

Participatory Design of Educational Escape Room Video Games: A Media Literacy Case Study

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Abstract. Arising challenges in digital media literacy regarding recognizing and handling misinformation demand the development of innovative educational tools. Educational escape rooms (EERs) are already established as engaging learning solutions for related topics, but their design often lacks meaningful involvement of end-users. In this paper, a participatory design (PD) approach for the development of media literacy EER video games is presented. As a part of the ENDGAME project, an international multi-stage workshop was conducted with 41 diverse participants from Finland, Serbia, and Spain, utilizing collaborative design methods including breakout sessions, brainstorming activities, and stakeholder feedback collection. The results illustrate different views and preferences on visual style, narrative themes, skill mapping, puzzle mechanics, and accessibility topics. Our findings contribute to the understanding of PD value in the creation process of immersive, adaptable, and engaging educational ERs.

Keywords: Participatory Design, Educational Escape Rooms, Video Games, Media Literacy, Co-Design.

1 Introduction

The continuous and widespread problem of misinformation and digital manipulations in media, worsened by social media algorithms and generative artificial intelligence (AI), has created an urgent need for innovative media literacy education, especially among young people, who represent particularly vulnerable groups. According to recent studies [1-3], while younger generations are adept at accessing various media sources, they often lack critical thinking skills to evaluate the credibility of the source, notice manipulation tactics, or recognize AI-generated/manipulated content, which may lead to filter bubbles and echo chambers that reinforce biases [4,5]. Many educators and media literacy specialists have turned to designing more interactive learning opportunities, often in the form of games, to reach this vulnerable group of

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people who also happen to be the heaviest users of social media. Games are particularly attractive to young audiences, making them a fitting choice for media literacy education.

Educational escape rooms (EERs) have shown promise as engaging game-based learning environments that combine problem-solving, collaboration, and time-pressured decision-making. However, limitations of traditional top-down EERs design approaches, such as behaviorist approaches, short durations often leave teenagers and young adults out of focus [6]. To overcome these challenges and potentially tailor more immersive experiences, the ENDGAME project adopts a participatory design (PD) approach, involving end-users: youth, educators, and media professionals, as co-creators to ensure the ERs are engaging, culturally relevant, accessible, and pedagogically effective across diverse contexts [7].

The main objective of the ENDGAME project is to empower European young citizens and individuals to be critical thinkers, responsible digital citizens, and active participants in a globalized society. To engage our target audience in the acquisition of media literacy skills, we aim to develop technology-enhanced educational ERs that immerse participants in interactive scenarios that mirror real-life situations in information consumption. At the heart of the project is the development of three modular educational ERs, each focusing on a specific set of media literacy competencies. These include: identifying disinformation and altered media, detecting AI-generated content, understanding the risks of personal data exposure on social platforms, and recognizing the rights and responsibilities that come with digital media engagement.

In recognition of the diverse media landscapes and issues across European countries, the project adopts a participatory approach in the selection of topics that will be covered in the educational ERs. To reflect regional priorities in the content of the educational ERs, participatory workshops are organized within Work package 2 (WP2) for the selection of these pressing matters in each of the three participating countries —Finland, Serbia, and Spain— representative of diverse regions of Europe with different political and cultural landscapes. The output of these workshops is then used to design the media-related content present in the ERs, which will be customized and contextualized for each region.

PD workshop is also organized within Work Package 3 (WP3) following a participatory approach to develop the narrative, format, and theme (storyline and gameplay) of the educational ERs in a way that is appealing to our target group, ensuring that a diversity of perspectives is taken into account to maximize youth engagement and that the ER games are intrinsically motivating beyond a learning activity. The emphasis on inclusivity and the participatory approach ensured that the project resonates with individuals from various cultural backgrounds, promoting a diverse and pluralistic media environment. The developed ERs will be completely modular and customizable, which allows them to be easily adapted to new contexts beyond the scope of the project through the development of content specific to other regions.

2 Theoretical Background

2.1 Educational Escape Rooms (EERs)

EERs carefully combine game-based learning and immersive storytelling experience, focusing on accomplishing a specific goal in a limited amount of time [8]. EERs enhance learner motivation, develop modern-day skills, and improve knowledge acquisition through playful, interactive experiences, as research indicates [9-12]. Frameworks like EscapED [13] have emerged to guide the creation of EERs in higher education settings, while design thinking principles have been applied to create learner-centered frameworks for EER development. EERs require careful matching of actual game goals and introduced educational objectives in order to provide a seamless user experience, which represents a very unique and specific challenge, not present in the recreational escape room design process.

