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What happens when the robot gets eyelashes? Gender perspective on programming in preschool

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Abstract
In the revised Swedish national preschool curriculum the idea of educating children in four specific disciplines is formed as an interdisciplinary theme as an applied approach to STEM. Programming, as a form of applied mathematics and technology, is a growing feature in preschools today, but little is known from research about coding with young children (Mannila, 2017). This chapter presents an analysis of a case study of how teaching and learning programming in early childhood education is done and the analysis elaborate on gender aspects of this. Multimodality, as well as feminist post structuralist perspectives are considered relevant analytical tools in order to understand the interaction and communication going on in the sequences of teaching and learning on programming (Francis, 2002, Kress, 2003, Selander, 2017). The results of the analysis shows both how programming creates great interest amongst the children, illustrated by children's patience and willingness to follow the content of the sequences, but also how programming risks to become more boy-friendly in educational practice.

Introduction
Just exactly what happens in a preschool setting when a robot that the group is working with gets eyelashes put on is of course difficult to answer, but interesting to note and think thoroughly about. In this chapter, this question will be discussed with the help of two concrete examples from a preschool setting. I will also shed light on how gender equality can be realized in the growing digitization era, i.e. how gender aspects on teaching and learning and digitization can be combined in early childhood settings. Questions about how gender is made in relation to digitization are posed and the idea why this is important relates to Swedish preschools' assignment to actively work for gender equality in order to prevent an imbalance between girls and boys both in preschool's activities but also concerning STEM-activities, here exemplified by programming. This will be done by looking at gender patterns as a part of programming, an aspect of the digitization work in preschool.

An increased focus on digital competence, including the introduction of programming in preschools and in early ages is still a rather new phenomenon. Consequently, there is little

prior research neither in Sweden (were this research was conducted) nor internationally. For instance, it is not possible to find any study similar to the one presented here, and a review of the international literature on this topic, programming in preschools, in general revealed only a few studies. Still, many preschools add programming to their everyday practice, despite the lack of supportive research and previous comprehensive experience. The rationale for doing so is multi-faceted. On the one hand, programming can be seen as a didactic tool for developing digital skills and computational thinking in different ways in preschool. Programming in preschool can also be a means of finding new ways for learning, motivating the children and increasing their interest and curiosity (Fesakis, et al., 2013). Children's learning and development form the basis on which planning, implementation and evaluation is designed and carried out.

Gender patterns that show that girls and boys get different access to, and conditions for, learning and developing in preschool are understood in this chapter as a lack of gender equality (Author, 2015). This is something that needs to be addressed within a preschool's curriculum, so that all children in preschool get equal access to and as equal conditions as possible to learn and develop. Research has long shown that children in preschool are given different opportunities for learning and development because of their gender (c.f. Hellman, 2010; Dolk, 2013).

Gender equality in preschool, and in relation to digitalisation and programming, is really nothing special or different compared to gender awareness in other areas in preschools. However, it is possible to raise specific challenges that may exist in relation to digitalisation and therefore I will exemplify and discuss the risks involved in making programming something for boys more than for girls. The chapter highlights new challenges that digitalisation can entail, not the least for preschool teachers.

An example study on gender perceptions

I want though, to start with an example from a study that concerns higher education, to reflect on whether there is a kind of connection between the preschool's gender-promoting work and the university's. Even though the length of time from when an individual attends preschool until s/he possibly start university education is quite long, the patterns and events that take place in both contexts can still be important to look at. In a larger educational perspective, it is possible to see a relationship between what is happening in preschool and what may happen at university and the pattern shown here is established some where on the way. The discourses on gender, gender equality and relationships that exist in both parts of the education system can resemble each other in content, even if they appear in different ways.

