



Teacher Motivational Scaffolding and Preschoolers' Motivational Triggers in the Context of Playful Learning of Multiliteracy and Digital Skills

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Abstract

This research focuses on exploring teacher motivational scaffolding and preschoolers' motivational triggers in a playful learning project conducted in a Finnish preschool context. The aim of playful learning was to promote preschoolers' multiliteracy and digital skills in a news-making project. The participants were 17 preschoolers and their teacher. Video ethnography and qualitative content analysis were employed as research methods. The findings indicate that the teacher's motivational scaffolding strategies in playful learning pedagogy included connecting with the preschoolers' prior experiences and interests, promoting exploration skills, supporting the different developmental levels of the preschoolers, and encouraging them to participate in playful learning. The following motivational triggers were identified for preschoolers: 1) engaging in discussions about news, 2) exploring news through traditional and digital media, 3) utilizing digital tools, and 4) creating and engaging in news-related activities. The findings contributed to the development of a motivational design model for playful learning.

Keywords Motivational scaffolding · Motivational triggers · Playful learning · Multiliteracy · Digital skills · Design-based research

Introduction

Over the last decades, the concept of scaffolding has received significant attention in educational research fields across various learning contexts (Atmatzidou & Demetriadis, 2017; Belland et al., 2013), such as teachers' motivational scaffolding strategies (Alvarez-Vargas et al., 2023; Masters et al., 2023; Pentimonti & Justice, 2010). This paper focuses on teachers' motivational scaffolding (Belland et al., 2013), which refers to strategies used by teachers to motivate children in their learning activities. Belland et al. (2013) emphasised that

motivational scaffolding theory highlights the roles of both the learning environment and teaching in enhancing learners' motivation. In the present study, teachers' motivational scaffolding was explored in the context of preschoolers' playful learning (PL). Playful learning is widely regarded as a crucial pedagogical method in early childhood education (Hassing-Das et al., 2017; Singer, 2015) that supports learners' motivation, agency, and creative exploration (Kangas, 2010; Whitton, 2018).

Teacher guidance and scaffolding have been the focus of research in creating engaging and motivating PL environments for children (Kangas et al., 2017; Koyuncu et al., 2023; Maksić & Josić, 2019; Sun et al., 2023). However, there remains a gap in understanding how teacher scaffolding can effectively enhance children's multiliteracy and digital skills in the preschool context. As Yelland (2018) pointed out, there is a need for a redesign of pedagogy to teach multiliteracy and digital skills in schools. Addressing this gap is critical, as the development of multiliteracy and digital skills is essential in promoting children's twenty-first century skills, aligning

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with the demands of the digitalised world. As learners are not automatically motivated by authentic, problem-based learning situations (Belland et al., 2013), the teacher plays a vital role in supporting learners' motivation and engagement in PL by providing the necessary guidance and encouragement (Kangas, 2010; Kangas et al., 2017; Sun et al., 2023). Learning is enhanced when motivation translates into behavioural, emotional, and cognitive engagement (Reeves, 2006). Teachers' motivational scaffolding strategies can boost learners' motivation in PL (Alvarez-Vargas et al., 2023). Similarly, previous research indicates that PL can increase learners' intrinsic motivation (Baker et al., 2023; Nesbitt et al., 2023). Motivation refers to a learner's reason for behaving as they do (Ainley, 2006; Ely et al., 2013; Renninger & Bachrach, 2015; Renninger & Hidi, 2022).

In this research, we are also interested in preschoolers' motivational aspects in the PL process. Specifically, the aim is to explore preschoolers' motivational triggers in a news-making project designed to enhance children's multiliteracy and digital skills. Technology is seen as both a tool and a target of PL, encouraging creativity and hands-on activities (Kangas, 2010; Glezou, 2020; Heljakka et al., 2019). One aim of PL is to foster children's agency utilising digital technology (e.g. Kangas, 2010; Kangas et al., 2017; de Koning-Veenstra et al., 2014; Hassinger-Das et al., 2017). In early childhood education, educators are encouraged to use technology to enhance children's motivation, including motivation towards literacy (Burnett, 2010; Flewitt et al., 2014). In the news-making project, preschoolers engaged in various playful literacy activities, such as story crafting and video shooting.

Reeves and Lin (2020) argued that educational research typically focuses on practices that are already working rather than on those with problems to be solved. This study approaches the promotion of children's multiliteracy and digital skills through the perspectives of preschoolers and their teachers. The Finnish core curriculum for basic education suggests applying PL methods to support children's learning and multiliteracy development (Finnish National Board of Education (FNBE), 2014; McInnes, 2019). The importance of this research lies in its contribution to the ongoing dialogue on educational practices. By focusing on preschoolers' motivational aspects in PL and the effective application of teacher motivational scaffolding strategies, this study not only aims to understand the behaviours of teachers and children but also to develop pedagogical practices and methods.

Theoretical Background

The theoretical background ties together research on motivational scaffolding (Belland et al., 2013; Koyuncu et al., 2023; Liping et al., 2023; Maksić & Josić, 2019), motivational triggers (Ainley, 2006; Ely et al., 2013; Hidi & Renninger, 2019; Kotkas et al., 2017; Renninger & Bachrach, 2015; Renninger & Hidi, 2022; Sherry, 2021; Siklander & Harmoinen, 2021), and PL (e.g. Kangas, 2010; de Koning-Veenstra et al., 2014; Hassinger-Das et al., 2017). Our investigation primarily focuses on motivational scaffolding and triggers, while the research context is PL in preschools.

