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ARTICLE / ARTÍCULO

Using Data Science to evaluate Game-Based Learning in informal contexts

La evaluación del aprendizaje basado en juegos en contextos informales mediante ciencia de datos

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Abstract: The emergence of digital Game-Based Learning (GBL) has sparked interest in assessing its efficacy. This assessment needs to consider the complex mix of narrative and interactivity typical of video games, which makes it difficult to evaluate to what extent a video game achieves its stated learning objectives. This challenge is exponentially increased when gaming sessions happen spontaneously in informal contexts, without any supervision by educators or the option to assess the players' prior knowledge and skills. This work presents a methodology for analyzing GBL experiences based on data science and the data collection functionalities offered by current game development platforms. This strategy is applied to the analysis of a social media simulator designed to promote information literacy within the video game Julia: A Science Journey. The system collected data on 436 sessions from 112 unique players over six months. The records included information on replayability, identification of fake news, and reaction times. The results suggest that players become more adept and swifter at identifying fake news through repeated games. Success in identifying misinformation is also related to the topic, with hoaxes related to scientific content being more easily recognized than those associated with political controversies.

Keywords: Video games, Game based learning, Information literacy, Misinformation, Data science, Critical thinking.

Resumen: El auge del aprendizaje basado en juegos (ABJ) digitales ha generado un interés por explorar su eficacia, ya que su compleja combinación de narrativa e interactividad hace difícil evaluar hasta qué punto un videojuego consigue alcanzar los objetivos de aprendizaje planteados. Este reto se incrementa de manera exponencial cuando la sesión de juego se produce de manera espontánea en entornos informales, sin la supervisión de educadores ni la posibilidad de evaluar los conocimientos y las capacidades previas del jugador. Este trabajo presenta una metodología de análisis de experiencias de ABJ a partir del uso de ciencia de datos y las funcionalidades de recogida de información ofrecidas por las plataformas actuales de creación de videojuegos. La estrategia se aplica aquí al análisis de un simulador de redes sociales creado para promover la alfabetización informacional, enmarcado dentro del juego Julia: A Science Journey. El sistema registró datos sobre 436 partidas realizadas por 112 jugadores distintos durante seis meses y recopiló información sobre la repetición de partidas, la identificación de fake news o la velocidad de reacción. Los resultados sugieren que los jugadores aprenden a identificar fake news de manera más efectiva y rápida a medida que encadenan partidas. El éxito en la identificación de la desinformación también está relacionado con la temática, ya que los bulos vinculados a contenido científico son más fácilmente reconocidos que los relacionados con controversias políticas.

Palabras-Clave: Videojuegos, Aprendizaje Basado en Juegos, Alfabetización informacional, Desinformación, Ciencia de datos, Pensamiento crítico.

1. Introduction

Game-Based Learning (GBL) is an emerging field in educational research. It leverages the teaching potential of games to encourage autonomous and interactive learning of complex knowledge and skills, while also fostering critical reflection on decisions made during gameplay (Gee, 2007; McGonigal, 2011). GBL studies encompass a wide variety of formats, including board games (Bayeck, 2020), role-playing games (Hammer et al., 2018), and especially video games. Due to their digital nature and interactive potential, video games have become the most studied type of game within the field (Squire, 2008), being applied to areas as diverse as history (McCall, 2016), biology (Sadler et al., 2013), and languages (Pitarch, 2018).

One of the current challenges of digital GBL is evaluating games as educational resources. This is because tracking the learning process during a gaming session is difficult due to the complexity of the interactions involved. (Connolly et al., 2009; Tahir & Wang, 2017). Previous work has focused on applying qualitative and mixed methods (documentary research, focus groups, questionnaires, etc.), which have contributed to a better understanding of games as an autonomous learning strategy (Mayer et al., 2014). However, the complexity of interactions and the current diversity of games present numerous challenges in evaluating digital GBL (Alonso-Fernández et al., 2019). Firstly, current analytical methods cannot explore the multitude of micro-interactions and decisions that occur during a gaming session; these micro-interactions, however, are crucial in characterizing the learning process with video games. Secondly, these methods do not capture the diversity of learning dynamics in video games, as each gaming session creates a unique narrative based on the player's decisions. Lastly, the methods used to date require supervised sessions and, therefore, are conducted in formal and non-formal learning contexts.

Limiting the analysis of game-based learning (GBL) processes to contexts controlled by educators poses a significant challenge in the field. Numerous authors argue that any gaming process is a learning process, regardless of its setting (McGonigal, 2011; Squire, 2021). Therefore, it can be argued that the greatest potential of GBL lies in informal contexts. Most learning dynamics with video games are not supervised by educators; instead, they occur at home on the couch, on public transportation with a mobile phone, or during social events in game sessions with friends.

