Exploring Students' Experiences and Perceptions of Computer Science: A Survey of Austrian Secondary Schools

Sara Hinterplattner[1][a], Marina Rottenhofer[2][b], Iris Groher[3][c] and Barbara Sabitzer[2][d]
[1]*Linz Institute of Technology, Dynatrace Austria, Linz, Austria*
[2]*Department of STEM Education, Johannes Kepler University, Linz, Austria*
[3]*Institute of Business Informatics, Software Engineering, Johannes Kepler University, Linz, Austria*

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Abstract: Companies regularly report difficulties in recruiting ICT specialists. The shortage of skilled women in this domain is especially prominent. Research shows that early exposure to STEM may spark children's interest and influence their future choice of careers. Children's understanding and conceptualization of their physical environment strongly influence their ability to grasp STEM concepts and learning outcomes in related subjects. The goal of our work is to provide a better picture of children's conceptions before they are confronted with computer science as a subject at school. To investigate students' preconceptions of computer science, a study of 188 fifth-grade students was conducted before they first experienced computer science lessons at school. We asked them about their perceptions and experiences of computer science. Our results show that both students who identify as female and those who identify as male have a narrow view of computer science and associate the field mainly with working with computers. Despite the narrow view, many students show an interest in computer science but few want to work in this field in the future. Students who identify as male have a significantly higher interest in the field than those who identify as female.

1 INTRODUCTION

According to the 2021 Digital Economy and Society Index, "55% of enterprises that [have] recruited or tried to recruit ICT specialists reported difficulties in filling such vacancies." (European Commission, 2021). Besides 70 % of employees lacking sufficient (digital) skills, there is also a huge gender imbalance, with only 19% of ICT specialists being women. Furthermore, there are insufficient specialized education programs and a lack of integration of digital subjects in other areas.

The shortage of skilled workers, especially women, is also noticeable for the global technology company Dynatrace, which operates a software-intelligence monitoring platform that "simplifies enterprise cloud complexity and accelerates digital transformation" (Dynatrace Austria GmbH, 2021). Dynatrace has more than 60 offices globally, with over 3000 experts and is growing rapidly. The headquarter of Dynatrace is in Linz, Austria, where the founder and CTO Bernd Greifeneder works. In recent years, the Austrian headquarters has felt the STEM skills shortage particularly strongly, as its high growth targets could not be achieved by recruiting only from the Austrian labor market. Indeed, people from more than 50 nations work for Dynatrace in Austria and 25% of the workforce are non-Austrian citizens. However, the effect of the lack of skilled workers in the field of computer science remains. To counteract this shortage, the company has started initiatives to arouse interest in STEM subjects at an early age to create more gender equality and foster the digital skills that will be needed in the future. As part of this, different studies have been conducted. The preliminary results of these studies are presented in this paper.

Research has shown that early exposure to STEM can spark children's interest and influence their future choice of career (Swift and Watkins, 2004; Maltese and Tai, 2010; Russell et al., 2007). Young children are curious and want to know how the world works. However, their spontaneous interest in natural phe-

[a] https://orcid.org/0000-0002-9601-433X
[b] https://orcid.org/0000-0001-5772-0672
[c] https://orcid.org/0000-0003-0905-6791
[d] https://orcid.org/0000-0002-1304-6863

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nomena decreases as they grow older (Osborne and Dillon, 2008). How children conceptualize their environment may influence not only their choice of career, but also their understanding of subject-specific concepts and subsequently their learning outcomes. These so-called preconceptions of natural and technical phenomena rarely agree with the scientific concepts taught at school and are a fundamental cause of learning difficulties in these areas (Kircher et al., 2009). Thus, it seems reasonable to implement STEM education as early as possible to preempt the development of conflicting preconceptions as well as foster children's curiosity.

