Escape rooms as an educational methodology to prevent disinformation in primary and secondary school students: the case of *Learn to Escape*

Escape rooms como metodología educativa para combatir la desinformación en alumnos de primaria y secundaria: el caso de *Learn to Escape*

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ABSTRACT

Introduction: Information disorder affects the health of public opinion in democratic countries. To prevent this phenomenon, numerous initiatives have emerged in recent years in the field of Media and Information Literacy (MIL). In addition, the emergence of gamified teaching methodologies has given rise to ludified proposals like educational escape rooms. These immersive experiences offer a playful and collaborative approach to exploring complex subjects. **Methodology:** The main goal of this article is to determine the perceptions that generate the use of educational escape rooms as a methodology to develop on MIL among primary and secondary school teachers. To this end, six Spanish educative centres that have participated in the *Learn to Escape* teaching proposal, an escape room about MIL launched by the Spanish transfer initiative Learn to Check, have been interviewed. **Results:** It is observed that teachers appreciate the use of educational escape rooms for their ability to motivate and arouse students' emotions and promote multidimensional and discovery-based learning. This aspect is also valuable for the MIL field. **Discussion and conclusions:** Escape rooms dynamics and, specifically, the one-off *Learn to Escape*, convert them into a valuable methodology for introducing the problem of the circulation of misinformation and strategies for detecting and counteracting it in young people. It is a catalytic proposal that fosters a critical spirit and the acquisition of digital skills that can be transferred to the everyday environment of its participants, in line with MIL objectives.

Keywords: Media literacy; News literacy; Gamification; Escape room; Disinformation; Misinformation; education.

RESUMEN

Introducción: El desorden informativo influye en la salud de la opinión pública de los países democráticos. Para combatirlo, en los últimos años han surgido numerosas iniciativas en el campo de la Alfabetización Mediática e Informacional (AMI). Paralelamente, el auge de metodologías gamificadas ha propiciado la creación de propuestas ludificadas como los *escape room* educativos, una metodología inmersiva que permite abordar temas complejos de forma lúdica y cooperativa. **Metodología:** El objetivo general del estudio es conocer las percepciones que genera entre el profesorado de educación primaria y secundaria la utilización de *escape rooms* educativos como metodología para trabajar la AMI. Se han entrevistado a seis centros educativos españoles que han participado en *Learn to Escape*, un *escape room* sobre AMI elaborado en el marco de la iniciativa de transferencia Learn to Check. **Resultados:** Se percibe que los docentes aprecian el uso de *escape rooms* educativos por su capacidad de motivar y despertar emociones entre el alumnado, así como fomentar un aprendizaje multidimensional y por descubrimiento, aspecto que también ven de utilidad para el ámbito de la AMI. **Discusión y conclusiones:** La dinámica *escape room*, y específicamente la de *Learn to Escape*, convierte la propuesta en una metodología útil para introducir en edades tempranas la problemática de la circulación de desinformaciones y divulgar estrategias para su detección. Se trata de una propuesta catalizadora que fomenta el espíritu crítico y la adquisición de habilidades digitales que pueden ser transferidas al entorno habitual de los participantes, en consonancia con los objetivos de la AMI.

Palabras clave: Alfabetización mediática; Alfabetización informacional; Gamificación; *Escape room*; Desinformación; Información falsa; Educación.

1.   Introduction

Disinformation is, especially since 2016, one of the major concerns of institutional and political actors for its ability to erode the proper functioning of democratic systems (Carrillo and Montagut, 2021). The European Union, together with states and institutions, has been an active actor in generating reports, policies and tools to combat false information (European Commission, 2018a, 2018b, 2018c; European Parliament *et al*., 2020; European Court of Auditors, 2021). In this context, media education is positioned at the center of long-term strategies to form a critical, resilient citizenry capable of selecting the right information to make their daily decisions (Victoria-Mas, 2021), resulting in the so-called media and information literacy (hereafter, MIL).

"Escape rooms are very complete methodologies that promote meaningful learning."

MIL is based on the concept of "educommunication", which has been advocated for more than three decades by Latin American authors (Herrero-Curiel and La Rosa-Barrolleta, 2023) and by theorists from the Anglo-Saxon context such as Masterman (1996), Buckingham (2005) and Livingstone (2004). Today, the MIL updates and expands this concept of critical media reading and production to include the new learning and challenges of digital technologies. Furthermore, Kačinová and Sádaba-Chalezquer (2022) propose to shift the focus of MIL and understand it as an "augmented competence", tilting the attention towards media "as an object of study and tool to be managed, to the person as a subject interacting with media in the broader context of life where media becomes primarily a means of personal improvement and interaction with others and a tool to increase the quality of life" (2022, p. 32). According to UNESCO (2018), MIL is also understood as a concept that encompasses a set of competencies (knowledge, skills and abilities) necessary for working and everyday life, and that enable people to search, evaluate and critically use information and content both broadcast in the media and in social networks. In addition to knowing the rights of users on the Internet, understanding how to fight disinformation and hate speech, and understanding the ethical issues raised by access to and use of information.