One of the most popular uses of GBL in informal contexts is related to the identification of fake news. The concept of fake news gained prominence during the 2016 US elections, characterized by the spreading of erroneous or fabricated information, both on social media and traditional media outlets (Cabezuelo Lorenzo & Manfredi, 2019). Over the past few years, fake news has become widely recognized both within and beyond academic circles. It generally refers to various forms of communication, such as satire, parody, news fabrication and manipulation, as well as propaganda or deceptive advertising (Tandoc et al., 2018).

GBL appears to be a particularly suitable resource for combating misinformation and its consequences. For this reason, various digital games focused on media literacy and addressing the rise of fake news have already been developed (Fernández Galeote & Hamari, 2021). These initiatives are based on the concept of inoculation: if individuals

learn to identify fake news in a controlled setting such as a video game, they should be capable of performing the same task under real conditions on social networks (Lewandowsky & van der Linden, 2021). However, the methodological limitations discussed earlier affect the assessment of the effectiveness of these inoculation efforts. While some studies highlight their benefits, others argue that inoculation does not protect against misinformation but rather fosters general skepticism toward all sources of information, a result that diverges significantly from the original objective (Maertens et al., 2021; Modirrousta-Galian et al., 2023; Roozenbeek et al., 2022). The importance of this issue suggests that we need better methods of analysis —especially in informal contexts where most GBL occurs— if we want to identify which gaming mechanics, if any, can enhance the informational literacy of our society.

This paper presents the design and analysis of a fake news simulator in an informal learning context. This simulator is embedded as a minigame within the video game Julia: A Science Journey (JASJ). JASJ incorporates data science tools to gather detailed information about how players approach the game's challenges via the Unity Analytics platform. The analytical framework is applied to three research questions aimed at enhancing our understanding of informal GBL processes and inoculation against fake news: a) How does replayability influence outcome improvement? b) What impact does content have on identifying fake news? c) Is there a relationship between interaction speed and minigame outcomes?

2. Methodology

2.1. Design of a transformative video game

The JASJ video game was developed by an interdisciplinary team of researchers, technicians, and artists with three objectives: a) promoting scientific culture, b) reflecting on the social impact of the COVID-19 pandemic, and c) developing a methodology to analyze GBL in informal settings. The game was implemented by a team of five using the Unity development platform and was published in Fall 2022. It is currently available as a free download for *Windows, Mac*, and *Linux* OS via a direct link on the official website or through the digital video game distribution platform Steam.

JASJ portrays the life of Júlia, a teenager from Majorca, in early 2020. Players will come to know Júlia through her reflections and personal relationships with friends, family, and teachers at her high school. The action unfolds just before the COVID-19 pandemic outbreak, with the plot evolving through three types of settings: a) dialogues that promote critical thinking, b) animated scenes that push the story forward, and c) minigames that delve into specific aspects linked to their use in secondary classrooms. The first two resources are useful in introducing narrative elements that enable players to empathize with the various individuals in Júlia's life and understand the impact the pandemic will have on them, with a particular focus on capturing the doubts and fears among teenagers (see Figure 1).

Figure 1. Dialogue at the beginning of the game. It shows content linked to the uncertainty of the future according to the perception of a teenager

2.2. A minigame about misinformation on social networks

Minigames are the cornerstone of JASJ's educational content, with *Quacker* standing out as a social network simulation where users must report any fake news they encounter on their wall. It is worth noting that there is currently some confusion surrounding the definition of "fake news" (Gómez-García & Carrillo-Vera, 2020; Ross & Rivers, 2018). During the development of *Quacker*, the decision was made to define "fake news" as a subset of disinformation practices focused on the dissemination of false news with fabricated, non-verifiable content, and without any mention to the sources (DeJong, 2023). Specifically, our focus is on fake news that is maliciously published and disseminated by creators who are fully aware that they are spreading deliberate falsehoods (Wardle & Derakhshan, 2018).

Quacker is an educational experience that simulates the social dynamics of the digital world, including the personal experiences of its users. The minigame is structured around four core concepts: misinformation, mental health, popularity, and toxicity. Quacker is seamlessly integrated into JASJ's story through narrative transitions in which Júlia casually uses her cell phone (e.g., while waiting for her friends). During these instances, the Quacker interface appears on screen, resembling a social network akin to Twitter or Instagram, where Júlia can interact with short messages posted on her wall.

