chambers and take them to a mass grave. Upon arriving, you are horrified by the number of corpses. There are five other people helping to load them onto a cart and five guards supervising. The guards seem somewhat distracted.

While narrating the scene, it became apparent that some players were displaying anxious expressions, and some were shocked by the situation their characters found themselves in. In this scene, the highlight was the character Max, who discovered a map indicating a secret exit and a place where weapons were buried. When asked if the group would like to share their character's findings with his friend Tina, the group refused and said they would keep the information a secret. The character Tina then performed a wisdom test to try to detect if something was suspicious but failed.

The third scene took place with the characters Hillie and Darko in the infirmary of the Birkenau concentration camp. Similarly, the dramatic reading of the text that introduces the location, available on page 13 of the Teacher's Book, was performed:

> You are in the infirmary, if we can even call it that. The barracks for the sick, like other buildings, were once horse stables. There are no windows, only a few small openings covered in the roof to let light in, and there are some holes in the walls and ceiling. Inside, on each side, there are three-tier wooden bunks, lined with straw sacks

and thin blankets. In the middle, there are two wooden tables used for observing the sick. Ten prisoners sleep here, in spaces meant for four. Most of the nurses are untrained Roma, whose job is to check temperatures and feed the sick. The doctors' main task is to record the number of deaths. Medicine is very scarce. Twenty to thirty sick people die daily, and their bodies are placed in a corner of the barracks and collected every night by a special kommando. (Kenrik; Puxon, 1995, P.134)". You were sent to the infirmary to help care for the sick, and there you find only one nurse (a Roma). What will you do?

The students playing as Hillie decided to talk to the nurse who was at the location and noticed that she was very excited about a festival that would take place that night in Birkenau. She was hopeful that things would improve and told Hillie that she had heard that there would be a musical performance by the Roma at the festival. Meanwhile, the students playing as Darko decided to focus on the task of counting the dead, and during this process, they found a pocketknife after a successful wisdom check. The players chose not to reveal that they had found the items. This concluded the first part of the game.

The second part of the game began with all the characters meeting in the courtyard, just minutes before the festival was set to begin. The students knew they had to act quickly for their characters to escape, as a massacre was about to happen. The players controlling Max, who had found a map indicating a possible escape route, kept the information hidden from the others and managed to stealthily head to the location on the map, after succeeding in a dexterity check. After investigating the abandoned warehouse, the players managed to get Max to escape the concentration camp without being noticed by the others.

After Max's escape, the students split up to search for another escape route. Tina's players sent her to the Laboratory, which was unsupervised, where she spotted several children, including Roma, twins, and people with dwarfism. At this moment, the players were informed that during the existence of concentration camps, it was common for horrific experiments to be conducted on babies with these traits, which left the class stunned. The students controlling Tina decided to try to save a baby. At the same time, Carmem and Kako were unsuccessfully searching for a gap in the barbed wire fences surrounding the concentration camp. Hillie and Darko were looking for shelter in the infirmary when they sensed that something bad was going to happen at the festival.

After the paired and individual scenes, the characters reunited once more, and Tina shared with the others that there were several babies in the laboratory. This information motivated the players controlling Hillie to go to the location to search for her children, who had been kidnapped. The other players decided to accompany her, but upon arriving at the laboratory, they were ambushed by guards who escorted them to the final song of Birkenau. Thus, the game ended with only Max's group achieving the main objective of the game: escaping Birkenau.

After the game session, there was a moment of dialogue with the students about the experience they had just had, and the key words most commonly mentioned were "fun" and "emotional." Many asked if we could continue playing for longer, but the class time was nearly over. Initially, we assumed that some students would be upset with those who played as Max, since they chose to escape alone, but they took that decision in good spirits.

3 Evaluation of the Game Application

It was explained to the students that after the game session, they would need to fill out an online evaluation form of the game using Google Forms, and they would be called individually for this task. The form was created based on the Game Evaluation Model developed by Savi et al. (2010), divided into three parts.

The first part of the form consisted of ten statements, to which students had to assign a rating from 1 to 5 based on their experience playing *The Last Song of Birkenau*, with 1 corresponding to "strongly disagree" and 5 to "strongly agree," according to the Likert scale. The statements aimed to evaluate the game's design ability to generate motivation and considered the following characteristics: 1) Satisfaction; 2) Confidence; 3) Relevance; and 4) Attention, as suggested by Savi et al. (2010):

Table 2 – Statements for Motivation Evaluation.