This study focuses on the desire to strengthen children's conceptions of computer science before they are confronted with it as a subject at school. To investigate students' preconceptions of computer science, a study of 188 fifth-grade students was conducted before they started learning this subject at school. At the time of the test, the students had not previously been taught other school subjects related to computer science. The remainder of this paper is structured as follows. Section 2 describes how computer science education is implemented in Austrian schools. Existing research related to our study is discussed in Section 3. The research method we followed in our study is presented in Section 4. Section 5 presents the results of our study. Finally, the conclusion of the paper and an outlook are provided in Sections 6 and 7.

2 COMPUTER SCIENCE EDUCATION IN AUSTRIA

In Austria, computer science was introduced as a compulsory subject at secondary general school for the first time in the 1985/86 school year (Reiter, 2005). Computer science was originally taught to ninth-grade students (one teaching hour (50 minutes) per week) but has now increased to two teaching hours (Siller and Fuchs, 2010). Hence, computer science remains limited to one grade level; consequently, it is not yet taught to all students continuously or consistently (Brandhofer, 2014).

In the primary school curriculum (grades 1 to 4), this topic is only mentioned as "general educational goal", where the "child-friendly use of modern information and communication technologies" is recommended (Bundesministerium für Bildung, Wissenschaft und Forschung, 2012). At the lower secondary level (grades 5 to 8), computer science is taught before the ninth grade in many school-independent concepts. Indeed, computer science has long been a major topic in many lower secondary schools. However, since it is an optional subject, there is no uniform curriculum or special training for teachers, and the content therefore depends on the skills and preferences of the teacher involved. Moreover, students attend these classes voluntarily. Due to the different priorities and levels of implementation at the lower secondary level, compulsory lessons in ninth grade can be a great challenge since there is often overwhelming heterogeneity between the students. For example, a student who may already have programming skills could sit next to a student who has never learned anything about computer science (Jarz, 2010).

To counteract this trend, the Austrian government published its "Master Plan for Digitization in Education" in 2018 (Bundesministerium für Bildung, Wissenschaft und Forschung, 2018a) to adapt the education system to the increasing importance of digitization. Besides the aim to expand the technical infrastructure and better integrate digitization into teacher training, the "Basic Digital Education" curriculum for lower secondary schools was introduced and implemented for the first time in the 2018/19 school year. The implementation of this curriculum is compulsory, but schools can choose to set two to four teaching hours per week as well as whether to offer it as an independent subject or integrate it into existing subjects. The curriculum includes topics such as social aspects, media design, digital communication, security, technical problem solving, and computational thinking, where students work with algorithms and acquire rudimentary programming skills (Bundesministerium für Bildung, Wissenschaft und Forschung, 2018b). Although the government has taken a further step toward early digital education with the compulsory "Basic Digital Education" curriculum for lower secondary schools, Austria and Germany remain low in global comparisons. As shown in Figure 1, the leading countries, Australia and the United States, start their computer science education in kindergarten (Grandl and Ebner, 2017).

This late start to teaching digital education raises questions about students' experiences and perceptions of computer science. Therefore, this study aims to answer the following questions: (1) what can be understood about the interest in computer science from children who have not yet experienced computer science education?, (2) what are the preconceptions about this subject of children who have not yet experienced computer science education?, and (3) what gender differences exist in the preconceptions of children who have not yet experienced computer science education?

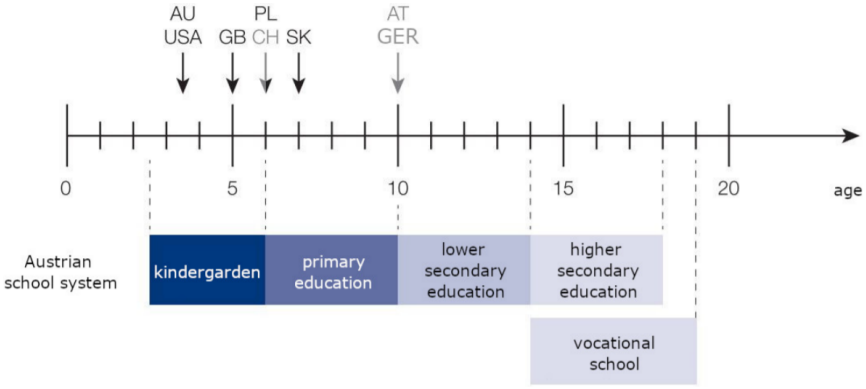

Figure 1: Starting age of digital education: A global comparison (Hörmann and Sabitzer, 2020).