The *Quacker* interface displays three main components: a) a short text message posted by a user (referred to as a "quack"), b) buttons for three possible interactions with the quack: 'like', 'dislike', and 'report', and c) the status of the game defined by Júlia's mental health, her number of followers, and the number of failures in her fake news reports (see Figure 2).

Figure 2. Quacker minigame user interface. The indicators of Júlia's status (mental health and popularity) have been marked with red boxes, as well as the available reaction options (like, dislike, and report).

In *Quacker*, the player is compelled to interact since there is no option to skip a quack. As in real social networks, simply viewing a post constitutes interaction. Therefore, the game design ensures that every player interaction has an effect. When a player engages with a quack, the game state changes based on three internally coded parameters:

1) *Fake news*: This is a binary variable (i.e., true or false) that determines whether the quack's information is a hoax, thus falling under what we commonly refer to as fake news.

2) *Toxicity*: The toxicity level of a quack ranges from −2 to 3, an interval set during the testing phase to provide a medium difficulty challenge. Interacting with a 'like' on a quack with negative values reduces toxicity within the network, thereby improving Júlia's mental health. Conversely, liking a quack with high toxicity values has a detrimental effect on it. The 'dislike' interaction reverses this dynamic: disliking a quack with negative values increases toxicity, while disliking one with positive toxicity values decreases it.

3) *Popularity*: The player's choices also affect Júlia's popularity, determining whether she gains or loses followers. This parameter ranges from 1 to 3, and its effect is reversed when using the 'dislike' interaction. Like the toxicity parameter, these values were established during testing, excluding any values of 0 or below, reflecting the notion that every interaction within a social network awards some degree of popularity.

Each session of the minigame starts with a value of 5 in both popularity and mental health. The objective of the game is to react to 10 quacks chosen randomly out of 30 possible ones, without either state falling to 0. Quacks can affect one or both states simultaneously, so the player must balance them. For example, liking a toxic quack will lower Júlia's mental health but increase her popularity, reflecting the typical

promotion of controversies in social media. In parallel, the second mechanic of the minigame is developed: identifying quacks as fake news using the 'Report' option. Committing three identification errors (either not reporting a quack that is fake or reporting a quack that is not) will result in failure. In all cases of failure —losing all followers, losing mental health, or receiving 3 strikes from fake news— the game ends and the player must repeat the minigame with 10 new quacks. If the player interacts with 10 quacks without meeting any of the failure conditions, they receive a score of 1 star (good), 2 stars (very good), or 3 stars (excellent), depending on the final status and on the amount of identification errors.

Fake news quacks created for *Quacker* (see Annex I for detailed information on each quack) are inspired by previously proposed definitions of fake news. Through the game states, an attempt is made to simulate the incentives found on social networks to viralize fake news instead of reporting them. The learning process focuses on reflecting on the dynamics of social media and understanding why the displayed quacks are considered misinformation. To facilitate this, *Quacker* explains the criteria for reporting quacks at the beginning of the game. Additionally, each quack is contextualized according to the reliability of the source (indicated by the name and avatar of the user who published it). *Quacker* warns the player that all opinions are allowed, but not those based on malicious false information. This is especially pertinent given the difficulty identified by previous works in differentiating between fake news and toxic opinions (Mohsin, 2020; Tandoc et al., 2018). The minigame incorporates both types of content, requiring the player to evaluate whether each quack really provides false information, or it is merely an inaccurate comment.

2.3. Data collection during gaming sessions

Currently, most video games require permanent internet connectivity. Development companies leverage this connectivity to collect real-time information about game sessions, generating a large volume of data. This data is useful for resolving code errors (i.e., bugs), identifying problems in the game mechanics, detecting cheats, and gathering information about player behavior (Su et al., 2021). This last use is particularly relevant and is tied to the lucrative business model of microtransactions: (usually) free games that offer additional content that can be purchased within the game. The content offered to the player is selected according to the collected data, making it personalized and adapted to their interests and playing style. While this practice has been economically successful, it is considered intrusive and opaque, leading to controversy within the video game industry.

Platforms created to collect this data can also be used to analyze learning processes with video games (Alonso-Fernández et al., 2019; Cano et al., 2019; Hauge et al., 2014). The methodology involves collecting data on how players interact with the game mechanics, which, in this case, are designed to achieve specific learning objectives. Analyzing this data allows us to evaluate the extent to which these objectives have been achieved through various strategies, such as game scores or internal metrics defined by the researcher. By doing this in an informed manner, we can access large volumes of detailed information in an unsupervised way (e.g., response times between interactions, number of repetitions, interaction sequences, game schedules, etc.). Therefore, this methodology is ideal for exploring the dynamics of GBL in informal contexts, where it is not possible to choose the sample, develop questionnaires before and after the game session, or interview the players.