In Spain, and despite the centrality of the MIL online in the political debate, the steps to implement it are just beginning to take shape. Already in 2013, the Organic Law 8/2013 for the Improvement of Educational Quality (LOMCE) recognizes the digital competence of students as fundamental. But it is not until 2020, with Organic Law 3/2020 amending Organic Law 2/2006 on Education (LOMLOE), that a real step forward takes place. The regulation establishes the exit profile of students at the end of basic education with a curriculum based on competencies, including digital competence, and which includes media literacy in addition to technological competence or cybersecurity competencies. In addition, in 2022, the National Plan for Digital Competences, a plan for digitalization and digital competences in the education system, which picks up the baton from the School 2.0 program (2009/2010). This plan deals with aspects such as digital resources, teacher and student training, the creation of a digital plan for the center and access to open educational resources, among others.

Even so, there are dilemmas when it comes to implementing the standard: Who is going to teach these contents and what kind of training should these teachers receive? Do they have to be transversal or are they structured through a compulsory subject? Under what legislative umbrella and with what resources is MIL online included in the school curriculum? Initiatives such as the Platform for Educommunication or the demands of the Spanish Association of Universities with Information and Communication Degrees (ATIC), among others, have been addressing these still unresolved dilemmas (Montagut cited in CAC, 2023; Cucarella and Fuster, 2022).

Meanwhile, MIL initiatives in Spain are numerous and scattered. On the one hand, and as indicated by Cucarella and Fuster (2022), professional associations of journalists have carried out various actions over the years (*Premsa a les escoles* of the Col·legi de Periodistes de Catalunya, *La Prensa en mi mochila* of the Asociación de la Prensa de Málaga, among others). Some regional audiovisual content regulators have tried to bring order by creating platforms that bring together all the initiatives dedicated to MIL, such as the Platform for Media Education in Catalonia, promoted by the Consell Audiovisual de Catalunya (CAC). The media, both public and private, have also carried out the design and dissemination of MIL materials, such as the program *Guerra a la mentira* (War on lies) on Radio Televisión Española. Other active players in this field, especially focused on combating disinformation, are professional fact-checkers. In Spain, *Newtral*, *Maldita.es* or *Verificat* offer training against disinformation to acquire online information skills through tips, videos, online workshops and other resources (Cucarella and Fuster, 2022; Carrillo and Montagut, 2021). Recently, and in the field of research, the European project Iberian Media Research and Fact Checking (Iberifier), which brings together twelve universities and five fact-checking platforms and research centers in Spain and Portugal, aims to promote media literacy initiatives, generate reports for trainers. It also aims to address groups vulnerable to misinformation, among which, according to various studies, are especially young people, older adults, people with intense exposure to social networks and people who are more to the right of the political spectrum (Gelado-Marcos *et al.*, 2022; Herrero-Curiel and La Rosa Barrolleta, 2023; González-Bailón *et al.*, 2023; Sádaba *et al.*, 2023).

Among these initiatives, attention is focused on the Learn to Check Association. Dedicated to MIL against disinformation, the association is legally constituted in 2022 as a knowledge transfer initiative with the participation of teachers and researchers from different Spanish universities and specifically dedicated to the field of disinformation and MIL. The initiative is also born from a previous dissemination experience in 2018 with the launch of the workshops *Que no te la cuelen* (Don't be cheated) in the American Space in Madrid, Valencia and Barcelona, with the support of the U.S. Consulate in Barcelona through its public diplomacy actions. In 2020, the transfer activity is strengthened with the launch of the website www.learntocheck.org, with open educational resources, and in the following years it is increased with the delivery of workshops and informative sessions, as well as the design and implementation of an educational escape room baptized under the name *Learn to Escape*. This is an educational methodology applied so far to primary and secondary school students, being a pioneering initiative in Spain by implementing it in person in the field of media and information literacy and aimed at students of these ages.

1.1. Gamification as an educational tool

Although the use of games as a didactic resource has a long tradition in classrooms, it has not been until the last decade that gamification or gaming has become an object of study of interest for researchers in education (Raitskaya and Tikhonova, 2019; Piñero-Charlo, 2022). This concept, defined by Deterding *et al.* (2011) as the application of game design elements in non-game contexts, is based on the idea of taking advantage of the potential of games to capture the attention and increase the motivation of their participants. Thus, the authors agree that among the main virtues of the use of games or their components (dynamics, mechanics, narratives, etc.) in the field of teaching are greater involvement and commitment on the part of students (Costello, 2020). Based on enthusiasm and motivation, teachers can propose activities to students that encourage social interaction, community learning and provide an entertaining learning environment. Thus, play experiences facilitate motivating educational environments (Kapp, 2012; Sendra *et al.*, 2021). However, it should be noted that greater use of play components does not directly translate into better educational outcomes. Thus, according to Lathwesen and Belova (2021), the challenge for teachers is to choose those game elements necessary to create an integrated solution that guarantees the fulfillment of specific didactic objectives.

Another benefit of the use of gaming experiences in the classroom is the creation of immersive learning environments that pose contexts that resemble real situations with complex problems. These allow experimentation and testing multiple solutions without fear of error, since the decisions made in the game have no consequences in reality (Gros Salvat, 2009). Thus, the introduction of gaming experiences in education enables participants to identify similar challenges in real life, helps to interpret these new scenarios and to transfer an appropriate solution to their needs (Sendra *et al.*, 2021).

One type of gamification that is very popular for its degree of immersion is escape rooms or escape games. An escape room is a playful proposal in a real environment in which a group of players is locked in a room where they must solve a series of riddles and puzzles as a team in order to escape before the end of a given time (Nicholson, 2015). This game technique is framed in a story in which the participants become the protagonists of the story and, in addition to escaping, their actions allow them to solve a crime, find a lost treasure or discover the cure for a deadly virus. In an escape room, players work on skills such as observation, memorization, communication, critical thinking, lateral thinking, teamwork, time management or stress; and among the benefits obtained are intellectual, social, emotional, educational and physical (Instituto de la Juventud de Extremadura, 2018).

