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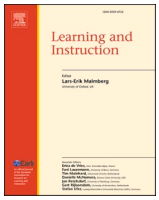

Relationality of play and playfulness in early childhood sustainability education

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STRUCTURED ABSTRACT

Background: Early childhood education emphasizes learning by playing. Play is self-chosen and devoid of external motivation. However, the definition of play presents a paradox in play-based learning, because the institutional framework imposes external objectives onto play.
Aims: From a cultural-historical perspective, the study examines the relationality of play and playfulness in early childhood sustainability education. By employing sphere theory and the attributes of playfulness, the study addresses the question: How can playful aspects in sustainability education permeate into children's play?
Sample: Two teachers and 39 children.
Methods: The study employed the methodologies of ethnographic research. The data consisted of video recordings (6h 37min), observational notes, and children's artifacts.
Results: The study revealed two aspects that unfold the relationality of playfulness and play in educational settings. First, the elements of playful learning activity permeate the children's sphere of staging, and second, the elements of playful learning activity permeate into the children's sphere of imagination. Both aspects show that the playful learning activity serves as the sphere of reality, bringing new concepts and ideas to children's play.
Conclusions: The knowledge children acquire in the playful sustainability education activity served as a sphere of reality that fed the sphere of imagination. Playful learning can include parts of mature play, and thus, play is not operationalized to serve learning, but in play, children reproduce and transform new knowledge blending it with their culture. Therefore, play can exist and evolve in an educational setting while respecting the freedom and intrinsic motivation of play.

1. Introduction

Many early childhood education curricula emphasize that children learn by playing, which the research literature widely supports (e.g. Pramling Samuelsson & Johansson, 2006; Sutton-Smith, 2009; Van Oers & Djuikers, 2013. However, Parker et al. (2022) point out that embedding learning through play is not unproblematic in practice. Furthermore, we claim that the definition of play raises another contradiction for play-based learning. Characteristics of play, widely agreed upon in various theories, suggest that during play, children create a sphere of imagination wherein they act as active agents, exploring and transforming the diverse aspects they encounter. Play, being free from the constraints of reality, invites spontaneous ideas (Schousboe & Winther-Lindqvist, 2013). Additionally, play is self-chosen and devoid of external motivation (Gray, 2009), which implies that play solely serves the purposes that are meaningful within the play context. Nonetheless, the definition of play presents a paradox in play-based learning, given that the institutional framework sets external objectives for play practices. While children inevitably acquire various skills through play, external entities should not regulate the aims of play. To bridge this discrepancy, the concept of playfulness has been explored in depth.

Playfulness is often conceptualized as an attitude toward play rather than the play action itself (Dewey, 1933; Sicart, 2014). Previous research has focused on playful learning from various perspectives, including psychology, education, and design, for example, by scrutinizing the effectiveness of playful learning (Parker et al., 2022), by comparing playful approaches to direct instruction (Weisberg et al., 2013), or by exploring playful learning within the realm of games and digital learning environments (Kangas, 2010).

Playfulness in the study by Weisberg et al. (2016) refers to the embodiment of enjoyable and engaging learning experiences, especially

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within guided play, where children can explore and discover while receiving necessary support and guidance from more capable community members. Playfulness can be defined as a comprehensive strategy through pedagogy (Parker, 2022) that encompasses dynamic facilitation strategies, children's agency, and the development of cross-cutting skills. This perspective shifts the focus from the transformative nature of playful learning to the cultivation of engaged, adaptable, and skilled individuals, prepared for the challenges of the 21st-century educational landscape through playfulness. Sustainability education requires children to develop a range of skills and mindsets that foster active participation, critical thinking, and problem-solving. Also, it invites us to figure out futures that are unknown. Playfulness is a powerful tool to make the unknown more tangible (Van der Meij et al., 2017), which is essential in fostering children's competence and their ability to envision and create sustainable futures. From Schousboe's (2013) perspective, a playful attitude enables aspects of reality to become a part of the imaginary sphere of play. Schousboe's approach to play allows the consideration of reality as a separable yet interrelational component of play. From an educational perspective, this opens up a space where sustainability aspects of reality can transform into children's play through intended playfulness.

We aim to build a theoretical framework of playfulness that follows the cultural-historical theory of play and serves as our analytical lens. In cultural-historical understanding, play refers to the actual play-act, and playfulness is defined as an individual's desire to play and encapsulates an attitude of play without necessarily requiring the presence of play activity (Schousboe & Winther-Lindqvist, 2013). Approaching play and playfulness in learning as interrelated but contradictory activities allows us to unfold the dynamics of play and learning from a new perspective. More precisely, we employ Schousboe's (2013) sphere theory and the attributes of playfulness as an analytical lens to address the research question: How can playful aspects in sustainability education permeate into children's play?

