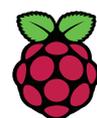# Who comes to Code Club?
Exploring the backgrounds
and interests of young people
in a sample of Code Clubs

Oliver Quinlan and Lucia Flóriánová

Raspberry Pi

code club

CoderDojo

Who comes to Code Club?
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Contents

Executive summary

In the UK, some groups of young people are still underrepresented in computing education[1]. We know that our network of UK Code Clubs spreads across schools that serve a wide range of communities, from the more affluent to the more deprived. This research project represents a first step in exploring which young people in each school choose to or are encouraged to attend these programming clubs.

In the project, we captured a snapshot of the groups of young people we are reaching in a small number of Code Clubs. To do this, we visited six clubs in schools across the West Midlands that serve communities made up of a range of socio-economic groups, based on their Deprivation Pupil Premium (DPP) population. We interviewed teachers about Code Club members' genders and ethnic and socio-economic backgrounds in order to determine whether these are proportional to the make-up of the wider communities the schools serve. We also investigated whether certain groups of young people are more or less likely to join Code Club due to their interests and how the opportunity is presented to them. This project's limited scope means it is just the first stage of our work to understand which groups of young people come to Code Clubs at schools serving diverse socio-economic communities.

The findings in this report are based on qualitative interviews with teachers about representation in their Code Clubs, relying on their knowledge of the communities their schools serve. We did not collect any data related to individual young people as part of this project.

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[1] Kemp, P.E.J., Berry, M.G. & Wong, B. (2018). The Roehampton Annual Computing Education Report: Data from 2017. London: University of Roehampton.

Key findings

Motivations for attending Code Club

- The most important reasons why young people attended a Code Club were curiosity about technology and wanting to have fun.

- Being interested in computing as a subject and explicitly aiming to build skills in coding did not appear to be primary reasons for attending Code Club.

- Young people often cited simply having more time to use a computer as a reason to attend Code Club.

- Code Club attendees had a range of other interests, and a singular focus on technology was not common.

- Scheduling clashes with other clubs, such as football or sports clubs, can be a factor in young people not being able to attend Code Club, an observation demonstrating their diverse interests.

- Some schools placed strong emphasis on after-school clubs and offered a range of them; choosing to attend a Code Club as one among a number of clubs was a different experience to choosing to attend a Code Club in isolation.

Demographic information

- All the teachers we spoke to perceived that their Code Club group was a mixture of students from different groups found in the community the school serves.

- Teachers mostly reported that young people in Code Club came from a mixture of socio-economic backgrounds that was at least similar to the make-up of the community the school serves. In one case they reported some underrepresentation of the school's most deprived groups in the club.

- Most teachers thought that the ethnic diversity in their clubs broadly mirrored the diversity in the community their school serves.

- On average around half of the Code Clubs' attendees were girls, although the proportions varied a lot between clubs, including girls being in the majority in one club, and not represented at all in another.

Academic performance

- Evidence from this small set of Code Clubs suggests that the clubs are not set up as academically focused environments, and that they attract attendees with wide-ranging levels of academic performance. Some teachers did, however, discuss links with the curriculum.

- Some teachers targeted the club towards young people who they felt needed to build more confidence with technology.

- One teacher placed a reading requirement on attendance to ensure young people would be able to successfully follow the Code Club projects instructions.

- One teacher used their Code Club as a barometer of the Computing provision in the school in order to identify areas young people were struggling with or excelling in. This influenced their planning for formal Computing provision.

Parental influence

- Most young people did not articulate a clear understanding of whether their parents work with computers.

- Teachers generally thought that the majority of Code Club attendees' parents did not have an occupation directly related to technology or computing skills.

- In one club, the teacher organised an open session for parents to join the club and see their young people working on projects.

Next steps and recommendations

- Consider how Code Club might be positioned alongside other after-school clubs, how our offer relates to others, and how we continue to attract young people with diverse interests.

- Continue to promote Code Club as a fun activity that is accessible to all, and particularly bear this in mind as we introduce opportunities for accrediting learning.

- Conduct follow-up research in some schools with significant ethnic minority populations to further explore their representation in Code Clubs.

Methods

The sample consisted of six primary school Code Clubs. We aimed to visit clubs led by teachers rather than volunteers, as teachers are likely to have a good understanding of the community a school serves. We visited each of these clubs to observe a session and speak to club members (30–60 mins), and conducted a semi-structured qualitative interview with the club leader (20–30 mins). In one case, we also talked to young people from the same year group who had chosen not to attend Code Club.

The interviews with club leaders were audio-recorded and transcribed, and the recordings were then deleted. Conversations with young people and observation of the sessions were not recorded, and instead notes were taken. No young people's names were collected.

We explained the purpose of the research to all participants (both leaders and young people), including their right to withdraw. Club leaders were also provided with a participant information sheet and our contact details in case they had any further questions or concerns.

General background

Schools and sample

The six Code Clubs we visited ran in primary schools in the West Midlands, some located in a city and some in smaller towns. We wanted to visit schools that had socio-economic diversity in their communities, in order to see whether this diversity was also represented within the Code Club. Therefore, our sample consisted of schools with 10–50 % deprivation pupil premium (DPP) population.

