“The Moving Pictures Factory”: Designing a Game-based Platform for Cinema Literacy

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ABSTRACT
In this paper we discuss the design of a digital games platform for cinema education and literacy. Through a mainly qualitative approach, we explore the students’ and teachers’ requirements, needs, and preferences collected through a survey and focus groups, and discuss the relevant educational design principles. The findings suggest the learning potential of the games platform from the perspective of the teachers, as well as the potential implementation challenges to be considered in the design. The children’s insights reveal game design goals such as freedom and autonomy, creative expression, social play and interaction, as well as their preferred themes and narratives. We hope that the findings could serve as a model for the design of educational games especially within the field of creative arts.

Keywords
Game based learning, film education, media literacy, cinema literacy, digital games, serious games.

INTRODUCTION
In this study, we discuss the design of an online platform integrating digital games for cinema literacy for young children. Cinema literacy is part of the broader field of media literacy and involves skills and competences for critically analysing and evaluating content, understanding the techniques and conventions used in films, understanding how films impact our thoughts and emotions, and developing a deeper understanding of the cultural and social contexts the films are situated in (Buckingham et al., 2005;

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Silverblatt, 2018). Cinema literacy equips children with the skills to critically view, assess and reflect on cinematic content they encounter (Bazalgette, 2022).

A substantial body of research and practice over the past few decades has documented the potential of digital games -when appropriately designed- as effective educational tools for teaching and learning (de Freitas, 2018; Hainey et al., 2016). Through games children take an active role in processing and comprehending the material (British Film Institute Primary Education Working Group, 2003). Their interactivity, mechanics, and embedded narrative structures enhance children's motivation, encourage experimentation, exploration, and foster a deeper understanding of even complex concepts. The concepts and challenges of the game are integrated into an authentic and meaningful context (Shaffer, 2006).

Digital games, being close to young people's media culture, can be powerful tools for children's film education and literacy enhancing existing traditional practices (Atzori, 2023). They are certainly a distinct medium to films, nevertheless they draw on qualities of existing media and share certain characteristics with films such as a narrative, a point of view, sound, and mise-en-scène (King & Krzywinska, 2006). There is a notable overlap between digital games and films in terms of their expressive tools, analysis, literacy development, and interaction as forms of media (e.g., the adaptation of films into digital games and vice versa) (King & Krzywinska, 2002, 2006; Lessard, 2019). The interactive nature of games can offer unique pedagogical opportunities by allowing students to actively engage with cinematic elements such as camera angles and editing, and understand how these elements enhance and impact storytelling, fostering a more hands-on approach to cinema literacy (Arsenopoulou et al., 2023).

Surprisingly, although digital games-based learning has been studied and applied in a wide range of subjects such as scientific literacy, mathematics, history, and language learning (Hussein et al., 2022; McCall, 2016; Poole & Clarke-Midura, 2020; Voulgari, 2020), research on the design and implementation of digital games aiming to support cinema literacy is limited. A recent systematic review and analysis of games on media literacy, as defined in the Dutch Media Competency Model, (Glas et al. 2023) found an over-representation of specific media literacy topics such as misinformation and digital safety, and of skills such as understanding how digital media work and reflecting on media usage, at the expense of a "broader set of media literacy skills" such as creating with media, connecting through media, and discussing media. At the same time, existing games focusing on media literacy or on topics, skills and competencies relevant to media literacy, seemed to lack a more "holistic multi-dimensional" approach which combines practical and reflective skills and builds upon their interdependence, as well as a focus on more "participatory, creative or socially oriented competencies". To address this gap in existing games for cinema literacy, we aimed to design and develop a digital games platform for children, through the "Moving Pictures Factory" project.

Previous studies have shown that games can foster a range of cognitive, affective and social outcomes (Connolly et al., 2012). Their success, though, often depends on how well design decisions align with players' expectations and learning contexts (Schrader, 2023; Silva, 2020). Scholars such as Khaled and Vasalou (2014) argue that serious games should be conceptualised not merely as tools for transmission but as situated design practices that mediate between pedagogical intentions, technical affordances, and player agency. This perspective informs our approach, where participatory design with children is not just a way to test usability, but a method for enabling them to express their expectations and values in relation to gameplay and learning.

