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Using photo-elicitation in early years mathematics research

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In this paper, I examined the use of photo elicitation interviews as a method for gathering data from parents, whose views are not often investigated in research in early childhood mathematics education. The parents shared and discussed photos of their children engaged in mathematics. This method for gathering parents' views is investigated using Bourdieu's theoretical lens of the field. The findings suggest both advantages and disadvantages that established rules of the field which could interfere with or enhance relationships. Photo-elicited interviews can provide insights into parents' knowledge, experiences and views, revealing broader perspectives on mathematics activities at home. However, the choice of photos influenced the interview, limiting or silencing parents if they were unable to recognise any mathematics in what the children were doing in a photo.

Keywords: Home environment, parents, photo elicitation interview, research methodology

Introduction

In this paper, I discuss the advantages and disadvantages of using photo elicitation focus group interviews to gain insights from nine parents, who have children in preschools in Norway, about mathematics education at home. In a photo elicitation interview (PEI), a single photo or a set of photos are used as stimuli during a research interview (Hurworth, 2004).

Vasilyeva, Laski, Veraksa, Weber, and Bukhalenkova (2018) concluded that parents' involvement in school and preschool practices has a significant impact on children's development and learning. Studies have shown that there is generally a positive association between parents' engagement in their children's education and students' academic outcomes (e.g., Galindo & Sheldon, 2012). These studies concluded that parents and family members have a role in children's achievement in preschool and school. Therefore, it is not surprising to find that parents' funds of knowledge when interacting with children at home have been recognised by researchers (Björklund & Pramling, 2017), with parents and families being acknowledged as children's first educators (Phillipson, Gervasoni, & Sullivan, 2017). The relationships between parents, teachers and children has consequences for children's engagement with mathematics.

Nevertheless, issues remain about the kind of role parents are expected to have. Most research focuses on parents' limited ability to support their children's mathematics learning at home. Although parents might feel welcome at preschool (Hujala, Turja, Gaspar, Veisson, & Waniganayake, 2009), Whyte and Karabon (2016) suggested the communication is typically one-way, from preschool to home. Although parents, such as immigrant parents, can have different views (Civil, Bratton, & Quintos, 2005), their views about mathematics done at home are often marginalized or absent in mathematics education research (Milner-Bolotin & Marotto, 2018). It is the teachers' expertise which is expected to enhance parents' awareness of their children's learning of mathematics (Streit-Lehmann, 2017). Consequently, some researchers, such as Anderson and Anderson (2018), have stressed the need for more understanding of the mathematical experiences of

young children that adults mediate at home. To conduct research which values parents' views about mathematics education for young children at home there is a need for an appropriate methodology.

To better understand the views of parents about the mathematics that their children engage with at home, I wanted to use photo elicitation interviews. PEIs are considered more effective in gaining insider views than information gained through exclusively verbal methods (Hurworth, 2004). In PEI, participants are asked to take photos on a topic (Epstein, Stevens, McKeever, & Baruchel, 2006). Using the photos as stimuli in interviews supports participants to reflect on a moment or an action (Torre & Murphy, 2015). Frith and Harcourt (2007) stated, "We saw the photographs as a reference point to be used in conversation rather than an objective representation of reality that has a meaning independent of these conversations" (p. 1342). Conversations around photos of everyday life can provide understandings how both the photographer and the viewer construct meaning. Thus, PEI are considered to facilitate dialogues that participants find enjoyable (Pain, 2012) and which enhance collaborative and participatory forms of data collecting.

In early childhood studies, photo elicitation has been used in several ways to try to gain participants' views on particular issues. Clarke and Robbins (2004) stated that discussions between parents and teachers when sharing photos taken by the parents created opportunities for a better understanding of aspects of activities captured in these photos: "The nature of these and the parents' ability to articulate them was a surprise to many of the teachers in the project" (p. 181).

In this paper, I examine photo elicitation interviews as a methodology for gathering data from parents about their views on mathematics. The paper is divided into three further sections. First, I outline Bourdieu's notion of a field as the theoretical framework for identifying the advantages and disadvantages for gathering data in this way. Secondly, I describe my study of parents' views, before, finally, I use examples from my study to discuss PEI's advantages and disadvantages.