1.2. From the commercial escape room to the educational escape room

Escape rooms are inspired by some cultural products of the eighties and nineties such as the Indiana Jones adventure films or the video games Monkey Island or Day of the Tentacle (Negre and Carrión, 2020). The first escape room of which there is documentary record appeared in Japan in 2007, but it was not until 2012 that the

phenomenon reached the European continent (Nicholson, 2015). Currently, in Spain, commercial escape rooms are a consolidated leisure alternative with rooms in almost any medium-sized city (Negre and Carrión, 2020).

Given their popularity, and in parallel to the new lines of research on neuroeducation in which the importance of emotion for learning is emphasized (Domínguez-Márquez, 2019), teachers appreciated the educational possibilities of escape rooms and decided to bring them to the classroom. However, these educational escape rooms differ from their commercial format mainly in their purpose. While the objective of commercial escape rooms is entertainment, in educational escape rooms their function is didactic, either introducing or reviewing content or practicing certain skills (Negre and Carrión, 2020). On the other hand, educational escape rooms present other challenges to be overcome by the teacher, such as, for example, the investment of time and effort in designing a recreational activity aligned with curricular objectives, the lack of logistical resources (materials and personnel), the lack of space and time (the sessions require rooms that must be previously prepared and vacated) and the management of a large number of simultaneous players. In order to solve some of these problems, some teachers have resorted to the virtual adaptation of escape rooms (as if it were a video game) or to those known as breakouts or escape boxes (Veldkamp *et al.*, 2020; Jadán-Guerrero *et al.*, 2022). These latter adaptations keep the physical and enigmatic essence of escape rooms, but instead of players having to escape from a room, participants must manage to find the code that opens a lock (or several locks) of a mysterious box. In this way, the teacher can give a box (or several) to the students who, organized in small groups, can solve the riddles that are posed autonomously in the same classroom.

For an escape room to work, it is important to control the flow channel (Csíkszentmihályi, 1990). That is, the level of the challenges must be in accordance with the previous knowledge and game experience of the participants. If an escape room is poorly designed -for example, it contains activities that are too difficult for inexperienced players-, players will become frustrated, demotivated and disconnected from the game. Since the ultimate goal is that the group gets to open the lock of the final box and learn during the activity, the teacher will adopt a guiding role and will give clues to the students in case they get stuck. Therefore, to respect the flow channel, a balance must be found between player autonomy and teacher intervention (Veldkamp *et al.*, 2020). Although the introduction of the codes in the locks already gives immediate feedback to the students, it is essential that, at the end of the game, the session ends with a debriefing with all participants to ensure that all the proposed elements and challenges have been understood (Veldkamp *et al.*, 2020).

1.3. Gamification applied to media and information literacy

Considering that MIL is at an early stage, academic studies on the use of gamification as a didactic resource in this field is incipient (Torres-Toukoumidis *et al.*, 2021). There are several examples where board games or digital applications (called newsgames) have been designed with the aim of verifying information and identifying fake news within the media landscape (Katsaounidou *et al.*, 2019; Literat *et al.*, 2020; Barzilai *et al.*, 2023; Glas *et al.*, 2023). All these studies highlight the good results of the use of gamification for the development of critical thinking skills and advocate its use to raise awareness of the citizen need to combat misinformation.

But, although educational escape rooms and breakouts are tools that are being applied for teaching several disciplines such as science, technology, engineering, mathematics, languages, music or cultural mediation (Fotaris and Mastoras, 2022), there are hardly any published academic studies with research cases applied to MIL. The only two experiences detected are outside the Spanish context and consist of an escape room designed by a group of librarians in order to teach verification techniques to university students (Pun, 2017) and a digital escape room aimed at young people designed as an extra-academic activity to raise awareness about misinformation (Paraschivoiu *et al.*, 2021). On the other hand, and outside the academic field, García Ortega (2022) reports in an article that the Argentine news checker *Chequeado* and the Spanish news checker *Maldita. es* together with Oxfam Intermón have designed digital escape rooms called *La sala de escape de Chequeado* and *La fábrica de bulos*, respectively. Their aim is to raise awareness in society of false information and to raise awareness of the most common disinformation strategies in social networks. There are also examples of escape rooms that focus on the dangers of false information and hoaxes in the fields of health (*Salud Sin*

Bulos, designed by the Spanish Association of Family and Community Clinical Pharmacy and the Salud Sin Bulos, Espacio Sanitario, 2021), cybersecurity (CyberCamp designed by the National Institute of Cybersecurity, INCIBE, 2019) or vulnerable groups such as migrants (*Cruza la frontera* designed as part of the Escape Fake project, Guerrero, 2022). These examples demonstrate the broad scope of media education and the interest that MIL reaches all social strata.

1.4. What is *Learn to Escape*?

The training proposal *Learn to Escape* was born in November 2021 and has been designed by this group of researchers in the framework of the transfer initiative that is the Learn to Check Association. This activity has been carried out in 12 Spanish primary and secondary schools in four different autonomous communities (Catalonia, Castile and Leon, Community of Madrid and Galicia) and has involved more than 400 students. The proposal follows a methodology based on learning by doing (Winn, 1995) and its tests are adaptable to the level of knowledge of its participants.