3 THEORETICAL BACKGROUND

Several authors have discussed the misperceptions of computer science among children.

Beaubouef and McDowell (2008) discuss the common myths and misconceptions about computer science and state that overcoming negative myths would help students see computer science as an exciting and fast growing field that leads to many diverse and rewarding careers. Martin (2004) reports on an exercise in an introductory programming course in which students are asked to explain what computer science is as well as draw a computer scientist. In particular, the data from the drawings show that computer science has a "fundamental image problem". Students lack a clear understanding of computer science and computer scientists. Mitchell et al. (2009) also report that few students have a clear notion of computer science. Their perceptions of the discipline develop early in their school career and thus better integration between schools and universities is needed. Yardi and Bruckman (2007) conducted interviews with teenagers showing that they perceive computing to be boring, solitary, and lacking a real-world context.

Gender differences in misperceptions have also been studied. For example, Mercier et al. (2006) performed two studies based on surveys, drawings, and interviews to examine sixth- and eighth-grade students' perceptions of knowledgeable computer users and their self-perception as a computer-type person. Both male and female students mostly drew male users and stereotypical features (e.g. glasses) were more common among older students. Moreover, most students said that they think a computer-type person exists but did not believe that they were such a person. Bollin et al. (2020) also report that interest in computer science tends to decline among young women. Hansen et al. (2017) developed the so-called Draw A Computer Scientist Test to understand how young children perceive computer scientists finding more female students drew female computer scientists that after their curriculum than before, whereas male computer scientists were mostly drawn working alone.

There have been several efforts to remedy this situation and support students in developing perceptions of computer science discipline as a discipline beyond hardware and programming. With this goal in mind, Grover et al. (2014) studied a middle school introductory computer science and programming curriculum designed to increase students' awareness of computer science as a problem-solving discipline in a real-world context. The authors asked the students about their view of computer science before and after the course and observed a positive shift in their perceptions of the discipline. Yardi and Bruckman (2007) also propose a new curriculum to teach teenagers core computing principles. The goal of this curriculum is to present computer science as an innovative, creative, and challenging field with authentic, real-world applications. Bollin et al. (2020) propose using attractive teaching material and classroom interventions to stimulate realistic interest for girls, such as working in an interdisciplinary manner.

4 METHODOLOGY

To delve into children's preconceptions of computer science, a questionnaire consisting of two parts was developed: The first part described the perceptions and experiences of computer science and the second part asked children to draw a picture of a person working in computer science. This study examines the responses to the first part of the questionnaire. This part contained six questions: four open-ended ques-

tions for which a short passage had to be written and two multiple choice questions. None of the questions were mandatory to answer. The questions were asked in German and can be translated as follows:

1. Are you interested in computer science? Choose an option: (1) I am very interested in computer science, (2) I am interested in computer science, (3) I am a little interested in computer science, and (4) I am not interested in computer science.
2. What is computer science? Provide a short answer.
3. What does a person working in computer science do? Provide a short answer.
4. In the future, do you want to work in computer science? Choose an option: (1) yes, (2) no, and (3) maybe.
5. Give the reasons for your answer to question 4.
6. List the people you know that work in computer science.

The participants of the study were students from different secondary schools in Austria in different areas. In total, 188 students were willing to fill out the questionnaire. 68 of the participants identify as female (36.17%), 118 as male (62.77%), and two did not mention their gender identity (1.06%). At the time of the study, all the students were between 9 and 11 years and attended the fifth grade. This grade was chosen because - at that time - students in this grade had not yet been taught a subject related to computer science at school. Moreover, the participants had not received any additional computer science-related education. Since this study investigates the students' preconceptions of computer science, this was seen as essential.