Theoretical framework

Parents' involvement in and preparations for PEI occur within power relationships, as they are influenced by the knowledge they have about the subject of mathematics and how this knowledge is then described by the researcher. As well, within a social situation such as the group interview, there is a negotiation of power and this determines which parents' views are heard. Thus, I have used Bourdieu's notion of a *field* to consider how parents and their social positions are located (Bourdieu & Wacquant, 1992). Social positions refer to the knowledge, skills, resources and dispositions that parents take into their discussions with other parents and myself as the researcher. These inform the types of relationships that parents have in society and with the institution of preschool.

Key aspects of Bourdieu's notion of a field are production and the material resources of power and capital. Capital refers to the variety of resources, noticeable and hidden, through which agents can further their aspirations and achieve "success" in the field (Bourdieu, 1975). A social position arises from an interaction between the rules of the field, the parent's habitus and the parents' capital (social, cultural and economic). The field is the social arena in which positions are available for agents, each with a different habitus (behaviour, dispositions to act in the social world), and which are constructed by relations between agents in this field. These relations are bound by rules, which are dynamic in that they can differ within the field and be changed and adjusted by circumstances.

Additionally, understanding the impact of capital can help to unpack and explain what is hidden, for example, in the parents' photos as it determines what is valued as mathematics activity. Identifying the capital that parents make use of within PEIs provides an opportunity to see how this affects their sharing of views.

Habitus can also help to unpack the set of dispositions parents use to identify the mathematics in their children's activities, as these are rooted in their experiences of schooling (Grenfell & James, 1998). Habitus includes a sense of parents' place in a social situation and the status they bring, such as how comfortable they feel in an interview and their views about what is expected of them to say or do.

The data in my study

Using Bourdieu's notions, I discuss the advantages and disadvantages of photo elicitation interviews by using examples from my study of nine Norwegian parents' (4 males, 5 females) views on mathematics activities their children engage in at home. This is a typical sample size for photo-elicited research involving both the production of visual data (photos) and participants' discussions and reflections of the photos (e.g., Clark-Ibáñez, 2004; Miller, 2015). Participants received guidelines in a letter about what to photograph (children engaged in mathematics), how many photos to take (10), time to complete this task (one week) and where to send the photos after completing the task. No data that could identify participants, such as income, education and family structure, and demographic details, were collected. The parents were asked to attend focus group interviews in which some of the photographs were used as stimuli. In group one, there were four parents, in group two five. During the interviews, the parents used their photo and those of others as a basis for sharing their views about children's mathematics activities.

In reflecting on my use of PEI, I was able to identify both advantages and disadvantages associated with gaining an insider view on parents' understanding about their children's mathematics activities. In the reflection, I also need to consider how my position as the researcher and facilitator of PEI may have affected my understanding. I come from a working-class background, was a preschool teacher in a low-income household area, and am a mother of two children. My research focuses on mathematics education in preschool and at home. These personal characteristics and experiences influence my position in the field and affect my habitus and doxa (organising the rules of PEI in the field of social situation to discuss photos). Reflecting on PEI supports me to understand how my own background can hinder or support me making sense of parents' views.

Discussion

Reflecting on PEI contributed to identifying advantages and disadvantages in generating data from it. In particular, the parents' cultural capital seemed to affect their sharing of views about their children engaging with mathematics.

Disadvantages of PEI

Drawing on Bourdieu's theoretical notion of the field, I could identify some of the parents' available positions which were affected by parents' habitus and dispositions to discuss mathematics activities and the status they brought to the situation. Although earlier research suggested that PEI is an effective strategy to gather data for investigating parents' views, it has some challenges.

PEI requires participants to be provided with more or less detailed instructions about what to photograph. However, the field in which these instructions are given in my study is that of research, a field in which not all participants can determine the implicit rules. For example, the participants needed to understand how the photos would be used, including ethical, privacy and sampling issues, but this information was not provided. It was clear that their interpretation of these issues shaped how and what they took photos of in their home environments. This sometimes resulted in the parents not being able to describe their views on the mathematics young children could engage in. For example, a parent stated, “I think he shows fingers too, but I did not manage to take a picture to capture that”. For a researcher, knowing the context of the discussion stimuli is important. However, like this parent, it did not always occur to the participants to take notes about the circumstances of a photo. This lack of knowledge about the research field affected how much each photo contributed to the discussions. If the parent who had taken the photo could not remember why they had taken it, then it was often difficult to provoke a discussion amongst the other participants. Thus, it seems that I needed to be more aware of the habitus and dispositions that the participants brought to the task.