Within the framework of the study, the research team interviewed students who attended study programmes where they were in a strong gender minority. Female students who went on a Master's programme with a specialization in computer science (a five-year engineering programme where most students are men). Programming is a significant part of the study

programme, and the female students described in the interviews how they did not feel comfortable with the programming parts of the curriculum, how they did not have the same prerequisites as the male students and did not always keep up with the teaching (but studied in race). The teachers at the college seemed to have an idea that the students would have some prior knowledge of programming (although there are no such formal admission requirements) and their image of this proved to be in line with the male students' prior knowledge. The female students talked about, and gave several examples of, how their male fellow students took over and ignored their suggestions and ideas when it came to programming. One of the female participants gave the following example:

"I study with a guy friend, and he can drive over me quite often. When I give an idea on a solution, he thinks it is bad and so we go on to his idea, because I have always felt that I am not right, or yes, have been told that I am not right. Who does that? Then I trust myself less and then I like to go on his options because it feels better. But it has been proved very many times that it actually was my idea or my alternative that was the right one."

The following is another example of how a female student's knowledge within the framework of engineering studies was reduced is a woman who said:

"Yes, there were many who had a difficulty because I was right. Yes, one example was when I was studying myself and not with someone, and a guy suddenly comes up and starts to look in my book, over my shoulder, and just pointing, just sayin "you're wrong". And he does not know what task I am doing, he does not know what I am doing, he would only state that I was wrong. And I knew I wasn't. And then he came back a while later and just said "no, you weren't wrong". So it feels like some, yes, just wanted to point out that I can't be right."

Both of these examples reflect a view that the female students were not expected to be able to program, even though they had been studying and although they might not have been comfortable with learning about programming initially during their studies. The male participants had the view that they new more about programming compared with their female colleagues even though this may not have been true in reality. The male participants also communicate their views to the females who were learning to program.

The purpose of describing this study and giving it space in a chapter about STEM and preschools, is that it can make us reflect on discourses about women and technology where women are often placed, and place themselves, in a position where they are not seen as adequate and where they are ignored. The example can make us reflect on that gender inequality is shaped over a period of time, not only on moments when you are in preschool. It starts here, if it starts. Traditionally, the predominant gender discourse is that men have, to a greater extent, and for a longer time, been the group that stood for "the technical", the difficult and the somewhat abstract, elusive. Based on these, stereotypical images about the technology corner, the programmer and the technology innovator have emerged, and in creating this picture women have largely been absent.

This is one of several possible reasons why gender awareness within the framework of programming would be needed already in preschool, since in one way it can be argued that technology, programming and digitization have from the start a gender coding that leans on the more so-called masculine. It is, of course, difficult to know if this applies to all parts of the digitalisation of the preschool, but there is a risk that as soon as the teachers in the preschool think about technology, programming, mathematics and digitalisation - areas that are often associated with each other - they think that the boys are better at it than the girls, or perhaps even more suitable. The teacher is most often a women herself, which might affect her self confidence in including these areas at all. Therefore, there is a need for studies with a gender lens on how these new areas are received in preschools so that all children can be included in the digitization transformation that the preschool as an institution is in.

Programming in preschool

Introducing programming at an early age is not new (see e.g. Clemens & Gullo, 1984 and Mannila, 2017, for examples of effort to teach programming in the 1980s), but one can argue that programming at this level lacks theoretical concepts connected to learning (Heikkilä & Mannila, 2018). Papert and colleagues introduced the LOGO programming language in 1967 as a tool for children to learn to program. Papert (1971) argued that technology should not be used to process children, but rather that children should learn to manipulate, expand and use technology in projects, thereby learning to understand and control their world. Programming is by nature a creative activity (Papert & Harel, 1980). Papert's programming language LOGO is often associated with a turtle that was controlled by simple command, and many of the programming tools and environments developed for young learners today are based on the same principles (e.g., simple robots such as Bee-Bot and Blue-Bot, apps such as Kodable and Lightbot).

In preschools, the goal is not to teach programming as an intrinsic or separate subject but to focus on the other abilities that you develop while engaging in programming activities, such as algorithms, logical thinking and debugging, as well as on the opportunities to use programming as a tool for being creative and making things. These abilities are often collected under the umbrella term *computational thinking* (CT), which was introduced by Papert (1980) almost 40 years ago but has received particular attention during the last 10 years, following an influential article by Wing (2006). Wing emphasizes the importance of learning strategies and skills, which help us use computers for what they are good at, so that we, humans, can focus on what we are good at. While CT is often framed around a set of concepts, research has shown that this is not sufficient to represent students' learning: rather CT is also about practices (experimenting and iterating: testing and debugging; reusing and remixing, and; abstracting and modularizing) and perspectives (expressing, connecting, and questioning) (Brennan & Resnick, 2012).