The research team applied this data science-based methodology to evaluate learning with Quacker, focusing on three research questions: a) What type of content is most difficult to identify? b) How does the speed of interaction affect player performance? c) How does performance improve with repeated attempts at the minigame? Figure 3 provides a summary of the data collection system; for more detailed information, see (Rubio-Campillo et al., 2023).

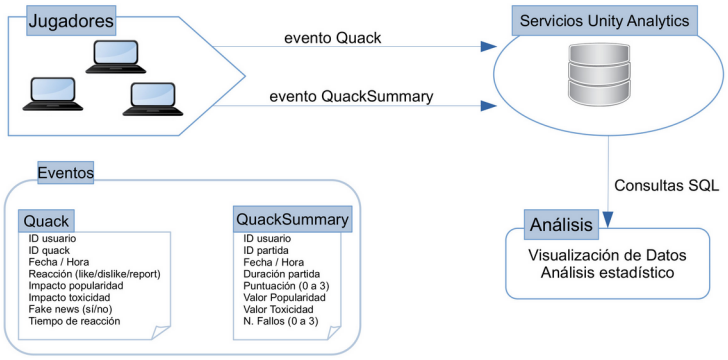

Figure 3. Diagram of the data collection process. As players interact with Quacker, events are sent using the Unity Analytics service and stored in a database. Researchers download recorded events using SQL queries and proceed to data analysis.

Analysis of *Quacker* was structured around two events sent from the gaming devices to a centralized database via Unity Analytics services. The Quack event collects information about a player's reaction to each specific quack presented to them, while the QuackSummary event provides information about an entire game session at the *Quacker* minigame. It is important to highlight that the initial screen of JASJ notifies the player that the game is part of a research project, and that data is collected from their gaming experience in a completely secure and anonymous manner. This screen must be accepted to continue playing.

The focus of this study on informal learning dynamics made it impossible to design an experiment with a predefined sample. Therefore, a closed data collection period was defined (November 2022-May 2023) during which data was recorded from people who voluntarily downloaded and played JASJ on their computers, without any contact or control by the research team. Over these six months, 3,565 interactions were recorded, representing a total of 436 Quacker games by 112 players, after eliminating interrupted games and fragmented information caused by communication errors.

3. Results

Figure 4 shows the distribution of game sessions for each player. The results indicate that most players participated in 1 to 3 games of *Quacker*, while a significant number of players engaged in more than 10 games.

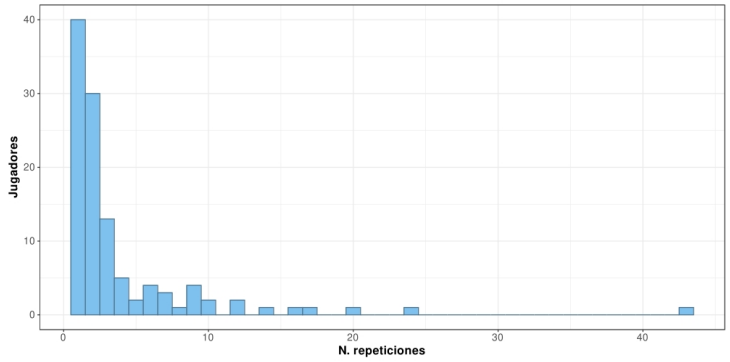

Figure 4. Histogram of *Quacker* games played by number of players

To examine the learning process in detail, variations in game outcomes were explored based on the number of games played by each player. If the GBL experience is properly designed, players should improve their performance through successive iterations of the game loop. In the case of Quacker, this should translate into better scores as more games of the minigame are played. Figure 5 shows the evolution of players' success over repeated sessions. In the initial repetitions, the percentage of 'Excellent' results (3 stars) is low, with 'Failure' (0 stars) being the most frequent outcome. However, this dynamic changes significantly from the third repetition, when the 'Excellent' result becomes the most common outcome; this pattern is maintained in subsequent iterations.

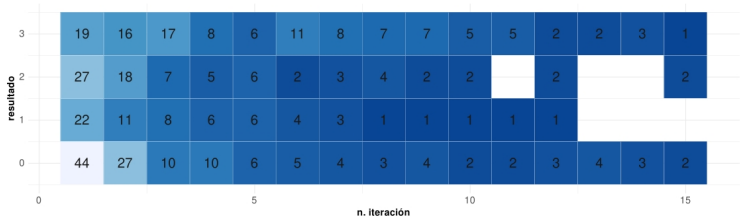

Figure 5. *Heatmap* showing the number of games belonging to a given iteration (x axis, limited to 15 repetitions) compared to each possible score (y axis, 0 to 3 stars)

The second question focuses on the impact of fake news and its correct identification. Figure 6 shows the percentage of reactions collected (like, dislike, report) for each of the 30 *quacks* defined in the game.