The data analysis was conducted by the main author of this paper and three other researchers. Discrepancies between the coders were discussed within the author group to adapt the coding guidelines. To analyze the data, descriptive and inferential statistics as well as content analysis methods were employed. Statistical tests were used to determine if the means of two sets of data were significantly different from each other. SPSS Statistics 25.0 was used to assist in the descriptive and inferential statistics.

5 RESULTS

In this section, we present the results of the analysis of the questionnaires. We first present the students' interest in computer science, followed by how they define computer science. Next, we present their perceptions of working in computer science and the people they know who do so.

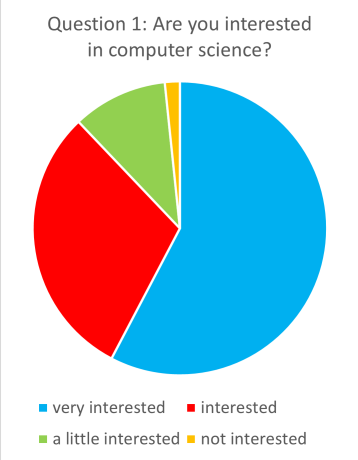

Figure 2: Students' interest in computer science (N=182).

5.1 Students' Interest in Computer Science

In the questionnaire, the students were asked if they were interested in computer science. They could answer this question with the following four given options: (1) I am very interested in computer science, (2) I am interested in computer science, (3) I am a little interested in computer science, and (4) I am not interested in computer science. However, the students were not required to provide an answer . In total, 182 students (96.81%) answered this question, with 105 saying that they were very interested in computer science (57.69%), 55 that they were interested in computer science (30.22%), 19 that they were a little interested in computer science (10.44%), and three replying that they were not interested in computer science (1.65%). Figure 2 provides an overview.

Of the 65 students who identify as female and answered this question (95.59%), 31 responded that they were very interested in computer science (47.69%), 22 were interested in computer science (33.85%), nine were a little interested in computer science (13.85%), and three were not interested in computer science (4.62%). Of the 115 students who identify as male and answered this question (97.46%), 74 stated that they were very interested in computer science (64.34%), 31 were interested in computer science (26.96%), 10 were a little interested in computer science (8.70%), and none were not interested in computer science. Figure 3 compares the answers by gender identity. In sum, differences in the answers could

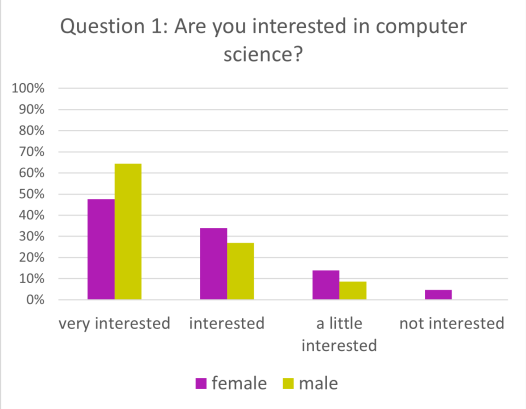

Figure 3: Comparison of students' interest in computer science by gender identity (N_f=65, N_m=115).

be observed. The distribution of the answers was found to be significantly different between the two gender groups. Students who identify as male stated significantly more often that they were (very) interested in computer science than students who identify as female.

5.2 Students' Definitions of Computer Science

In the questionnaire, the students had to define computer science using a short passage. An answer was not mandatory, however, all the students (N=188) answered. The following answer was mentioned the most often: "doing something with a computer/laptop/PC" (n=129, 68.61%). (n=129, 68.61%). None of the other definitions were as common (Table 1). This was also true when segmenting the answers by the gender groups. However, there were some differences between these groups. The terms mentioned by the students who identify as female but not by the students who identify as male included "automation", "math", "modifications", and "website". Nevertheless, these definitions were also rarely mentioned (i.e. once or twice) in this group. The terms mentioned by the students who identify as male but not by the students who identify as female included "binary", "cool"/"fun"/"great", "doing something with a device", "installing", "looking up things", name of a game console, "office", "operation", "science", "smartphone", "USB stick", and "you need IQ". Again, the definitions were rarely mentioned (i.e. once or twice) in this group except the cluster of positive descriptions ("cool"/"fun"/"great"). As mentioned above, these positive descriptions were not used by students who identify as female, but were used by 11 students who identify as male (9.32%),

Table 1: Students' definitions of computer science in total (N=188) and in gender groups female and male (N_f=68, N_m=118).

