Journal of Childhood, Education & Society
Volume 5, Issue 3, 2024, 305-318
DOI: 10.37291/2717638X.202453326
ISSN: 2717-638X
Research Article

Presentations of children in research articles framed within the theory of pedagogical content knowledge

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Abstract: Teachers' knowledge about children is a part of teachers' Pedagogical Content Knowledge (PCK). With this in mind, the purpose of this study is to generate knowledge about how children are presented in PCK research. This is carried out by examining both the existence and the nature of descriptions related to presentations of children in selected PCK research articles. The method used in this qualitative study is inspired by document analysis and the analysis is a combination of content analysis and thematic analysis. In the analysis, articles presenting results from studies conducted in primary schools and in preschools were used. The focus of the analysis is on whether or not children are presented in the texts as active participants in teaching situations. The findings were divided into three themes: *Presentations of children through the construct of PCK*, *Presentations of children's thinking and motivation*, and *Presentations of children in play-based situations*. The results show children as active participants with materials and in informal learning spaces, and that children can influence teaching situations through the teachers' knowledge of children. One theme stands out in the analysis of the texts where children are presented as active participants: *Presentations of children in play-based situations* where children are described as being in control of their play, to which the teachers then adapt their teaching. It is in these presentations that children's active participation and agency is most clearly defined.

Article History
Received: 31 August 2023
Accepted: 24 July 2024

Keywords
Children; PCK; Teaching; Agency; Document analysis

Introduction

This study focuses on presentations of children in research articles that present research in the tradition of the Pedagogical Content Knowledge (PCK) theoretical framework (Shulman, 1986; 1987). The research interest focuses on when and how children are described as active participants and in this way earlier PCK research may illustrate how children are viewed in different educational practices. In this study, two educational practices for learning are central: primary school and preschool. Studying these two practices may provide an understanding of whether or not the practice in which the PCK research takes place influences the way children are presented.

One profession that could be affected by this study is the school-age educare teachers in Sweden. In Sweden, school-age educare is directed towards education and care of pupils between the ages of six and twelve before, after, and during school. School-age educare teachers teach in an interdisciplinary way, using different fields of knowledge simultaneously, taking into account the needs, interests, and experiences of the children. PCK research in school-age educare is almost non-existent and could be an important part of the development of the profession of school-age educare teachers. Teachers in school-age educare therefore need to have pedagogical content knowledge about how to teach and plan teaching in which children are active participants. The scrutiny of the articles produced in the PCK research tradition in this study focuses on how children are presented in research articles from the related educational practices of primary school and preschool, in an attempt to initiate a discussion on how school-age educare teachers' PCK may be conceptualised. Articles from primary school are chosen because school-age educare is aimed at the age of children in primary school. In addition, preschool articles are selected because of the kindred educational attitude between preschool and school-age educare with a more holistic approach

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based on education, care, and developmental progression with the priority of the child's wellbeing and enjoyment.

PCK originated in the 1980s and has been scrutinised, criticised and developed since then (Gess-Newsome, 2015; Hume et al., 2019; Shulman, 1986; 1987; 2015). Research using PCK as a theoretical framework emphasises teachers and their knowledge. This is often related to a specific subject in school. The concept *Subject matter content knowledge* is important in this tradition for depicting teachers' ability to make instructional choices which is an important part of teachers' PCK (Shulman, 1986). According to Shulman, PCK is teachers' professional knowledge related to teaching.

The concept of agency is inspired by the sociology of childhood (James & Prout, 1997) where children are perceived as active agents in the construction of their own lives, the lives of those around them and of the societies in which they live. According to Dreke (2016), the concept of children's agency is now setting normative standards for the academic discipline of pedagogy through its influence on educational institutions through the integration of the concept into the curriculum in, for example, Brazil and New Zealand. However, the concept of agency is an important part of the analysis in this study to find out how children are presented as active participants in PCK research articles. The concept of agency is thus part of the analysis, although the focus of this study is on when and how children are presented as active participants in the texts. This study explores how children are perceived as part of teaching situations in the texts and how this is described. For this reason, the study is inspired by the sociology of childhood and not, for example, by child-centred teaching, where children may be at the centre of teaching or where children should direct their activities in teaching situations (Chung & Walsh, 2000).

A systematic analysis of how children are presented in PCK articles could contribute to an overview of how children are described in research on primary and preschool teachers' PCK, as well as to initiate a discussion of how children may be viewed in teaching situations in different educational practices including school-age educare in Sweden.