2. Play from a cultural-historical perspective

The cultural-historical understanding of play is rooted in the broader cultural-historical psychology, primarily influenced by Lev Vygotsky's work (1967; 1978). According to this theory, children's play is a crucial aspect of their development, deeply embedded within, and influenced by, the cultural and historical context in which they are situated.

Vygotsky's (1967) definition of play concentrates on sociodramatic play. For him, play encompasses imaginary situations, role-taking, assigning new meanings, and rules. Elkonin (2005) further developed Vygotsky's idea of play and introduced the concept of mature play. For Elkonin, mature play is the only form of play that can emerge as a leading activity and, thus, the source of development for young children. In his view, play always includes role-taking, and it develops toward mature play through four levels (Bodrova & Leong, 2015): At the first level, play is centered around simple actions with objects, aimed at play partners. Roles are not pre-defined but emerge from actions. The actions are repetitive with no strict adherence to real-life logic, and children do not object to inconsistencies. At the second level, play actions begin to reflect real-life actions. Children can name the roles they are playing, but only after play begins. The sequence of actions mimics real life, yet peers do not heavily criticize deviations. At the third level, the focus shifts to defined roles and actions within the roles. Children name roles before playing, and a special "role speech" emerges when one player talks to another utilizing language, tone, and manner that align with the specific roles. Actions become more varied, and if inconsistencies occur, peers object, and corrections are made. The fourth level of play is a fully mature play, and it revolves around portraying relationships between characters. Roles are well-defined, and children remain consistent throughout their roles. Role-related speech and actions are consistent, and the sequence of actions follows real-life logic, with children correcting each other and explaining the real-life rationale behind the correct sequence.

Bodrova and Leong (2003) outline that the characteristics of mature play encompass imaginary situations wherein children assign new meanings to objects, people, and actions. Mature play incorporates diverse roles that serve to broaden the scope of play with governing rules. In mature play, play themes are flexible, allowing new roles and ideas to emerge. This flexibility also extends to the negotiation of rules throughout the play.

In cultural-historical understanding, play is seen as a medium through which children engage with their social world, and through play, they internalize the cultural norms, values, and practices of their community with the support of more capable members of their community (Bodrova & Leong, 2003; Vygotsky, 1978). From a cultural-historical perspective, thinking emerges through social interaction and socially meaningful activities (e.g., Rogoff, 1998; Vygotsky, 1978), and thus, cognitive processes are spread among individuals engaging in culturally significant activities. Therefore, thinking applies in different ways in every situation. It is specific to the context, influenced by interaction with others, and mediated through cultural tools and artifacts (Rogoff & Chavajay, 1995). From a cultural-historical perspective, activities of the mind take place in interactions between people, contexts, actions, meaning, and tools (Edwards, 2000; Vygotsky, 1978). This means that through socio-cultural considerations of learning, playfulness is not to be understood as a mere activity of the mind but could be considered through multimodal interactions mediated through language, gestures, signs, materials, and actions (see also Alcock, 2013).

Because of its strong cultural roots, play is sensitive to changes in reality (Schousboe & Winther-Lindqvist, 2013). Schousboe (2013) suggests that play encompasses three distinct yet interrelated spheres of reality in which children operate simultaneously during play. These spheres are:

The Sphere of Reality: This sphere pertains to the real-world properties, such as the physical environment, and the actual attributes of the players, such as knowledge and skills, which are relevant to the content and execution of the play.

The Sphere of Staging: Here, children negotiate themes and roles and make proposals that direct the structure and plot of their imaginative play. This sphere sets the stage for the enacted fantasies in the sphere of imagination.

The Sphere of Imagination: In this sphere, children immerse themselves as actors in make-believe events, engaging in a fabricated world that emerges from their creative imaginations.

According to Schousboe (2013), these spheres are mutually permeable, meaning they are separate but interconnected, allowing for a dynamic flow of ideas and actions among them. This permeability is crucial for the functional significance of play as it enables a wide field of reality from which ideas can emanate and be realized. All spheres continuously interact to ensure that the play activity is sustained. Even amidst the deepest immersion in play, children remain aware of the immediate reality and staging elements to ensure safe and continued play. The interaction among these spheres is depicted as dynamic and crucial for enriching the play experience, where occurrences in one sphere could drive or alter the actions and scenarios in the others.

3. Attributes of playfulness

To unfold playfulness as a concept that can be observed in an interaction mediated through language, actions, and artifacts, we conceptualize the attributes of playfulness by taking the definitions of van der Meij et al. (2017) and Hyvönen and Ruokamo (2005) and by considering the characteristics of mature play (Bodrova & Leong, 2003) from the viewpoint of mental activity that is present in the play. In this research, we consider playfulness through pedagogical actions and choices and use the model proposed by Hyvönen and Ruokamo (2005), where the attributes of playfulness are narration, imagination,

co-creation, embodiment, action, and insight.