As mentioned above, the research base on programming in early ages is still rather limited. International studies on programming at preschool level emphasize the knowledge areas that

children develop when engaging in activities related to robotics and programming. In a meta study, Toh et al (2012) found that these types of activities develop children's cognitive, conceptual, linguistic and social skills by focusing on, for instance, problem solving, logical thinking, collaboration and a structured way of working and presentation. Bers et al (2013) found that children from the age of four can take in programming instruction and develop their problem-solving skills related to computational thinking, coding and robotics.
While programming per se can be seen as an abstract activity, physical artefacts such as robots make the activity more concrete while simultaneously also encouraging collaboration around the programming task at hand. Bateman, Carr and Gunn (2017) discuss how objects in children's learning environments are crucial for children's learning and how technological objects work as 'physical props' supporting learning processes (Kanaki & Kalogiannakis, 2018). Levy and Mioduser (2010) describe how children explore the possibilities of the robot in a playful and curious manner. They also show how this, for instance, resulted in children making plans and predictable actions in order to make the robots act in a desired way. Sullivan et al (2013) show how children can design, build and program robots after a limited time of instruction. This could imply that children are susceptible to more than merely very basic instruction in programming. Sullivan et al. (2013) go on to discuss how these results could aid in developing programming instruction, for instance by integrating it with mathematics and using programming for language development.

In another study, Kazakoff et al. (2013) show how sequencing, which can be considered an important skill in both mathematics and early reading comprehension, can be developed through programming. They also discuss how the sequencing skills needed when programming can be supported by children's ability to think in terms of sequences as a result of their experience from stories, which commonly build on a sequence of events. The corresponding sequential way of working is one of the fundamental concepts in programming, together with conditionals (making it possible for a program to do different things based on the current situation) and repetitions (making it possible to repeat a part of the program several times).

Digital tools are a natural part of children's everyday life, both at home and at preschool. As always when choosing an activity, tool or teaching approach, it is important to have a clear focus and goal. For instance, Palmér and van Bommel (2016) point out that it takes thorough planning for the teaching activities to focus on the content at hand (in their case mathematics) and not technology per se. Cejka et al (2006) show the importance of teachers receiving appropriate and sufficient professional development in order to be able to develop content and form for introducing programming to younger children.

How can communication, learning, gender and programming be understood in relation to each other? Theoretical framing of the chapter

There are a number of different perspectives to apply to the very large and wide-ranging concepts and contexts that communication, learning, gender and programming constitute.

The theoretical perspectives used in this chapter are a combination of a number of different perspectives that originate from post-structuralist theories.

In the analysis of the empirical material that will be presented below, where video films were collected in a research project on programming in preschool, a multimodal perspective was used (Kress, 2003; 2010) to understand what happened in the communication between the children and the preschool teachers. In the interpretation of the content of the teaching, that is, how programming as a subject content was problematized and highlighted. Earlier studies were used from the programming area (see eg Mannila, 2017; Åkerfeldt, Kjällander & Selander, 2018), but also feminist theories (Francis & Skelton, 2001; Davies, 2003) to focus the analysis of the gender aspects of the teaching, that is, how gender can be understood as part of the communication that takes place and how the teaching is formed.

There is an intricate and intertwined connection between both communicative aspects of teaching and content aspects. The content of the teaching can be said to influence how communication is constituted, built up and appears in the teaching situations, and that there are gender aspects as part of that communication. Communication in the teaching is never neutral or something that only becomes as it becomes (Kress, 2003; Säljö, 2010). There are always discursive and contextual aspects of the communication, which shows how the participants talk, who gets to speak, in what order they get to speak, who takes the most bodily space, who is heard the most and whose understanding of the situation is given validity. In these discursive aspects, gender norms are also an important part. The participants' understanding of girls and boys, women and men, exists as a base in the context. This understanding is then reflected in the content for the moment, in the case of the study in connection with programming in preschool.