Motivational Scaffolding

Learners' motivation can be understood as their eagerness and readiness to exert effort and continue with the learning task, and in this process, teacher scaffolding plays a key role (Belland et al., 2013; Schunk et al., 2008). Wood et al. (1976) used the term 'scaffolding' and denoted adults' role and assistance in the learning process of children, encompassing strategies such as direction maintenance and demonstration. Over the decades, the concept of scaffolding has been widely used in educational research and practice, and a number of other different scaffolding strategies, such as cognitive, social, procedural, and motivational scaffolding, have been identified (e.g., Baxter & Williams, 2010; Belland et al., 2013; Hannafin et al., 2001; Koyuncu et al., 2023).

In this research, we focus on teacher motivational scaffolding strategies, which, according to Belland et al. (2013), initially trigger learners' interest and enhance their motivation in the activities and subsequently foster learners' ownership of a task. The authors divided motivational scaffolding frameworks into three primary strategies, which were used as the conceptual frameworks of this study, with a specific focus on scaffolding strategies that foster children's interest. The first is *prompting learners to choose an aspect of the problem that connects to their interests* (Belland et al., 2013). In this research, preschoolers were given the autonomy and agency to make decisions based on their interest in the news-making project. In addition, socially shared PL was promoted by developing shared goals in the process.

The second scaffolding strategy involves *asking driving questions that intrigue learners and that can be addressed only by investigating the target material* (Belland et al., 2013). This strategy focuses on questions proposed by the teacher to stimulate the children's interest and curiosity. The third scaffolding strategy is *using language that is congruent with learners' everyday experiences when describing tasks/content* (Belland et al., 2013). This means that the teacher needs to express herself and use materials and concepts in a language that the children could understand. This

requires from the teacher pedagogical competence, sensitivity, and engagement in the pedagogy of child-centred PL. As Koyuncu et al. (2023) highlighted, scaffolding during child-centred playful interactions may be challenging and requires strong teacher professionalism. In their research, the teacher's scaffolding strategies consisted of using questions, hints, probing, and wait-time in supporting the children's activities.

Maksić and Jošić (2019) explored types of scaffolding for the development of creativity and found that motivational scaffolding for creative learning consisted of stimulating interest, allowing freedom, rewarding, and instilling an appreciation of the value of creativity. In a game-based study conducted by Koskinen et al. (2023), the authors suggested that an emotional scaffolding design improves the development of interest among players. This shows the meaning of emotional aspects in scaffolding and guiding teachers' activities (Kangas et al., 2017; Sun et al., 2023). Based on their literature review on scaffolding in a game-based learning context, Sun et al. (2023) emphasised that scaffolding strategies are important for supporting learning, engagement, skills development, and the joy of learning. The authors also found that teachers can use diverse scaffolding strategies in particular phases of learning—for instance, in familiarising players with various activities. Kangas et al. (2016) suggested a shift in the teacher's role during the learning process, from organising activities within a pedagogical framework to introducing the topic, guiding the learning process, and facilitating the discussion during the process. Regarding the scaffolding of multiliteracy learning, Wong (2015) and Kirova and Jamison (2018) stressed the importance of providing young children with scaffolding in multiliteracy development at home, which significantly enhances their learning outcomes in a school setting.

Motivational Triggers

Triggers are motivational structures that can include affective and cognitive components; they are factors that catch, maintain, and rekindle a learner's *interest* and willingness to engage in activities (Hidi & Renninger, 2019; Siklander & Harmoinen, 2021). In general, interest is defined as the most prevalent emotion that directs everyday activities (Izard, 1991). This study focuses on *motivational triggers* that stimulate learners' *situational* and *maintained interest* (Hidi & Renninger, 2019; Renninger & Hidi, 2022). Renninger and Hidi (2019, 2022) defined four phases of interest development.

At first, the learner is triggered cognitively and affectively by *situational interest*, attends to content briefly, and may not be aware of the experience. Additionally, the learner may need support from the teacher or others and

may experience positive or negative feelings in the process. Next, in the *maintained interest* phase, the learner focuses on something interesting that reoccurs or persists and reengages previously triggered attention and developed knowledge. Support may be required from the teacher or others to find connections between earlier skills, knowledge, and experiences. The maintained interest usually arises from positive emotions (Hidi & Renninger, 2019, 2022). Hidi and Renninger (2019) clarified that situational interest arises and focuses on content and situational factors, whereas maintained interest indicates engagement that is typically supported by others. The next two phases involve *emerging* and *well-developed individual interests*, which usually take time to manifest and require reflection and question reframing. These phases are more advanced forms of interest development (Hidi & Renninger, 2019, 2022) and are, therefore, not in focus in the present research.

However, interest is not always linear; it rises and falls from moment to moment in response to changes in the environment and develops through interactions with others (Izard, 1991; Mouratidis et al., 2011; Renninger & Hidi, 2022). In the motivational trigger process, situational and individual interests and the relevance of knowledge are crucial (Renninger & Hidi, 2022). The authors refer to self-related information processing, where the content is relevant to learners and the relevance depends on the usefulness of the knowledge. Earlier research indicates that interest and relevance can lead to the enjoyment of knowledge (Ainley, 2006; Ely et al., 2013; Renninger & Bachrach, 2015; Renninger & Hidi, 2022). A goal of PL is that learning is interesting, enjoyable, fun, and grounded in children's prior knowledge (Kangas, 2010; see also Reeve et al., 2008). According to Renninger and Hidi (2022), relevant knowledge is meaningful, familiar, relatable, and situational, and individual interests strive to fill the curiosity gaps in knowledge structures. Renninger and Bachrach (2015) highlighted the importance of understanding the triggering process to design learning environments that enable children to determine their interests and thus engage in learning. In addition, grasping the relationship between emotional support / positive feedback and the triggering of interest and motivation is essential (Reeve et al., 2008). It is the teacher's attitude and supportive behaviour that impact children's motivation (Komarraju, 2013; Kotkas et al., 2017).