Narration. Both Hyvönen and Ruokamo (2005) and van der Meij et al. (2017) define narration as a central element of playfulness. In the course of play, narration creates a plot for a story that is acted out. Through narration, roles and rules of play are negotiated (Bodrova & Leong, 2003). From the viewpoint of playfulness, the narration for the play, rules, and roles can be co-created, planned, and shared without the plot unfolding as an acted play.

Imagination. Creating and maintaining imaginary situations is crucial for play as it is understood from the cultural-historical perspective (Bodrova & Leong, 2003). In an imaginary situation, the objects and participants are assigned new meanings that differ from conventional ones. Van der Meij et al. (2017) recognize interaction as a playful process when imagination is used to make the unknown more tangible through new or unusual ways. Hyvönen and Ruokamo (2005) note that creativity is promoted by unbound thinking and imagination.

Co-creation. Van der Meij et al. (2017) portray co-creation as a collaborative endeavor that thrives on diversity and leads to tangible or social outcomes. For Hyvönen and Ruokamo (2005), collaborative actions in playful contexts embody various forms of social cohesion, cooperation, and the collaborative construction of knowledge. Bodrova and Leong (2003) stress that different forms of communication are used to negotiate roles and rules, and to explain pretend behavior in play, forming an intellectual network in which experiences and problem-solving processes are made meaningful for playful action.

Embodiment. Hyvönen and Ruokamo (2005) outline that embodiment signifies the interconnectedness of human neurobiological systems, bodily functions, and the environment, including interactions with other people. The concept of embodiment extends to an individual's experiences, knowledge, and feelings, channeled through their body as they interact with others and their environment. Van der Meij et al. (2017) connect tactile environment for learning with bodily interaction and meaning-making. The multimodal embodied nature of play is present when children change their voices and ways of moving when they take different roles. Children show, with embodied actions, the emotions of the fictional characters in play (Bodrova & Leong, 2003) by imitating, for example, crying or fearing.

Action. By action, Hyvönen and Ruokamo (2005) refer to experiential physical interaction with a physical learning environment. Van der Meij et al. (2017) connect reflection to action, and by doing so, they underscore consequential thinking, where children discover the different effects of actions. Action can also appear during playful situations, such as active role-playing (Van Oers, 2013), enabling children to experience role-played characters' behaviors and thoughts.

Insight. Hyvönen and Ruokamo (2005) conceptualize insight in the context of problem-solving and drawing conclusions. Playfulness encourages children to "play" with a problem, thereby facilitating its resolution. Playfulness also fosters curiosity and the generation of novel questions, which Van der Meij et al. (2017) discuss through simulation where participation is enhanced by focusing on challenges and rewards. Insight melds with narration, allowing children to grasp the content as a holistic entity, crucial for collaborative efforts in maintaining a story's theme during interactions with others.

Children repeatedly engage in play scenarios through playfulness, which evolve over time. For Schousboe (2013), playfulness is vital when children move towards the imaginary sphere from reality. From Scousboe's perspective, a playful attitude enables aspects of reality to become a part of the imaginary sphere. This notion implies that children's knowledge and skills are activated in different spheres, each serving distinct purposes. In the sphere of staging, aspects of reality, including knowledge and skills, are used to agree upon, negotiate, and argue over the roles and plot of the play. In the sphere of imagination, knowledge and skills serve as meaningful cultural tools within the context of play. By following this notion, our aim is to unfold children's playful sustainability activities and play to scrutinize how playful aspects permeates into children's play.

4. Methodological considerations

4.1. Research design, method, and participants

The study utilized ethnographic research methodologies (Hammersley & Atkinson, 2019) and was conducted in the spring of 2022. It was part of the Sustainable Future program 'The Sustainable Fox' in the City of Helsinki (https://helsinkioppii.hel.fi/en/publications/fox-book/). The program aims to introduce various themes of sustainable education to children in an age-appropriate manner, using the narrative of a fox family. "The Sustainable Fox" model guides children towards a sustainable lifestyle, and its activities aim to encourage children to feel, explore, and embrace, through play-based practices, aspects of a sustainable future. The present study focuses on two public early childhood education (ECE) units in Helsinki, located in the suburbs. One class of each unit implemented the model, resulting in a total of 39 children aged four to five and two teachers participating in the study (Table 1). One of the units (Class 1) was located in a densely populated area, where 30% of the children had a minority ethnic background, while the other unit (Class 2) had only 1.5% of the children with a minority ethnic background. In both classes, 'The Sustainable Fox' model was modified according to the needs of the group. Class 1 got to know three foxes: Outdoor Fox, Skillful Fox, and Wise Fox, and learned about traffic rules and safety, recycling, and friendship skills. The teacher only used the exercises from the material because the narratives were too challenging for children learning Finnish as a second language. Class 1 teacher's lesson preparation mainly focused on supporting the children's understanding by preparing picture support. The teaching unit of Class 2 was centered around a fourth fox, Story Fox, and its story. The children learned about recycling and how to care for nature and their surroundings. The teacher had carefully prepared the learning environment for each lesson with elements suitable for the session built in the space (e.g., a blanket hut), and the sounds of nature playing in the background.

