
Connected Learning in Kindergarten

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Abstract: The aim of this socioculturally informed study is to explore teachers' insights into connected learning projects in kindergarten. The focus was on the ways in which early childhood teachers and educators ($N = 8$) supported children in connecting their interest-driven and inquiry-oriented learning to their local surroundings, family, and community. The data consisted of teachers', educators', and researchers' collaborative conversations, supplemented by project portfolios. The preliminary content analysis of the 2 representative projects shows how the children's own discoveries of nature were connected to an extended network of peers, family, and external experts through the use of a trail camera. Conclusions are drawn about activities that afforded the co-creation of a participatory network of people, tools, and resources organized around a shared object of inquiry.

Introduction

Over the past decade we have witnessed the emergence of extended learning networks and digitally mediated practices. These sociotechnological developments point us toward a more participatory culture, one in which we have relatively low barriers to participation, strong support for creating and sharing one's creations, and some type of mentorship in which what is known by the most experienced is passed along to novices (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2008). Rheingold (2013) argues that these new opportunities challenge educators to advance a participatory pedagogy assisted by digital media and networked publics.

Despite widespread optimism about the potential of digital technologies and social networking, only a small minority of children and youth take advantage of these opportunities (Barron, 2006; Ito et al., 2013). To overcome the risk of an emerging participation gap (Jenkins et al., 2008), Ito and colleagues (2013) argue for the need for *connected learning* that supports children and youth to link their formal learning with society, family, and community in an interest-driven and inquiry-oriented manner. While we have begun to have successful examples and studies of connected learning in schools, we have less of an understanding of what it might mean in the context of early childhood education (ECE).

Mitchel Resnick (2017) argues that a kindergarten approach to learning may offer novel opportunities to develop the mind-sets and skills needed in the rapidly changing 21st century. People of all ages should be focusing more on imagining, creating, playing, sharing, and reflecting, just as children do in traditional kindergartens (Resnick, 2017). Given this insight, we aim to take a kindergarten perspective on connected learning and study the emerging learning networks, activities, and forms of participation that are mediated when teachers and educators describe and reflect on connected learning projects in ECE.

Sociocultural Framework

The present study draws on sociocultural perspectives of learning and participation that originate from

the intellectual work of Lev Vygotsky (1978) and his followers. For Vygotsky, participation in the everyday activities and practices of communities was a crucial feature of learning. Rather than learning's being seen as an individual mental process, he emphasized the essential role played by the experienced others who can support the learning of the child, and who pass on the skills and knowledge from generation to generation through mentorship and collaboration (Kozulin, Gindis, Ageyev, & Miller, 2003). Apprenticeships with community members allow for the development of skills and knowledge that go hand in hand with a growing sense of one's self or identity (Barron, 2006; Wenger, 1998).

Moll, Amanti, Neff, and Gonzalez (1992) argue for the need to develop a positive view of the kinds of expertise and affordance networks that children are already connected to when they enter formal educational institutions. Their *funds of knowledge* approach refers to the knowledge, skills, and social networks that children and their families sustain and develop in their everyday practices (Moll et al., 1992). McTavish, Streelasky, and Coles (2012) note that nowadays, children and their families also use the Internet to connect with various kinds of information networks that stretch beyond the boundaries of their immediate community.

As children's everyday experiences deeply influence their personal interests, goals, and identities, educators have to bridge this range of opportunities in educational activities (Pramling Samuelsson & Asplund Carlsson, 2008). This challenges us to co-design participatory networks that benefit from the existing funds that children are already familiar with and connect them with the resources that their peers and teachers have access to (Vartiainen, 2014). In design-oriented settings, children may learn by co-creating an epistemic environment that affords their interest-driven inquiry activities (Markauskaite & Goodyear, 2016). Given this insight, our research question is: *How do early education teachers support children's interest-driven participation in connected learning projects?*

Method

Research Context

This research is part of a long-term, larger design-based project in which the aim is to iteratively develop and study connected learning networks and related design-oriented pedagogical practices and theories (Vartiainen, Nissinen, Pöllänen, & Vanninen, 2018). The context of this design experiment is an educational project for in-service teachers organized in the spring of 2015 at the University of Eastern Finland. The project aimed to support teachers and educators in co-designing forest-related learning projects together with their kindergarten children. The forest served as a joint, multifaceted phenomenon for the project, as it is present in the everyday lives of the children living in the area. In that region, a great deal of forest expertise and resources are also available (e.g., forests, forest museums, forest researchers, and domain expertise).