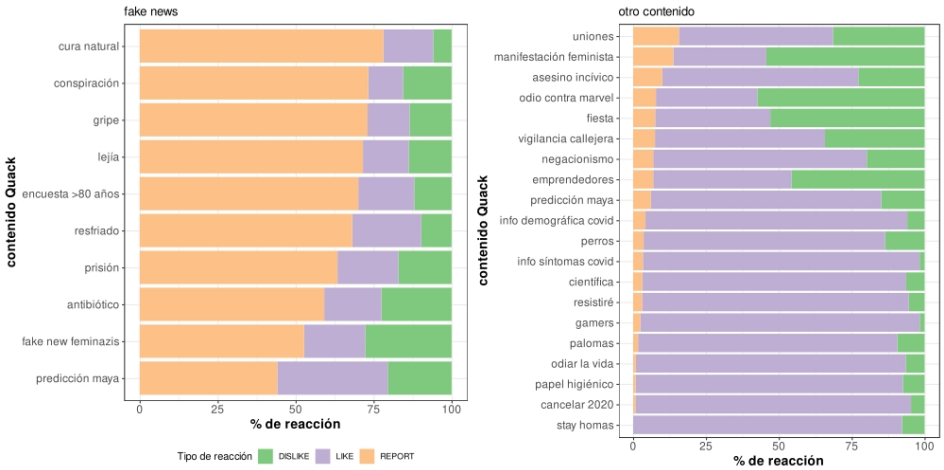

Figure 6. Percentage of reactions chosen for each quack. All 30 quacks are classified according to their identification as fake news to facilitate comparison

The last research question focuses on evaluating the relationship between interaction speed and player performance. Figure 7 shows the distribution of reaction times for the different iterations and outcomes.

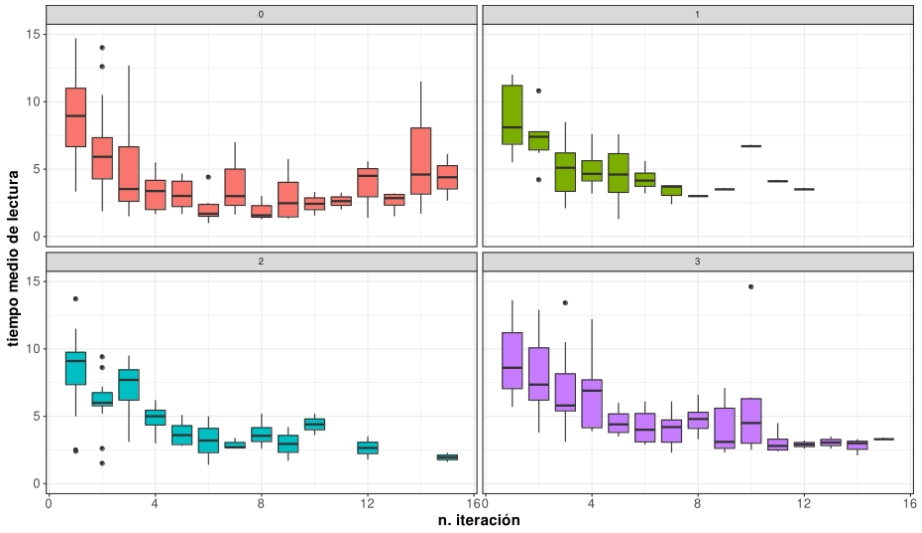

Figura 7. *Boxplot* showing average interaction time (y axis) as a function of the iteration number (x axis), sorted out by final score (from 0 to 3 stars)

Spearman correlations between the average reaction time and the aforementioned variables suggest a strong negative correlation for the binomial 'Average reaction time' versus 'Iteration number' (–0.66), while there does not seem to be a clear correlation between speed and score (–0.02).

4. Discussion

Below we examine the three research questions posed above according to the set of results.

4.1. Iteration and learning

A typical property of GBL is replayability; that is, any game is structured as an iterative process in which the player performs a series of actions and receives feedback to inform them of their progress. From this feedback, a loop is established where the player improves their performance to move forward in the game's story.

The distribution of games shows that *Quacker* generates high interest from the players, who on average played four games of the minigame before continuing with the JASJ story. It is important to note that players can continue the main JASJ game (and therefore stop playing *Quacker*) only if they avoid failure conditions throughout the 10 quacks, regardless of how well they have done (i.e., how many stars they have earned). Thus, some repetitions are due to the need to repeat failures; the rest, however, are voluntary decisions by the player. This can be explained by several reasons: some players may want to achieve the maximum score of three stars, while others may want to explore the minigame in depth to see all the possible quacks.