Learn to Escape is a collaborative breakout whose objective is to develop the necessary skills for an adequate contrast of information, such as observation, reading comprehension, the search for external information, critical thinking and reflection, as well as the management of emotions and time so as not to get carried away by stress and overinformation. To this end, the proposal combines analog and digital format tests. These are designed for players to work on MIL concepts such as sources, types of disinformation, disinformation actors and introduce digital reverse search tools for image and news verification. In order to ensure an optimal flow, the activity requires one or two trainers from the Learn to Check Association to act as game guides.

Building on the metaphor with the coronavirus pandemic, the narrative premise given to the players is that the misinformation virus has spread throughout society. It is a highly contagious virus and grows with social interaction. Therefore, players will be confined until they pass the tests and thereby obtain a critical thinking certification (called PCR, for Critical Thinking Recidivism) that will enable them to detect deception and thus not contribute to the disinformation virus. This certification is contained within a single final box enclosed with a padlock.

The breakout has a linear structure with path architecture (Negre and Carrión, 2020, pp. 73-77). It consists of a system divided into several phases that act as checkpoints to guide the pace of play of the whole group. The activity is designed for 16-32 students playing simultaneously. Thus, the group-class is divided into two equal rooms and, in turn, are distributed into four subgroups of between two and four players. Each subgroup is given a tablet or cell phone with internet access and a first clue that allows them to read a hidden message, which, in turn, leads them to find a hidden envelope with a QR code puzzle. By scanning it, each QR code leads them to a Google Forms form that integrates the different tests. To move from one challenge to another, the correct code (pre-programmed answer) must be entered. All the clues to answer the challenges are physically distributed around the room. This system gives instant feedback to the players since, if they do not solve each test correctly, the game does not progress. Once the entire Google Forms form is completed, each subgroup receives a fragment of a joint message. Upon reading it in its entirety, the players realize that they need the other group of players (who are in the other room) in order to open the final box. Inside the box they find the PCR cards that certify them as free agents of disinformation and authorize them to go outside.

The game session ends with a joint discussion on the challenges and difficulties encountered by the players and also resolves final doubts in order to ensure that they have understood all the didactic elements and thus convey a sense of empowerment in the detection and dissemination of hoaxes. In this discussion, students are invited to share their personal experiences with misinformation and their reflections on the topic.

2.   Research objectives

The main goal of this article is to determine the perceptions that generate the use of educational escape rooms as a methodology to develop on MIL among primary and secondary school teachers. To this end, it is broken down into the following specific objectives:

> **O1.** To know the perceptions that the use of the escape room methodology as an educational resource generates among primary and secondary school teachers.
>
> **O2.** To know the opinions that the *Learn to Escape* didactic proposal generates among primary and secondary school teachers when working with the MIL in educational centers.
>
> **O3.** To determine from the perceptions of participating teachers whether the escape room methodology, and specifically the *Learn to Escape* proposal, is a useful didactic resource to deal with MIL with primary and secondary school students.

3.   Methodology

Taking into account the stated objectives, the research is exploratory in nature. Methodologically, it follows a qualitative approach and uses the semi-structured interview as the main data collection technique. Qualitative interviews represent a valuable research technique because they provide a good opportunity to understand, reflect and go deeper into topics and issues that cannot be easily observed or accessed (Tracy, 2020, p. 79). In addition, they facilitate evidence about the context and origin in which a phenomenon to be studied arises, being enriched by the insider view of people who have direct experience about it (Miller and Glassner, 2016). Some previous academic studies have employed the semi-structured interview as a research method to inquire into the perceptions that different actors have about the use of gamification in the classroom. Thus, García-Marín and Llera-Sánchez (2022) used it with secondary school teachers in their study on the educational possibilities of independent video games and Guerrero-Puerta (2024) with the group of trainee teachers to find out their opinion about including gamification as an educational resource in their own teacher training.

The sample of the present analysis comprises six of the twelve educational centers in which the escape room methodology has been implemented to work on MIL, and which belong to the following four autonomous communities: Catalonia, Castile and Leon, Community of Madrid and Galicia. In order to obtain greater diversity, both public (3) and private and subsidized (3) centers were included, in which the escape room had been implemented in the primary (3) and secondary (3) educational stages. In the case of the Community of Madrid and Catalonia, twice as many centers were added as in the rest of the territories, since they are the two communities in Spain with the highest population rate. Thus, the sample for this study consists of the following schools: Colegio Estudio and Instituto Carmen Conde (Community of Madrid), Escola Tecnos and CEIP Miquel Martí i Pol (Catalonia), Colegio SEK-Atlántico (Galicia) and CEIP Melquiades Hidalgo (Castile and Leon).
In order to meet the established objectives, six semi-structured interviews were conducted with teachers who witnessed the implementation of *Learn to Escape* in their school. The interviews, lasting between 45 and 120 minutes, were conducted telematically between June and July 2023 due to the geographical diversity of the sample, with teachers located in different parts of Spain. All conversations were recorded and subsequently transcribed and analyzed with the qualitative analysis software Atlas.ti. The constant comparative method (Wimmer and Dominick, 2013) was applied. The data obtained were assigned to categories and, after an initial analysis, the established categories were refined, as well as the relationships and themes detected, with the aim of identifying the most recurrent issues. The names of the teachers were anonymized, being only identified by school affiliation, as agreed with the participants through informed consent.