The Moving Pictures Factory Project

The main objective of the project was the design and development of a digital games platform for education on the technologies and language of cinema, aimed at primary education children (ages 6-12). The term "Factory" was a key concept of the project; the term is inspired by the Lumière brothers' factory, to whom the invention of cinema is attributed. Through this term, we aimed to emphasise the role of technology as a tool and its application by the workers of the 7th Art. It resonated with the historical essence of cinema and suggested a place of creation and creativity, innovation, and production, where "moving pictures" are crafted.

It is intended for the context of formal (i.e., school), informal (e.g., home), and non-formal (e.g., after-school workshops) learning settings (Cedefop, 2015; Karalis, 2009; Kasola & Karalis, 2022). The main goals of the platform were to engage students with the basic principles of film creation (technical skills), support critical and reflective viewing of films (cinema literacy), and familiarise the target audience with the applied audiovisual language. The objective was to contribute to the formation of a thoughtful cinema audience, helping them to encode and decode more effectively the cinema language and media. The project was implemented in two phases:

a) During phase A we conducted a needs analysis, determined the educational units, designed, and modelled the learning games (see details in the Methodology section). This phase was mainly research and design-oriented and was based on the interdisciplinary collaboration of experts in cinema, film education, game-based learning, and media literacy. The goal was to create a cohesive set of topics and actions that accurately reflected the cinematic practices, but primarily, to determine the pedagogical-learning objectives of each specific application and to define the framework of the overall playful digital experience.
b) Phase B involved the artistic design, the development and composition of the models, the development of the applications (i.e., games and interactive activities) and their integration into the platform, the testing and piloting, and the final dissemination of the platform.

METHODOLOGY

Educational Design Principles

The first step of our study was to review existing practices and principles in cinema education (e.g., British Film Institute Primary Education Working Group, 2003). Through this literature review, the following recommendations and guidelines were identified:

Cinema Literacy Skills and Competencies

Since our primary goal is to promote children's cinema literacy, we aim to integrate games focused on the technical aspects of filming and the elements composing a film such as camera and camera movements, lighting, sound, music, shots, while also promoting the development and understanding of the language of cinema. After establishing the basic knowledge of technical filmmaking elements (functional literacy), we aim to support the development of knowledge and skills of critical literacy, such as critical thinking and attitude, identifying the ideological, social, and cultural context of a film (Brisk & Harrington, 2010), how the technical elements represent this social and cultural context, and understanding the media employed in order to achieve a cohesive outcome. Finally, a crucial aspect is the in-depth exploration of the cinematic language and the use of film's expressive tools as an art form, both from the perspective of the creator and the audience (Giannetti, 2014). Through the platform, the children will learn to interpret the elements and tools of cinema, decode messages,

concepts, and values, understand how the tools of cinema support expression and evoke emotions and thoughts to the public.

Developing an Awareness of Social and Cultural Contexts

A key goal of the platform is to foster children's ability to analyse films within their social and cultural frameworks. Through the game activities, students will be guided to identify and understand the conventions that define the social and cultural context of a film, including how it was produced and its intended audience. For instance, children will be encouraged to recognise and critique stereotypes and archetypes, such as how heroes are portrayed in fantasy or superhero films. Additionally, they will explore cultural and social differences across various films, allowing them to evaluate, question, and propose alternative representations (British Film Institute Primary Education Working Group, 2003). Encouraging children to recognise and critique stereotypical representations in films is supported by research on films as tools for social and cultural criticism. Genres such as comedies may serve as vehicles for critiquing social norms and cultural discourses (Bakar, 2021).

Fostering Higher-Order Cognitive Skills

The platform also aims to promote deeper comprehension of cinematic meaning through the development of higher-order cognitive skills such as critical thinking, problem-solving, and decision making. Through structured activities that go beyond surface-level understanding, children are encouraged to analyse, synthesize, and infer meaning from complex materials (Hamzah et al., 2022; Liu et al., 2024). By engaging in platform activities, children will be encouraged to think critically and draw informed conclusions about the films they encounter. These activities will be designed to challenge students to go beyond surface-level understanding, helping them refine skills such as analysis, synthesis, and inference (British Film Institute Primary Education Working Group, 2003).