Background

This section provides a background to PCK and children's agency. Within this background there is also a section on school-age educare in relation to children and children's agency in this setting. This is to problematise children's agency in relation to the PCK of school-age educare teachers.

Reconceptualising PCK

The core idea of PCK is that teachers have a specific kind of knowledge about teaching, called pedagogical content knowledge, which is different from the knowledge of a subject expert. The current research discourse has been reformulated since Shulman (1986; 1987) began to theorise about PCK. Shulman (2015) himself then criticised his own original formulations from the 1980s. One of Shulmans criticisms of his own work was that the original research and theorising did not take into account pupils' context and learning. In recent years, researchers who have taken note of this criticism have developed new models for understanding PCK. The two most commonly used are a model of teachers' professional knowledge and skills that includes teaching knowledge and influences on classroom practice and student outcomes (Gess-Newsome, 2015, p. 31), and the other model that shows teacher knowledge and skills, student outcomes, teacher contributions, student contributions, other contributions, and knowledge exchange (Carlson et al., 2019, p. 83).

As Shulman (2015) states in his critique, the link between PCK and pupils' learning has only been studied by a few researchers, for example Alonzo et al. (2012). In their study, they show that there is a relationship between teachers' use of PCK and pupils' learning and outcomes. Based on their study, they conclude that teachers need to have *flexible, rich,* and *learner-centred* ways of teaching. Flexible teaching consists of a familiarity with different ways of teaching, so that teachers can choose between alternatives in the classroom, and an understanding of content and the ability to identify content ideas as expressed by novices. Teachers need to have a repertoire of representations to illustrate topics in different ways in order to provide rich teaching. In the learner-centred way of teaching, teachers need to have knowledge of the

common difficulties that pupils have with subjects. Knowledge of pupils' learning difficulties may be used to improve the sequencing of instructional representations (Alonzo et al., 2012).

Studies using PCK as a theoretical framework may differ, for example, depending on the subject and teacher group on which the research is focused (Park & Oliver, 2007). This provides an opportunity to rephrase concepts in PCK. Studies of preschool teachers' teaching that have used PCK as a theoretical framework rephrase concepts in PCK to fit the professional knowledge of preschool teachers. Kutluca´s (2021) findings on preschool teachers´ PCK and science teaching show that, for example, teaching with preschool children should be based on children's previous experiences, capturing unexpected phenomenon as they happen, asking children questions to challenge them and stimulate further investigation, and listening to children and their explanations. The study shows that preschool teachers' PCK includes child-centred teaching, where preschool children´s ways of learning are central, for example through play-based and everyday activities to apply the teaching of different subjects in teacher-child interactions.

Dunekacke and Barenthien (2021) problematise the components of PCK in relation to early childhood teachers. This is because content knowledge, which refers to the teacher´s knowledge of a specific topic, is different in early childhood education, where teachers have knowledge in many areas. In early childhood, as opposed to later childhood, learning is seen as play-based and integrated into everyday life, with a more holistic view of the child itself (Dunekacke & Barenthian, 2021).

Although PCK has been reformulated since Shulman's (1986; 1987) original conceptualisation, the starting point of PCK mentioned children (students) as a factor in teachers' pedagogical content knowledge: "…the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons" (Shulman, 1986, p. 9) and "…knowledge of learners and their characteristics" (Shulman, 1987, p. 8). These statements show that from the very beginning of Shulman's conceptualisation of PCK, children were considered as a part of the teachers' acquired knowledge base and thus their PCK.

Children's Positions in School-Age Educare

In Sweden, school-age educare focuses on education and care before, after and during school for pupils between the ages of six and twelve years. The educational activity in school-age educare is regulated by the Education Act (SFS 2010:800) and the curriculum for the compulsory school, preschool class and school-age educare (Swedish National Agency for Education [SNAE], 2022). The knowledge that school-age educare teachers transform into teaching is not directly related to traditional school subjects such as mathematics, science or language, but more often to values, social interaction, identity, crafts, play, care, and meaningful leisure time. School-age educare teachers teach in an interdisciplinary way, incorporating different areas of knowledge at the same time.

In school-age educare, children's needs, interests and experiences are the starting point and the activity is regulated in the national curriculum (SNAE, 2022). In this sense, school-age educare teachers' should teach children with their agency in mind. However, according to Ljusberg (2023), this can be a difficult task because of how children themselves can formulate what they are interested in and how the teachers view children as co-actors or objects. In Ljusberg's (2023) study, the school-age educare teachers could view the children as co-actors, as objects to be taught, or show a total disinterest in the children´s interests, indicating the children´s subordinate position in the school-age educare setting.