Multimodality is seen as a relevant analytical tool and perspective in order to deeper understand the interaction and communication going on in the sequences of teaching and learning programming (Kress, 2003, 2010). In such an analysis it is also possible to highlight social norms, such as gender norms, and discuss how they appear and are being negotiated and constructed in and by multimodal communication. Multimodal perspectives can contribute to analytically describing how teaching and learning as a social phenomenon is established as meaning making processes. This can be done by creating modal complexes where meaning making in a social semiotic understanding implies learning (Kress, 2010, 2017). Modal complexes are never arbitrary but vary extensively in social practice and need to be empirically studied in relation to different aspects of social life, such as teaching and learning. Empirical studies such as this one, of how modal complexes are constituted and shows children’s gender patterns, can present the complexity of social life, and also the complexity of ECE and learning - not putting verbal or written language in the centre of how communication is realized.

Pahl (2009) argues that a multimodal lens on children’s literacy can reveal and open up new and widened ways to look at children’s lives. A multimodal lens can even result in children’s

activities being considered more relevant and accurate, compared with an analysis being focused on verbal or written language only. Pahl's (2009) research further emphasizes how language and multimodal creation of texts become intertwined communicational activities for children. This is also brought up by Stein (2008) in her studies on children's creation of multimodal practices. Both Stein (2008) and Pahl (2009) argue that multimodal analysis can create a deeper understanding of children's meaning making.

As I described earlier, programming in this chapter can be seen as gender-coded towards foremost a masculine activity and interest, which in turn can be intertwined with the gender norms that exist in preschool in general. It can be argued, that the communication that is created in a teaching situation about programming in one way or another contains aspects of gender, since programming often is understood as something masculine. The research interest must be to question this and try to find empirical examples.

In the presentation of examples from this study concepts such as gender norms and gender coded, and also the concept of gender didactics are used. These three concepts are understood as nuances of an understanding of gender as something done through actions, either linguistic or bodily. Gender is about how we "become" girls, boys, women and men and how this partly takes different expressions in different contexts. Everywhere we are, our ways of being and communicating are shaped, so also how we are like girls, boys, women and men (Francis, 2012).

The reason why gender aspects get a lot of attention both in preschool and in society more generally, could be because it is linked a power imbalance through the ways girls and boys are allowed and expected to be. For example, in preschool, their understanding of how they, as children, and later as school pupils, can be and is expected to be formed. Thereby, norms as well as visible and invisible rules are created about gender which can partly aim to give more influence and power (formal or informal) to a particular group than to another, and partly to mean that certain groups get more influence than others in social context which makes them feel more welcome, more included and more secure. When it comes to learning, this could then mean that some children will feel more included than others, and consequently learn more. This is the reason why gender norms and gender aspects need attention in the educational context in preschools. The question one can ask is whether there are relevant norms in preschools that allow all children to be included and thereby develop and learn, or if some groups are favoured in a way that is not in line with the goals of the curriculum.

Study context and design

The presented study was conducted in the context of a Swedish preschool setting, that is, ECE for ages 1-6. In order to address the research interest, video recordings from teaching sessions at a preschool unit in a mid-size Swedish municipality are analysed. We chose this particular unit, as it has two teachers who are very interested in teaching programming. This can naturally also be argued to lead to potential bias, but since teaching programming

systematically, as they do, in early ages is still not very common and lack a researchis identifies, we do not see the teacher selection as a problem. In order to get reliable data, there was a need to find engaged teachers that were committed to work systematically over a longer period of time.

The research has been designed as a case study. According to Jensen and Sandstorm (2011) case studies should develop and generalize theories, resulting in a so-called *analytical generalization*. They argue that "an analytical generalization is based on the ability of one or more concepts to understand or explain events (or activities, processes) in different contexts" (p.64). In this research, the concepts central to understanding the events and activities found were programming and debugging at preschool level. Jensen and Sandstorm also point out that complex phenomena that are investigated should be contemporary and understood through concrete events. I see programming as a contemporary phenomenon and I try to deepen the understanding of how programming is a social practice by analysing concrete events. Therefore, the case study design has been appropriate in relation to the aims and research questions in this study and we argue that the results can be analytically generalizable.