Showcasing the Multiple Dimensions of Cinema

In the design of the platform, emphasis is placed on the multiple dimensions of cinema: as a technology, as an art form, and as an industry (Vaniuha et al., 2024). The platform highlights cinema both as an artistic expression and as an industrial and technological process. This will help children understand who the creators and decision-makers are in the filmmaking process, and how these individuals influence the messages, principles, and values conveyed through films. The historical technological advancements upon which cinema is based, and the basic scientific principles that enabled the development of tools like the camera and projector, will be central to several of the platform’s games. By focusing on cinema as an industry - reinforced by the platform's characterization as a "Factory" - children will gain insights into the workflow and the roles of the various creators and decision-makers in film production.

Meaningful Activities in an Authentic Context

To enhance children’s interest and engagement and help them understand the significance of the concepts explored, the activities are situated within a meaningful and authentic for the children, context (Dewey, 1963). As meaningful activities we define the activities that children find personally valuable and relevant to their lives; activities that reflect their interests and experiences. Similarly, authentic activities are rooted in real-life contexts and experiences of the children, allowing them to link learning with their own lives and communities. For example, games will be framed around a larger goal or narrative with missions that the children must accomplish. In this way, knowledge and skills are not an end in themselves but tools for achieving a final result. Through this approach, the children will be able to choose the appropriate tools or techniques to achieve the desired outcome (to convey the message, idea, or emotion they aim for in their work as filmmakers). Additionally, by being able to

decode the techniques and tools used in a film, they will be gaining a deeper insight into a filmmaker's intentions.

Connecting to Children's Experiences and Interests

From a young age, children are exposed to various forms of audiovisual expression that use the tools of cinema, and they begin to form knowledge, perceptions, and opinions, which are often subconscious and not fully understood (Bazalgette, 2022; Clearing House of the Department of Mass Communication of Unesco, 1961). This prior experience and knowledge form the foundation for future learning. The platform's activities, concepts, and materials will be designed to connect with the immediate experiences and interests of children (British Film Institute Primary Education Working Group, 2003; Danish Film Institute, 2020). By working with material that aligns with their interests and daily experiences, by transitioning from the familiar to the unfamiliar, children can more easily integrate new concepts, knowledge, and meanings into their existing conceptual frameworks (or challenge them). This helps them better understand the concepts before integrating them into the context of cinema tools and language (British Film Institute Primary Education Working Group, 2003; Theodorides, 2017; Papadopoulos, 2021). Since the specific interests and prior experiences of each child using the platform are unknown and children may have different starting points, evidence-based design decisions will be made to ensure the platform caters to a broad spectrum of children's needs. Feedback from the target audience (questionnaires, focus group interviews) was used to assess the needs and preferences of children, as described in the next sections.

Alignment with the School Curriculum

Wherever possible, the platform's activities and materials will be linked to the existing Greek school curriculum. The aim is for the activities to cross over into the subject areas of the Primary Education Curriculum (Theodorides, 2017). This approach facilitates the smooth and effective integration of the platform into existing classroom practices, making it easier for both teachers and students to use.

Data Collection and Participants

We examined the needs, requirements, and expectations, through a survey to teachers and focus groups with children. Both the survey and the focus groups were conducted online due to the covid-19 restrictions. The responses were analysed to be further considered for the design, development, and implementation of the platform.

The questionnaire was distributed online at a Film Festival for Children and Young People in 2021 during a dedicated event organised to present the rationale and design of the platform. Following the presentation, educators and trainers attending the event were invited to complete the survey. Their insights would help us align the platform and game design with the classroom conditions, including pedagogical needs, available resources, and curriculum requirements. The survey included demographic questions (profession and specialty, gender, years of experience) and five open-ended questions:

- Q1 Do you believe you could use the "Factory" platform with your students? If yes, in what way?
- Q2 What difficulties, challenges, or problems do you think you might face regarding the use of the "Factory" platform at school?
- Q3 In what way do you think you could implement the "Factory" with your students?
- Q4 What difficulties do you think you might face regarding the use of the "Factory" platform at school?
- Q5 Any other comments or suggestions?