Although it is stated that PEI offers insights that might not be achieved through verbal-only methods, the usefulness of the data is still dependent on the interviewing skills of the researcher. Within the field of research, the researcher is accepted as being more knowledgeable about how to do the research than participants are. This power dynamic can affect participants’ willingness to discuss the topic if I, as the researcher, impose my own view, as occurred in the following example:

Researcher: Is Yahtzee a game that you play a lot in Norway?

Parent 1: It is a (holiday) cottage phenomenon.

Parent 2: Yes, yes, yes!

Researcher: Okay.

Parent 1: Yes, everybody plays Yahtzee.

Parent 2: All Norwegians that have respect for themselves have Yahtzee in their (holiday) cottages.

Researcher: So, you can claim that all children know Yahtzee in Norway?

Parent 2: Yes, I think so. They probably have the same in preschool too.

Researcher: But I mean, do you have it at home?

Parent 2: Yes, it’s quite common to have it at home.

Parent 3: Yes, it’s a regular game to have a home. Yes!

The rules of PEI used by myself, as the researcher to construct or, as Bourdieu stated, to produce, circulate and exchange knowledge, pushed the conversation in a particular direction through my follow-up questions. Although I was seeking clarification, the parents’ responses suggest that the conversation was somewhat awkward as they are not entirely sure what was being clarified and why. The parents’ answers suggest that they assumed that I as the researcher would have the same knowledge (cultural capital) about what would occur in holiday cottages, and as this was an

experience shared by all Norwegians, it appeared not need elaboration. They seemed confused as to why I continued to question them about the presence of Yahtzee in Norwegian homes. The status they brought was not embedded in my habitus for understanding parents' embodied views.

In the Yahtzee, example parents were placed in a position of having to convince me, which could affect their behaviour in later discussions, hence limiting their possibilities to develop a sense of trust in how I would make sense of the information they were providing. In another example, the angle of the photo of the outdoor game "stone skipping" did not provide an immediately recognisable mathematical situation for myself or other parents.

Parent 4: I think of distance, but I am unsure if this is correct.

Researcher: What are you doing?

Parent 4: My son will throw stones in the lake and has two stones, one in each hand. I do not know if you see here (pointing on the photo). No, you cannot see his hands!

Researcher: What you are thinking about this situation?

Parent 4: I think distance, but he does not. I do not know, maybe how far he should throw the stone?

The lack of response by other parents suggests that they perhaps did not share the social capital hidden in Parent 4's photo, and thus did not "see" the potential mathematics that the child was engaging with. Whereas Parent 4's habitus could be explained as a disposition to act in this activity, for the researcher to see a possible identification of mathematics in "stone skipping" to some degree was uncertain.

As well, differences in social capital between parents and the researcher can interfere with providing recollections about the content of the photo and its social context. For example, after a father spoke about playing an app on a tablet, a mother asked me, as a researcher, for an opinion about children playing apps. That parent seemed to consider that I had a form of cultural capital that gave me the possibility to evaluate the value of another parent's point of view.

In summary, PEIs have some disadvantages, related to how parents' positions are located in the field. As the facilitator of the PEIs, I, as the researcher, had more status and the social capital that I brought with me seemed to be considered more relevant for this research field. This unacknowledged valuing could limit the possibilities for parents' views to be valued appropriately in the discussions. As a researcher, I needed to be aware of how I could overcome these disadvantages.

Advantages of PEI

Bourdieu's notion of field situates parents' positions (knowledge, skills and relationships) in interactions in which their habitus (behaviours and dispositions) is evident. From this notion, I could identify opportunities for gaining insights into parent's views about mathematics activities at home for young children in the PEIs. In my project, 23 coloured photos were used to stimulate discussions. Parents used the photographs to discuss the mathematics they considered their children engaged with. Parents' positions were constituted by the system of the relationships they had to

each other as parents and having an interest in discussing and presenting their views on children's mathematics activities at home.