Even though EERs are still considered a novel educational tool, many researchers have investigated this topic. Early research by [14] and [15] explored EER teaching potential and design considerations. Later studies focused on implementation and curriculum integration, though theoretical foundations remain limited [16], while [17] concluded EERs are generally effective across different education levels. Domain-specific reviews in STEM [18], medical education [19], nursing [20], as well as media literacy specifically [21] show positive outcomes as their research finds that ERs are enjoyable, contribute to knowledge gain, and increase motivation.

2.2 Participatory Design in Educational Game Development

PD originates from Scandinavian workplace democracy movements [22, 23] and it evolved over time into a comprehensive methodology for involving end-users in design processes. Further research [24] expanded PD toward collaborative creation, generative toolkits, and infrastructuring. PD has been applied in educational contexts to co-design digital tools, games, and curricula through involvement of end-users in iterative cycles of brainstorming, prototyping, and evaluation, ensuring designs align with users' needs and contexts [25]. So far, PD has had limited influence in serious game development, despite its popularity in interaction design, which opens up opportunities for methodological innovation.

Analyzed experimental results [26] suggest that user involvement in game design may contribute to effectiveness by creating a better fit with user preferences, making it a particularly suitable method for teaching students and children. However, systematic reviews reveal diverse and inconsistent participatory methods in educational game design, with unclear outcomes regarding optimal approaches and a lack of details on how the process is being evaluated. For example, PD methods analyzed in [26] showed significant variation. These ranged from involving students in pre- and post-tests of game interfaces to determine usability effectiveness, to poster-making activities using materials and questionnaires as multisensory design techniques. Other approaches included daily camp activities for creating and testing hands-on games as learning tools, and workshops focused on concept development, personas, and storyboards.

2.3 Media Literacy Education Through Games

Ever-growing challenges of information verification, determining source credibility, and noticing digital manipulation have gradually turned media literacy education toward game-based approaches to increase engagement among the most vulnerable groups. Research [5] suggests that, for developing misinformation identification skills, games proved to be more effective than conventional, often static content, in both online and offline delivery modes. The time-sensitive nature of escape rooms particularly suits media literacy education by simulating the fast-paced information environment young people navigate through daily [21]. This creates opportunities for experiential learning about detecting different forms of misinformation under pressure.

The Dutch Media Literacy Competency Model [27] identifies 8 key skills: operating devices and software, exploring applications, finding information (including detecting misinformation), creating with media, connecting through media, discussing media, understanding media (recognizing biases and business models), and reflecting on media usage. The framework also covers topics of health, education, employment, and identity. Ongoing media literacy training initiatives are often fragmented and short-term [21,28], with calls for more evidence-based, scalable approaches asserting gamification.

3 Methods

The participatory design process in WP3 aimed to ensure that the educational ERs being developed in the scope of the ENDGAME project (<https://endgameproject.github.io>) are engaging, contextually grounded, inclusive, and reflective of regional disinformation challenges. Building on the findings from WP2 (Identification and creation of contextualized media literacy scenarios), the co-design process focused on translating country-specific disinformation narratives into compelling and pedagogically relevant scenarios tailored for game-based learning environments. The goal of the participatory workshop, where participants contributed to shaping both the narrative structure and puzzle mechanics of the ERs, was to co-create learning experiences that go beyond instructional objectives, immersive storylines, visually dynamic environments, and meaningful challenges that resonate with the everyday media experiences of young people.

A core principle of this approach was the meaningful inclusion of diverse perspectives, particularly those often underrepresented in digital design and media education. Rather than treating participants as end-users, the process positioned them as co-creators. The workshops were thus grounded in the belief that participatory design is not a peripheral consultation tool, but a creative and empowering methodology through which learners directly influence the form, tone, and function of the educational media they engage with.

3.1 Participants and Recruitment

An international PD webinar was held with stakeholders from all three partner countries to collaboratively shape the high-level narrative arc, structure, and educational strategy of the ERs. To ensure representational diversity in ER design, each national team invited participants from various age groups, gender identities, socio-economic backgrounds, and digital media familiarity levels. Stakeholders included: secondary and university students, schoolteachers and digital literacy educators, media literacy trainers and youth workers, civic society representatives and media professionals, individuals from underrepresented groups. Out of 58 people registered for the workshop, 41 participated, ensuring diversity in gender, ethnicity, ability, and region.