In this case, the interviews were semi-structured in order to guarantee some freedom to the interviewees and the questions asked were organized in two thematic blocks, which are specified below:

a) perceptions about the escape room methodology as a didactic methodology and

b) perceptions about the Learn to Escape didactic proposal to work on media and information literacy in the classroom (Table 1).

Table 1. *Relationship of the research objectives and interview script.*

Objectives	Interview script
O.1.	**Block 1. Perceptions about the escape room methodology as a didactic methodology** 1. What is your opinion about escape rooms applied to education? 2. Have you designed or organized before Learn to Escape any activity in the center that makes use of the escape room methodology? If so, which one and with what objective? 3. In your opinion, do you consider escape rooms to be a useful educational methodology to work on issues such as misinformation and media/digital literacy, for what reasons?
O2. **O3.**	**Block 2. Perceptions about the Learn to Escape didactic proposal to work on MIL in the classroom** 1. What is your opinion of the *Learn to Escape* proposal for working on misinformation and media/digital literacy in the classroom? 2. To what extent do you think that your students' participation in *Learn to Escape* helped them to learn about issues related to misinformation? 3. If the answer above is yes, what issues do you feel they learned about in this area? 4. From a competency standpoint, do you feel that your students put into practice any competencies or skills while participating in *Learn to Escape*, could you list which ones? 5. In your opinion, did you feel that any of the tests were more enjoyable for the students? If so, could you indicate which one(s) and for what reason? 6. After the completion of *Learn to Escape* did you discuss the activity with the students or have you done any further activities to work on misinformation in the classroom? 7. After conducting *Learn to Escape* at your school, have you observed any significant changes in how students and teachers approach misinformation and media/digital literacy? If so, could you give any examples? 8. To what extent do you consider that the *Learn to Escape* proposal has been a useful educational methodology to work on misinformation and media/digital literacy in your center?

Source: Elaborated by the authors.

4.   Results

4.1. Perceptions about the use of escape room as a didactic methodology

The teachers participating in the study emphasize that the escape rooms are a cross-curricular methodology, since they have been applied in mathematics and natural sciences classes as well as in languages and social sciences. As a teacher from the Colegio SEK-Atlántico highlights: "We have done escape rooms for mathematics, social studies, literature, things that may be more arid for them [the students]". It is also perceived that its use is not only curricular, but also serves to carry out more playful activities such as, for example, a session

of knowledge of the group that generates the creation of a sense of community either on specific days as a celebration (for example, Book Day or the end of the course) or even as a dynamic activity in outings outside the center.

Among the advantages listed, it is worth mentioning that the escape room is an active methodology focused on the student and cooperative work that promotes shared learning. This aspect generates a lot of motivation due to the game's competitive feel, since its format is adaptable to any content, even digital. In addition, according to the teachers, it offers immediate feedback on the student's progress which, accompanied by a previous contextualization and conclusions, can be very effective. To summarize, here are some of the reasons specified by the teachers participating in the research:

- When we want to transmit something, to teach something, we have to present it in a very attractive way. The escape room has that attraction. It is gamification, it is a project based on the game, it is a dynamic, experimental learning, in which they are building and it provides them with a lot of feedback. I think it is a great working tool in the classroom. (Teacher at CEIP Melquiades Hidalgo).

- I think it is an attractive proposal where the students are the protagonists, that captures their attention and also afterwards there is a conversation, a sharing. It is not something individual where you go and give a talk, there is shared learning. (Teacher at CEIP Miquel Martí i Pol).

In addition to the above advantages, there are teachers who emphasize as positive elements the ease of being able to adapt tests according to age and knowledge, the possibility of working on time management in a friendly environment and also that its effectiveness is due to the fact that it is a dynamic activity that moves away from lectures and breaks the daily routine. This is how a teacher at IES Carmen Conde, puts it:

Escape rooms make them leave the classroom space, [...] they make them more active to new stimuli. In the classroom, many [students], as soon as someone comes to tell them something, they close their minds, but on the other hand, I think this stimulates them more and makes them more interested.

Some teachers interviewed, and with training in neuroeducation, also emphasize that escape rooms are very complete methodologies that promote meaningful learning. On the one hand, because they enliven the emotionality of the activity, since it is a methodology that generates curiosity, surprise, a feeling of competitiveness, but at the same time, a feeling of group cohesion and cooperation. On the other hand, as it is a dynamic methodology in which students must move around the classroom, this fact helps content retention because, as the teachers at Colegio Estudio point out, "movement fixes the memory". In this sense, these same teachers also emphasize:

What I see is that methodologies such as the escape room encompass all types of students and all types of intelligences: from creativity, ingenuity, initiative, leadership skills, group responsibility, and all this predisposes the student to acquire knowledge.

In addition, according to the perceptions of the informants, escape rooms can generate positive reinforcement for all those students who find it difficult to acquire knowledge through more theoretical methodologies. By using a much more experimental methodology, they can feel integrated into the class group. However, these Colegio Estudio teachers also emphasize that despite the multiple benefits of escape rooms, they should be considered as complementary methodologies to other traditional ones such as, for example, lectures, and never as a substitute for them.

I think that alternating different rhythms works very well. [...] alternating something more theoretical with something more practical. [...] For me, a gamification methodology seems to me to be as valid and appropriate as many other methodologies. It is not better because it is gamification, but what is important is that it is well organized. I think that a well-delivered master class can also reach the emotion.

As for the disadvantages of escape rooms, teachers point out the logistical challenge of setting them up correctly (lack of space and personnel) and the difficulty of controlling large groups playing at the same time. Although these are recurring elements in previous academic literature, the teachers participating in this study mentioned two new elements: the loss of learning vision and the tow effect.