#	Item	Dimension
1	It is because of my personal effort, or my commitment to helping the team, that I am able to progress in the game.	Satisfaction
2	I am satisfied because I know I will have opportunities to apply what I learned in the game in practice.	Satisfaction
3	As I progressed through the game, I felt confident that I was learning.	Confidence
4	It was easy to understand the game.	Confidence
5	The content of the game is connected to other knowledge I already had.	Relevance
6	The way the game works is suitable for my way of learning.	Relevance
7	I consider the content of this game to be relevant.	Relevance
8	The variation in the narrative helped me stay focused on the game.	Attention
9	There was something interesting at the beginning of the game that captured my attention.	Attention
10	The design of the gamebook is attractive.	Attention

Source: prepared by the authors themselves.

The second part of the form consisted of thirteen statements, which also needed to be evaluated on a scale from 1 to 5, with 1 corresponding to "strongly disagree" and 5 "strongly agree." The statements aimed to evaluate the player's experience and considered the following characteristics: 1) Competence; 2) Fun; 3) Challenge; 4) Interaction; and 5) Immersion, as suggested by Savi et al. (2010):

Table 3 – Statements for evaluating the player's experience.

#	Item	Dimension
1	I had positive feelings of efficiency as the game progressed.	Competence
2	I was able to achieve the game's objectives through my skills.	Competence
3	I would like to use this game again or play for more time.	Fun
4	I would recommend this game to others.	Fun
5	I had fun with the game.	Fun
6	The game progresses at an appropriate pace and doesn't become monotonous – it offers new obstacles, situations, or variations of activities.	Challenge
7	This game is adequately challenging for me; the tasks are neither too easy nor too difficult.	Challenge
8	The game promotes moments of cooperation among the participants.	Interaction
9	I had fun with other people.	Interaction
10	I was able to interact with other people during the game.	Interaction
11	I felt more immersed in the game environment than in the real world, forgetting about what was around me.	Immersion
12	I didn't notice time passing while playing.	Immersion
13	I temporarily forgot my day-to-day concerns and became completely focused on the game.	Immersion

Source: prepared by the authors themselves.

The third and final part of the form aimed to assess the students' learning and, consequently, the game's ability to generate new knowledge. For this stage, four questions were created, three of which were multiple-choice and one open-ended:

Table 4 – Questions for learning assessment.

	Learning assessment	
Statements	Do you think the experience with the game contributed to acquiring new knowledge?	Multiple choice
	How effective was the game in your learning about Nazi extermination practices compared to other activities?	Multiple choice
	How much do you think the game contributed to your learning about the history and cultures of the Roma people?	Multiple choice
	What did you learn about the Roma Holocaust?	Open-ended

Source: prepared by the authors themselves.

The evaluation of the game was carried out by the 14 students who participated in the implementation, and the Google Forms tool was used to collect and process the data, turning it into statistics (available for consultation in the Appendices). Subsequently, a weighted average was calculated to measure the students' evaluation in each assessment parameter, with a score ranging from 1 to 5, which was essential for understanding the strengths and areas that need improvement.

4 Presenting the Evaluation Results

Below, we present the evaluation results and the discussion they sparked, as well as the improvements planned and/or implemented based on them.

a) Motivation Evaluation: The first section of the form answered by the students aimed to evaluate whether the game design motivates students to use the resource as learning material. The following results were obtained from the responses:

Table 5 – Evaluation Scale adapted from Savi et al. (2010) for the characteristic of satisfaction.

#	Item	Dimension	Grade
1	It is because of my personal effort or my commitment to helping the team that I am able to progress in the game.	Satisfaction	3,60
2	I am satisfied because I know that I will have opportunities to apply in practice what I learned from the game.	Satisfaction	3,67
		Average	3,63

Source: prepared by the authors themselves.

The table above presents the weighted average of the responses related to the motivation evaluation, concerning the satisfaction triggered by the game's design, which is directly linked to the positive feelings about the learning experience and the recognition of the applicability of what was learned. According to Savi et al., "Students should feel that their effort in studying was appropriate and that there was consistency between objectives, content, and assessments" (Savi, et al., 2010, p. 4). By analyzing the data detailed in Table 5, we can conclude that the students' satisfaction evaluation was above the average (2.5), but there is still room for improvement in performance. To improve this result in future implementations and increase students' perceived value, a new section of the player's book has been planned, entitled "How Can This Knowledge Be Useful?". This section aims to bring applicability to this knowledge, especially in confronting neo-Nazism.