In the school-age educare setting, children are offered free space without the teachers, which creates opportunities for children to form their own communities (Sparrman, 2002). According to the children in Ackesjö and Landefrö's (2014) study, school-age educare is a place for play, where they can do what they want and where they learn social skills, whereas in school children learn school subjects and the teaching is based more on teacher-centered perspectives. However, the children's participation is negotiated with the teachers and with the other children on a daily basis in the school-age educare setting. For example, in the study by Elvstrand and Närvänen (2016), the children expressed that they did not oppose the rules set

by the teachers.

Research focusing on children's perspectives in the school-age educare setting shows that teachers take children's agency into account to varying degrees. In her study of children's multimedia storytelling, Klerfelt (2007) shows that teachers in the school-age educare setting gave children autonomy to use their own culture in activities. School-age educare was identified as an institution that provided space for children's perspectives.

Hippinen Ahlgren's (2021) study shows that teachers' interaction with the children varied, they positioned the children with agency or without agency in their participation. The results show that in some teaching situations in school-age educare children can be positioned with no participation and the teacher controls the teaching in these situations. However, in other teaching situations in school-age educare, the children control the teaching situations and are positioned as an active part of the teaching, and the teacher takes a position of listening to the children and supporting the children with teaching when needed (Hippinen Ahlgren, 2021).

In the school-age educare setting, the capacity to act as a child is limited and constrained by structures. Activities in the institution provide a framework within which children can act. The institution is run by school-age educare teachers who may enable or inhibit children´s participation, influence, and agency. A key factor in children´s agency is the interaction between teachers and children and how children have agency in their participation in the teaching situations or are seen as objects for the teachers' instructional choices.

Conceptual Framework

The notion of children as active participants in this article is inspired by the sociology of childhood (James & Prout, 1997; Mayall, 2001). Mayall describes a shift in thinking about children in the sociology of childhood, where children move from being objects of adults' work to being competent, contributing social actors, and where children's own wishes and expressed needs are relevant to the construction and implementation of social policies and practices. Mayall (2001) states that if adults are to respect children´s right to participate, they must create the conditions for participation.

Children can be seen as social agents, which in turn influences the way in which adult-child interactions take place and are sustained (James & Prout, 1997). Mayall (2001) points to the need for teachers to take children's views into account. The best thing about school for children is their friends, according to the results of Mayall's study. Relationships with friends enable children to make sense of, endure and even enjoy school (Mayall, 2001). Children's agency, according to Mayall (2001), is an important consideration for teaching and teachers. However, the extent to which children can be social actors in the context of school depends on how they are able to act as pupils.

Children´s agency should not be viewed uncritically. Children´s agency should be scrutinised with the aim of not putting too much pressure on children (Tisdall & Punch, 2012). On the other hand, what kind of agency children are allowed to have and what rights to agency the children have are other critical questions on the political agenda to expose children´s minority status (James, 2009). There is also an ongoing generational process within and outside institutions with social consequences for those categorised as children (Alanen, 2005). The generational condition determines the extent to which children have access to expand their agency. In society, children are placed in a subordinate position in relation to other groups. This position may limit the extent to which children can be active agents (Corsaro, 2015). Children themselves actively contribute to maintaining the social structure in their interactions with adults, they reproduce society (Moll & Betz, 2016). Children´s status in society has consequences for their identity and the recognition of their agency (Wihstutz, 2016).

According to Coffey and Farrugia (2014), the concept of agency is a contested and controversial term in sociology of youth and contemporary sociological theory. What young people's agency consists of, and how the concept may be legitimately used, is an important factor in the debate. The view that is identified in Coffey and Farrugia's (2014) study, where agency is seen as the subject's embodied potentiality to form

intra-active relations with material structures, discourses and intersubjective environments, is also a view relevant to this study. Lee (1998) argues that sociologists of childhood fit children into a standard form of sociological theory rather than developing sociological theory that fits children. Essential agency should be based on children's independence. Lee (1998) describes that "…agency is an effect of independence that emerges from a fundamental dependency" (p. 472). Children's agency in this description is dependent on external mediation.

Purpose

The purpose of the study is to create knowledge about how children are presented in PCK research. This is carried out by examining both the existence and the nature of descriptions of children as active participants in the presentations of children in selected PCK research articles.