In this study, preschoolers were seen as active news and knowledge creators during the PL process. Triggering children's interest and enhancing their motivation are crucial aspects of PL. Previous research shows that there are many ways to grab the interest of learners, such as the novelty of the environment, uncertainty, complexity, challenges, and discovery (e.g., Izard, 1991; Reeve, 2008). Krapp and Prenzel (2011) stated that the teacher's role is to find

students' motivational triggers to promote effective learning. Playful learning environments can themselves trigger children's interest and promote their motivation. Sawyer's (2017) findings support the use of playful and play-based pedagogy to trigger and maintain children's interest. In this research, preschoolers' motivational triggers were explored in a learning context, where novel tools and methods were used with the aim of supporting children's' multiliteracy and digital skills. Employing PL is especially effective in this regard, as it is a key method for teaching these skills in pre-primary and primary education (FNBE, 2014; Pihlaja & Kangas, 2023; Yelland, 2018).

Playful Learning of Multiliteracy and Digital Skills

Here, we denote by PL a holistic, interactive, and learner-centred approach bridging the gap between academic learning and playful exploration. Learners are seen as active knowledge co-creators who can share ideas and use their imaginations (Kangas, 2010; Ferguson et al., 2019; Hassinger-Das et al., 2017; Hyvönen, 2008; Moyles, 2010). In the PL process, through interaction, support, and guidance, the teacher facilitates the development of children's motivation for play activities and promotes curricular goals while maintaining critical aspects of play, such as voluntariness, autonomy, and enjoyment (Kangas et al., 2017; Karpov, 2005). Playful learning recognises playfulness, creativity, emotions, narrativity, collaboration, and embodiment as important elements of learning along with the use of diverse media and technologies (Kangas, 2010; Kangas et al., 2017; Hassinger-Das et al., 2017; Manzano-Leon et al., 2021). Playful learning, combined with technology practices, enables innovative learning and allows children to discover and have adventures with new aspects of their environment (Kangas et al., 2017). In the teaching of children's multiliteracy, PL plays a crucial role. By playful exploration and producing different forms of media and texts guided by the teacher, children can acquire creative thinking, cooperation, and multiliteracy skills (FNBE, 2022).

Multiliteracy is a broad concept entailing cognitive, skill-based, and affective components and refers to the competence to interact with different kinds of content, including verbal, visual, auditory, and numeric, as well as kinaesthetic symbol systems and their combinations (FNBE, 2018; Rasi et al., 2019). It is an umbrella term for various literacies, including media, coding, and visual, and at all ages, it requires goal-oriented teaching and learning (Burnett, 2010; Kupiainen, 2019; Monteiro et al., 2021; Valkonen et al., 2020; Walsh, 2020). The concept of multiliteracy extends beyond traditional literacy skills and refers to a multilayered competence involving a learner's ability to search for, interpret, and evaluate information, produce various digital

and media content, use different media and digital tools, and act in the media and digital world (Kangas & Rasi, 2021; Palsa & Mertala, 2020). Multiliteracy calls for pedagogical practices that enable creative, collaborative, and exploratory learning in pre-primary and primary education in Finland (FNBE, 2014, 2018, 2021, 2022; Rasi et al., 2019; Säljö, 2004). Similar to literacy as broadly defined by UNESCO (Preston, 2006), multiliteracy is a complex learning process that is always situated and practiced.

In this study, multiliteracy is promoted through the PL process of preschoolers' news-making through creative media production activities, which are seen as a part of the media literacy process (Zalipour, 2019). In media-based projects, media production, documentation, and discussions with children about how to use digital tools help promote children's multiliteracy (Rasi & Kangas, 2018). Rasi et al. (2019) and Kangas and Rasi (2021) presented four dimensions of multiliteracy promotion that can be applied to PL in preschool education. The dimensions combine (and partly overlap) the sub-categories of multiliteracy and media literacy (e.g., Aufderheide & Firestone, 1993; FNBE, 2014; Kupiainen, 2019; Martens & Hobbs, 2016). The first dimension involves the use of diverse information sources, including textbooks, websites, TV programmes, magazines, and games in learning. Sources can be verbal, visual, auditory, numeric, kinaesthetic, or a combination of these. The second dimension is the critical assessment of information sources and information itself, while the third dimension involves the production, presentation, and sharing of diverse media. The fourth dimension supports the use of multiliteracy to promote well-being. In this study, we focus on the 'use of diverse information sources' and the 'production, presentation and sharing [of] information sources and information' in the PL process. Digital skills, in turn, refer to literacy practices related to media and digital technologies that are often realised through playful and creative activities in pre-primary education (Arnott, 2016; Kangas, 2010; Burnett, 2010; Marsh, 2016).