Definition	n	n_f	n_m
"doing something with a ... ... computer/laptop/PC/"	129	58	71
"a subject in school"	17	9	8
"I don't know"	17	2	15
"programming"	17	9	8
"something with technology"	12	5	7
"ten finger system"	12	5	7
"cool"/"fun"/"great"	11	0	11
"surfing the Internet"	6	2	4
"something with information"	5	3	2
"doing something with a ... ...device"	3	3	0
"software"	3	1	2
"automation"	2	2	0
"hardware"	2	1	1
"operation"	2	1	1
"processing"	2	1	1
"science"	2	0	2
"binary"	1	0	1
"doing something with a tablet"	1	0	1
"installing"	1	0	1
"looking up things"	1	0	1
"math"	1	1	0
"modifications"	1	1	0
name of a game console	1	0	1
"office"	1	0	1
"smartphone"	1	0	1
"USB stick"	1	0	1
"website"	1	1	0
"you need IQ"	1	0	1

making it the third most frequent answer for this group. The second most frequent answer given by this group was "I don't know" (n=15, 12.71%). This reply was only mentioned twice in the group of students who identify as female (0.29%). Here, the second most frequent answers were "a subject in school" and "programming", with 9 mentions each (15.52%).

5.3 Students' Perceptions of Working in Computer Science

The students were asked three questions about working in computer science. First, they were asked about what people who work in computer science do. Second, they were asked if they want to work in computer science in the future. Finally, they were asked to provide their reasons for this decision. An answer was not mandatory for any of these questions.

For the question about what a person who works in

computer science does, it was possible to answer with a short passage. Although an answer was not mandatory, all the students (N=188) answered. Similar to the second question ("What is computer science?"), the most frequent answer was "doing something with a computer/laptop/PC" (n=78, 41.49%) even though this answer was not given as often as before. The second most frequently mentioned aspect was "programming" (n=35, 18,62%), being mentioned more than twice as often here, than at the previous question (n=17, 9,04%). However, none of the other definitions were repeated by participants, as seen for the previous question, and more unique answers were given (Table 2). In the gender groups female and male, the most common answer was again "doing something with a computer/laptop/PC" (45.59% (f) and 34.75% (m)). However, there are some differences between the groups. The terms mentioned by the students who identify as male but not by those who identify as female included "app", "appointments", "architect", "boss", "calculating", "configuring", "engineer", "gambling", name of a communication platform, name of a search engine, name of a spreadsheet software, name of a word processing software, "office", "operating system", "problem solving", and "website". Nevertheless, these definitions were also rarely mentioned (i.e. once, twice, or three times) in this group. The group comprising students who identify as female noted only one term that was not mentioned by the other group: "chatting". This term was also only mentioned rarely, twice in this case. The second most frequent answer given by the students who identify as female was "I don't know" (n=14, 20.59%) followed by "programming" (n=10, 14.71%). Similary, "programming" was in the other group the second most frequent answer in the other group (n=24, 8.47%) followed by "I don't know" (n=8, 6.78%).

For the question about working in computer science in the future, it was possible to choose between three options (yes, maybe, and no) or provide no answer. Of the 183 students who answered the question, 24 stated that they wanted to work in computer science in the future (13.11%), 122 that they maybe wanted to work in computer science (66.67%), and 37 that they did not want to work in computer science (20.22%) (Figure 4). The answers to this question correlate with those to question 1 ("Are you interested in computer science?"), showing that the students who classified themselves as being (very) interested in computer science could more often imagine working in computer science in the future.