3.2 Workshop structure and tools

Conducted as a 100-minute online event via the Zoom platform, the workshop combined presentations, interactive quizzes, breakout room discussions, and digital collaborative tools (AhaSlides and Google Forms) structured as presented in Table 1.

Table 1. Participatory design workshop structure.

Sessions	Duration	Description
Welcome and Introduction	10 min	Project overview, ER example ("The Hoax Factory") demonstrating puzzle-skill links
Presentation of Insights from WP2	10 min	"Real-Fake News" quiz (5 timed questions), Insights from WP2 (Recurring themes across regions, How insights will potentially inform escape room narratives)
Brainstorming Narrative Ideas (Breakout rooms)	25 min	"Truth and a Lie" game for rapport. Word clouds on game visuals, themes and settings.
Puzzle and Skill Mapping (Breakout rooms)	20 min	Puzzle and skill mapping example, Discussions regarding puzzle types, challenged skills and techniques for avoiding revealing solutions.
Inclusion and Accessibility Discussion	10 min	Addressing stereotypes and accessibility
Wrap-Up and Next Steps	20 min	Survey capturing additional ideas

“Welcome and Introduction” session started with a brief introduction of facilitators and explanation of the workshop purpose, as well as a brief overview of the following session activities, followed by a brief overview of the ENDGAME project and the goals of the ERs. After a short mention of project partners, the Educational ERs concept was explained and demonstrated using an example of a digital educational ER [29], which had the purpose of visually describing the presented concept.

“Presentation of Insights from WP2” began with the first ice breaker – a simple 5-question “real-fake” quiz based on different news articles and social media posts. Participants were asked to guess if the post in question was true or false, and the

results were presented to participants after each question. Each question had a time limit to simulate a potential ER challenge.

The purpose of the quiz was to set the base for the rest of the workshop and provide participants with hands-on experience. The quiz was implemented and conducted through the *AhaSlides* platform. After a short discussion about the quiz results and participants' impressions, a concise summary and highlight of recurring themes of disinformation narratives gathered through national workshops in Finland, Serbia, and Spain was presented to the participants, along with a few examples of how these insights will potentially inform ER narratives.

Each breakout room facilitator started "Brainstorming Narrative Ideas" session with a simple "truth and a lie" game (Fig. 1) as a form of another more personal ice breaker, where participants could volunteer, share their name and role, and present two simple statements where only one statement is true, and other participants must guess which one. The facilitator presented the first pair of personal statements to start the game, after which other participants continued the game. The session utilized AhaSlides's Word Cloud feature (Fig. 2) for two key brainstorming activities: narrative choice selection and real-life setting preferences. After each word cloud generation session, facilitators introduced previously developed team concepts to gather participant opinions and feedback.

The image shows a presentation slide from a Zoom meeting. At the top left, it says "iEND GAME!". At the top right, there is a small text "Keeping new disinformation through good fact cross gender media literacy education" and a page number "1/7". The main title is "Welcome & Introduction". Below the title, there are bullet points for the game rules: "• 'Truth and a Lie'", "◦ Share your name and role.", "◦ Present two simple statements about you, one true one false", and "◦ Vote (in Zoom comments) which one was true.". Below the rules, there are two numbered statements: "1. I worked at a comic book store." with a book icon, and "2. I was a part of a hip hop duo." with a person icon. To the right of these statements is a graphic of two overlapping cards, one blue labeled "TRUTH" and one red labeled "LIE". At the bottom of the slide, there are several logos, including the European Union flag and text "Co-funded by the European Union", and other logos for "MILITARIA", "MILITARIA", "MILITARIA", "MILITARIA", "FaktaBaari", "FAKE NEWS", and "traget".

Fig. 1. Presented "Truth and a Lie" game rules as a part of the "Brainstorming Narrative Ideas" session.

The goal of the "Puzzle and Skill Mapping" breakout session was to link media literacy skills (e.g., identifying manipulated images, evaluating sources) to potential puzzle types. Facilitators presented one valid puzzle with mapped skills for easier understanding and guided groups to suggest specific puzzle ideas tied to the narrative.



Fig. 2. Narrative choice - Word cloud.

“Inclusion and Accessibility” session raised some important questions regarding how to keep content free of stereotypes, how to improve accessibility of the ER, will the game include experiences relevant to marginalized communities, etc.