Research Aim and Questions

The aim of the research is to explore preschoolers' motivational triggers and teacher's motivational scaffolding in the PL process and to develop a motivational design model of PL to promote multiliteracy and digital skills in the pre-school context. In Finland, preschoolers are usually six years old.

The research questions are as follows:

1. What kinds of motivational scaffolding strategies do teachers use in the PL process?

2. What triggers preschoolers to engage in the PL process of developing multiliteracy and digital skills?

Methodology

This study follows design-based research (DBR) principles to study an activity in authentic PL settings with the goal of advancing theory and impacting educational practice (Barab & Squire, 2009; Cobb et al., 2003; Design-Based Research Collective, 2003; Wang & Hannafin, 2005). As a widely used research method, DBR is effective for understanding and studying formal educational practices (Anderson & Shattuck, 2012; Design-Based Research Collective, 2003; Papavlasopoulou et al., 2019). Design-based research is situated in an authentic educational context, focusing on the design and testing of a significant intervention. It involves multiple iterations, a collaborative partnership between researchers and practitioners, the evolution of design principles, a comparison to action research, and a practical impact on practice (Anderson & Shattuck, 2012).

Typically, DBR involves a series of phases: developing an initial design, conducting the experiment, and carrying out a systematic analysis (Cobb et al., 2003). This study focuses on the first cycle of DBR, encompassing the design, implementation, analysis, and re-design of the PL model. In this research, the PL model (Kangas, 2010; Kangas et al., 2017) was applied as the initial design and pedagogical standpoint for the PL process. In the first iteration of the study, the model was tested and refined for the next cycle of DBR. The challenge in DBR is to have an objective and not allow biases to affect the research (Anderson & Shattuck, 2012). During the experiment, the corresponding author worked as a teacher in the preschool and was responsible for the children’s PL process and data collection.

The Participants and Research Procedure

The research was conducted in a Finnish preschool in 2020–2021, which overlapped with the COVID-19 pandemic. The research permit was required from the preschoolers and the guardians by the research permit letter. In this middle-sized school in Southern Finland, the first author worked as the teacher of the preschool class and knew the target group of preschoolers well. Altogether, 17 preschoolers (5–7 years old) participated in a three-month teaching experiment during which they made their own news. Based on the PL model (Kangas, 2010; Kangas et al., 2017), the experiment followed three phases: orientation, play, and elaboration (Table 1). The orientation and play phases were conducted in November–December 2020, while the elaboration phase

Table 1 The playful learning model (applied from Kangas, 2010; Kangaset al., 2017)

Pedagogical framework	
<ul style="list-style-type: none"> - Curriculum - Aims and learning goals: multiliteracy and digital skills - Equipment: iPad, paper, and pencil - Environment: the classroom 	
Orientation phase	Elaboration phase
Familiarising preschoolers with the theme, equipment, and forthcoming activities Creating common rules Ideating the news Talking about the news Watching the children’s news Reading newspapers together Learning to use the iPad Drawing and planning own news Playing games	Presenting the news to each other Discussing the experiences Learning from each other Posing the questions: What, how, and why?
Play phase	
Role-playing as news creators and presenters Making the news Playing the news Filming the news	

was carried out in February 2021. Table 1 presents the phases of and activities performed during the process. The news-making project took one hour per day over six days.

In the orientation phase, the preschoolers were familiarised with the topic by discussing news, reading ‘Helsingin Sanomat’ (HS), the children’s news, watching HS on YouTube, planning their own news, and playing GraphoGame, which combines multiliteracy skills with digital, play, and literacy components (FNBE, 2021). The game was developed to help children learn to read (Lyytinen et al., 2021; Saine et al., 2011) and was used here to let preschoolers practice their basic literacy skills (e.g. Finnish alphabet sounds). The preschoolers also practiced taking pictures and shooting videos using iPads. The teacher’s role was to organise the activities, guide the children, maintain their motivation, and help them with the iPads.

In the play phase, the preschoolers worked in small groups and produced a variety of information and stories by making, playing, and filming their own news. The teacher facilitated this process by offering encouragement and guidance, such as instructions on how to perform on camera. For instance, one of the groups filmed their news by playing with toy animals. In the elaboration phase, the preschoolers presented their news to others, and the whole process was elaborated and discussed in the classroom. The point of this phase was to share knowledge and experience and learn from each other. The teacher’s role was to encourage and give positive feedback during the process. The main goal of the PL process was to promote children’s multiliteracy and digital skills.

Data Gathering with Video Ethnography

The data collection followed the objective video ethnography method (Sorrel, 2012). The qualitative video data comprised 4 h 50 min of material, which was gathered during the orientation and play phases (Table 2). Because the focus was on motivational triggers and the teacher’s scaffolding, the most important phases were orientation and play, during which the children engaged in playful activities. Therefore, no video material was collected during the elaboration phase.

Video ethnography is often used in social research (Pink, 2013; Shrum et al., 2007). Otsuka and Jay (2017) stressed the importance of viewing videos objectively. Video recordings allow researchers to directly capture people and their actions. Video ethnography is similar to

traditional ethnography and photographic representation but more revealing (Pink, 2013; Shrum et al., 2007). Pink (2013) also noted the importance of clear audio and video (see also Shrum et al., 2007). In this study, video recordings were made using an iPad with a good microphone, which was essential for the analysis to obtain proper audio recordings—as some preschoolers spoke quietly during the activities. Pink (2013) highlighted the importance of researchers’ thinking, which affects how they view the research material. In this study, the researcher worked as a teacher in the class and therefore knew the preschoolers well, which increased the trustworthiness of the data interpretation and analysis.