The data consist of video recordings of teaching sessions with children and a teacher working on programming. Children are engaged in both unplugged activities, such as programming using verbal instructions or cards, and tasks that involved some digital equipment, such as small robots (Blue bots) and iPads.

The video material was recorded in the preschool during the school year 2017-2018. The video material consists of 25 sessions of teaching in programming with preschool children, who were four or five years old. The preschool group consisted of around 18 children, but not all were always present. The children participate in the video sequences in smaller groups, ranging from pairs to groups of eight children. All in all, the video material comprised 30 hours. One of the members of the research team took care of recording the sequences at the preschool once a month, whereas the preschool teachers, guided by the researcher, recorded the other sequences. The collaboration between the researcher and the teachers was successful. The teachers were instructed to 1) record the videos focusing on the children's activity as close as possible, 2) try to get as many children as possible in the recording and 3) make sure that speech would be audible.

The analysis of the video recordings

The analysis was carried out in several steps. First, all video recordings were watched several times, with research interest concerning programming and gender in mind, in order to get an idea of the width of the data. The research team found a number of sequences, were gender was done, and in most of them it was done very shortly with verbal comments. There were also sequences where I interpreted that gender was playing a role in what happened and some of this a member of the research team. One of those examples I chose to present here as the first example. The second example presented here is concerning a much clearer

sequences, almost as a set up where the teachers wanted to think about gender together with the children. With these ideas in mind I watched some of the video recordings once again, in order to reformulate or reshape the ideas if necessary.

The selected sequences are examples that could function as representations of the most common gender patterns found in the material. One video recording can, however, never represent another, so with that in mind, the transcription and the gender analysis were done as parallel processes.

Example from a preschool that works with programming
In this chapter, sequences have been highlighted and analyzed, which in various ways actualize gender aspects in the teaching. One research question that was formulated is: "How is gender done in teaching about programming?" That question is also conceivable for preschool teachers to reflect on in relation to their own teaching, being any subject. A follow-up question to it was formulated as: "How can preschool programming be a part of making programming something that is regarded as both feminine and masculine?"

An ethical approach in connection with research on children
When children are filmed in their everyday life, it is important to have an ethically well-grounded approach to the video footage, and to the children. In the study presented here, all parents had received detailed information and were asked whether their children may be involved in video recording for research purposes. Most accepted participation, but not all. In the actual work, this, in cases where the parents have not approved participation, their children have not been involved in the sequences recorded. And since the groups that have been taught almost always have had different compositions, no child has had to feel exposed or visible - neither as filmed nor as un-filmed.

Besides the adults' "yes", the children have of course also been given the opportunity to make their voice heard. As a researcher, I have carefully explained what I am doing and why I film, although it may be abstract for some children. I have exemplified how they can say no to participate, either by saying no, using the stop hand or turning away the body. In the filming I have also been careful in trying to feel the children's bodily expression and in some cases interpreted (wrong or right?) that a child does not want to be filmed.

The preschool teachers in the study have been informed about what the study means, what their part is and that they have the opportunity to choose and opt out of video sequences that they are not comfortable with. It has been an ongoing conversation between me and the teachers about the recordings and the material that has worked well.

Results of how gender is made in programming teaching
In the two examples below, which are taken from teaching situations where a preschool teacher and a group of children together are programming a robot, two overarching themes are highlighted: how the teachers make gender in the teaching and how the robot is made

into a "he" in the conversations in the programming. Before the first example is presented, however, I would like to emphasize that the preschool teachers who participated in the study are extremely reflective, thinking and inclined to development. They are educated preschool teachers and have worked some years together as colleagues, and have jointly developed their knowledge in the area of programming in preschool. They have clear support from the preschool administration in their municipality and are often invited to hold inspiration meetings and train colleagues at other preschools.