The teachers of both classes implemented the teaching unit in small groups of 5–7 children. The objective was to follow the same children's process throughout the project; therefore, the research data was collected from one small group of each class, comprising a total of 12 children and two teachers. The selected small groups comprised only the children granted a research permit. Similar activities were conducted with the remaining children, but no data were collected for research purposes in these cases.

Data collection.

The second author collected data from the ECE units over a period of two months, visiting classes when the teachers had planned to conduct activities related to 'The Sustainable Fox' model. Both classes had four sessions in total (the duration of each session was approximately 42–68 min), as shown in Table 1. The data consisted of video recordings, researchers' observational notes, informal conversations with teachers, and the drawings produced by children. The video data (6 h 37 min) was collected with movable video cameras within the natural settings of the ECE units. The researcher maintained their position as an observer who did not aim to alter the course of events. However, it was acknowledged that it is impossible to study the social world without being a part of it (Hammersley & Atkinson, 2019). The researcher, for example, responded to the children's interactional initiations and was emotionally aligned with the children; for example, they smiled back at the children when they smiled at the researcher.

4.2. Ethical considerations

The process followed the Guidelines for Ethical Review in Human Sciences (Keiski et al., 2023), and consent for the research was obtained from the municipality, guardians, teachers, and children. The researcher explained to the children in an age-appropriate manner that she was a researcher and described her aim to study the children's play and interaction during the activities. The children were informed that they

Table 1
Background information and data of the participating classes.

Classes (class size and age)	Lesson	Participating children[a]	Description of activities	Length of video recording (min:s)	Other collected data
Class 1 (Eighteen 4-5-year-olds)	*1*	7 (5)	*Outdoor Fox* – Learning about travel safety in a city: the traffic rules, different vehicles, and a safe way to cross the street.	49:10	Researcher's notes
	2	5 (4)	*Skillful Fox* – Recycling waste and a trip to a recycling point.	67:38	Researcher's notes
	3	5 (4)	*Wise Fox* – Reading a friendship-themed book from the Roundies SEL curriculum (https://tunteetjataidot.fi/en/home/) and discussing friendship skills.	45:48	Researcher's notes 2 drawings
	4	5 (4)	*Skillful Fox* – Reading Emilia Erving's picture book *Roskakasa* [Pile of garbage] and recycling waste (laminated images).	45:35	Researcher's notes 1 drawing
Class 2 (twenty-one 5-year-olds)	*1*	4 (–)	*Story Fox* – Reading Story Fox's story and discussing it together.	42:12	Researcher's notes
	2	4 (–)	*Story Fox* – Reading a letter from the fox asking for children's help in picking up trash. Recycling waste and making/creating nursery rhymes and songs.	47:57	Researcher's notes
	3	5 (–)	*Story Fox* – Making a forest-trip themed play, with a self-created storyline and playing it.	46:58	Researcher's notes
	4	4 (–)	*Story Fox* – Reading Story Fox's story and creating how the story could continue. Drawing pictures.	51:47	Researcher's notes 4 drawings
			Total	6 h 37 min 7 s	

[a] Inside the parentheses, the number of children with minority ethnic backgrounds.

could tell the researcher to stop filming and documenting their actions at any point. Given that the study involved young children, researchers paid careful attention to children's non-verbal signs indicating possible discomfort with being filmed. During the data collection, the researcher discussed her notes and interpretations of the different situations with the teacher and asked about the teacher's perspective.

4.3. Data Sset and analysis

Based on the video data and the researcher's observation notes, content logs were created to give a rough overview of the data. In the content log, the moments that included playful interaction were marked (see example in Fig. 1). It is notable that not all moments of the activities included playfulness or play, for example, transitions.

We utilized intensity sampling to find rich cases for deeper analysis (Patton, 2002). Intensity sampling allows the selection of cases that are rich examples of the phenomenon of interest. Instead of looking for average or typical cases, this approach seeks out exceptionally informative examples. The rich cases were selected according to the following criteria.