This iterative improvement process is reflected in a positive correlation between the session iteration number and the number of stars achieved (0.23). We believe that this score improvement is caused by two factors: the understanding of *Quacker* mechanics and the understanding of the notion of fake news. On the one hand, transformative games like JASJ embed into the game loop content, decisions and mechanics that are closely linked to the real-world dynamics on which the player is prompted to reflect and learn. In the case of *Quacker*, as the player iterates, they will better understand the game dynamics and, therefore, improve their performance both in identifying fake news and in generating the toxicity that affects Júlia's mental health. On the other hand, the 10 quacks presented to the player during a session are randomly chosen from a pool of 30 quacks. As more games of the minigame are played, repeated quacks will appear, and the feedback the player receives will inform them about the correct identification of fake news. Thus, the combination of these two learning dynamics meets the objectives of an inoculator by improving the *Quacker* player's ability to identify fake news on social networks beyond JASJ.

4.2. Fake news identification

The results suggest that fake news with pseudoscientific content is easier to identify, especially when the message is linked to the COVID-19 pandemic. In contrast, fake news involving political controversies is misclassified much more frequently.

A quack inspired by a real fake news that had a significant impact on Twitter is an example of this dynamics: the supposed connection between the feminist demonstration of March 8, 2020, and the arrival of the COVID-19 pandemic in Spain. Almost half of the players did not report this quack as misinformation, and 20% of them even chose the 'like' option. Likewise, most false positives (i.e., quacks mistakenly identified as fake news) are clustered in quacks with political content. In contrast, quacks correctly identified as real information typically include humorous content,

personal reflections, and public information. This last case is worth remarking as it reveals how players use the source of information (i.e., the user who created the quack) as a valid proxy for evaluating content. Quacks made by the World Health Organization and other reputable public institutions are almost always identified as real, while similar content published by accounts of dubious origin (e.g., individuals or associations against science) is typically identified as fake news.

4.3. Speed of interaction

A previous research work carried out with a smaller sample identified a negative correlation between the best result of each player and the average interaction time, understood as the average number of seconds elapsed between the presentation of a quack to the player and their reaction (Rubio-Campillo et al., 2023). The results suggested a positive relationship between reading speed and reading comprehension in a video game setting, and this is an important contribution to the ongoing debate on how reading speed impacts comprehension in digital formats (Dyson & Haselgrove, 2000). However, the analysis did not fully take advantage of the detailed information about the learning process that the system built into JASJ provides, as it only evaluated each player's best response. The results of this work extend the already published analysis by considering the relationship between three defined variables: a) speed of interaction, b) number of games played, and c) outcome.

The results show that reaction speed gradually increases with repeated games up to the ninth iteration. Beyond that point, the dynamics become difficult to interpret, likely due to the small number of players who repeat the minigame more than ten times. This number of repetitions seems illogical from the player's perspective, as the minigame is designed to be played five times, based on the pool of 30 quacks. The dynamic could be explained by the presence of players who want to see all the quacks or obtain all the achievements. These achievements are a feature of the Steam platform. When creating a game, developers propose a set of achievements published on Steam. These achievements can be related to progression (e.g., finishing a game), skill (e.g., finishing a game without failing even once), or rare events within the game (e.g., finishing a game without killing any enemies). Some players are motivated to attain all achievements (so-called completionists), and their thorough exploration of the game content likely explains the systematic repetition of the Quacker minigame.

The analysis builds on the previously mentioned positive correlation between iteration number and final outcome, suggesting that players react increasingly faster and more successfully as they repeat the minigame. The increase in reaction speed makes sense considering that some quacks will be repeated between iterations, allowing players to quickly identify their content. However, the lack of a correlation between reading speed and performance seems to contradict or at least nuance the results of the previous work. The difference in correlation values is explained by the focus of the analyses: the first analysis considered only the players' best results, discarding the rest of the attempts, while this one takes into account the entire iterative process until reaching the final score. It appears that the fastest players do not necessarily obtain better results overall; instead, as players continue to play, they react faster, making the best result, which is usually the last attempt, also the fastest.