Method

The method used in this study is document analysis, which is a systematic procedure for reviewing and evaluating documents (Bowen, 2009). "The analytic procedure entails finding, selecting, appraising (making sense of), and synthesizing data contained in documents" (Bowen, 2009, p. 28). In this study, the analysis is a combination of *content analysis* and *thematic analysis*. This type of analysis is an iterative process used in document analysis (Bowen, 2009). *Content analysis* in this study is inspired by Bowen's discussion of content analysis in the context of document analysis, where content analysis involves a document review in which meaningful and relevant parts of texts are identified in order to find pertinent information. *Thematic analysis* in this study is inspired by Braun and Clarke's (2006) way of conducting a qualitative analysis and was used in coding and constructing categories. This is done through a reading that focuses on the patterns when using the concepts of analysis (Braun & Clarke, 2006).

My analysis consists of five steps in which I have used both content and thematic analysis to develop my analytical steps: 1. Skimming the documents, 2. Reading the documents thoroughly, 3. Interpreting and coding patterns in the documents according to the concepts of analysis, 4. Constructing categories and themes according to the concepts of analysis, and 5. Presenting the results.

The concepts used in the analysis are inspired by the sociology of childhood and are used to identify how children are described in the selected PCK articles. The analysis focuses on how children's *active participation* can be understood in previous PCK research. Agency as an analytical concept is understood here from a relational approach, where agency occurs in relation to interactions (Mayall, 2008).

In the result, the presentations of children in the research articles were analysed with a focus on whether they were described as active participants. When children, students or pupils were mentioned in the articles, this sequence in the article was coded to see if it was a text that presented children as *active participants* in a teaching situation. If the description of children could be analysed with the notion of being active participants in teaching, the sequence became a segment of the coding pattern. The aims of the studies may not be primarily focused on children's agency, or may not discuss children as active participants, but if the text in the articles is written in such a way that children are seen as active participants, it is analysed as such. In the examined articles, children are referred to as children, students or pupils. However, in my analysis they are referred to as children.

The articles selected for analysis were those most frequently cited by other researchers in the Scopus database available at Stockholm University Library in June 2022. The search was done within article titles, abstracts, and keywords. The search terms were *pedagogical content knowledge* and *primary school* or *pedagogical content knowledge* and *preschool*. From the search, the 12 most cited articles of each practice were selected for analysis. The skimming process revealed that some researchers did not use PCK as a theoretical framework in their study. These articles were removed from the list and not analysed. One study focused on high school and was removed from the study. This resulted in 9 articles presenting results from studies conducted within the PCK framework in primary school and 10 articles presenting results from studies conducted within the PCK framework in preschool.

The search attempted to find research on school age educare and PCK, but no studies were found in Scopus that included school age educare and PCK or leisure time centers and PCK in titles, abstracts, or keywords. This shows the relevance of analysing studies that focus on PCK research in primary and pre-school education in order to start a discussion about PCK of school-age educare teachers.

The articles focusing on primary school and PCK included studies from these subject areas: *mathematics* (Blömeke et al., 2012; Carpenter et al., 1996), *science* (Appleton, 2002; Appleton, 2003) and *educational technology* TPACK and ICT-TPCK (Angeli & Valanides, 2009; Chai et al., 2011; Koh et al., 2014; Koh et al., 2016; Webb et al., 2016).

The articles that focused on preschool and PCK included topics such as: *mathematics* (Anders & Rossbach, 2015; Blömeke et al., 2017; Dunekacke et al., 2016; Lee, 2017; McCray & Chen, 2012; Oppermann et al., 2016; Tirosh et al., 2011) *educational technology* TPACK (Liang et al., 2013; Roig-Vila et al., 2015) and *science* (Gropen et al., 2017).

Ethical Considerations

The Swedish Research Council's (2017) information on ethical considerations information, consent, confidentiality, and use of data was followed. No sensitive material was collected in this study.

In a document analysis of previous research focusing on PCK, it is important to consider the researchers' purpose of the studied articles. Their purpose is to illustrate a part of PCK that is different from the focus of this study. This study does not criticise previous articles. The focus here is to analyse how children are presented in the texts.

The other consideration is the selection of articles. The most cited articles consist of the most popular topics for PCK research and may not be the most recent articles, as they need to have been in circulation for a while in order to be exposed to the scrutinising eye of other researchers and to be cited by them. These two considerations could be seen as a limitation of this study.

Results

In this section, the findings from the research articles are presented in themes that focus on the concept of analysis when children are presented as active participants in the text. The themes are: *Presentations of children through the construct of PCK, Presentations of children's thinking and motivation,* and *Presentations of children in play-based situations.*

Some of the articles have been given more space in the presentation of the findings because they illustrate the findings of this study. However, some of the articles are not mentioned at all if they do not present children as active participants in the texts.