1) The cases included interpersonal playful interaction without actual play-act. Playful interaction was understood as the interaction between children and teachers or among children where attributes of playfulness were present. The playful interaction included at least two communicative turns by participants. Consequently, interactions such as the following were excluded: For example, in the data (0042_26:02), there is an episode where the teacher and children are pondering which trash goes to which recycling bin. A child initiates a playful narration, altering her voice, and says, "It was so mean that someone had thrown trash in the play forest." The teacher answers, "Yes, you are right," and immediately turns towards the trash on the floor. She picks the trash up and says to the children, "Okay, thanks a lot," and ends the recycling activity. In the teacher's reply, there are

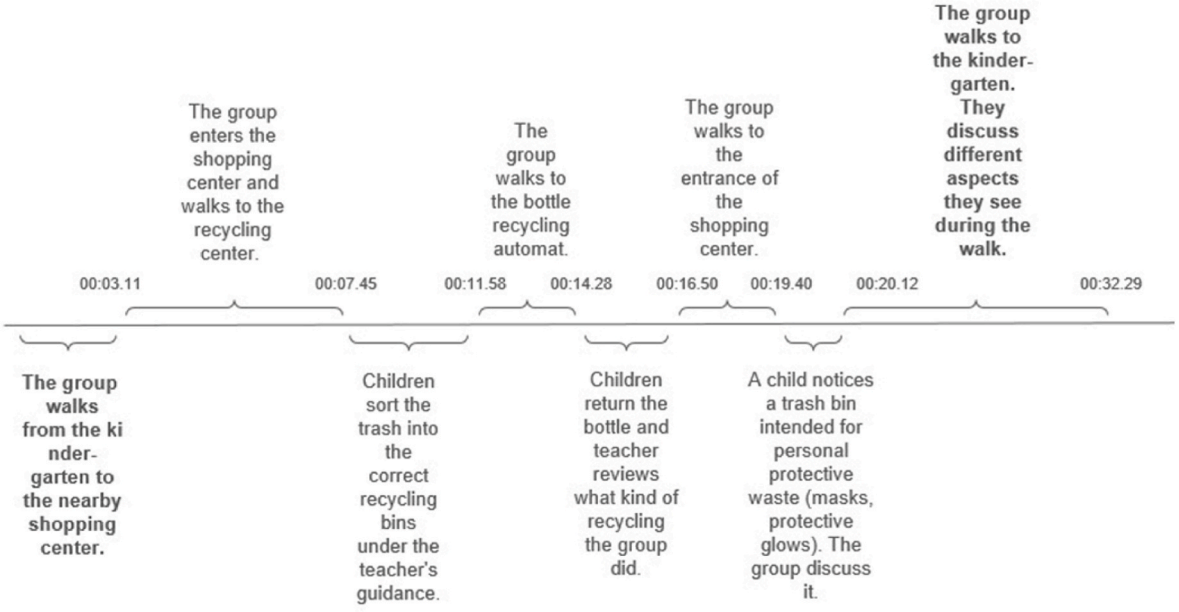

Fig. 1. Example of a content map. Bolded moments include playful interaction or play.

no attributes of playfulness present. Therefore, the child's playful interaction turn is interpreted as a single turn and not seen as a rich case.

2) The cases included playful interaction within the actual play-act, which was on level 3 or 4 of mature play according to Bodrova and Leong's (2015) definition. Those moments included, for example, children defining roles beforehand and special "role speech" emerging when one player talked to another utilizing language, tone, and manner that aligned with the specific roles they were playing.

Altogether, we used a sub-corpus of 12 rich cases that met the criteria for a more detailed multimodal interaction analysis (Taylor, 2014) that followed the abductive approach, which is considered a process of intuition or a form of systematized creativity to create new knowledge (Andreewsky & Bourcier, 2000). The initial data analysis began with the question, "What kind of playful interaction emerges in the data?"

The rich cases' narrative descriptions were produced, and the cases were coded using Atlas.ti. First, we coded the attributes of playful interaction in the data. Playful interactions were identified according to multimodal interaction analysis (Taylor, 2014) from verbalizations, gestures, actions, haptics, and gazes. To ensure reliability during the coding process, we applied the principles of intercoder reliability for qualitative research that aligns with the interpretivist epistemological paradigm (Cofie et al., 2022). Two researchers, Author 1 and Author 2, participated in the coding. Author 2 was responsible for data collection, whereas Author 1 was more removed from the data collection process to minimize bias. Both authors reviewed the data thoroughly and discussed their initial interpretations together. Author 1 proposed a framework for analysis that both authors adopted. They frequently engaged in discussions about the meanings of the codes to reach a consensus. The coding process was iterative, as the analysis followed an abductive approach (Andreewsky & Bourcier, 2000).