5. Conclusion

One of the most important challenges of research in informal learning is evaluation in unsupervised contexts, where it is not possible to apply an experimental design to compare knowledge and skills before and after the activity. This work presents a data science-based methodology to improve the understanding of digital GBL. The richness of the data collected extends beyond the *Quacker* case study, as JASJ also collects information about its other minigames. It is worth remarking that the automatic data collection strategy is somewhat compatible with experimental designs based on questionnaires. In fact, JASJ includes an initial form for gathering player's information (e.g., socioeconomic variables, expectations, prior knowledge, or assessment of the experience). This information will be used in future works to better understand how various individual factors influence the video game learning process. Anyway, it is important to clarify that players voluntarily choose to spend their recreational time on the game, so any request for information can be perceived as a barrier and cause significant player dropout. Thus, the researcher must carefully evaluate the minimum information necessary to answer their research questions.

Furthermore, the presented methodology requires control over the video game source code, which we consider its most important limitation. The game must be designed from the beginning as an educational experience with the data collection system implemented simultaneously. Collaboration with a development studio willing to integrate such data collection for research purposes is also possible. Hence, this method cannot be applied to the study of commercial video games developed by third-party companies that do not allow code modification. Some authors have explored creating mods (i.e., modifications) to collect data in commercial games (Yee, 2014). This approach can generate detailed interaction data but is limited by the need for the player to actively install the plugin and by the possibility for game updates to affect compatibility with the developed mod.

Finally, it is important to highlight that GBL strategies are an emerging teaching resource because their format can communicate complex information through a powerful combination of narrative and interactivity. However, these elements also make analysis difficult. Therefore, the growing number of published GBL experiences should be accompanied by innovative methodological proposals that assess the educational potential of video games. These proposals should consider the diversity of avocational contexts, the typology of games, and the learning objectives, if any. The techniques necessary to analyze GBL dynamics in detail already exist but have not been widely used in the educational context until recently. Thus, beyond the specific results presented in this work, we hope this methodology contributes to a better understanding of what and how we learn when we play video games.

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8. Annex 1. List of Quacks implemented in the mini-game

Pop = Popularity; Tox = Toxicity

ID	Content Type	Effect	User	Quack (publication)
Cancelar 2020	Joke	Pop: 2 Tox: - 2	Cabronaxi	Ya he probado el mes gratis de 2020 y quiero cancelar la suscripción xfavor
Palomas	Joke	Pop: 1 Tox: 0	Cabronaxi	La gente se rie mucho, pero ¿te imaginas que acabamos todos confinados? Osea las palomas van a flipar en plan donde se ha metido todo el mundo.
Predicción maya	Joke	Pop: 1 Tox: 0	Cabronaxi	Seguro que esta pandemia también la predijeron los mayas xD.
Odiar la vida	Joke	Pop: 1 Tox: -1	Cabronaxi	Gente en otras redes sociales: MI VIDA ES MARAVILLOSA :D Gente por dentro: odio mi vida. Gente en Quacker: ¿odias tu vida? Yo más.
Perros	Joke	Pop: 1 Tox: 0	Cabronaxi	Ante el inminente confinamiento las perreras preparan perros para el paseo de humanos.
Gamers	Joke	Pop: 1 Tox: -1	Cabronaxi	Los gamers llevan toda la vida preparándose para esto. #Covid #Confinamiento #GamersRiseUp
Cura natural	Science	Fake New	Científicos por la verdad	¡Cura natural para la #Covid! Dr. Nanotecnólogo Sirius Quintero nos lo explica: El #Coronavirus emite 17Hz al cerebro, la solución es crear un campo de fuerza electroestática de 77Hz que anule la frecuencia del ADN enfermo. Ingredientes para el remedio: jengibre, malojillo, pimienta negra, limón y miel.
Gripe	Science	Fake New	Científicos por la verdad	La misión de Científicos por la Verdad es DESPERTAR al pueblo dormido Todos los artículos científicos sobre la Covid son falsos porque a todos los científicos les paga el gobierno. Nosotros te demostramos con ciencia alternativa que la Covid NO existe