The study followed the ethical principles for scientific research established by the Finnish National Board of Research Integrity (<https://www.tenk.fi>), the Data Protection Act, and the Convention on the Rights of the Child. The local director of early childhood education and the head of the school approved the study, and informed consent was obtained from all preschoolers and their guardians. This consent included permission to participate in the research and to use photos in the research report, conference presentations, and teachers’ education. At the beginning of the PL process, the teacher informed the preschoolers about the research and the forthcoming video recordings in the classroom. Pseudonyms were used for all preschoolers.

Data Analysis

The analysis was conducted in two phases. The first involved transcribing and familiarising ourselves with the whole video dataset. A systematic analysis was subsequently performed to identify manifestations of preschoolers’ motivational triggers (RQ1) and the teacher’s motivational scaffolding encounters (RQ2). The analysis utilised qualitative content analysis (Drisko & Maschi, 2016; Krippendorff, 1989, 2018; Mayring, 2014; Stemler, 2015) and was content-driven (RQ1) and theory-driven (RQ2). The analysis involved a progressive refinement of the hypotheses, as described by Engle et al. (2007). This included a cyclic process in which questions were posed, and the analytical approach was multistep and recursive rather than linear. The analysis consisted of individual and collaborative data evaluations, coupled with interpretative and reflective discussions between the researchers.

The content-driven analysis began with a preliminary review of the video to identify broad themes pertaining to preschoolers’ motivational triggers. Next, the video data

Table 2 Data gathering

Phases of the playful learning process	Time	Data gathering
Orientation	November–December 2020	Video data
Play	November–December 2020	Video data
Elaboration	February 2021	-

were systematically reviewed, looking for critical situations and moments in which the preschoolers exhibited enthusiasm or motivation. The unit of analysis was meaningful verbal talk, incidents, or body activity. All meaningful acts were coded in Excel for further analysis. Altogether, 62 meaningful acts were identified in which preschoolers showed enthusiasm and motivation by talking, performing actions, or quietly concentrating. The acts that were interpreted as reactions of motivational triggers included observable activities, as well as discursive and nonverbal actions (Drisko & Maschi, 2016; Hidi & Renninger, 2019; Krippendorff, 1989, 2018; Mayring, 2014; Renninger & Hidi, 2022; Stemler, 2015). Consequently, the following categories that inspired preschoolers during the PL process were identified: (1) engaging in discussions about news, (2) exploring news through traditional and digital media, (3) utilising digital tools, and (4) creating and engaging in news-related activities.

The teachers' motivational scaffolding acts were cyclically reviewed and analysed based on the three motivational scaffolding strategies (Belland et al., 2013). The strategies were thematised to the PL phases (Belland et al., 2013; Drisko & Maschi, 2016; Krippendorff, 1989, 2018; Mayring, 2014; Stemler, 2015), resulting in the following main content areas for promoting preschoolers' interest in the PL context: connections with children's prior experiences and interests, promotion of shared exploration, and promotion of children's development.

Results: Teachers' Motivational Scaffolding Strategies in the Playful Learning Process

According to Belland et al. (2013), there are three scaffolding strategies for promoting students' interest. In this study, these strategies were analysed through the activities

in which the teacher engaged during the process. Table 3 presents the guiding strategies the teacher used to increase the children's interest. Based on the PL model (Table 1), the orientation phase is important for triggering children's motivation and consists of many scaffolding strategies (see Sun et al., 2023). In the play phase, the children already know their task and the goals that affect the teachers' scaffolding strategies.

In the orientation phase, to help children choose a child-centred aspect of the problem, the teacher's guiding strategy was to make *connections with children's prior experiences and interests* and the knowledge and skills required in the process. The teacher used the following strategies to trigger the preschoolers' interest and increase their motivation: (1) mapping their prior literacy and digital skills, (2) respecting their interests, (3) listening to their views, and (4) noting their special needs. Mapping children's prior literacy and digital skills was achieved by talking with them about the news, exploring news from print and digital media, gameplay, and starting news planning with the children. Crucially, the teacher respected the children's interests and listened to their views when orienting to the news theme and the process. This involved letting the children select themes and respecting their preferences, such as their willingness to play a specific role. Guiding strategies also included considerations of children's special needs (e.g., developmental level and possible challenges).

To encourage preschoolers to explore the target materials, the guiding strategy was *the promotion of exploration skills*. For this, the teacher used the following strategies: (1) teaching multiliteracy and digital skills, (2) providing new knowledge, (3) asking situation-relevant questions, and (4) exploring media with the children. For successful news-making and exploration, children needed to practice their literacy and digital skills and obtain new knowledge, such as how to write and use iPads in the project. In addition, to

Table 3 The teacher's guiding strategies in the orientation and play phases

Strategies (Belland et al., 2013)	Orientation phase	Play phase
Prompting children to choose an aspect of the problem that connects to their interest and mapping their prior knowledge and skills	Connections with children's prior experiences and interests Mapping children's prior literacy and digital skills Respecting children's interests Listening to children's views Noting children's special needs	Encouragement Listening to children's views
Asking driving questions that intrigue children and can only be addressed by investigating the target material	Promotion of exploration skills Teaching multiliteracy and digital skills Providing new knowledge Asking situation-relevant questions Exploring media together with the children	Encouragement Asking situation-relevant questions
Using language that is congruent with children's understanding	Supporting children's different development levels Using multiple media and texts Teaching clearly and illustratively Guiding social interaction	Encouragement Guiding the use of digital tools Guiding social interaction

support an explorative approach, it was essential to ask situation-relevant questions and explore media and various texts with the children. The questions the teacher asked included where the children encountered or heard news, where their parents watched the news, and why the news was presented to the public. In addition, the teacher explained the purpose of broadcasting the news to the public.