Sharing photos engaged parents in discussions about their children engaging in a variety of mathematics situations at home (e.g., gaming, cooking, playing, building etc.). Some situations, such as playing the board games Ludo or Yahtzee, were recognized in the photos by many parents, suggesting that they shared social capital that allowed them to relate to these activities. This then allowed them to share their understanding about their family resources to describe different strategies the family used to play these games with children. Within the social field of the group interview context, there were possibilities to uncover what parents had in common as the first educators of young children. The similar strategies for supporting children in the games, such as manipulating the game so that younger siblings had a chance to win or participate, suggested that the parents could "read" each other's habitus and confirmed each other's views on these situations being mathematical. The parents supported each other in a confident manner when discussing their children's actions, for example, when they were using dice. In the field, there are different positions available for persons with different habitus, and they are equipped with different capitals. Their capitals can be valued differently and also in different ways (Bourdieu, 1975). Bourdieu stated that what is valued is important as what it is, and different ways of being engaged in mathematics at home may also be given different values. This is an example of a condition for being qualified as a capital.

For some parents, the sharing provided them with new ways to think about everyday activities. For example, a parent stated:

In a busy day at home, it is a bit difficult to think about mathematics, it's not easy at all. You are not thinking about it. But once you are aware of it, you are going to find it, you'll find it all over the place.

From the everyday activities, these parents could identify and discuss mathematics and its possible relevance in home environments. As considered with cultural capital, parents' views about mathematics activities can be gained through PEI and it becomes relevant to reflect on mathematics from their point of view.

The photos taken in environments well known by the parents supported them to express their point of view. The parents' photos had been taken because the parents believed that they showed their children engaging with mathematics, based on their knowledge of what could be labelled mathematical. As parents' participation in PEI includes a system of power relations between positions, the parents seemed to share cultural capital by recognising that they also engaged in similar situations, which meant they were able to take powerful positions as experts within the research field. This was in contrast to situations where PEI did not support the sharing of views – a result of one person, often me as the researcher, being seen as having more valuable knowledge or by acting as though that was the case.

Conclusion

Drawing on Bourdieu's notion of the field to reflect on the impact of using PEIs in early years mathematics research, habitus was a tool for understanding parents' dispositions and had to do with conditions that are set up in the field. The way in which the parents understood the structure of PEI

and how this knowledge was incorporated in their habitus was influenced by the new experiences of discussing photos with others. The condition of PEI was structured internally in terms of power relations between parents and researcher and had an impact on gaining insights into parents' views about mathematics activities of young children. Parents' views are embedded between structure, their habitus and capitals and are representations of implicit relations that affect what is considered as mathematics activities. In the field of research, parents struggle over the unequal distribution of and definition of what are the most valued views. Therefore, it is a matter of distinguishing the most worthwhile efforts and methodology where parents' views can be carried out.

A field can be considered as a social arena of the positions available for persons, each person with a different habitus. In a certain field different capitals are valued (Bourdieu, 1975). As a method for gathering data, PEI includes certain kinds of rules which made a limited set of positions available for those who participated in a study. PEIs are described as enabling participants to record and reflect on their own perspectives and concerns, by promoting dialogue about issues and views through discussions about photos (Miller, 2015). When initiating PEI, I had no doubt that parents' dispositions to take an active position in discussion required me to be reflective. As the parents had already identified mathematics activities at home when they decided to take specific photographs, they came into the interviews situated as experts. In the parts of the interviews in which they could situate themselves as experts, parents were able to discuss the different photographs by talking about the mathematics that they saw their children engaged with at home.

However, there were challenges in using PEIs which hindered the parents in retaining the position of expert in those interviews. As a researcher, I was located within the research field, where I organized the rules and guidelines for PEI. Although the formal rules were sent out with the information letter, there were invisible rules connected to the field of research that the parents were unaware of such as keeping notes about the photos they had taken, which affected the data which was produced.

The PEI methodology is a social activity, where parents could contribute with a certain kind of knowledge, based on their capitals and habitus. Parents suggested that taking photos gave them new views on the activities their children engage in at home. They also found the task to be of interest and helpful to unpack their own views about mathematics education for young children at home. As a researcher, reflecting on the use of PEI to gather data has helped me understand how my actions can support or limit parents providing their views about the mathematics that their children engaged with at home. This is important if I am to be able to evaluate my own research questions as well as give information back to the preschool sector about the expertise that parents could have about mathematics activities that could be used as a basis for activities in preschool.

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