Additionally, two focus groups with children were conducted. It was our intention to invite children who may have some knowledge of cinema and filmmaking to ensure more insightful and information-rich data. The call for participation was distributed through the networks of one of the partners focusing on film education and organising workshops and events for children (e.g., film festivals). Participants were volunteers who responded to the call. Focus group 1 (FG1) involved three students aged 8-10 years (2 girls, 1 boy), and focus group 2 (FG2), three students aged 11-12 years (2 boys, 1 girl). Drawing from the experience, the preferences, and the cultural references of the children was crucial for the design of the platform. Responding to the children's interests and connecting them with the design of the games and platform would allow us to adapt our pedagogy "in culturally responsive ways" and create "a meaningful learning environment that children could connect with" (Sisson, 2023). The open questions allowed the children to freely express their insights and preferences, while the researchers took the role of the coordinator, encouraging the participation of all children (Adler et al., 2019). Informed consent from the parents or guardians and the assent of the children was acquired before the focus groups. Participation was entirely voluntary. The main discussion topics and questions were:

- **Personal interest and habits**: What are their favourite activities? What games do they usually play? Which games do they like and why?
- **Exploration of previous knowledge about cinema and films**: How often do they watch movies? What is their favourite film? What films have they watched at school? Where do they watch movies? Who do they watch movies with? What types/genres of movies do they like? Which movies have they watched recently? Do they talk about movies with their friends?
- **Experience in film making**: Have they participated in any cinema-related workshops or other activities? Do they film videos with their mobile phones? Have they ever used a camera? How do they think films are made?
- **Opinions about the platform and its sections/activities**: What do they want to learn about cinema? What would they like a cinema museum to include?

When the focus groups took place, we had developed two sample games in order to elicit more concrete and focused feedback from the children by situating their insights in a realistic context (Celis et al., 2013): a) The "From the Character to the Movie" game (Figure 1), for the older children of FG2, was rather an open-ended simulation aimed at familiarising the children with the process of setting up a cinematic shot. Set in a classroom environment, the game allowed children to create a character, position them within the scene, adjust lighting and camera angles, and develop a storyboard to express specific ideas or emotions, and b) the "Creating Magic" game (Figure 2), for younger children of FG1, allowed them to experiment with modifying the content and meaning of a short film through basic editing. Children could view a sequence of film frames, delete any of them they wished, and observe how their choices altered the final animation. After demonstrating the games, we invited participants to share their feedback and suggestions. These games acted as boundary objects or artefacts that facilitated communication and ideation between the adult designers and the child participants, by embodying key educational goals and technical elements of the platform. As Khaled and Vasalou (2014) argue, boundary objects in participatory design gain significance in later stages of the design cycle when they are conceptually aligned with the theoretical underpinnings of the learning goals, thereby enabling children to generate more meaningful and relevant design ideas. In our case, the two games scaffolded children's reflections on scene composition, interactivity, and creative control.

Data Analysis

Quantitative data were analysed descriptively due to the small sample. For the qualitative data, three coders analysed the transcripts of the focus groups, and the responses to the open questions of the survey using focused coding and thematic analysis (Saldaña, 2009, p. 115) to identify themes grounded on the data. One main coder analysed the transcripts, and 2 coders analysed at least 20% of the data to verify the emerging codes and themes. Any discrepancies were negotiated among the coders until a final set of themes with conceptual clarity was agreed. Verbatim quotes from the focus groups and survey responses are cited here for each theme, translated to English from the original language. The code of the focus group and participant is included in every quote.

FINDINGS

The Perspective of the Teachers

The total number of respondents was 19 (N=19). All the respondents were educators in various levels and settings of education (primary, secondary, formal, non-formal), with most of them (7) specialising in arts (theatre studies, music, animation, film directing and editing, ceramics), languages (5) (literature, English, German, French), primary school education (4), social studies and sciences (4) (informatics, theology, social studies), and in 1 case physical education (in 2 cases the educators reported 2 specialities). The majority identified as female (12) and 7 as male. Their teaching experience varied from a few months to 35 years (M=18 years).