Presentations of Children Through the Construct Of PCK

In Shulman's (1986; 1987) construct of PCK there are descriptions of what teachers should have in their PCK and one of these areas of knowledge is knowledge about the children they are teaching. Shulman's descriptions of teachers' knowledge about children were a starting point in some of the articles analysed, a starting point where the text shows a child with possibility to learn and that teachers in the articles have to adapt their teaching to the children. Children are described in this theme as part of teachers' PCK and how teachers should adapt their teaching to learners. For example, in Angeli and Valanides (2009) conceptualisation of ICT-TPCK (Information and Communication Technology-Technological Pedagogical Content Knowledge) the children are presented through Shulman's (1986; 1987) descriptions of the knowledge teachers need to have about learners.

> …knowledge of learners are blended into an understanding about how particular topics to be taught are represented and adapted to learners' characteristics, interests, and abilities… Accordingly, PCK encompasses an understanding of students' preconceptions and learning difficulties, and includes the most useful forms of representation, the most powerful analogies, illustrations, examples, explanations, demonstrations, and other ways of representing and formulating the subject in forms that are comprehensible to learners (Angeli & Valanides., 2009, p. 155).

Angeli and Valanides (2009) present how the pre-service teachers need to tailor the design of lessons to the learners. In this way, the article describes children as being at the centre of teaching, where they have agency in their own characteristics, interests, and abilities. The text shows that teachers need to adapt their teaching to these ideas of children and that technology as a tool in teaching, where children are active participants with these tools, supports their learning.

Children's active participation is evident in the text of the article when it states that ICT-TPCK may support the learning of children with different learning styles by transforming content with multiple representations using a variety of technological means in such a way that learners and technology form a shared cognitive system (Angeli & Valanides, 2009). "Each step of the process was exemplified with specific examples of how the pedagogical affordances of specific ICT tools could transform the content into powerful pedagogical representations tailored to the learners' abilities, interests, and previous knowledge and/or alternative conceptions" (Angeli & Valanides, 2009, p. 164-165). In this way the children are at the centre of the teaching, they have agency in deciding what is taught and the teachers have to adapt their teaching to the children. In this way, children´s needs, interests, and experiences should form part of teachers' PCK, as in school-age educare. When children are seen as co-actors and not as objects to be taught, as described in Ljusberg's (2023) study. Children's active participation in this way is achieved through the presentation of their own characteristics, interests, and abilities, rather than agency through pressure on children (Tisdall & Punch, 2012).

One article by Koh et al. (2016) also presents children through Shulman´s (1986; 1987) description of teachers' knowledge of children. According to the text, teachers need to have an understanding of children's preconceptions and difficulties in their PCK. In Koh's et al. (2016) study with primary school teachers on 21st century learning, children are presented with different difficulties in understanding the lessons and when teachers change their planning through ICT and thereby 21st century learning improves their teaching, according to the article. In the text, the children had *weaknesses* in articulating their scientific reasoning, *problems* in applying grammar rules, *weaknesses* in asking higher order questions to support the generation of rich content for their conversations. The teachers in the article revised their lessons and supported the children through various ICT tools that the children actively used. The article presents the children's preconceptions and difficulties and shows how the teachers in the study supported the children by changing their lessons. In this way, the children were then presented with agency to change teaching.

In the formulations of the research articles, children were presented with reference to Shulman's (1986; 1987) construct of PCK, particularly in the descriptions of teachers' knowledge of children. The nature of the descriptions focused on how the teachers' knowledge of children would enhance their teaching with the children as active participants and in some way at the centre of teaching. The children were presented with agency to change teaching in the texts.

Presentations of Children's Thinking and Motivation

The knowledge of children is in most of the articles a knowledge that teachers need to have in their PCK, although it is not explicit in all of the texts. The knowledge of children is directed towards different areas. In some of the articles there are sections that illustrate teachers' knowledge of children's thinking or children's motivation. For example, in the text written by Tirosh et al. (2011), the teachers in the development programme had to reflect on the children's thinking, they had to be aware of the relationship between affect and learning. There are descriptions in the formulations about the relationship between children's emotions and their ability to solve problems (Tirosh et al., 2011). Carpenter's et al. (1996) text focused on primary school children's mathematical thinking. The text describes a research-based model of children's thinking that complements teachers' PCK. More specifically, that a part of PCK is knowledge of pupils thinking, knowledge of conceptions, preconceptions, and misconceptions that children bring to the learning of a subject, which make it easy or difficult to learn. In the text it is described that pupils construct knowledge in an active way rather than assimilating knowledge. Children are presented in the text as having agency in the way that they bring informal or intuitive knowledge of mathematics to school. Children can construct viable solutions to a variety of mathematical problems. In the article the children