Regarding the first element, some teachers commented that while students are playing escape rooms, they lose the vision of learning, they focus more on the playful vision and that this sometimes causes more competitive personalities and unethical situations to emerge. In order to win, some students cheat, or share answers between groups and pass tests more superficially. A teacher at Colegio Estudio reflects: "They don't do it on purpose, but sometimes, they forget the real reason why they are doing the escape room."

Regarding the second element, other teachers expressed their frustration at the impossibility of motivating all students in an experiential activity and that it generates a tow effect in some students:

- Sometimes, when we present an activity that is so attractive to them, what makes you angry is that there are students who are not able to get involved in an activity that is also dynamic and motivating. Those students who, for example, do not debate, do not talk, do not engage in dialogue, are the ones who go to the back of the queue, to other people's decision making, for example. But it is not because they are not taken into account, but because they themselves do not want to participate. [...] So, yes, we have to continue working on these things. (Teacher at CEIP Melquiades Hidalgo).

- There is no methodology that involves 100% of the students. In collaborative work, there are some students that finds it more difficult to intervene or to participate. That is to say, they were lagging behind the rest of the group members. [...] But this is inevitable. (Teacher at Escola Tecnos).

4.2. Perceptions of the *Learn to Escape* proposal for working on MIL in the classroom

The results of the study also reveal that the experiential methodology offered by the *Learn to Escape* proposal is one of the aspects most appreciated by teachers. They consider that the game dynamic consisting of solving verification challenges through manipulative tests provides a dynamic playful character that breaks the classroom routine and encourages learning by discovery. In addition, it enables participants to become familiar with informational content and issues that influence their daily lives. They highlight, in this sense, the multimodality of the tests that players must face, with challenges that involve both the identification of false images and information and the detection of clickbait headlines and phishing-type practices, extracted from information environments such as social networks, to which students are also more accustomed.

Teachers also appreciate as positive that the detection of falsehoods in the *Learn to Escape* proposal involves the use of technological tools applicable to the field of digital verification such as Google Lens or Google Maps, not only because they consider that the digital component generates more attraction among participants when it comes to receiving the activity with enthusiasm, but also because its use helps them to discover, consolidate and perfect a domain of a technical nature that also leads them to practical knowledge. This performance, moreover, is combined with the development of theoretical knowledge, since in the detection of falsehoods they consider that they also put into practice civic and informational criteria such as, for example, the importance of not sharing content without verifying it, the need to contrast, and the distinction between information and advertising. In line with this reflection, a teacher from the Colegio SEK-Atlántico emphasizes that:

[In the activity] they have to use the technique, use the information, know how to look for real information. That's where they can see how false information leads them to a dead end. Or it leads them, well, to get it wrong and do the wrong things. It is the most practical way to see reality.

This same teacher also appreciates that the *Learn to Escape* proposal reinforces aspects previously worked on in the classroom, such as, for example, the importance of examining sources when consulting information:

> It helped them to fix ideas and to be aware of these little things. We tell them every day about checking information. But perhaps because of their age [5th grade], they still didn't bear it in mind. So that's when they realized the importance of paying attention to it, of looking at different sources and checking.

In this sense, teachers emphasize as relevant that *Learn to Escape* generates "multidimensional" learning, since both cognitive and rational aspects are worked on, as well as procedural ones, and according to their perceptions, this has as a prominent result the promotion of the students' critical spirit. A teacher at Colegio Estudio points out: "They don't see things the same way anymore. Here we receive newspapers daily and now when they come to me they ask me: 'Professor, how did they do this image or this layout?' They already see everything with this filter".

A teacher from IES Carmen Conde also agrees with this reflection and considers that the implementation of the escape room:

> It helps them get out of their comfort zone. That is, to consider that the things they see or the things they hear may be manipulated and that it is not only the opposites, those who do not think like them, who manipulate.

Some teachers also emphasize that the critical capacity acquired by students during the activity can be applied later in the interpersonal sphere, both among students and even among families. A teacher at the Colegio SEK-Atlántico gives as an example that a student has taught her parents techniques for verifying information learned in the escape room. A teacher at CEIP Melquiades Hidalgo also describes an event that took place at the school a few days after her students took part in *Learn to Escape*:

> Shortly after doing the activity, a problem arose between students. So-and-so told me that so-and-so said that so-and-so told me that I was so-and-so. Well, in these cases of conflict, what we always try to do is not to have the teacher solve the problem, because we are not judges, but to provide the students with the tools to solve it by themselves. I asked for the help of the other students and said: "Come on, how can we solve this problem?" Well, one student who had participated in the escape room said: "Why don't you do what we have learned? Go to the source, don't rely on the opinions of others, ask directly." [...] This simple anecdotal fact indicated to me that it had reached them and that they were able to apply it to their reality and daily life.

In this sense, the teachers consider relevant "the awareness" that the activity provides to the participants, although they also recognize that the degree of awareness may vary according to age. Likewise, they also perceive Learn to Escape as a catalytic proposal in their professional field because it not only allows them access to the implementation of a new teaching methodology, but also because it offers them the possibility of incorporating new training content in the classroom, in addition to training themselves in disinformation and digital verification. In line with this reflection, a teacher from CEIP Miquel Martí i Pol indicates that "it is a very good way to start, to start from something and then continue deepening. I took advantage of some materials to design other activities."