The teacher used language appropriate for the children as part of *supporting the different development levels of the children*. First, the teacher used multiple media and texts to promote multisensory and holistic learning and to ensure the congruence of the preschoolers' multiliteracy skills with the learning goals. Second, teaching clearly and illustratively was critical for supporting children's learning, regardless of their developmental level. Third, the teacher ensured that the preschoolers properly understood others in the group, thus guiding the preschoolers' social interactions.

In the play phase, the teacher encouraged the preschoolers emotionally, cognitively, and socially in the process of news production and play. Mostly, the teacher asked situation-relevant questions, respecting the children's ideas, situational needs, and challenges. Examples of driving questions included: 'What is your topic for the news?', 'What is happening in your news?', and 'What roles do you have?' The teacher's questions intrigued the preschoolers and could be addressed through play activities. In addition, the teacher used language that was congruent with the children's understanding when guiding their use of digital tools, including video and camera applications. Moreover, the teacher encouraged the preschoolers to use their imagination in news-making, thereby respecting the language children use in their lives and play.

Preschoolers' Motivational Triggers

In this study, the preschoolers were inspired by a variety of PL activities, and their motivational triggers were as follows: (1) engaging in discussions about news, (2) exploring news through traditional and digital media, (3) utilising digital tools, and (4) creating and engaging in news-related activities. The results revealed preschoolers' motivational triggers related to learning with and about media: becoming familiar with the news topic through talking and exploration, learning from digital technology, and engaging in their own media content production and play. During this process, joy and fun were evident. The preschoolers seemed to enjoy the activities, which is important for promoting multiliteracy through PL.

First, the children's interest was triggered by *engaging in discussions about the news*. The preschoolers were eager to talk about topics related to their own lives and experiences.

They also needed to ask about or explain the meaning and importance of the news (see Cortés Loyola et al., 2020). For example, one preschooler asked the teacher about a current topic: '*Do you have a Corona signal, teacher? It is very useful to download a Corona signal.*' Preschooler 1.

Second, the preschoolers were motivated to *explore news through traditional and digital media* guided by the teacher. In particular, their attention increased when digital news was watched and discussed together. The news was professionally made for children by a Finnish media company. One explanation for this heightened interest is that the reporters in the news were children. Another explanation could be related to video as a learning material. This finding is in line with earlier results showing that visual video material motivates children more than still images (Burnett, 2010; Verhallen et al., 2006). The following extracts illustrate the preschoolers' interest in exploring news from digital and traditional print media. Both show the preschooler's enthusiasm for the news based on their earlier experiences: '*Oo, children's news? My big brother used to be reading these because my grandmother had ordered this for my big brother. She gave the newspaper first to me to take a look.*' (Preschooler 2) and '*I have seen these ones on TV! (...) What is a propeller? Where are they sailing around the world for four years?*' (Preschooler 6).

Third, *utilising digital tools*, such as tablet applications and a digital game, seemed to trigger the preschoolers' motivation. The children were inspired to learn how to use the tools creatively in the news-making process, as shown in the following extracts: '*We do not have this iPad, but we have more expensive ones at home Preschooler 5(...) Adam, come to see! Take a picture from the back here. Look, I took a picture from this Lego box.*' (Preschooler 1) and '*Yeah! How do you write a name, hey? I do not find [the letter] R here. Where do I push? Where did you get there? Can you help me already?*' (Preschooler 4).

The preschoolers were also guided to play GraphoGame, which taught them reading and writing skills. They were eager to use their imaginations and create their own figures. The teacher helped the preschoolers, who also helped each other. However, in line with previous research, the findings showed that the children's gameplay skills varied greatly (e.g. Kirova & Jamison, 2018; Valkonen et al., 2020).

Fourth, the preschoolers' motivation was triggered by *creating and engaging in news-related activities*—that is, actual *news-making*, which consisted of planning and group discussions—and *news-playing*, which involved news production and role-playing in roles such as photographer, videographer, and news reader. When the preschoolers started to plan their own news, almost all exhibited enthusiasm and motivation. For example, they were very excited to write down their names on the planning sheet and suggest

possible themes for their news. Not all of the themes were accepted by the group, and the teacher supported the preschoolers in negotiating and selecting the themes to produce their news. The final news themes were firefighter, nature, coronavirus, and animals. Turtle Yoda was part of the animal news: *'I would preferably draw my turtle. Yoda can also be on the ground, but [here] Yoda is swimming. I have to make Yoda's tail hurt because Yoda has been hurt in his tail.'* (Preschooler 3).

The preschoolers were also enthusiastic about filming and playing different roles in producing their news. Some children liked to perform in different roles, while others did not want to play any roles. The role of creator, who was responsible for narration or illustration, seemed especially motivating for the preschoolers. They seemed to be more inspired to script a story and draw their news rather than reading on camera. The next extract concerns the coronavirus news produced by a group: *'Good day from the coronavirus news. In Tampere, there has been a new infection. I am not the coronavirus guy. Do not be afraid. Let us go together. These have coronavirus infection, so it is not good to go [anywhere]. I will put up the sign because here is corona. It is a very powerful coronavirus.'* (Preschooler 1, news reader).