In the “Wrap-Up and Next Steps” session, participants were asked to fill out the Google Forms form (25 out of 41 participants completed the survey), and the workshop was concluded by outlining the following steps that should be performed, such as development of room prototypes, piloting and testing, and follow-up invitation for those interested in contributing to storyboarding or testing.

3.3 Data collection and analysis

Data was collected through a multi-method approach to capture comprehensive participant feedback throughout the workshop. Real-time polling was conducted using *AhaSlides* to gather immediate responses during interactive activities. Facilitators documented discussions and outcomes from breakout room sessions, while word cloud generation captured brainstorming outputs on game visuals, themes, and settings. Post-workshop structured questionnaires were administered via Google Forms to collect participant feedback on workshop components and their experiences. Additionally, qualitative data was gathered through open discussions, allowing participants to provide unstructured insights and suggestions. This data collection strategy ensured comprehensive documentation of participant input across different phases of the workshop.

Analysis combined quantitative preference data with thematic analysis of qualitative discussions, identifying patterns.

4 Results

The findings from breakout sessions showed strong alignment with wrap-up survey results, confirming the consistency of participant preferences across different collection methods. Importantly, the interactive nature of breakout discussions allowed gathering more subtle details and contextual explanations that represent additional value beyond the quantitative survey data.

4.1 Visual and Thematic Preferences

Participants demonstrated clear preferences for illustrative art styles (Fig. 3), with 47.1% votes favoring this approach compared to pixel art (38.2%) or real-life photography (14.7%). This preference was consistent across all breakout rooms and was reinforced by participant concerns about AI-generated art, with explicit requests for human-created visual content.

Analysis of thematic preferences revealed three primary areas of interest (Fig. 4). Political misinformation and election interference emerged as the most preferred theme, accounting for 32% of responses. Health and science misinformation followed closely at 24% of responses, while AI-generated content represented 20% of participant preferences. Participants emphasized the timeliness and global relevance of these themes, particularly noting their impact on emotions, politics, and public trust.

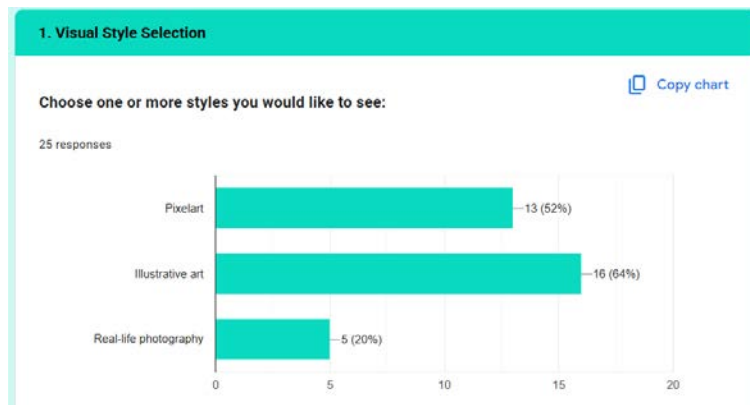


Fig. 3. Visual style selection responses in *Google Forms* (Multiple choice was allowed).

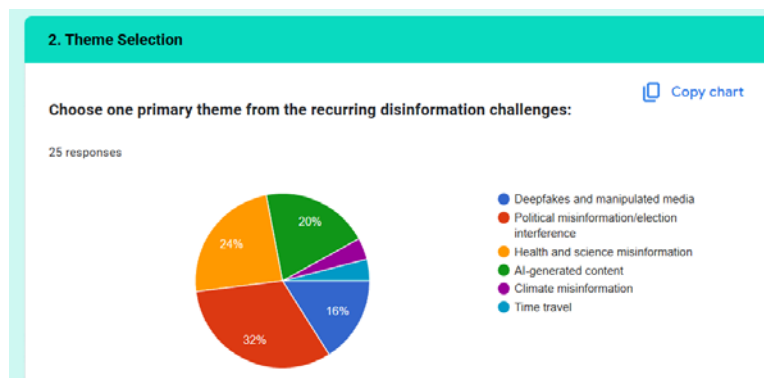


Fig. 4. Theme selection responses in *Google Forms*.

4.2 Setting and Character Preferences

Real-world settings demonstrated clear hierarchical preferences among participants (Fig. 5). Newsroom or media organization settings ranked highest at 24.4%, followed by social media company headquarters at 19.5%. Government offices received 12.2% preference, while university or classroom environments attracted 9.8% of participant interest.

