Ready to Robot!? – Kindergarten Girls' and Boys' Expectations Towards Robotic Devices

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ABSTRACT

In the age of digitalization it is essential to raise interest in the development of programming skills at an early age. In STEM-professions an uneven gender relation, as well as a shortage of skilled professionals, can be seen. To fight this problem, girls and boys have to be attracted equally to technology and digitalization.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**.

KEYWORDS

STEM, gender stereotypes, robots, kindergarten

1 INTRODUCTION

The uneven gender relation in STEM-professions can often be traced back to gender stereotypes that are conveyed by the social environment and the media. Several initiatives trying to engage children and youth in STEM fields typically adress students 13 years or older. Although it can be expected that kindergartners have less pronounced gender roles, there are almost no insights on technical affinities and computational thinking of younger children. By the use of suitable intervention measures, a sensitization of the teachers and parents in terms of gender stereotypes can be achieved, as well as a raised interest of girls and boys in STEM-topics.

2 METHODS AND RESULTS

The quantiative (i.e. online interviews with caregivers) and qualitative (i.e. guided interviews with children) study investigated the willingness for digitalization. An online interview with caregivers investigated demography of caregiver and child, care situation, attributed personality of the children [3], personal attitude towards STEM-topics [1], desired level of remedial teaching in STEM-topics, anticipated reaction of their child towards robots. The online interview took an average of 30 minutes. 12 mothers participated, while no father volunteered. The guided interview of the children while playing with robots took place in familiar surroundings in kindergarten [4]. The children were interviewed in an average of 17 minutes concerning attractiveness, functionality and suggested gender of the robots. The interview included questions that allowed conclusions on the childrens' attitude towards gender and STEM, for example "Is the robot a boy or a girl?". The robots Dash & Dot, MiP, Sphero and Cubelets were choosen by three optical criterias: humanoid, cuteness, abstract. Children indicated their personal attitude towards STEM-topics and played with the robots. Interviews were videotaped and coded for interaction duration. 8 girls and 4 boys participated. The range of age was 4-6. The data from the transcription of the interviews was processed by encoding. Based on the interpretation of the scripted interviews, a deductive-inductive thematic category formation and application according to Kuckartz[2] was made.

3 CONCLUSION AND FUTURE WORK

Results show that the participating mothers do not feel ready for digitalization and wish to be supported. Meanwhile the children are very interested, no matter which gender they belong to. Based on the study findings a service learning offer has been initiated. Computer science students serving as female role models have started to offer robot workshops in the kindergarten. It can be seen as a high level remedial teaching in STEM-topics to reduce gender stereotypes. At the same time, the students can gain IT-based experience.

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