In fact, according to the teachers participating in the study, the implementation of *Learn to Escape* in their center has subsequently led to the design of new activities such as, for example, the writing of false information by students and its verification in the classroom by the rest of their classmates, as well as the development of proposals to raise awareness of the impact of misinformation in society and in the center itself, with activities also aimed at combating rumors that arise among the students themselves. In this line, a teacher from CEIP Melquiades Hidalgo highlights one of the activities implemented after the escape room:

> What we have done is to hang some posters in the hallway where we provide information about news from the center that they have to contrast. Then it's interesting to hear the students in the hallways, see what they first get out of that information and then say to other classmates: "No, wait, we'll have to ask if that's really what you're seeing." That is, it is no longer like before, that everything that someone said

seemed to be true, and more so when they are student leaders, but now there are already students who stop and say: "No, you have to ask" To whom? Well, ask the tutor, the teacher, the headmistress? So I believe that yes, yes, there are small changes, changes that I hope will be maintained over time.

Some schools have also incorporated disinformation transversally in linguistic subjects such as Spanish Language, in which they analyze the editorial forms under which disinformation can be presented; in social science subjects such as History, in which they also study hoaxes and disinformation produced in the course of history; and in experimental science subjects such as Biology, in which they focus on disinformation of a scientific nature and also related to climate change. In centers such as Colegio Estudio, the activity has led to the creation of a rap on the subject of misinformation and even the development of an escape room called *Bulolandia*:

> *Learn to Escape* has been the seed for our *Bulolandia* project, an escape room that has also been developed in collaboration with the School of Education of the Complutense University of Madrid. [...] We created a kind of city that was divided into different areas and tests. [...] The first test is directly inspired by one of the *Learn to Escape* tests, which is to make a word search in which to look for specific terms in the field of misinformation.

From a competency point of view, *Learn to Escape* is also a useful didactic proposal for teachers since it fosters the acquisition of specific skills applicable in multiple contexts, such as critical thinking, active listening, group decision making, teamwork, and the search for and management of information sources. Thus, they consider that the competencies recognized in the LOMLOE that students mainly work on through *Learn to Escape* are Digital Competence; Personal and Social Competence and Learning to Learn; Citizenship Competence; and Linguistic Communication Competence. In this sense, a teacher from CEIP Melquiades Hidalgo emphasizes the following skills and competencies:

> Teamwork, active listening, the search for information, critical thinking to solve and find a solution, and then you have to analyze if the solution is effective, if it is valid with what you were looking for. Also the digital competence, it is an escape room that works at a digital level, and I think that is very important today.

The implementation of the escape room on digital verification is also perceived as useful for teachers when working on contextual issues that they consider to influence student learning. Among such aspects, they point out the existence of media and ideological bubbles, the lack of knowledge of media language, the lack of informational criteria and informative disinterest, as well as difficulties in concentration and reading comprehension:

- They are students who generationally have not read a newspaper, do not read the press, do not get into the digital press either. [...] In addition, they do not filter the information, and then they are very ideologically biased by their families and then they are easily manipulated. (Teacher at IES Carmen Conde).

- The most difficult thing with them, precisely, is to bring them to this state of concentration, of focus, so that they reflect on what is there. And I am also referring to the headline part, for example. When we give them a headline and, of course, then the rest of the news, they stay very much in the headline. And they tell you, they say: "I just don't want to read anymore." (Teachers at Colegio Estudio).

- Students now have a hard time with the text. We see that when they have to look for information they go directly to the images, they no longer go through the text. In addition, with the first source of information they find, they copy it and maybe they don't even understand what they are copying, but they do it anyway. (Teacher at CEIP Miquel Martí i Pol).

In this sense, according to their perception, the activity provides students with a greater capacity for observation that results in a better reading comprehension of the texts, as well as in a greater attention when observing images, in the acquisition of specific vocabulary -in this case focused on the field of misinformation-, and in a greater capacity for reflection, since they consider that the activity invites students to question and to be cautious when evaluating the reliability of the contents they consume. In the light of this reflection, some teachers conclude that:

- From the moment they [students] begin to reflect, to look at things from another point of view and ask themselves questions about what they see, for me it is an activity that they have generalized and that has reached them. (Teacher at CEIP Melquiades Hidalgo).

- [After the activity] the students said: "Look at this picture I think it is a fake, let's look for it." They had already been left with details, they were looking for information or they saw a picture and said: "I think it's fake, teacher." Before, they wouldn't even have stopped to think about it. And some parents also told us that at home they had been told about the fake photos, about the importance of the networks and the sources. They were very happy. (Teacher at Colegio SEK-Atlántico).

Below, based on the perceptions of the teachers participating in the study, the main findings detected in the implementation of escape rooms as an educational resource applied to the field of media and information literacy are synthesized and inferred (Table 2).

Table 2. *Advantages and disadvantages in the implementation of escape rooms as an educational resource applied to the field of MIL.*

Dimension	Advantages	Disadvantages
Teacher	- Possibility of curricular application. - Knowledge of a gamified methodology in the field of digital and information literacy. - Teacher training in disinformation and digital verification. - Catalytic proposal to design other activities on disinformation in the center.	- Need for specific training in media and information literacy and escape room methodology. - Disproportion between the time and effort of design and its subsequent application in the classroom.
Educational and civic	- Gamified methodology. - Multidimensional and discovery learning. - Encouragement of teamwork. - Educational proposal containing sentiment. - Acquisition of a critical spirit. - Awareness of disinformation processes and their effects. - Knowledge of digital verification tools. - Competence training. - Contents with applicability in daily life.	- Punctual activity. - Competitive logic that may distort the educational background. - "Towing effect" in the group dynamics. - Difficulties of concentration and reading comprehension of the students due to lack of informational criteria. - Sensitization subject to the maturity and sociocultural context of the students.