Character role preferences (Fig. 6) showed a tie between journalists/reporters and students/researchers, each receiving 26.7% of responses. Fact-checkers garnered 12.1% preference, while ordinary citizens received 10.3% of participant support. These preferences reflect participants' desire for relatable, investigative scenarios rather than abstract or fantastical contexts.

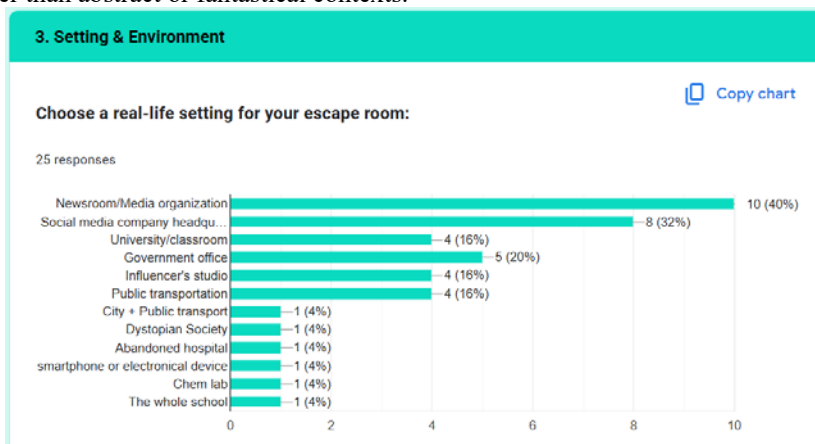


Fig. 5. Setting and Environment selection responses in *Google Forms* (Multiple choice was allowed).

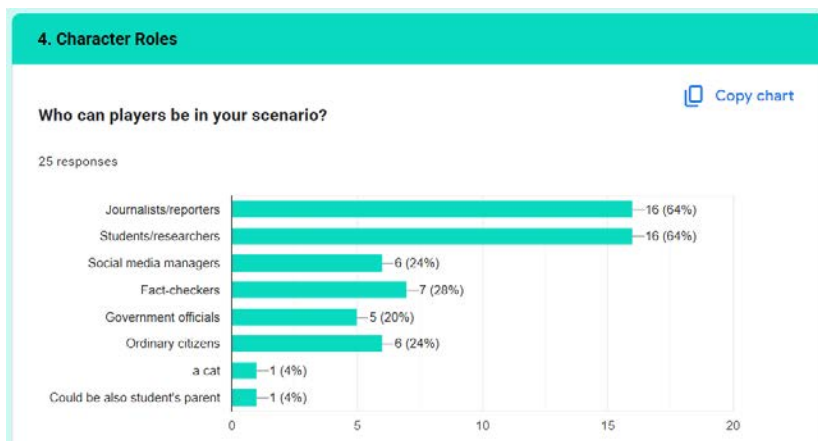


Fig. 6. Character roles selection responses in *Google form* (Multiple choice was allowed).

4.3 Game Objectives and Puzzle Design

Central game objectives revealed participants' focus on actionable misinformation encounter (Fig. 7). Finding the source of disinformation emerged as the primary objective preference at 30.4%, followed closely by stopping viral fake news from spreading at 26.1%. Protecting individuals victimized by disinformation was 15.2% and restoring trust in legitimate media gathered 13% of participant selections.

Puzzle type preferences (Fig. 8) emphasized several key elements. Participants favored visual analysis, source verification, pattern recognition activities, and cross-referencing tasks, and collaborative problem-solving approaches. Additional preferences included progressive difficulty with multiple solution paths and integration with narrative elements rather than standalone challenges.

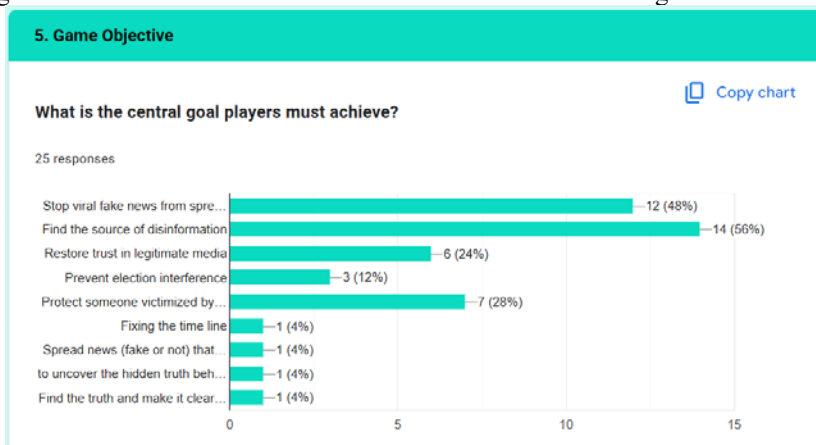


Fig. 7. Game objective selection responses in Google form (Multiple choice was allowed).