Of the 66 students who identify as female and answered this question (97.06%), eight stated that they wanted to work in computer science in the future (12.12%), 40 that they maybe wanted to work in computer science (60.61%), and 18 that they did not want to work in computer science (27.27%). Of the 115 students who identify as male and answered this question (97.46%), 16 stated that they wanted to work in computer science in the future (13.91%), 80 that they maybe wanted to work in computer science (69.57%), and 19 that they did not want to work in computer science (16.52%)

Table 2: Students' perceptions of tasks when working in computer science in total (N=188) and in the gender groups female and male (N_f=68, N_m=118).

Definition	n	n_f	n_m
"doing something with a ...	78	36	42
... computer/laptop/PC/"			
"programming"	35	10	24
"something with technology"	15	6	8
"I don't know"	11	14	8
"writing"	11	5	6
"developing"	6	2	4
"installing"	6	2	4
"supporting"	5	3	2
"software"	4	1	3
"calculating"	3	0	3
"doing something with a device"	3	1	2
"explaining"	3	1	2
"looking up things"	3	2	1
"surfing the Internet"	3	2	1
"apps"	2	0	2
"constructing"	2	0	2
"chatting"	2	2	0
"e-mails"	2	1	1
"office"	2	0	2
"operating system"	2	0	2
"repairing"	2	1	1
"robots"	2	0	2
"teacher"	2	1	1
"website"	2	0	2
"appointments"	1	0	1
"architect"	1	0	1
"boss"	1	0	1
"configuring"	1	0	1
"doing something with a screen"	1	0	1
"engineer"	1	0	1
"gambling"	1	0	1
"modifications"	1	0	1
name of a communication platform	1	0	1
name of a search engine	1	0	1
name of a spreadsheet software	1	0	1
name of a word processing ...	1	0	1
... software			
"problem solving"	1	0	1
"squatting"	1	0	1
"USB stick"	1	0	1

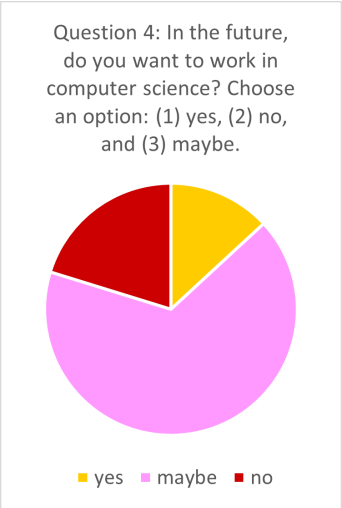

Figure 4: Students planning to work in computer science in the future (N=183).

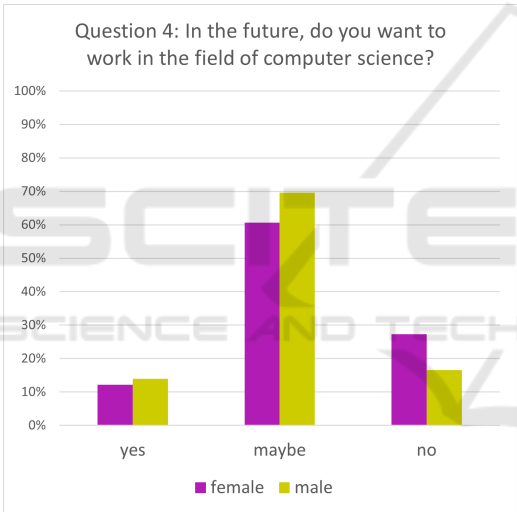

Figure 5: Comparison of the number of students planning to work in computer science in the future in the gender groups female and male (N_f=66, N_m=115).

Figure 5 compares the answers by gender, showing no significant differences, concurring with the no significant differences by gender identity in the answers to question 1 (“Are you interested in computer science?”).