Learning Potential

For identifying the learning potential of the platform, we analysed the open questions Q1 and Q3. The most frequently cited theme that emerged was that the platform may allow for ***Engaging Learning Experiences*** (10 occurrences); the participants referred to ways through which the platform can meaningfully engage learners e.g., "*Learning in a pleasant way, developing skills*", "[combining] *presentation and comprehension activities*", "[the Factory] *can be the core, the motivation for the development of a student project*". The second most cited theme was the development of ***Technical Skills in Filmmaking*** (7 occ.), e.g., "skills development through the auditory and musical design of an animation", "*the technical aspects of photography and cinema need to be clearly understood*". The respondents further discussed the ***Creative Expression*** of students and educators enabled by the platform (5 occ.) e.g. "*I may give my students the opportunity to express themselves in a new and interesting way*". Through comments such as "[the platform can be implemented] *in the context of school activities focusing on audiovisual literacy and the language of the cinema*", and "*knowledge on the language of the cinema will become the foundations for cinema viewers who will be more aware on the function of the cinematic language*" the respondents emphasised the importance of development of ***Film Literacy and Cinematic Language*** (4 occ.). And finally, in 2 occurrences, the participants referred to the importance of ***Collaborative Learning and Teamwork***.

Implementation Challenges

By analysing responses in Q2 and Q4 we identified the main implementation challenges cited by the teachers. Existing ***Technical Infrastructure and Equipment Issues*** were the most referenced challenges particularly in schools (14 occ.) e.g., "*The speed of the internet is very low in our school. We may have problems if many users are trying to connect* [to the platform]", "*In my current school there is only one PC lab for the Informatics classes, so it's difficult to find it available.*" ***Time Constraints*** (6 occ.) due to pressures of the curriculum and the schedule, the ***Need for Teacher Training*** (4 occ.) particularly regarding the use of technology, ***Parental Concerns*** (3 occ.) regarding the

reservations of parents towards screen time, and the potential ***Cost*** (2 occ.) were also among the potential barriers for implementing the platform to formal education settings.

The Perspective of the Children

Cinema Education Experience

Although our sampling process may have introduced some bias regarding previous cinema experience (invitation sent through film education channels, discussed in the Data Collection and Participants section), it was nevertheless interesting to find differences between the younger and older children.

Older children had more experience in filmmaking and described in more detail and depth the filmmaking process (e.g., editing, green screen, sound design). They described technical details such as lighting, changing background, plot and expressed interest in learning more about production techniques: *"I like finding videos on YouTube, downloading them, and inserting them in my video"* (FG2_MY), "*I have some difficulty fitting the right music and lighting in a video, so as for the story to make sense"* (FG2_MA). Most of them had participated in after-school cinema education programs and had some experience in making films e.g., "*They showed us how to film a movie and how to add subtitles"* (FG2_MA), *"In [after-school program] we made a police movie and spoke about silent movies"* (FG2_SA).

Younger children described the filmmaking process as fun but challenging. They described the film creation process more vaguely and in more abstract terms e.g., "*I think they film movies piece by piece and then link them together*" (FG1_IO), and focused more on visual elements such as the set design and the roles of the actors, rather than any technical details, e.g., *"I like designing the sets because I like the crafts"* (FG1_LY) "*We made a scary movie in the forest with my friends"* (FG1_LA).

Freedom and Agency

The theme of freedom and agency came up when children were discussing their favourite games and their preferences. Indicatively, *"My favourite game [in Roblox] is Brookhaven. You enter [the game] and it takes you to a place in a city, and you do stuff that you also do in real life; you have a profession, a house, a car. You can go to the playground; you can do anything."* (FG2_SA). Notably, a girl in FG2 argued that she did not like digital games *"because I think that you do not give them instructions to play them, but they give you instructions [instead]. And it's not nice to tell you 'Do this' and 'do that' and you to have to do it. It would be better if you could do things yourself, as you think of them"* (FG2_MA). Similarly, younger children appreciated the freedom to express themselves and modify the content of the game such as creating characters and changing the background and sets, e.g., *"I've played a game where you dress up and set up Santa Claus"* (FG1_IO), *"I would like [the game] to have a green screen where we can add the sets"* (FG1_LA). Children seem to enjoy the opportunity to take initiatives, create, make choices, and control their path in the game.