The reason I write this is that, as a reader of a chapter that makes critical analysis of teaching, it can be easy to believe and think that the teachers who are described do not do a good job. But they do! They are also willing to learn, and this can be seen in the second example where they themselves have initiated and tried to get an idea of the children's gender norms.

Preschool teachers do gender in teaching

In this introductory example, the focus is directed towards the teachers and their ways of doing gender. The purpose is to exemplify small linguistic and communicative actions that, if they happen too often and too continuously, can result the girls might not feel included in the programming teaching. It can also lead to them choosing to self-exclude themselves, that is, directly or indirectly thinking that programming is not something for them. Doing gender in practice in preschool and in, for example, programming teaching is seldom about a clear exclusion of either girls or boys, but about small linguistic or communicative actions where the girls and / or the boys, or certain groups of girls or boys, are not included in the teaching in the same way as the others.

"No, we should not take the carpet now"

In the programming lesson held this day, the children's group, comprising five children, was very happy. They wanted to try every possible way to use the robot, also called the blue bot. The group worked with the blue bot for about 15 minutes together with preschool teacher Linda. Linda, who was used to working with this group of children, had planned a set-up that meant that the children would have to test the blue bot and program it so that it moved from location A to location B. She showed that on blue bot's "back" there were arrows that pointed forward, backwards, turn left, turn right, pause and delete. Each child then got to test, measure the length of the blue bot's steps, think along with the other children and talk about how the move would take place in the best way.

Thereafter, the children were allowed to try themselves without instructions from the preschool teacher and after the formal teaching and testing was over, most of them continued on their own. All the time Linda was actively present to make sure that the blue bot was not turned into a toy. The teachers had reflected a lot on the fact that they did not want the robot to be an entertaining thing for the children, but that it would have the character of being something that was only used in teaching and learning situations.

During the test, one of the children, let's call her Natalie, saw a plastic mat with boxes of different colours that Linda had taken with her and which she had had an idea of using in connection to the teaching. Linda, however, had not used the mat, but Natalie was curious about the mat and asked Linda if she could try it. Linda then answered clearly, and with quite a certain voice, that they would not use the mat. In addition, she directed her body against Natalie as to clarify her negative answer, which Natalie could have understood as being excluded. When Natalie asked again, she received the same answer, no, the mat would not come up now. Shortly thereafter, some of the boys went and took the mat and spread it out on the floor. Neither Linda nor anyone else said anything about this, but the mat became part of the continued testing. For Natalie's part, it meant that she eventually had to test the mat and blue bot, as she had wanted from the beginning. The dilemma of this situation was that she had asked for permission and got a no, while the boys took the mat without asking and without being stopped. The signals this situation sends can be interpreted from a gender perspective, where boys are not told when they do certain things, while girls can risk getting a no if they ask. Is it then better for children to just do as they wish or should they ask first?

The robot is a "he"?

The second example is a situation in another programming teaching sequence in the current preschool that focused on the children starting an understanding of debugging as a phenomenon in programming. Debugging is a central part of learning programming. It requires analysis ability and creative thinking in order to solve the "bug". Debugging can also be a way to develop children's analytical abilities in general.

In the teaching situation, two boys sat with preschool teachers Linda and Anna. Together they did the activity "find five errors" with a regular picture and talked about what it was like to find errors and search for errors. They also talked about the concept of "bug" and that it was an English word which had several meanings.

After that, Anna took the blue bot for the boys, so they could practice debugging according to instructions they would receive from Linda and Anna. To test gender and test their own language about gender, Anna had put false eyelashes on one of the blue bot's "eyes".

When Anna showed the blue bots boys could see them, without saying anything about the eyelashes, the boys were silenced. Then they directed their bodies and glanced at the blue bot that did not have eyelashes and the following dialogue took place:

Oskar: I want the boy.
Linus: But, I want the boy.
Anna: Why do you think it's a boy?... Why is it a boy?
[Silence while both are watching both robots.]
Linus: And why is that a girl?
Anna: Why it?
[Linus takes the robot with eyelashes and turns it against him.]