Looking at the reasons for these decisions, the answers differed depending on the answer given before. Nine of the students who wanted to work in computer science mentioned that they were very interested in the field (37.50%), six wanted to learn programming (25%) including three who mentioned programming games (12.50%), five liked “doing things on computers” (20.83%), five noted that computer science was fun (20.83%), and two wrote about role models in the field (8.33%). Students with unique answers mentioned that they wanted to learn something new, wanted to support others, wanted to learn computer science, wanted to develop a better search engine, and “were talented at computer science” (4.17% each).). Fifty-six of the students who maybe wanted to work in computer science mentioned that they did not yet know what job they wanted in the future (45.90%), 17 said that computer science was fun (13.93%), 15 said that they thought that a job in computer science would be interesting (12.30%), 14 already had other plans for their future in mind (11.48%), eight liked “doing things at the computer” (6.56%), and three were sure that they would be good at computer science (2.46%). Explanations mentioned twice by the students included that it would be too much work, that it would be good to have the competency, that programming would be good to know, and that computer science would be very useful because it is “necessary nearly everywhere” (1.64% each). Explanations mentioned once by students included that they liked surfing or having money, that it would be one of their dream jobs, and that they had a role model in the field (0.82% each). Sixteen of the children that did not want to work in computer science in the future already had other plans for their future (43.24%), 11 did not know what they wanted to do (29.73%), and seven mentioned that they were not interested in computer science (18.92%). Answers mentioned only once included that they did not want to sit in front of a computer that much, that they did not know anything about this field, and that they preferred working with people, with animals, or in the sports field (2.70% each).

The comparison of the answers by gender identity is omitted due to an insufficient amount of data.

5.4 Students’ Role Models in Computer Science

In the questionnaire, the students were asked to list the people they knew who worked in computer science. They could answer this question with a short passage. An answer was not mandatory; however, all the students answered this question (N=188). Of them, 93 computer science teachers at their schools were noted by 68 students (36.17%), while 64 mentioned that they did not know anyone working in computer science (34.04%).

Altogether , 77 family members were mentioned by 48 students (25.53%) including mothers (24 mentions), fathers (23 mentions), uncles (15 mentions), aunts (four mentions), sisters, male cousins (three mentions each), brothers, female cousins (two men-

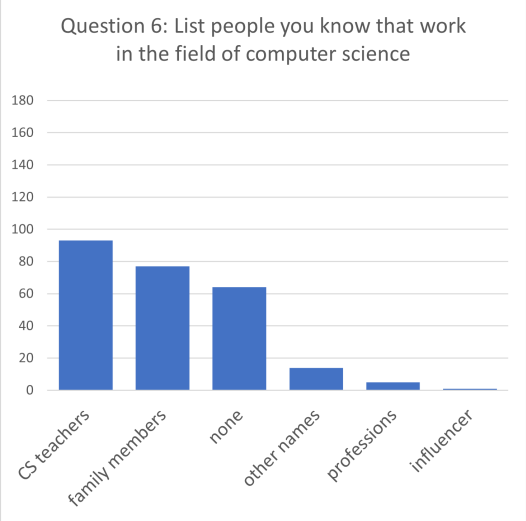

Figure 6: Number of mentions of people working in computer science (N=188).

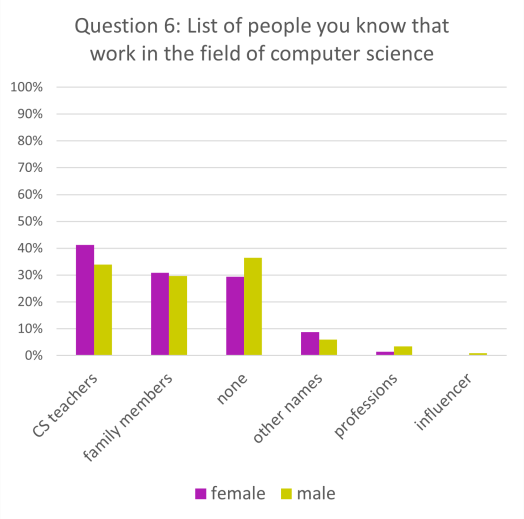

Figure 7: Comparison of the number of mentions of people working in computer science in the gender groups female and male (N_f=64, N_m=115).

tions each), and grandfathers (one mention). Moreover, 14 students mentioned other people that could not be classified as family members or teachers (7.45%): five students mentioned general professions including bank clerk, computer science teacher, electrician, gamer, hacker, manager, modder, (medical) programmer, software developer, and teacher (2.66%) and one noted a famous coding influencer (0.53%). In sum, 119 students did not know anyone working in computer science except the computer science teachers at their schools (63.30%) (Figure 6.