Table 6 – Evaluation Scale adapted from Savi et al. (2010) for the characteristic of trust.

#	Item	Dimension	Grade
3	As I went through the stages of the game, I felt confident that I was learning.	Confidence	4,13
4	It was easy to understand the game.	Confidence	4,33
		Average	4,23

Source: prepared by the authors themselves.

The game's ability to instill confidence is related, according to Savi et al., to creating positive expectations among students. The authors state that "[...] this can be achieved by providing success experiences stemming from their own skills and effort [...]" (Savi et al. 2010, p. 4). According to the results in Table 6, the confidence characteristic was well noted by the students, with particular emphasis on the ease of understanding the game, which was the highest-rated aspect by the students. From the outset, creating a game that is easy to understand was one of the major concerns and challenges of this research, as it can be a decisive factor in the choice of the pedagogical tool by both teachers and students. Through the evaluation of the students/assessors, a satisfactory result was found.

Table 7 – Evaluation Scale adapted from Savi et al. (2010) for the relevance characteristic.

#	Item	Dimension	Grade
5	The content of the game is connected to other knowledge I already possessed.	Relevance	3,67
6	The functioning of this game is suitable to my way of learning.	Relevance	3,87

#	Item	Dimension	Grade
7	I consider that the content of this game is relevant.	Relevance	4,33
		Average	3,95

Source: prepared by the authors themselves.

The relevance characteristic aimed to measure the extent to which the game's design allows students to perceive its educational importance and how the learning content can be connected to their ways of learning. Observing the data in Table 7, it is possible to identify that the game's content was considered relevant by the class, with results above the average.

Table 8 – Evaluation Scale adapted from Savi et al. (2010) for the attention characteristic.

#	Item	Dimension	Grade
8	The variation in the narrative helped me stay attentive to the game.	Attention	4,33
9	There was something interesting at the beginning of the game that captured my attention.	Attention	3,93
10	The design of the gamebook is appealing.	Attention	4,47
		Average	4,24

Source: prepared by the authors themselves.

Analyzing Table 8, which presents the results for the attention characteristic, it is observed that all items were rated above average. Thus, it can be concluded that the game's design is appealing and that students showed interest in the game. Overall, the motivation assessment demonstrated positive results, with all characteristics evaluated above average. This indicates that the game's design motivates players to play and learn.

In the player experience evaluation, which corresponds to the second part of the questionnaire answered by students, the goal was to assess whether the game's design provided a good experience for the players. Based on the responses, the following results were obtained:

Table 9 – Evaluation Scale adapted from Savi et al. (2010) for the competence characteristic.

#	Item	Dimension	Nota
11	Tive sentimentos positivos de eficiência no desenrolar do jogo	Competence	3,87
12	Consegui atingir os objetivos do jogo por meio das minhas habilidades	Competence	2,80
		Average	3,33

Source: prepared by the authors themselves.

According to Savi et al. (2010), "competence" "[...] is related to the perception of skills, control, and the use of these skills to explore the game and progress." (Savi et al., 2010, p.4). Although this aspect received an above-average evaluation, the result was significantly lower compared to other characteristics. The statement "I was able to achieve the game's objectives through my skills" received the lowest score in the entire evaluation. This may have occurred because only one group of players managed to achieve the game's objective (ensuring that their character escaped from Birkenau).

Table 10 – Evaluation Scale adapted from Savi et al. (2010) for the fun characteristic.

#	Item	Dimension	Grade
13	I would like to play this game again or play it for a longer time.	Fun	4,60
14	I would recommend this game to others.	Fun	4,67
15	I had fun playing the game.	Fun	4,67
		Average	4,64

Source: prepared by the authors themselves.

In the fun characteristic evaluated by the students, the highest scores were observed. Based on these results, it can be interpreted that the students would like to play the RPG again, would recommend it to their peers, and had fun, as indicated in Table 11.

Table 11 – Evaluation Scale adapted from Savi et al. (2010) for the challenge characteristic.

#	Item	Dimension	Grade
16	The game progresses at an appropriate pace and does not become monotonous – it offers new obstacles, situations, or variations of activities.	Challenge	4,40
17	This game is appropriately challenging for me; the tasks are neither too easy nor too difficult.	Challenge	3,67
		Average:	4,03

Source: prepared by the authors themselves.