Creative Expression

Children expressed their interest in games that would allow them to create or adjust their movies, design sets, use special effects, characters, chose music, and combine techniques and narrative by expressing their imagination: *"I have some difficulty finding the music that fits best, and the lighting, the decoration of the space where the actors will play"* (FG2_MA), *"I would like games with backgrounds and sets that change quickly, like puppets [theatre]"* (FG1_LY). The children discussed games that would provide them with the tools to create their own stories, characters, and film scenes, with the flexibility to modify elements such as background, costumes, and

props, and opportunities to experiment with film techniques such as lighting, sound, and editing.

Social Play

Although older children expressed their enjoyment in social play and playing with friends and family e.g., *"I now play online games because my friends have them and they tell me 'Join this game' and 'Join that game'"* (FG2_SA), *"I prefer playing with friends, because I am used to it"* (FG2_MA), younger children seemed to mainly play digital games alone or with close family members e.g., *"I play with my brother on the computer. But when I am alone, I play games with cars"* (FG1_IO). This could potentially be attributed to concerns of the parents on safety and security issues of online games.

Themes and Narratives

For designing content which could resonate with the children's interests, we explored their preferences of themes and narratives in films. Younger children discussed simpler stories, while older children seemed to enjoy more complex narratives. Both younger and older children referenced ***magic and fantasy*** elements: *"To have games with magic, like fairies"* (FG1_LY), *"It would be nice to have [the character] in a forest, to take a walk, and get lost. There may be dangerous animals, and then something magical to happen"* (FG2_MA). In both age groups, ***mystery and adventure*** also emerged as a theme they enjoyed: *"I would like games with mystery, like in Cluedo"* (FG2_MY), *"To be in a [village] square, where a crime happened, and to try to solve the crime, [and find] who killed whom"* (FG2_MY), *"We had made a police movie, where some people robbed a bank and we called the police"* (FG2_SA), *"I would like to film a scary movie, with ghosts, zombies, and policemen"* (FG1_LA). Elements such as the ***emotional impact***, e.g., *"My favourite film is Coco because it shows that we must not hold on to things that we don't know how they really happened"* (FG2_MA), *"[my favourite movie] sometimes it's also emotional like when his mother went to find him"* (FG2_SA), ***humour*** e.g., *"Many people were chasing him! We laughed a lot."* (FG2_SA), and ***historical context*** e.g., *"[I like this film] because it's set in WW2, and I like this kind of movies."* also came up. Younger children particularly discussed themes closer to their ***immediate experiences*** e.g., *"I would like games like MacQueen [in the animated film Cars]"* (FG1_IO), *"I would like it to have many images, like the puppets in [a popular shadow theatre]"* (FG1_LY).

Discussing the Games

When discussing the pilots of the two games showcased by the researchers, all children of FG2 disapproved of the classroom setting of the "From the Character to the Movie" game, as they thought it would limit the potential for plot, dramatic events, or actions in the game, probably drawing from their own experience in a real-classroom settings (e.g., *"I don't like the setting [..]. I think I would like it to be, not in a classroom, but a playground, or at home, where they can do many things. What can you do in a classroom? [..] There are not many things you can do."* (FG2_MA), *"I would change the space. I wouldn't film the scene in a classroom [..]. I would prefer somewhere outside"* (FG2_SA). One of the children further commented that there should be more characters and not a lone child in the classroom scene.

Figure 1 The “From the Character to the Movie” game

In the case of the “Creating Magic” game, the younger children did not share any in-depth insights except that they would enjoy playing the game, and that they liked the theme with the magician. It could be the case that they lacked the vocabulary to express their requirements, or that merely showcasing the game to them was an inadequate approach to elicit their feedback.