Logistics	- Activity that modifies the school routine and the usual classroom dynamics. - Contents adaptable to different educational contexts. - Flexible formats, tests and materials.	- Complexity in managing large groups. - Availability of space and support teachers to develop the escape room. - Need for technical and economic resources. - Time constraints in the preparation and development of the activity.

Source: Elaborated by the authors.

5. Discussion and Conclusions

This study has found that primary and secondary education teachers have a positive perception towards the use of the escape room methodology in the classroom, since it has been previously and widely used in different educational contexts for being active and student-centered, in addition to allowing the presentation of content in an original, attractive and fun way. These are aspects that authors such as Nicholson (2018) and García-Lázaro (2019) have also pointed out as beneficial in the implementation of escape rooms in student training, and that in this case the teachers participating in the study also see as useful for working on misinformation and MIL. Even, from a logistical point of view, the emotionality and the very dynamic against the clock that characterizes the escape room is perceived as a useful aspect to recreate the media context in which false information circulates, which according to authors such as Santana-Chaves and Simón-Astudillo (2022) are disseminated precisely because they are polarized discourses that appeal to the emotions. Moreover, the dynamics that contribute to the spread of misinformation, especially in online environments, are also characterized by a flow of sharing in which speed and spontaneity predominate, rather than prudence and reflection (Buchanan, 2020; Vosoughi *et al*., 2018).

In this way, the escape room methodology makes it possible to introduce at early ages - where students are characterized as "citizens in the making" (Buckingham, 2005) - complex aspects such as the dynamics of disinformation circulation and, through specific tests oriented to the field of MIL, also to instruct them in detection competencies and skills that allow them to counteract them. Techniques for assessing the reliability of information sources and audiovisual content are highlighted, together with the use of technological tools that can be applied to such detection. Thus, both curricular and procedural aspects can be worked on, and they also have an impact on the interpersonal and everyday environment, with a clear application to daily life, as also contemplated by the MIL (UNESCO, 2018).

In this case, there is a consensus among teachers in pointing out that for greater effectiveness the escape room methodology applied to the educational context, and in particular to the field of misinformation and MIL, must necessarily end with a joint discussion that incites students' reflection and strengthens the understanding of the proposed objectives. This is a particularly relevant aspect in a methodology that, due to its gamified dynamics, can contribute to divert the focus of attention of the participants and even, being a team activity, can generate a "towing effect" among peers.

Regarding the specific *Learn to Escape* proposal, it is concluded that teachers describe it as useful because, according to their perception, it contributes to the development of students' critical spirit through multimodal tests in which participants must identify images and false information to continue with the game, thus forcing them to question the reliability of different contents, both textual and visual, which have been extracted from information

" *Learn to Escape* is also a useful didactic proposal for teachers since it fosters the acquisition of specific skills applicable in multiple contexts."

environments that are common to them, as is the case of social networks. Learn to Escape is therefore an educational proposal that focuses on the field of "interaction with other people's messages", a field of work of media competence that authors such as Ferrés and Piscitelli (2012) have identified as notorious. The acquisition of detection skills that contribute to a critical interaction with information is precisely another of the objectives of MIL (UNESCO, 2018), especially those that can have a transposition in everyday life. In this regard, Learn to Escape is also perceived to be useful, since the results of this study evidence that it has had a subsequent applicability, both among students and teachers. On the one hand, after the experience, some students have used lessons learned from the activity-such as, for example, the need to contrast sources- in the resolution of everyday problems. On the other hand, the possibility of seeing the implementation of Learn to Escape has motivated the design of new teaching proposals to address the issue of misinformation and MIL. Thus, it has been an activity that has had a significant impact on its reception, reaching different educational spheres that encompass both teaching action and the educational and civic sphere.

The results of this study are consistent with most previous research conducted in the field of gamification (Chapman and Rich, 2018; Da Rocha-Seixas *et al*., 2016; Hamari *et al*., 2014), in which despite possible drawbacks of a logistical nature, more benefits than disadvantages are identified, especially in relation to an increase in motivation and student interest regarding the topic addressed. Even in the field of MIL and the fight against misinformation, gamification has also been shown to be an effective strategy, especially in the acquisition of complex digital skills that, through play, could be integrated by students and subsequently transferred to their usual environment (Chang *et al*., 2020). In an information ecosystem characterized by access to information through social networks, especially at younger ages (Newman *et al*., 2023), this aspect becomes particularly relevant, as well as the issue of motivation. Taking into account the proliferation of the so-called "information ninis" (Amoedo *et al*., 2023), especially at early ages, gamified methodologies such as escape rooms applied to MIL are also presented as motivational strategies that could be useful even in recovering the interest of audiences.

The application of escape rooms as a didactic resource in the field of MIL is therefore a field of study that presents multiple opportunities for research, and that should continue to be explored in order to determine what its benefits could be. This research aims to open new approaches in this field, being a first exploratory contribution that examines the usefulness of escape rooms in the field of misinformation and media and information literacy in Spain through a gamified design specifically created for this purpose, and that could also be explored in new implementations and formats.

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