According to Coelho (2013), challenges in games are obstacles to achieving the game's objective. There are several challenges within the universe of *The Last Song of Birkenau*, with varying degrees of complexity and different outcomes, which can be satisfactorily perceived by the players, as indicated in Table 12.

Table 12 – Evaluation Scale adapted from Savi et al. (2010) for the interaction characteristic.

#	Item	Dimension	Grade
18	The game promotes moments of cooperation among participants.	Interaction	4,40
19	I was able to interact with other people during the game.	Interaction	4,67
20	Pude interagir com outras pessoas durante o jogo.	Interaction	4,33
		Average	4,46

Source: prepared by the authors themselves.

As evidenced in Table 13, the students/evaluators were able, based on their experiences as players, to observe interaction through the game's design. This result was expected, as the RPG is inherently an interactive game, played through the interaction between the different players and the game master.

Table 13 – Evaluation Scale adapted from Savi et al. (2010) for the immersion characteristic.

#	Item	Dimension	Grade
21	I felt more in the game environment than in the real world, forgetting what was around me.	Imersão	3,93
22	I didn't notice time passing while I was playing.	Imersão	4,33
23	I temporarily forgot my day-to-day concerns and became fully focused on the game.	Imersão	4,13
		Average	4,13

Source: prepared by the authors themselves.

According to Savi et al. (2010, p. 4), "[...] good games lead the player to have an experience of deep involvement in the game, which usually causes a shift in focus from the real world to the game world." As indicated in Table 14, the game provoked satisfactory immersion, as many students did not notice the passage of time while playing.

The player experience evaluation also demonstrated positive results, with all characteristics rated above average. This indicates that the game's design provides a good experience and fosters students' desire to continue playing.

Regarding the learning evaluation, it was divided into two stages. In the first stage, consisting of three objective questions, students assessed whether the game had characteristics that allowed learning. The second stage, consisting of a subjective question, aimed

to assess whether students learned something that helped develop the skill outlined in the BNCC descriptor EF09HI13: "describe and contextualize the processes of the emergence of fascism and nazism, the consolidation of totalitarian states, and extermination practices (such as the Holocaust)." (Brazil, 2018, p. 429).

In the first objective question, "Do you think the experience with the game contributed to acquiring new knowledge?", students could answer with "No," "Partially," "Yes," or "I have no formed opinion." We observed that 4 students agreed that the game contributed to acquiring new knowledge, and 21.4% agreed partially. None of the students answered "No" or "I have no formed opinion."

The next two objective questions were evaluated on a scale of 1 to 5, where 1 corresponds to "little" and 5 to "much." The following results were obtained by calculating a weighted average:

Table 14 – Evaluation Scale adapted from Savi et al. (2010) with the average results obtained in the analysis for the learning subcomponent.

#	Item	Dimension	Grade
1	How efficient was the game for your learning about Nazi extermination practices compared to other activities?	Learning	4,13
2	How much do you think the game contributed to your learning about gipsy histories and cultures?	Learning	4,33
		Average	4,23

Source: prepared by the authors themselves.

As expressed in Table 15, the students/evaluators mostly recognized contributions to their learning through the game *The Last Song of Birkenau*. An important piece of data that highlights the recognition of the educational role of the game, combined with its playful nature.

To assess the students' learning, a question was proposed that could be related to and compared with the one used in the diagnostic assessment activity. Thus, the question "What did you learn about the 'Gypsy Holocaust'?" was posed, and it was answered by the 14 participants in the implementation:

Table 15 – Learning Evaluation[1].

#	What did you learn about the "Gypsy Holocaust"?
1	They were in concentration camps.

---

[1] We chose to work with the original responses from the students.

2	The life of the Gypsies was difficult in the concentration camps.
3	I discovered that there were crematoriums and gas chambers in the concentration camps. I already knew about the Gypsies, but I didn't know they were an ethnicity like the indigenous people and black people.
4	They were used for experiments, lived in fear, and were always looking for an escape.
5	They felt very sad and lived in fear of ending up like their relatives.
6	They were badly treated, and it wasn't good at all. The Gypsies lived through a terrible situation.
7	In my opinion, I was sure that the Gypsy women didn't feel completely comfortable witnessing all the things that happened in the concentration camps.
8	They were repressed, even in the camps, subjected to poor conditions and degraded by other prisoners.
9	They lived through a bad time.
10	I didn't know this existed, I was able to learn a lot, and I hope to learn more.

Source: prepared by the authors themselves.