Of the 68 students who identify as female and answered this question (100%), 45 computer science teachers from their schools were mentioned by 28 students (41.18%), 39 family members were mentioned by 21 students (30.88%), 20 mentioned that they did not know anyone working in computer science (29.41%), six students mentioned other people that could not be classified as family members or teachers (8.82%), and one mentioned general professions (1.47%). Of the 118 students who identify as male and answered this question (100%), 43 mentioned that they did not know anyone working in computer science (36.44%), 48 computer science teachers from their schools were mentioned by 40 students (33.90%), 38 family members were mentioned by 27 students (29.66%), seven students mentioned other people that could not be classified as family members or teachers (5.93%), four noted general professions (3.39%), and one mentioned a famous coding influencer (0.85%) (Figure 7). In sum, 41 students who identify as female did not know any person working in computer science except the computer science teachers at their school (60.29%) compared with 78 students who identify as male (66.10%).

The results were compared regarding the dependencies of the knowledge of people working in computer science and their decision to consider a job in computer science, but no statistical relations were found.

6 CONCLUSIONS

The aim of this study was to examine children's conceptions before they experience computer science as a subject at school. In this process, students' interest in computer science was investigated. It was shown that most were very interested in computer science. Only 1.65% of students noted that they were not interested in computer science. All those students that were not interested identify as female. Moreover, students who identify as male also mentioned significantly more their interest in computer science than students who identify as female. When looking at the preconceptions of computer science, around 9% of students did not know what computer science is and around 6% did not know what computer scientists do . The most common answer from all students, even when splitting the group by gender identity, was that computer science is "doing something with a computer/laptop/PC" and computer scientists are "doing something with a computer/laptop/PC" and computer scientist are "doing something with a computer/laptop/PC". No significant differences in the answers of students who identify as female and male were observed. However, only students who identify

as male described computer science in positive terms such as “cool”, “fun”, or “great”. These answers were provided by around 9% of students in this group. Most students could imagine themselves working in computer science (answered “yes” or “maybe”). No gender differences were observed when describing their future plans. It was also investigated whether students knew people who work in computer science. Most mentioned their computer science teachers at school, but only 36.70% of students could note at least one other person. Again, no significant gender differences were observed within the groups.

In summary, our results show that both students who identify as female and those who identify as male have a narrow view of computer science and associate the field mainly with computers. Despite this narrow view, many students show an interest in computer science and can imagine themselves working in this field. Role models seem to be missing for most students.

7 OUTLOOK

The evidence from this study implies that for children, computer science is firmly linked to working with computers. These observations concur with the assumption of Martin (2004) that few children are aware that computer science means much more than this and that most lack a clear understanding of computer science and computer scientists. However, our study revealed that many students are interested in computer science. Hence, if we can convey a positive picture and broaden their view of computer science, more might be interested in deepening their knowledge about this field. As also suggested by Beaubouef and McDowell (2008), overcoming negative views and myths would help students see computer science as an exciting and fast developing field. Interestingly, no significant gender differences were observed in our study. One possible reason could be the participants' young age. As suggested by Bollin et al. (2020), interest in computer science tends to decline among young women. This again highlights the importance of presenting computer science much earlier in the life course and giving it more intensive attention. With the implementation of initiatives to arouse interest in STEM subjects at an early age as aimed by Dynatrace, we hope to spark joy, and awaken the curiosity of many children to broaden their view of computer science. Our investigations into this area are ongoing, as further studies will accompany the development of Dynatrace's STEM initiatives for young children.

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