are presented at the centre of teaching situations, and teachers need to have knowledge of children's mathematical thinking to be able to teach in ways that help children understand mathematics. The text suggests that teachers' detailed knowledge of children's thinking in mathematics provides an explicit context for evaluating and reconceptualising decisions about pedagogy. In these articles, as in others in this study, children are seen through the lens of teachers, and in this way may have a minority status (James, 2009). On the other hand, in many of the articles it is stated that teachers need to have knowledge about the children in their PCK in order to be able to offer agency to the children, but the generational condition or position of the relationship between teachers and children determines how children have access to extend their agency (Alanen, 2005; Corsaro, 2015).

Children's motivation and engagement in activities is central to their active participation and is explored in Appleton's (2002) text where it is described that an important part of science PCK is activities that children can engage in. The text presents children in the context of how teachers in the study develop science activities that work. The presentations of children illustrate that children need to be engaged in activities, they should not be bored. Children are presented as active participants when it is described that teaching needs to involve children and be enjoyable to them. Children's active participation in activities is at the centre of what is presented in Appleton's article.

> Some teachers looked for a "gimmick" or something spectacular which should grab the children's attention: "You get the 'Oh ahh' from the kids and they remember" (Loiuse). Others merely wanted to ensure that the activity was of interest to the children, would get them involved, and would be enjoyable: "The (activities) that work the best are the ones that they have really enjoyed. Because I know that once we have done it in the class they will go home and explore it further because they have enjoyed it" (Karen) (Appleton, 2002, p. 399).

In this way, children are presented with agency to explore the phenomenon in the class and at home, they are active and have to be active according to the text.

The children's active participation is sometimes not explicitly formulated in the articles, but the notion of the teachers' knowledge of the children, of their thinking and of their motivation shows the children's activity in some of the text segments.

Presentations of Children in Play-Based Situations

When children play, they are active in the play situations. Some of the articles presented children in play. In Lee's (2017) article, which mainly focused on preschool teachers' PCK in mathematics, formulations in the text show a view of children as active in their informal learning. The text points out that preschool children are "… active mathematics learners, possessing informal mathematical knowledge… this informal mathematical knowledge is developed when children engage in problem-solving processes which often occur during children´s free play time…" (Lee, 2017, p. 232). However, the text describes how preschool teachers should notice mathematical situations in children's free play time, where children are seen as active participants, despite the teachers' focus on mathematics in the text.

Another article in the study that presents children in free play is one article by Anders and Rossbach (2015). In the text it is stated that child-oriented beliefs are very common among preschool teachers and that approaches to learning that emphasise play-based learning and cooperative learning, as well as children´s freedom of choice. Thus, children's active participation is illustrated in the text through play-based learning where children are active participants and where their freedom of choice is emphasised (Anders & Rossbach, 2015).

Children's active participation in play-based activities in preschool is also mentioned in the articles by Oppermann et al. (2016) and Dunekacke et al. (2016). Oppermann et al. (2016) illustrate in their text that early mathematics education should be integrated into children's everyday play activities, while Dunekacke et al. (2016) define in their text that preschool learning takes place in open and informal settings and starts with children's interests and needs. In this sense, the texts show children as co-actors rather than objects to be taught (Ljusberg, 2023). The children are perceived as capable of agency and not in a subordinate position (James, 2009). However, the texts in the articles do not mention the concept agency and how children are able to extend it or not (Alanen, 2005; Corsaro, 2015).

To summarise, the presence of descriptions of children is evident in the selected PCK research articles. Although it is not in the main focus of the articles, the texts show presentations of children in various forms. The nature of the descriptions of children is related to Shulman's (1986; 1987) construct of PCK and how teachers' knowledge of children is a part of their PCK. The presentations of children in the texts also illustrated descriptions of children's own characteristics, interests, and abilities as well as difficulties. The descriptions of children showed that teachers needed to have knowledge of children´s thinking and knowledge construction. In order for the children to be active participants, the texts emphasized the need for children to be motivated, engaged and to enjoy the activities. In this way, children were interpreted as active participants in teaching situations. The presentation of active participation was clearly interpreted when the texts referred to children's free play and freedom of choice. Children were presented as active participants in the articles studied when teachers were described as adapting their teaching to children's own characteristics, interests, and abilities; when children were described as motivated, engaged, and enjoying activities; and when they participated in play-based situations.