During the project, five joint network meetings with teacher educators and researchers were organized. In these joint meetings, the teachers were encouraged to reflect on their own project activities and to share the emerging ideas, connections, and challenges. The joint discussions also aimed to support ideating the scaffolds that may subsequently be implemented to facilitate children's activities.

Participants

Twenty-seven kindergarten teachers and child-care nurses or assistants participated in the project.

However, the analysis of the present study focuses on two representative learning projects of kindergarten teachers ($N = 2$) and child-care nurses and assistants ($N = 6$) working in teams of four members. As noted by Heikka, Halttunen, and Waniganayake (2016), Finnish ECE professionals are well-educated, well-trained, multidisciplinary staff who typically work as small teams with qualifications from diverse disciplines.

Data Collection

The main data reported in this study are the collaborative discussions from the five network meetings between teachers, educators, and researchers. A total of 8 hours and 12 minutes of discussions with kindergarten teachers were recorded. From this data, stories of two representative learning projects were selected for more detailed content analysis. Moreover, project portfolios were used as a secondary data source, for example, when they were relevant to interpreting the object of the collaborative discussions.

Preliminary Data Analysis

The data analysis was performed in collaboration with two of the authors. First, the audio data from the collaborative discussions were transcribed in full for analysis purposes, consisting of 230 pages (Arial 12, spacing 1.5). Second, we proceeded to identify the key episodes from each project based on several readings of the transcripts. In this study, an episode was defined as a thematically meaningful unit that consisted of a connecting idea, thought, or suggestion (see Chi, 1997) grounded in group-inquiry activities. An episode was considered to begin when the object of the teachers' discussion shifted and it ended when it shifted again to something else (Kumpulainen & Rajala, 2017). All meaningful episodes related to the research question were coded to develop an initial list of themes.

In the third analysis phase, we compared the episodes to allow for the emergence of key themes that were found in the projects. This stage resulted in the merging and dividing of themes as follows: reflection, observation, discovering, negotiation of meaning, imagination, and the creation of meaning. Finally, we discussed and identified the connections between these key themes in order to further develop our preliminary interpretations about the nature of connected learning in ECE.

Preliminary Findings

Next, we turn to illuminating our findings through two representative project episodes.

Preschoolers' Trail Camera Project

Our first example illuminates how the children's ideas and funds of knowledge were connected to a preschooler trail camera project. The group consisted of 20 preschoolers and four adults (in Finland, preschool begins when the child reaches 6 years old).

So, in a way, our group had started already before Christmas. We saw a weasel while we were looking for the traces of the elves. And we had a project on that. We also evaluated the project with the children. What was fun? And what was interesting? And we studied the weasel as well. The children were trying to figure out where to look for information. From Dad, and Grandpa, and the library, and the Internet, and so on. Then we used the Internet and books for information on the weasel. But we only saw it once. And then in the evaluation, it came out that it was a little bit boring that we didn't see it again. And then this one child, in fact, whose

grandparents' property we were making the field trip to, said that if only we had a robotic camera, it could be taken to the woods. And this is how this project started.

In the example, the teacher describes the children's reflections on a previous learning project that began with the on-site observation of wildlife while looking for the traces of imaginary creatures. This evaluation mentions the children's funds of knowledge and the Internet as an inquiry resource, but it also indicates the children's desire to extend the existing learning system by connecting novel tools to inquire about wildlife in the forest. The example further illustrates that the children's initiatives were not ignored, but actualized, in terms of installing the "robot camera" on the home turf of the child. This demonstrates how the teacher supported the children in creating a novel bridge across previous activities, their funds of knowledge, and technology in a manner that allowed for their active participation in designing the emerging learning network.