Linus: But, oh, how cute she is!
Linda: But why is it cute?
Anna: How can you ... How do you know that it is a girl and a boy?
Oskar: It's cause they have ...
[Oskar points with his fingers against his own eyes.]
Linda: What's that?
[Silence]
Linda: Do you mean eyelashes?
[Linda looks at Oskar.]
Anna: They here? [Pointing to the eyelashes.] But boys also have eyelashes.
Linus: Yes. These.
Anna: You also have such eyelashes.
[Anna points to Linus eyelashes]
Oskar: Yes, don't want to have that one.
[Oskar points to the "girl robot".]
Anna: You can choose which one you want to use.
[Both boys point to or grasp the one without eyelashes. However, Linus looks at the other one when Anna removes it from the table]

Linda and Anna later told me that they did not expect the boys to react so much and so clearly to the blue bot's eyelashes. They were both astonished and somewhat distressed that the "test" so clearly showed that the boys categorized the bots, as well as perhaps also themselves and other children based on gender, and that they added some signifiers to this gender categorization. The boys' preferences regarding gender were also quite clear, although Linus expressed the categorization more clearly than Oskar, especially through the connection to "cute". Furthermore, Linus was not entirely convinced that he only wanted the "boy robot", but his gaze also followed "the girl robot" when Anna removed it from the table. Oskar was much quieter than Linus, but with the help of pointers and his body position, expressed more clearly that "the boy robot" was his preference.

The boys' reflections on the significance of the eyelashes for doing gender were enhanced when Linda and Anna later, in another group with some other children, tried to give them only the blue bot with eyelashes. Some of the boys then said that they did not want to use it at all and asked for the "usual" blue boot. The conclusion that Linda and Anna drew from this was that the boys did not want the robot with the eyelashes, while the girls could have both that one and the one without eyelashes.

This trend is in line with other research that points to girls being able to relate as much to, for example, girls and boys in children's books, while boys have a clearer preference for boy characters. This can in turn be related to what is highlighted in a governmental report about masculinity related to schooling (SOU 2010: 53) where it appears that one of the characteristics that exist regarding how a "real boy" is expected to be (there is of course no such "list", but tendencies) including that he should distance himself from the feminine and

feminine connotations in order to avoid being perceived as an unreal boy. This can be important knowledge for preschool teachers, while at the same time problematizing gender, and also needing to be aware of the nuances in gender identity .

Conclusion

The question that one can of course, and should, ask after having read so far is: "What sort of conclusions can one draw from two individual examples in this case study?" The answer is likely, not so great, if any at all. However, these can function as examples which together with a large amount of other research (see Hellman, 2010; Eidevald, 2009; Paechter, 2009, Blaise, 2015, Dolk, 2013) shows how gender patterns in preschools are created and established. They can exemplify and again emphasize that gender is done in the preschool and that what is done may be seen as small things, but that, lined up next to each other, they form a certain kind of norm and pattern of behaviour for the children. In order for these patterns not to take place and be established, there must be adults who question and challenge the sometimes one-sided image of women and men that the children can otherwise risk being brought up with. The risk is then that children's talent and interests are diminished by adults and gender norms.

This becomes even more important when it comes to teaching in the preschool in a Swedish context, which will be even more in line with the new curriculum (Lpfö 18). For example, teaching in different thematic entities, such as different topics of digital, technical and mathematical contexts in preschool, will have to become more common. Today there are tendencies that STEM knowledge would be based on less subjective "opinions" and thus are more true. This is of course not true. The knowledge that exists in STEM is partly developed in certain kinds of processes, and partly it is chosen to be regarded as important knowledge of people who have probably been gender-marked by their time.

This chapter can remind preschool teachers and researchers that gender is being done in all parts of the preschool, also when it comes to developing computional thinking and implementing programming teaching. Perhaps the text can lead to gender-didactic reasoning and reflections that can have girls and boys included on equal terms. Furthermore, it could give the teachers tools that help them manage what boys and girls choose and that they seem to value girls and boys differently. To opposite this, they need gender-didactic tools and practice in managing conversations with children about gender.

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