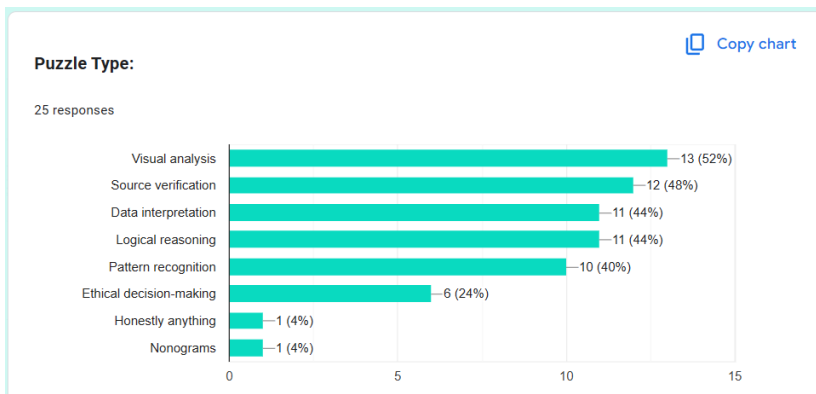


Fig. 8. Puzzle type selection responses in Google form (Multiple choice was allowed).

4.4 Accessibility and Inclusion Insights

Participants provided comprehensive recommendations for inclusive design implementation. Visual accessibility suggestions included high contrast themes for low-vision users and text alternatives for visual and audio content. Technical accessibility considerations encompassed multiple information channels (visual, textual, audio), simple language avoiding jargon, and accommodation for slower internet connections and older devices. Cultural inclusivity recommendations emphasized diverse character representation while avoiding stereotypical portrayals.

5 Discussion

Workshop results confirm the value of PD in effective involvement of end-users in pre-planning grounded, immersive, and accessible educational ER experiences. While maintaining participant attention and engagement during the process, valuable data has been gathered through a combination of real-time polling, brainstorming, and structured feedback questionnaires. Data will be used in the creation of 3 different ER games, and implementation and evaluation of these games will help to further confirm the effectiveness of PD in the development process.

Participant feedback, gathered through surveys and open discussions, emphasized several recurring themes. The PD process was perceived as fun, collaborative, and informative. Many participants, including youth, reported learning new perspectives on disinformation throughout the session. A strong preference emerged for realistic scenarios that felt grounded in everyday digital experiences and avoided abstract or moralizing tones. Neutral missions framed around investigation, teamwork, or digital problem-solving were preferred over those suggesting the pursuit of “truth.”

Visual inclusion and accessibility were consistently mentioned, including suggestions on color contrast, text readability, gender balance in character design, and overall interface clarity. Both individual and group gameplay modes were seen as valuable for maximizing accessibility and engagement.

The online workshop format proved to be very effective for the inclusion of participants from different states, but revealed limitations such as limited time for deeper discussion of complex topics, trouble building rapport in a virtual environment, and the challenge of managing different views on a subject within a given time. Next to that, all participants were self-selected and may not ideally represent a broader population that may interact with the created video games.

6 Conclusion

This paper demonstrates the potential and feasibility of incorporating PD approaches as an important building block of educational ER video games. Structured online collaboration with 41 stakeholders across three countries allowed identifying end-user preferences for narrative themes, visual styles, and puzzle mechanics that balance engagement with educational objectives.

The study contributes to both methodological insights about conducting international PD workshops and real findings about stakeholder preferences for media

literacy education games. The created guidelines provide a valuable starting point for similar project workshops while also highlighting the importance of user-oriented design and co-creation in educational technology development. Combined with the findings from our recent literature review about EERs for media literacy [21], the results of the PD workshops will serve as the departure point for designing the escape rooms of the ENDGAME project.

As misinformation continues to challenge democratic discourse and social cohesion, educational tools must be improved and adapted with and for the young people they aim to serve. PD offers a path toward more relevant, engaging, and effective educational games that respect learner agency while advancing critical learning objectives.

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