The results also provide some evidence regarding preschoolers' motivational triggers in the orientation and play phases, showing (1) triggered situational interest, (2) maintained situational interest, and (3) emerging individual interest (see Hidi & Renninger, 2019; Renninger & Hidi, 2022). The preschoolers' attention seemed to be captured by situational interests, such as print and digital news. They also utilised their previously developed interests (e.g. coronavirus) in the project, reflecting maintained situational and emerging individual interests. In addition, the news-making process aroused interest in further ideas in some preschoolers, such as making news outdoors, indicating emerging individual interest in the activities.

Motivational Design Model of Playful Learning to Promote Children's Multiliteracy and Digital Skills

Playful learning pedagogy is a meaningful way to promote children's multiliteracy and digital skills. Based on the findings and the PL model (Table 1), a motivational design model of PL was developed to promote multiliteracy and digital skills (Table 4). It combines the previous model with the teachers' motivational scaffolding strategies presented in this study.

Multiliteracy needs to be understood as a situational competence, meaning that the particular place, time, and

culture are important when designing teaching and PL to support children's multiliteracy (Mertala, 2017; Rasi et al., 2019). Pedagogical planning of the PL phases is essential for structuring and defining the learning goals of the process. A loose design allows for possible changes and flexibility in the process (Flewitt et al., 2014). In the orientation phase, *searching for information* and learning to use digital tools are relevant targets for the teacher's scaffolding. The aim of orientation is to create a shared vision of the learning process, methods, and common rules and to stimulate learners' interest, for example, by mapping their prior literacy and digital skills and listening to their views. The length of the orientation depends on the available tools, resources, learning goals, and learners' interests. Especially for older children, the information search can be more important when connected with the critical assessment of information and sources (e.g. Kangas & Rasi, 2021), including social media, websites, games, and traditional media (Rasi et al., 2019). During orientation, the teacher's motivational scaffolding strategies consist of activities such as establishing connections with the learner's prior experiences and interests, promoting their exploration skills, and supporting the different development levels of learners.

The play phase focuses on *producing information* in a playful way. The key question is how and in what format learners produce information and knowledge (see Rasi et al., 2019). Is information verbal, visual, or auditive, and what kinds of digital tools are used? It is essential to consider developing children as multiliterate persons who learn to interpret and generate different texts in written, spoken, audiovisual, or digital formats (The New London Group, 1996; Valkonen et al., 2020). As this study indicates, combining information search with common exploration and playful media production can trigger children's interest in the learning process. In the play phase, the teacher's motivational scaffolding strategies mainly include encouragement, such as listening to learner's views and asking situation-relevant questions to promote learning.

In the present study, the news plans could have been created with iPad drawing apps or by concentrating on specific news elements, such as creating a frame story and images. The news could also be filmed with the iMovie application (Burnett, 2010). When making and playing news as part of PL, the most important motivational scaffolding strategy adopted by the teacher was encouragement. Previous research has shown that children's satisfaction with the PL environment correlates with teachers' emotional and pedagogical engagement with PL (Kangas et al., 2017).

In the elaboration phase, information and play-based productions are shared and elaborated. This is a key phase in promoting multiliteracy in terms of learning to share learned and experienced content, such as one's own news, in diverse

Table 4 Motivational design model of playful learning to promote multiliteracy and digital skills

Pedagogical framework: Curriculum, aims and learning goals (multiliteracy, digital skills, and subject content), equipment (e.g., iPad, iMovie, paper, and pencils), and environment (classroom and outdoors)	
<p>Orientation stage</p> <p>Familiarising the children with the theme, equipment, and forthcoming activities</p> <p>Creating common rules</p> <p>Ideating the news (Search information)</p> <p>Talking about the news</p> <p>Watching the children's news</p> <p>Reading newspapers together</p> <p>Learning to use the iPad</p> <p>Drawing and planning own news</p> <p>Playing games</p> <p>Motivational scaffolding strategies:</p> <p>Connections with learner's prior experiences and interests</p> <p>Promotion of exploration skills</p> <p>Supporting learners' different development levels</p> <p>Playful learning to promote good</p>	<p>Play stage</p> <p>Making and playing the news in roles (Produce information)</p> <p>Making the news (e.g. using the storyboard and creating a story and pictures)</p> <p>Playing the news</p> <p>Filming the news</p> <p>Motivational scaffolding strategies: Encouragement (e.g. listening to learner's views and asking situation-relevant questions)</p>
<p>Elaboration stage</p> <p>Presenting the news to each other</p> <p>Discussion of experiences (Share information)</p> <p>Learning from each other</p> <p>Posing the questions: What, how, and why?</p> <p>Sharing the news with peers and parents</p>	

formats (Rasi et al., 2019). Furthermore, it is possible to interact with children's parents and have them participate in the research by sharing the news. For example, Rusk et al. (2008) encouraged exhibitions for children's projects more than competitions.