The episodes that included playful attributes were transcribed into multimodal interaction analysis grids. The first meaningful communicative turn with playful attributes that led to interpersonal interaction was identified as the beginning of the episode. The end of the episode was identified as the point when interaction between children or children and teacher ceased.

By looking simultaneously at the written narratives and multimodal interaction analysis grids, we picked out cross-episodal threads where the same theme or concepts occurred in episodes across the timeline. The episodes in which playful interaction without play-act and playful interaction with play-act included the same themes or concepts were selected for closer examination. For these threads of episodes, Schousboe's Sphere Theory was used to identify the sphere towards which the children's focus was primarily oriented (Schousboe, 2013). From the episode threads, we chose two threads, one from each class, that present two different ways concepts or skills related to sustainability were activated through playfulness to children's play, and we use these to illustrate the relationality of playfulness and play in early childhood sustainability education.

5. Findings

Our study revealed that, in some cases, the concepts and knowledge manifested in playful interaction during the learning activity were activated in children's interaction within the play activity. We found two aspects that unfold the relationality of playfulness and play in an educational setting. First, the elements of playful learning activity permeate the children's sphere of staging, and second, the elements of playful learning activity permeate into the children's sphere of imagination. Both aspects show that the playful learning activity acts as the sphere of reality that feeds new concepts and ideas to serve as cultural tools in children's play.

We present our results through two rich cases, demonstrating the activation of playful learning activity elements in children's play. Case 1 describes a situation where the elements related to playful activity led children to plan a narrative for future play. Case 2 describes a situation where children, in the midst of playful activity, immersed themselves in play, which was propelled by the elements of playful activity.

Case 1. Trash detectives: Playful activity initiates staging of future play

In the kindergarten, the children have been introduced to the concept of waste recycling. However, the ECE unit's recycling setup doesn't accommodate hazardous waste, prompting a field trip to a nearby recycling point that handles such materials. As the group walks, the children notice the abundant trash on the ground. The teacher responds to the children's observation by saying that there is a job for a "trash detective". With this playful narrative, the teacher incites a whimsical discourse. Anna curiously asks the teacher, "Do trash detectives really exist?" The teacher, indulging in the imaginative narrative, replies, "They might! We could become ones." Anna's excitement is palpable as she exclaims, "Yeah!" and she turns to Ida walking beside her, "Can we become trash detectives?" Ida, while looking at the ground, responds, "Yeah. But watch out, so you don't step on trash." Anna assures her that it's not dangerous. Subsequently, Anna begins to stomp on the ground pretending to squash the trash, with Ida joining the act. Through this, the children embrace a playful moment of embodied action and imagination as they step on imaginary trash.

Upon reaching the recycling point, the teacher and the children sort batteries and lamps into their designated spots. The journey back to the daycare commences with the children engaging in light banter about everyday observations. The teacher, Ida, and Anna delve into a conversation about sleep and its significance, when Isaac spots a piece of trash on the ground, points at it, and exclaims, "There's trash there!" The teacher responds, "There indeed is a lot of trash. It's unfortunate!" Anna's face crinkles in thought. Isaac suggests collecting the trash, to which the teacher replies, "For that, we would require a trash bag and protective gloves. We could organize a separate trip, equipped with a trash bag, trash pickers, and gloves." Ida inquires if there's still time for outdoor play, which the teacher affirms. Ida jumps slightly with a joyful "Yes!"

As they proceed, after a few minutes, Ida voices her desire to play a researcher. The teacher, building on Ida's idea through playful narrative, remarks, "We kind of were trash scientists earlier when we sorted the garbage." Ida asserts, "I am a real researcher," prompting the teacher to respond, "Real scientists do study garbage, too." Recalling the trash detective narrative, Anna asks, "Can we play trash detectives, teacher?" The teacher encourages the imaginative venture, "Absolutely. It's a fantastic idea!" This marks the genesis of a play situation stemming from real-world observations. Inviting the children to co-create a play scenario, the teacher poses, "What if we became trash detectives, what equipment would we need?" A contemplative Anna suggests, "Police gear." The teacher inquires further, "So, we'd need some vests. What else?" Anna responds, "A police hat." The teacher elaborates, "A police hat, and then we would need trash bags, trash tongs … " Anna interjects enthusiastically, "and gloves! And magnifying glasses!" Fig. 2 illustrates this moment.

The teacher proposes they continue planning the trash detective play, and the children draw their vision of a trash detective back at the daycare. Anna suggests enacting the trash detective play in the afternoon, but the teacher suggests scheduling it for the following day, promising to gather the necessary props.