When compared to Graph 3, which showed that before the game implementation, 78.6% of the class knew nothing about the Gypsy Holocaust, we can conclude that the RPG game *The Last Song of Birkenau* was highly successful in developing knowledge that can contribute to the development of the BNCC skill under descriptor EF09HI13.

Table 16 – Comments and Suggestions[3].

#	Leave any comments or suggestions (optional):
1	No comments, I loved everything, I want to play again.
2	Very cool.
3	It's like the persecution of the Jews, but with the Gypsies.
4	I really liked the game, I would love to play more times.
5	I want to participate in more games like this.
6	I thought it was great.
7	I thought the game was good, I would keep playing if the class lasted longer.

Source: prepared by the authors themselves.

The research revealed that, after playing the game, all students were able to describe the characteristics of the extermination practices and the conditions faced by Gypsy prisoners during the Nazi period. Additionally, half of the students made positive comments on the evaluation form, as shown in Table 17.

5 Final Considerations

This article presented a comprehensive analysis of the implementation of the educational RPG game *The Last Song of Birkenau*, highlighting its pedagogical effectiveness in promoting knowledge about the history and culture of the Roma, as well as reflecting on the Roma Holocaust. Through the Design Science Research methodology, it was possible to develop an artifact that not only engaged the students but also provided an immersive and meaningful experience.

The evaluation results demonstrated that students found the game fun and exciting, highlighting the potential of games as educational tools. The average positive evaluation across various dimensions, such as attention, competence, and immersion, reinforces the idea that playful approaches can be effective in education, especially on sensitive and complex topics like the history of the Roma and genocide.

Additionally, the research emphasized the importance of including historically marginalized narratives in school curricula, promoting a more inclusive and diverse education. The experience with the game not only contributed to the acquisition of new knowledge but also fostered a space for dialogue and reflection among the students, which is essential for building a more just and respectful society towards cultural differences.

Finally, it is crucial for future research to continue exploring the use of games and other innovative approaches in education, aiming not only at knowledge transmission but also at the formation of critical citizens who are aware of their history and cultural identity.

REFERÊNCIAS

BRASIL. Ministério da Educação. **Base Nacional Comum Curricular**. Brasília: MEC, 2018. Disponível em: https://www.gov.br/mec/pt-br/escola-em-tempo-integral/BNCC_EI_EF_110518_versao-final.pdf. Acesso em: 3 set. 2019.

BRASIL. [Constituição (1988)]. **Constituição da República Federativa do Brasil de 1988**. Brasília, DF: Presidência da República, 1988. Disponível em: https://www.planalto.gov.br/ccivil_03/constitui-cao/constituicao.htm. Acesso em: 12 nov. 2024.

BRASIL. **Lei nº 9.394, de 20 de dezembro de 1996**. Estabelece as diretrizes e bases da educação nacional. Brasília, DF: Presidência da República, 1996. Disponível em: https://www.planalto.gov.br/ccivil_03/leis/l9394.htm. Acesso em: 12 nov. 2024.

BRASIL. Presidência da República. **Decreto de 25 de maio de 2006**. Institui o Dia Nacional do Cigano. Diário Oficial da União: seção 1, Brasília, DF, 26 maio 2006. Disponível em: https://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2006/Dnn/Dnn10153.htm. Acesso em: 27 jan. 2025.

BRASIL. **Lei nº 10.639, de 9 de janeiro de 2003**. Altera a Lei nº 9.394, de 20 de dezembro de 1996, que estabelece as diretrizes e bases da educação nacional, para incluir no currículo oficial da rede de ensino a obrigatoriedade da temática "História e Cultura Afro-Brasileira", e dá outras providências. Diário Oficial da União: seção 1, Brasília, DF, 10 jan. 2003. Disponível em: https://www.planalto.gov.br/ccivil_03/leis/2003/L10639.htm. Acesso em: 27 jan. 2025.

BRASIL. **Lei nº 11.645, de 10 de março de 2008**. Altera a Lei nº 9.394, de 20 de dezembro de 1996, modificada pela Lei nº 10.639, de 9 de janeiro de 2003, para incluir no currículo oficial da rede de ensino a obrigatoriedade da temática "História e Cultura Afro-Brasileira e Indígena". Diário Oficial da União: seção 1, Brasília, DF, 11 mar. 2008. Disponível em: https://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2008/Lei/L11645.htm. Acesso em: 27 jan. 2025.