Discussion

The findings of this research highlight several key points regarding teachers' motivational scaffolding and preschoolers' motivational triggers in promoting multiliteracy and digital skills through a playful news-making process. The role of the teacher as a facilitator and motivator was crucial (see also Belland et al., 2013; Hidi & Renninger, 2019; Renninger & Hidi, 2022). First, the teacher's use of motivational scaffolding strategies, such as listening to the children's voices, asking for their wants and needs, allowing independent work, providing help when needed, and being responsive and empathetic to their perspectives, significantly contributed to student motivation and engagement. Rusk et al. (2008) identified different ways in which children's interests can be harnessed for learning skills and knowledge. Additionally, the present study emphasised the importance of respecting children's interests and views to maintain their motivation. Engaging in discussions about news, exploring news through traditional and digital media, utilising digital tools, and creating news-related activities were all effective in triggering preschoolers' interest and promoting their engagement (Azevedo, 2019; Marklund, 2020; Ozturk & Ohi, 2018). In Yelland's (2018) study of playful multiliteracy pedagogy, the children's autonomy and confidence increased, and the teacher's pedagogical choices were more explicit.

The findings also highlight the significance of multiliteracy and digital skills in today's society (FNBE, 2014; Kupiainen, 2019; Rasi et al., 2019; Yelland, 2018). These skills are essential for understanding the world, communicating with others, navigating the media and digital landscape, and engaging in various modes of learning, meaning-making, and text usage (Burnett, 2010; Cortés Loyola et al., 2020; Hackett & Somerville, 2017). Moreover, this study suggests that teachers should understand children's literacy and digital skills, as well as their individual needs. Clear and illustrative instruction, guidance in social interactions, and support for children at different levels of learning are important factors in promoting multiliteracy and digital skills. This research also aligns with previous studies that emphasise the positive impact of student interest and autonomy on learning outcomes (e.g. Yelland, 2018). When teachers are interested in the subject and use digital technology effectively, students are more motivated and

engaged in the learning process (Renninger & Hidi, 2022). Preschoolers are at an age when they show curiosity about a wide range of subjects and display a strong eagerness to learn, particularly in playful contexts in which the boundaries between reality and fiction are blurred (Kangas, 2010; Kangas et al., 2016). This can partly explain why the preschoolers were interested in the news-making process and its different phases. They also demonstrated their capability to support each other with the technology when the teacher was unavailable (Björger, 2022; Kirova & Jamison, 2018; Valkonen et al., 2020).

Reeve et al. (2008) proposed six principles for autonomy-supportive instructional behaviours that are applicable to PL pedagogy: 1) listen to children's voices during instruction, (2) ask children what they want or need, 3) allow children to work independently and in their own way, (4) help children when they are stuck, (5) be responsive to students' questions, comments, recommendations, and suggestions, and (6) be empathetic to children's perspectives or experiences. Furthermore, by adopting a PL mindset, the teacher can bring the joy of learning into the classroom (Boehm & Franklin, 2023; Lammers et al., 2022). This begins by placing playfulness at the centre of multiliteracy teaching and learning.

Based on these findings, a motivational design model for PL was developed. This model can guide teachers in designing pedagogical practices that promote multiliteracy and digital skills. It can also be utilised in teacher education programmes to enhance educators' understanding of PL principles (Kangas et al., 2017; Nousiainen et al., 2018; Sun et al., 2023). Overall, this study contributes to the understanding of how motivational scaffolding, respect for children's interests and views, and the integration of multiliteracy and digital skills can enhance preschoolers' engagement and motivation in PL contexts (Lavonen et al., 2022; Renninger & Hidi, 2022; Taylor & Clarke, 2021; Xu et al., 2012). It provides valuable insights for educators and policymakers aiming to promote effective and engaging pedagogical practices in early childhood education.

Limitations and Implications

This study has several limitations that need to be acknowledged (Pink, 2013). First, the group-based nature of the PL process did not prioritise individual preschoolers' interests, as the focus was on identifying the interests of the entire group. This may have impacted the level of individualised motivation and engagement experienced by each child. Additionally, the researcher's dual role as both researcher and teacher in the study may have influenced the outcomes. The teacher's motivational scaffolding strategies could have been biased or influenced by their role as the researcher.

This potential bias should be taken into consideration when interpreting the findings. The time constraints placed on the research represent another limitation that may have impacted both the PL process and the teacher's practices. Although these limitations may make it difficult to generalise the findings to other contexts, the developed model (Table 4) can guide educators in designing PL environments that foster children's multiliteracy skills. It is important to emphasise that collaborative efforts among students, teachers, and researchers are crucial for enhancing multiliteracy teaching practices (Kulju et al., 2018). Further research is needed to explore the perspectives of motivational scaffolding and how different teaching approaches can enhance motivation and engagement. In addition, research on motivational scaffolding in the elaboration phase would be valuable. Reflection during this phase encourages learners to look back on their performance and compare it to other performances (Kangas, 2010; Collins, 2006). Understanding how to effectively integrate children's out-of-school knowledge and technology in a healthy way is also an important area for future research.

While video ethnography was a valuable research method for capturing the PL activities and teacher scaffolding strategies, it is important to note that the camera presence could have influenced the natural behaviour of the participants. However, efforts were made to respect the participants' anonymity and create an authentic environment. According to Lipponen et al. (2015), the visual method captures unique and unrepeatable experiences through the behaviours and social interactions recorded in video footage. In the next cycle of DBR, the model will be redesigned and retested (e.g., Anderson & Shattuck, 2012). In conclusion, while this study provides valuable insights into the motivational scaffolding strategies in PL for preschoolers' multiliteracy and digital skills, there are limitations that need to be considered. Future research should aim to address these limitations and further explore the effectiveness of motivational scaffolding in diverse educational contexts.

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