Discussion

The purpose of this study is to create knowledge about how children are presented in PCK research articles. The findings consist of three themes that emerged as the most prominent patterns when analysing children as active participants in the research articles. These themes were: *Presentations of children through the construct of PCK, Presentations of children's thinking and motivation,* and *Presentations of children in play-based situations.*

In the theme *Presentations of children through the construct of PCK*, it was evident that Shulman's description of teachers' knowledge of children in the construct of PCK was a starting point for the presentations of children in the texts. According to PCK, teachers need to have knowledge about children's characteristics, interests, and abilities, as well as their preconceptions and learning difficulties. In this way, the texts present children with the opportunity to actively participate in how teachers adapt and revise their teaching according to children's interests and difficulties.

In the school-age educare in Sweden, the national curriculum regulates the activities in the school-age educare so that the starting point is the children's needs, interests and experiences (SNAE, 2022). The studied articles show that in order to be able to do this, teachers need to have knowledge of, for example, children's characteristics, interests, and abilities in their PCK, which could be an argument for claiming that knowledge of children should be at the centre of school-age educare teachers' PCK. However, attention should also be directed towards how this knowledge can be used to make children active participants in teaching situations and how children can be given agency. Teachers' knowledge of children's needs, interests, and abilities may not ensure that children are given agency in teaching situations, given the teachers' view of children, for example when children are in a subordinate position (Corsaro, 2015).

In this theme, children's active participation is also evident in the way teaching with ICT tools is described in the texts, where ICT tools can, according to the articles, enhance both teaching and learning when children actively participate with these tools (Angeli & Valanides, 2009; Koh et al., 2016). ICT tools can now be seen as a tool used in society at large and as a powerful tool in children's own culture. Using children's own culture in activities is a way of adapting these activities through children's perspectives and agency, which is a part of teaching in the school-age educare setting (Klerfelt, 2007). Perhaps in this way, children form agency in their active participation with ICT tools and the discourse of school, preschool and school-age educare in interactive relations with material structures, discourses and intersubjective environments, in the line with how Coffey and Farrugia (2014) see agency in their study.

The theme *Presentations of children's thinking and motivation* shows presentations of children in the research articles that illustrate their thinking in mathematics and their motivation towards learning science. According to the texts, children's emotions are a part of their ability to solve problems as well as their thinking, and teachers need to have knowledge about these areas in order to teach the children (Carpenter et al., 1996; Tirosh, 2011). The nature of the presentations in this theme is that children think and feel

differently about different subjects, and teachers need to have knowledge about this and adapt their teaching to include children's feelings and thinking in different subjects. In this way, the texts present children with the opportunity to actively participate in how teachers adapt and revise their teaching according to children's feelings and thinking. Children's motivation in this theme is described through their engagement in science activities as described in Appleton's (2002) article. Children's active participation is presented in the text in a way that describes that children should not be bored in the science activities, they should be engaged, involved, and the activity should be enjoyable. Activities that motivate children are at the heart of teaching in school-age educare. Children negotiate their participation with the teachers and other children on a daily basis (Elvstrand & Närvänen, 2016). In this theme, the nature of presentations of children in the articles shows the importance of considering children's thinking, emotions, and motivation in the construction of teaching situations. However, it is questionable how the institution of school, preschool or school-age educare can always have this is in mind. Elvstrand and Närvänen (2016) state that the children in the school-age educare setting did not disagree with the rules set by the teachers. Teachers may interpret children's thoughts and feelings in different ways. The questions that arise are whether teachers are able to take children's views into account in the school context (Mayall, 2001) and what kind of agency the children are able to have in their minority status (James, 2009).

In the theme *Presentations of children in play-based situations*, children were presented as active participants in play-based situations. The articles in this theme were focused on PCK in a preschool context (Anders & Rossbach, 2015; Dunekacke et al., 2016; Lee, 2017; Oppermann et al., 2016). All articles presented children as learners in an informal context, often in play-based activities. The nature of the descriptions showed children with agency in their own free play, and some of the articles highlighted children's freedom of choice. Teachers in preschool settings, according to the texts, should integrate teaching into play-based situations. This is echoed in research by Dunekacke and Barenthien (2021) and Kutluca (2021) who describe that in early childhood, in contrast to later childhood, learning is seen as play-based and integrated into everyday life, with a more holistic view of the child itself. This is similar to how learning is perceived in the school-age educare settings, where children are given space to form their own communities (Sparrman, 2002). According to the children in Ackesjö and Landefrö's (2014) study, school-age educare is a place for play where they can do what they want. Mayall (2001) states that the best thing about school for children is the relationships they make with their friends, and in this way it is an important consideration for teaching and teachers to take children's agency into account.