Lejía	Science	Fake New	Donaldo Trom	Mi primo, que es médico, me dice que la #Covid es una infección. La solución es obvia, deberíamos beber lejía para limpiar nuestro cuerpo.
Científica	Science	Pop: 1 Tox: 1	Dra. Blasco	Llevo 15 años trabajando en el estudio de epidemias. Veo mucha desinformación por las redes, así que voy a intentar explicar qué está pasando en China. ¡Seguidme si os interesa! #pandemia #Covid
Negacio-nismo	Dispute	Pop: 1 Tox: 3	Dra. Blasco	Creo que hoy día es importante preguntarse... ¿Llamamos negacionista a todo aquel que es crítico?
Vigilancia callejera	Dispute	Pop: 2 Tox: 3	Policía vecinal	Estamos en cada calle, en cada esquina, en cada balcón... Si sales a la calle, vigilaremos que llevesmascarilla. Si alguien conoce a las personas que denunciamos, pasadnos su perfil y nos encargaremos de civilizarla.
Asesino incívico	Dispute	Pop: 2 Tox: 1	Policía vecinal	Salir a la calle siendo portador de #Covid te convierte en asesino. Ante la duda, aíslate. #EsteVirusLoParamosUnidos #EstoNoEsUnJuego
Uniones	Dispute	Pop: 2 Tox: 0	Gobierno del buen ciudadano	¡Victoria de los trabajadores contra la patronal! En caso de confinamiento, los trabajadores tendrán derecho a saltárselo siempre que abandonen a sus familiares en casa para salir a trabajar
Papel higiénico	Joke	Pop: 1 Tox: 0	La Croqueta Indiscreta	Mucho arrasar con el papel higiénico en el súper, pero el estante del brócoli bien que ni lo tocáis, ¿eh?
Stay Homas	Music	Pop: 1 Tox: -1	La Croqueta Indiscreta	Please stay homaaa Don't want the corona … It's okay to be alona #QuedateEnCasa #StayJomas
Fiesta	Dispute	Pop: 2 Tox: 1	La peña del moco	#MDLR ¡la EmOs liAo! BotelLon Kon los R€ALes f*** polisia beInaL

Resfriado	Science	Fake New	Michael José	A los médicos se les va la olla con la Covid, es solo un RESFRIADO. Lo único que tenéis que hacer es no ir lamiendo farolas y lavaros un poco. Os dejo tontorial: Echar agua y jabón Frotar manos Enjuagar con más agua Secar al gusto
Antibiótico	Science	Fake New	Michael José	No entiendo tanta alarma con esto del virus, ¿no tenemos antibióticos? Con tomarte un par acabas con la Covid
Conspiración	Dispute	Fake New	Michael José	Nos han impuesto una gran PLANdemia llamada Covid para tenernos callados y sumisos. La Covid NO existe, siempre vas a encontrar pruebas a favor y en contra, lo que importa es lo que TÚ QUIERAS CREER. ¿Te unes a la verdad alternativa?
Predicción maya	Science	Fake New	Oki Diario	Los expertos descubren que los Mayas predijeron una gran pandemia en el siglo XXI. ¿Estamos ante el fin de la civilización?
Prisión	Dispute	Fake New	Oki Diario	#UltimaHora del #Coronavirus ¡El Gobierno está planeando encarcelar la población bajo un estado de alarma! Expertos alertan del comienzo de una dictadura socialcomunistarra.
Info demográfica Covid	Science	Pop: 1 Tox: 0	Organización Mundial de la Salud	Datos oficiales hasta la fecha: Más del 95% de los fallecidos por #Covid tenía 60 años o más, siendo los mayores de 80 los más vulnerables.
Info síntomas Covid	Science	Pop: 1 Tox: 0	Organización Mundial de la Salud	¿Cómo diferenciamos entre la #Covid y la gripe? Aunque los síntomas leves sean similares: tos seca, fiebre o fatiga. La Covid puede producir síntomas únicos como la dificultad para respirar.
Emprendedores	Dispute	Pop: 2 Tox: 2	Poma Callardo	Si tanto os quejáis de las restricciones, dejad de llorar ayudas al mismo papá Estado que os encierra. Empezad a hacer algo útil: sed emprendedores, adaptaos al mercado, invertid en cripto. Todo es cuestión de voluntad, amigo.

Manifestación feminista	Dispute	Pop: 3 Tox: 3	Poma Callardo	Si acabamos todos confinados, os recuerdo agradecérselo a las feminazis de la manifestación multitudinaria del #8M
Fake new feminazis	Dispute	Fake New	Poma Callardo	¿Cuántas pruebas necesitáis? Las fotografías del #8M son suficientes para demostrar que las feminazis fueron las causantes de la gran ola de contagios en España.
Odio contra Marvel	Dispute	Pop: 2 Tox: 2	Poma Callardo	Ya estamos con otra peli de Disney que cambia de color de piel a sus protas ¡Quiten la política de mi infancia! Todo para que no se quejen los ***** ofendiditos de la izquierda identitaria :)
Encuesta >80 años	Science	Fake New	tuDiario.bal	¡Que no cunda el pánico! Los mayores de 80 años no morirán de #Covid, por lo menos, este año. Así de optimistas lo afirman más de un millón de jubilados entrevistados en España
Resistiré	Music	Pop: 1 Tox: -1	tuDiario.bal	Más de 20 artistas unen fuerzas contra la Covid-19 con la nueva versión AGUANTARÉ 2020 #YoMeQuedoEnCasa #Aguantare #Covid19