COELHO. Eduardo Vinícius Guimarães de Souza. Órfãos do Fogo: jogo em tabuleiro cooperativo ambientado no Brasil do século XIX. 2013. Trabalho de Conclusão de Curso (Bacharelado em Desenho Industrial) – Universidade de Brasília, Brasília, DF, 2013.

COSTA, Elisa Maria Lopes da. Contributos ciganos para o povoamento do Brasil (séculos XVI-XIX). **Revista Arquipélago – História**, Brasilia, DF, 2005. Disponível em: https://repositorio.uac.pt/bits-tream/10400.3/416/1/Elisa_Costa_p153-181.pdf. Acesso em: 12 nov. 2024.

GOMES, Alex Sandro; GOMES, Claudia Roberta Araújo. Estrutura do Método científico: Por uma epistemologia da Informática na Educação. *In*: JAQUES, Patrícia Augustin; PIMENTEL, Mariano; SIQUEIRA; Sean; BITTENCOURT, Ig (org.). **Metodologia de pesquisa científica em informática na educação**: concepção de pesquisa. Porto Alegre: SBC, 2020. (Série Metodologia de Pesquisa em Informática na Educação, v. 1).

HANCOCK, Ian. The roots of anti-gypsyism. *In*: GOLDFARB, Maria Patícia; TOYANSK, Marcos; OLIVEIRA, Luciana de (org.). **Ciganos**: olhares e perspectivas. João Pessoa: Editora UFPB, 2019.

HEVNER, Alan. A three cycle view of design science research. **Scandinavian Journal of Information Systems**, [*s. l.*], v. 19, n. 2, 2007. Disponível em: https://www.researchgate.net/publication/254804390_A_Three_Cycle_View_of_Design_Science_Research. Acesso em: 12 nov. 2024.

KENRIK, Donald; PUXON, Grattan. **Os ciganos sob o domínio da suástica**. Lisboa: Centre de Recherches Tsiganes Secretariado Entreculturas, 1995. (Coleção interface).

MARTINEZ, Nicole. **Os ciganos**. Campinas: Papirus, 1989.

MOONEN, Frans. **Anticiganismo e políticas ciganas na Europa e no Brasil**. Recife: Mimeo, 2012.

PIMENTEL, Mariano; FILIPPO, Denise; SANTORO, Flávia Maria. Design Science Research: fazendo pesquisas científicas rigorosas atreladas ao desenvolvimento de artefatos computacionais projetados para a educação. *In*: JAQUES, Patrícia Augustin; PIMENTEL, Mariano; SIQUEIRA; Sean; BITTENCOURT, Ig. (org.). **Metodologia de pesquisa científica em informática na educação**: concepção de pesquisa. Porto Alegre: SBC, 2020. (Série Metodologia de Pesquisa em Informática na Educação, v. 1). Disponível em: https://metodologia.ceie-br.org/livro-1/. Acesso em: 12 nov. 2024.

ROMÁN, Teresa San. **La diferencia inquietante**: viejas y nuevas estratégias culturales de los gitanos. Madrid: Siglo XXI de España Editores, 1997.

SAVI, Rafael; VON WANGENHEIM, Christiane Gresse; ULBRICHT, Vania; VANZIN, Tarcisio. Proposta de um modelo de avaliação de jogos educacionais. **Revista Renote**, Porto Alegre, v. 8, n. 3, 2010. Disponível em: https://seer.ufrgs.br/index.php/renote/article/view/18043. Acesso em: 15 nov. 2024.

TRIPP, David. Pesquisa-ação: uma introdução metodológica. **Educação e Pesquisa**, São Paulo, v. 31, n. 3, p. 443-466, set./dez. 2005. Disponível em: https://www.scielo.br/j/ep/a/3DkbXnqBQqyq5b-V4TCL9NSH. Acesso em: 12 nov. 2024.

MINI BIOGRAPHY

Lucas Medeiros de Araújo Vale
Bachelor in History (UFRN). Master's in Innovation in Educational Technologies (PPgITE/IMD/UFRN). History and Digital Culture Teacher.
E-mail: lucas.vale.103@ufrn.edu.br

Aquiles Medeiros Filgueira Burlamaqui
Bachelor in Computer Science (UFRN). Master's and PhD in Computer Engineering (UFRN). Associate Professor at UFRN. Researcher and coordinator of the Laboratory of Automation and Robotics (LAR) and the Laboratory of Educational, Assistive, and Multimedia Technologies (TEAM).
E-mail: aquilesburlamaqui@gmail.com