PCK is a theoretical construct in which teachers have a particular kind of knowledge about teaching. This theoretical framework, as well as research using this framework, focuses on teachers and their teaching. However, as Shulman (2015) points out, there is a need for further research on, for example, children's contexts and learning. One study that focuses on the relationship between teachers' use of PCK and pupils' learning and outcomes shows that teachers need to have flexible, rich, and learner-centred ways of teaching to improve pupils' learning and outcomes (Alonzo et al., 2012). This study shows that some PCK research do show the children in a learner-centred way and that these texts describe the importance of teachers' knowledge of children. In this way, teachers in the research articles may engage children to become active participants and thereby the teachers may improve their teaching. In the research articles from the preschool context, it was illustrated that teachers need to have specific knowledge of children in order to be able to integrate their teaching into informal and play-based situations where the children are active participants. In a school context, the mediations could be influenced by teachers' instructional choices. Mayall (2001) argues that if adults are to respect children´s rights to participate, they need to create conditions for participation. The findings of this study show descriptions of teachers' instructional choices, and in the texts it is evident that teachers decide how children can or cannot participate. Children´s participation and agency is in the hands of teachers and their view of children, even though the teachers in the research articles talk about child-centred teaching (Chung & Walsh, 2000). Children's agency may be limited in this way by their subordinate position (Corsaro, 2015).

Children's agency and active participation in teaching situations, I argue, is an important part of developing PCK in different educational contexts. Teachers' knowledge of pupils is a part of the knowledge

domains in PCK, but how children might have agency and thus be active participants in teaching situations is shown in the texts, but is not foregrounded or conceptualised in the research articles studied. The question is how children's perspectives, including their agency, can be a part of teachers' PCK.

Limitations and Implications for Future Research

The limitations of this study are related to ethical considerations. In this study, it is described that the purpose of the researchers in the research articles is different from the focus of this study, which may limit the findings in how children are presented. The other factor in the ethical considerations was the selected articles, which consisted of the most cited articles, which limits the selection of, for example, different types of PCK research. In addition, this is a small study and the study might have benefited from a larger number of articles analysed.

Implications for future research would be to continue to explore how knowledge of children's agency might form part of teachers' PCK. In addition, this study could possibly be the starting point for a discussion about conceptualising school-age educare teachers' PCK in relation to children's agency.

Conclusions

This study focuses on presentations of children in PCK research articles. The results show examples of formulations in the texts where children are being presented as active participants in teaching situations. The ways in which children are presented in the research articles reveal three themes: *Presentations of children through the construct of PCK, Presentations of children's thinking and motivation,* and *Presentations of children in play-based situations.* The presentations of children focus on teachers' knowledge of children in a variety of ways, where their knowledge and view of children's active participation may be crucial to whether children are given possibilities to agency in teaching situations. However, the theme that stands out is *Presentations of children in play-based situations* where children are described as being in control of their play to which the teachers then adapt their teaching. It is in these presentations that children's active participation and agency is most clearly defined.

From the perspective of school-age educare, this study shows that a conceptualisation of PCK adapted to school-age educare, where for example children's active participation and agency are a part, could make PCK an important theoretical framework for school-age educare, where the starting point for teaching is children's needs, interests, and experiences. In conclusion, a discussion is needed on the relationship between school-age educare and PCK to create a shift in thinking, as well as on PCK and children's participation rights and agency in different educational practices. This shows the need for further research to discuss children's agency within the theoretical framework of PCK.

Declarations

Authors' Declarations

Acknowledgements: Not applicable.

Authors' contributions: This is a single-authored paper.

Competing interests: The author declares that there are no competing interests.

Funding: No funding was used for this study.

Ethics approval and consent to participate: The paper is based on a systematic review and involves no human participants.

Publisher's Declarations

Editorial Acknowledgement: The editorial process of this article was completed under the editorship of Dr. Eleonora Teszenyi through a double-blind peer review with external reviewers.

Publisher's Note: Journal of Childhood, Education & Society remains neutral with regard to jurisdictional claims in published maps and institutional affiliation.

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