As the walk continues, Anna and Ida are smiling broadly. Anna shrieks joyfully that they are all going to become trash detectives. Ida states that she will become a pink trash detective because she likes pink so much. Engrossed in their playful narrative, the children, while walking, co-create elements of a trash detective play. Even though they can't yet carry out the desired play, the sphere of staging absorbs them, and the children use imagination, narration and co-creation as they

Fig. 2. Children and teacher are planning the roles of trash detectives in a play while they are walking back to kindergarten.

ponder their own trash detective characters. Fig. 3 is an example of children's drawings of the trash detectives. Anna has drawn Ida as a pink trash detective as Ida staged during the discussion of characters. The detective patch in the picture that says "*Roskapoliisi*" is Finnish and means trash detective. Anna wrote each child's name on the drawing over the characters' faces.

Case 2. Garbage around the hut: The elements of playful activity embodies in fantasy play

A teacher has constructed a playful learning environment in which a hut, soft toys, and a soundscape invite children to learn about recycling. Initially, the teacher reviews different recycling-marked trash bins with the children, discussing what types of materials can be placed in each. Following this, the children explore the playful environment created by the teacher, and discover a letter addressed to them. The letter is from the foxes of the nearby forest, whose home is surrounded by trash. The foxes ask the children for help with sorting the trash. The teacher has scattered various types of trash around the hut, which the children excitedly run around to find. The teacher crafts a playful narrative, building upon her speech and the letter. She also creates a scenario in which insight emerges through problem-solving. The search for the letter in the learning environment with a play hut, soft toys, and soundscape, invites children to playful action (see Fig. 4).

Upon searching, the children are horrified by the amount of trash. However, a playful tone permeates the children's horror, arising from the emphasis in their altered voices and the repetition of the phrase, "There's a lot of trash here." Thus, children engage in the co-creation of a playful situation along with the teacher and other children. The teacher instructs the children to gather the found trash into one pile on the floor in front of the trash bins. The children's enthusiasm is visible in embodied actions: they jump around and fiddle with the trash. The

Fig. 3. Anna's drawing of trash detective's gear. For ethical reasons, the drawing image has been edited so that the children's names are not visible.

Fig. 4. Children gather trash around the foxes' play hut.

teacher gathers the children's attention by continuing the narrative, "You have done a really good job. The foxes were wondering, there's so much trash, and they don't know what to do. People have taken the trash to the forest and now people can help the foxes. Let's see calmly where this trash should go." Silvia adds to the teacher's narrative, "Luckily we are helping them now!"

The teacher lifts a transparent plastic bag from the pile of trash and asks the children what it is. The children respond that it is a plastic bag, and the teacher directs their attention to the fact that instead of throwing it in the trash, it could be reused. Silvia jumps around and suggests that holes could be cut into the bag, and it could be used as a summer dress. Silvia injects imagination into the situation by giving the bag a new meaning, and other children participate by shouting out their own ideas for new uses. Together, the teacher and the children conclude that the plastic bag should not be thrown away but reused.

The teacher then presents an old key. The children catch their breath upon seeing the key, expressing through embodiment their excitement about the artifact. The teacher initiates a narrative with imagination, "Imagine if this could unlock some secret treasure." "It can be used in some play," Julia suggests. The children begin to co-create ideas on which play the key could be used: Home play, doctor play, or role-playing. The teacher suggests that, for example, a knight could have such a key. Ruth continues the narrative by suggesting that the knight could use the key to free someone locked in a tower.

The teacher notices that the children have become restless and in the midst of a learning activity she suggests that they play in a hut with some soft toys. The children gather inside the hut (Fig. 5). The sphere of staging becomes dominant when children start verbalizing their roles, "This would be a rabbit, this is an owl." The children in the play begin reading a book to the soft toys. Laura opens a book, alters her voice, and states, "This is the first page." This moment shifts the focal point of the play into a sphere of imagination. "Recycling is fun," Laura pretends to

Fig. 5. Children read pretend stories about recycling to the soft toy animals in the hut.

read from the book. At this point, it can be observed that the recycling theme of the playful activity pervades the children's play. In other words, the playful activity, where recycling was learned, creates a sphere of reality for the children from which they draw content into their play. Lily sings, "Recycling is fun."

The children continue playfully reading from the books, with the recycling theme remaining within the story. Laura reads from the book, "You have to recycle, you can't leave that [trash] in the forest." From Laura's pretend story, it can be interpreted that the concern of the foxes about trash in the environment, brought out through narration in the activity, permeates into the children's play. The children discuss the play's continuation and Silvia takes the reader's role. She alters her voice and reads, "If you use mirrors too much and touch them, they can break. But don't buy a new one. Instead, recycle and make a new mirror." Silvia's story includes the idea of reusing items seen in the sustainability education activity. The children begin reading made-up recycling stories from their own books simultaneously, but the inner rule of the play about one reader breaks, changing the focal point of the play. The sphere of staging becomes dominant, and the children agree to start a play where they search for food for the stuffed animals.