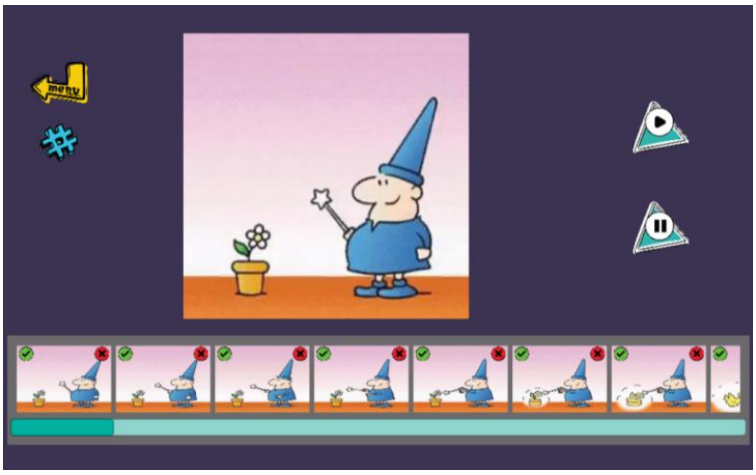

Figure 2 The "Creating Magic" game

DISCUSSION AND CONCLUSIONS

By exploring the perspectives of both teachers and students and relevant literature on film education, this study identified themes that highlight both the educational potential and design implications and challenges for the development of digital games on cinema literacy for young children (primary education). The findings emphasise the need for a flexible, age-appropriate, and creative platform that fosters cinema literacy through meaningful and engaging game-based activities.

The differentiated needs, preferences, and experiences of younger and older children require the design of adaptable and age-appropriate games, with varying complexity of narratives, focus on and terminology of the technical aspects, and creative autonomy, such as multiple versions of each game with varying levels of difficulty, while maintaining the same learning goal. These variations allow the platform to meet the different interests, prior experiences, and cognitive development levels of children. In

both age groups though, support for and encouragement of exploration, creative expression, and creative autonomy emerged as key design requirements. This finding aligns with research on constructivist game-based learning (Shaffer, 2006), highlighting the importance of engaging children as active creators rather than passive consumers. The games should feature tools for creative storytelling that allow for both structured and open-ended play, such as sandbox-like features for experimentation with narratives and techniques.

The findings revealed differences in how younger and older children engage with games socially. Older children expressed enjoyment in multiplayer games where they could collaborate or compete with friends, while younger children reported playing games individually or with family members. Social interactions within games for learning can foster teamwork, communication skills, and shared creativity (Danby et al., 2018; Gonçalves et al., 2023). At the same time, safeguards must be in place to ensure age-appropriate interactions. Relevant design features could be multiplayer modes for older children to co-create films or solve challenges together, family-friendly activities that encourage younger children to play with parents or siblings, and options for safe sharing and showcasing of children's creations within a secure environment.

The teachers' responses highlighted practical challenges for implementing the platform in formal educational settings, including technical infrastructure issues such as low connectivity speed, limited availability of computers, older systems, time constraints, lack of financial resources, and the need for teacher training. These findings align with broader challenges in integrating digital tools into classroom environments (Muehrer et al., 2012). It is therefore crucial to ensure the platform is accessible on devices with low technical requirements, design flexible games that can be completed within short time frames to address curriculum pressures, and provide teacher training resources and instructional guides to support educators in integrating the platform into their teaching. Tablets and smartphones are easily accessible by the children and are often used in their everyday practices (e.g., creating videos with friends or family). They seem, therefore, as appropriate devices for accessing the games in informal learning settings.

Beyond the evaluation of a specific platform or game, it is important to reflect on serious games as a broader design and cultural practice. Serious games are situated within frameworks of pedagogical, technical, and social dimensions. The player experience is determined by the learning goals, the affordances and the constraints of the medium. As such, our study aligns with perspectives that conceptualise serious games not just as tools for instructional efficiency, but as situated practices that mediate between designers, learners, and institutions (Blumberg et al., 2012; Khaled & Vasalou, 2014). This reflexive stance allows us to position the "Moving Pictures Factory" not only as a functional intervention, but as a contribution to the evolving discourse on the design and appropriation of serious games.

By following a more participatory approach and incorporating teachers' and children's voices into the design process (Druin, 2002; Khaled & Vasalou, 2014), this study aimed at aligning the educational games with students' interests, experiences, and developmental needs, as well as to the practical implications and challenges of school implementation of digital games. Silva's proposed methodology for the design of educational games (2020) similarly emphasises the integration of pedagogical objectives supported by the mechanics and the aesthetic dimensions of the gameplay. The structured engagement of the children enabled them to meaningfully shape the design and development of the games, contributing to the creation of more engaging and contextually relevant educational games. Through this approach we tried to ensure that the platform will be easy to use in existing school practices and engage children as active learners and creators to promote cinema literacy. Future work will involve the

development and testing of the platform and games and evaluating their effectiveness. Nevertheless, we hope that the findings could serve as a model for the design of educational games especially within the field of creative arts.

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