The teachers' written reports evidenced that the project also provided children with the opportunity to connect with the expert tools and community. Here, the father of one child served as an expert on local wildlife. He also installed the camera together with the groups of children, supported by the two domain experts from the university.

The Animal Trails Project

The second example illustrates how the trail camera project connected another group as well as their parents and grandparents in the collective inquiry of wildlife. This group consisted of 22 children aged 3–5 and four adults. The project began in the local forest and was connected to the preschoolers' project of installing the trail camera alongside external experts.

Well, the children in our group are 3–5 years old, so we had to wait for the temperatures to get milder. And we went looking for the traces of animals in the woods. Images were taken on the iPad and they, the kids themselves, found the hare's tracks. And then there were traces of other animals, and then they thought of which animals they could be. They strongly felt that there had been a wolf chasing a rabbit. And then one 3-year-old said that no, it was Ms. Dragon. So, the dragon's traces were found there. And now, hopefully, when we go on the field trip and install the trail cameras, something new will emerge. And this information will be incorporated into arts, sports, and drama.

In the example above, the teacher aims to make children interested and engaged in something that exists in their immediate surroundings by taking the children to a forest nearby. The focus is on children's on-site observations, their discoveries, as well as in the different meanings that the children themselves give to them. The example further illustrates that, instead of the children being accountable for providing the correct answer to the teacher with respect to the identification of the tracks, their observations, discoveries, and the imaginary connections between them were going to be harnessed as the basis for designing the various future activities of the project. Furthermore, the meanings that the children built up are connected to the trail camera with the desire of discovering something new.

In the next meeting, she explains how the trail camera that the children installed on the home turf of one child from the preschool group connected new information resources to be appropriated for analyzing the tool-mediated data from the wildlife. This example further illustrates how the teacher supported children in using these information resources to solve problems together with their peers. Furthermore, the teacher also observed that interest evoked from the forest began to emerge in the children's play.

The kids have learned to use nonfiction books. Every time we visited the trail camera page, the adults did not tell the kids which animals were in the pictures, but the kids themselves figured out that they could look at the book. The boys went to search for some books on animals and the whole group was searching for what animal it could be. And they found it. ... Animals have also started to appear in the children's play quite a lot.

Moreover, the teacher described how their funds of knowledge and the tools found from an extended peer network connected their parents and grandparents to the project in an interest-driven manner.

And families and grandparents have also joined our project. Many grandmothers and grandfathers have asked us for the link to the trail camera page, where you can watch those animals. And the father of one child is also involved. He brought these [shows a hare's paw to the others]. [Everyone says out loud] Oh!

Discussion

In this paper, we have preliminarily depicted teachers' insights into the ways in which children's participation was supported in the two representative kindergarten learning projects. The results of the study indicated that the teachers encouraged children to observe and discover their surroundings as well as to engage in collaborative meaning making with their peers. The teachers purposely left room for the children's imagination and playful initiatives. Rather than presenting a fixed solution to the children's own discoveries, such as the traces of animals, the teachers cultivated a generative mind-set in which the object under investigation was approached and negotiated from many perspectives. Such acts of imagination transformed the real-life environment into a space of play and experimentation (Thomas & Brown, 2011) in which experiences of interest stemming from multiple settings could be re-created (Hedges & Cooper, 2016).

As stated by Hedges, Cullen, and Jordan (2011), understanding and engaging with children's interests also requires the acknowledgment of the richness of children's lives and positive collaboration with their parents. Here, the expertise and affordance networks that children were already connected to in their everyday practices were harnessed in educational settings by observing, discovering, imagining, creating, playing, sharing, and reflecting together with the children (Resnick, 2017). The learning community that emerged included peers, peers in other groups, experts, parents, and grandparents, and it was organized around a shared object of inquiry.

Overall, the extended learning network, as reflected in these project examples, involves an orientation similar to what Henry Jenkins et al. (2008) define as the emergence of a participatory culture. Instead of merely socializing within existing practices, the children were positioned as a contributing member of a larger community of people interested in what they were learning about (Engle, 2006). Building meaningful connections with tailored-to-the-need networks promotes children's epistemic authority (Barton & Tan, 2009) and supports the children in seeing themselves as knowledge creators whose contribution is relevant to the community.

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