6. Discussion and conclusion

Our aim was to unfold the relatedness of playfulness and play in the context of playful sustainability education activities. Our results revealed that playfulness during learning activities formed a developmental space to explore ideas connected to recycling. Playful exploration formed the sphere of reality that activated concepts and insights in children's sphere of staging and sphere of imagination. According to Schousboe's theory, the sphere of reality is often interpreted as the physical environment, encompassing the laws of nature, objects, props, and co-players, all immediately accessible and perceptible (e.g., Winther-Lindqvist, 2009). Moreover, our data suggest that learning activities that include playful elements can serve as the sphere of reality that will permeate children's fantasy play. This is supported by the cultural-historical notion of play as an outcome of cultural processes that are connected to human decisions and cultural values (Van Oers, 2013). Learning activities as cultural processes that appreciate playfulness can generate play as an outcome.

In Case 1, the children's trash detective play was influenced by recycling activities. The recycling theme sensitized the children to notice the trash in the environment, and the teacher's playful narrative and imagination about whether they should become trash detectives acted eventually as the igniter of the play and the sphere of reality from which the play began to build. While the children and teacher were planning the play, for the children the sphere of staging played a dominant role, but for the teacher the sphere of reality was the most dominant. She brought in the safety perspective of collecting trash by suggesting tools for the trash detective that make collecting trash safe.

In Case 2, the teacher utilized narration, imagination, action, embodiment, and insight to create a playful atmosphere in learning while navigating through the activity with the children. She left ample room for the co-creation aspect of playfulness, for example, when the children were able to ascribe new meanings to garbage. The data indicate that the knowledge acquired by the children in the playful sustainability education activity about recycling served as a sphere of reality, which in turn fed the sphere of imagination for the children. The notion that new knowledge got activated in children's play is remarkable because in play children reproduce and transform knowledge in a meaningful way in the framework of their own culture (Vartiainen & Kumpulainen, 2020). At the same time, children's free play that stems from playful learning activity allows teachers to assess and evaluate the learning activity and recognize what aspects of knowledge children find meaningful.

Cecchin (2013) criticizes playful learning by noting that in playful learning play is institutionalized and thus has thinned out in educational settings to a medium to achieve skills and knowledge. However, we claim that playful learning can act as a gateway that allows children to bring concepts and knowledge from more structured playful learning activities as a part of their play. In Schousboe's theory, the sphere of reality is in direct connection with the sphere of staging and the sphere of imagination. This notion supports the conclusion that playful learning and play can form an entity where learned aspects serve as a sphere of reality that eventually permeates into a sphere of imagination. Our data support the notion that playful learning can include parts of mature play and, in that case, play is not operationalized to serve learning but new knowledge feeds the play and children can reproduce and transform new knowledge further in their play in a meaningful way that merges with children's culture. Therefore, play can exist and evolve in an educational setting while respecting the imagination, freedom, and intrinsic motivation of play.

Our results indicate that the teacher's role in playful learning is like a seesaw: On the one hand, a teacher can suggest through playfulness in spheres of reality and staging viewpoints, materials and contents for children's play, but at the same time the teacher needs to appreciate freedom of play and choose to either step aside or fully participate in play when the relational intensity changes from the sphere of reality or staging to the sphere of imagination. As Schousboe (2013) points out, all players are not necessarily in the same dominant sphere, and disharmony can increase imagination in play. It is evident in our analyses that a teacher can take a position that is in disharmony with the children and leverage the children's sphere of imagination through playfulness.

For teachers, especially narratives, imagination, and co-creation are powerful attributes of playfulness that can help children apply new knowledge and skills in their play. As an implication for playful learning practices, we encourage teachers to frequently incorporate attributes of playfulness into learning activities as well as daily routines. Through playfulness, any situation can become a learning opportunity that invites children to reproduce and transform new knowledge as a meaningful cultural resource in their play. As a contribution to playful learning theories, we suggest that playfulness in early childhood education is more beneficial when we view it not merely as an attitude towards play without actual play practice, but when we recognize the importance of free play as an integral part of playful learning. This is because learning and play create a relational entity, where educational elements act as a foundation of reality that ultimately blends with and enhances the sphere of imagination.

CRediT authorship contribution statement

Jenni Vartiainen: Writing – original draft, Visualization, Project administration, Methodology, Formal analysis, Conceptualization, Writing – review & editing. **Kati Sormunen:** Writing – review & editing, Investigation, Writing - original draft, Formal analysis. **Jonna Kangas:** Writing – review & editing.

Declaration of Generative AI and AI-assisted technologies in the writing process

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