We initially aimed to visit clubs in schools with 30% DPP population, as this is the national average. However, due to the practicalities of recruiting clubs for the project, the final sample included one school with 10–15%, two schools with around 30%, and three schools with 40–45% DPP population.

Once we had recruited our sample, we conducted desk research into the features of the schools using data made public on the government's school information and school performance websites[2]. We also looked into the schools' Ofsted inspection reports, paying particular attention to comments about the features of the community the schools serve[3]. Our sample included a mixture of schools with varied levels of cultural and ethnic diversity among the student population. A number of schools had a significant proportion of students who are part of a specific cultural minority, e.g. young people of Eastern European descent in one case, and of South Asian descent in another. In some cases, this was reflected in the school environment, e.g. through displayed quotes, religious symbols, or signs in another language alongside English.

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[2] See get-information-schools.service.gov.uk and www.compare-school-performance.service.gov.uk

[3] See reports.ofsted.gov.uk

All schools were rated as good or outstanding by Ofsted.

Table 1: Information about schools in sample						
	Location	**School DPP population**	**Ofsted rating[4]**	**Total number of pupils[5]**	**Pupil to teacher ratio[6]**	**Expenditure per pupil[7]**
Club 1	Smaller town/ village	25–30%	Outstanding (1)	340 (50% girls)	6	£4500
Club 2	Area of a large city	~30%	Good (2)	410 (51% girls)	22	£5200
Club 3	Large city	~45%	Good (2)	410 (44% girls)	19	£6100
Club 4	Town	40–45%	Good (2)	220 (51% girls)	20	£6000
Club 5	Large city	40–45%	Good (2)	230 (49% girls)	21	£5900
Club 6	Large city	10–15%	Outstanding (1)	390 (50% girls)	21	£4500

[4] Note that many schools increased their expenditure after their Ofsted report, so some improvements would not have been reflected

[5] Total number of pupils on roll, all ages for 2016/2017; national average is 48.7% girls and 51.3% boys

[6] Rounded number of young people per teacher as recorded at www.compare-school-performance.service.gov.uk; national average is 20.6

[7] Rounded total annual expenditure per pupil in 2016/17 as recorded at

Code Clubs

Four of the clubs in our sample were led by a computing or a maths teacher, one club was led by a volunteer, and one club was led jointly by a teacher and a volunteer.

Four of the clubs ran once a week after school for an hour, one club took place twice a week (with two mostly different groups of young people) before school for 50 minutes, and one club ran during lunch break for 30 minutes.

Table 2: Information about clubs in sample							
	Time of CC	**Club Leader**		**Number of young people[8]**			**Age Group**
Club 1	After school (1 hour)	CS/ICT teacher	Female	Total: 13	Girls: 3	Boys: 10	Years 3–6
Club 2	During lunch break (30 min)	Computing coordinator	Male	Total: 24	Girls: 18	Boys: 6	Years 4 and 5
Club 3	After school (1 hour)	Maths teacher	Female	Total: 3	Girls: 0	Boys: 3	Year 5
Club 4	After school (1 hour)	CS/ICT teacher	Female	Total: 11	Girls: 5	Boys: 6	Years 3–5
		Volunteer	Male				
Club 5	Before school (50 mins)	Volunteer	Male	Total: 7	Girls: 2	Boys: 5	Year 4
Club 6	0 After school (1 hour)	Computing coordinator	Male	Total: 13	Girls: 7	Boys: 6	Year 4

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[8] Number of young people present at the session; the absence rate was generally low

Availability and attendance

Most clubs we visited were being made available to Year 4 and Year 5 students, with some clubs including individuals from Year 3 or Year 6. Code Club attendance was open to all young people from the selected year groups, although in one case the more able Year 3 students had been selected by the teacher to make sure that they could keep up with older attendees. Usually, the Code Club had been promoted to parents in a letter including other clubs running at the school.

Clubs varied in size. In most cases, the teacher set a limit on the number of attendees to keep the club to what they felt was manageable. Club environments are often busy and young people regularly require help and one-to-one attention. Teachers are used to dealing with larger groups in lessons, but they often limit the size of a Code Club to accommodate the support the young people need and the informal atmosphere of young people moving through projects at their own pace.

In one case, the size of the club was limited by lack of equipment: the volunteer only had six laptops available. One of the boys in this club said that he attended sessions regularly but would not write code himself, because there was no spare laptop. Instead, he would circle around the room and test other young people's programs. Despite not having a chance to write his own programs, he appeared enthusiastic and engaged.

To allow more young people to attend, some clubs in our sample ran with different cohorts of students attending for blocks of time during a school year (e.g. for a term). In those cases, some young people would stay on after their block ended to join the next cohort. In one school, the teacher had to create a waiting list for students who could not currently attend due to the limited capacity of the club.

Groups of young people

In this project, we wanted to investigate three related questions:

1   Why young people choose to attend Code Club

2   Whether the Code Club sessions are made available to all
young people equally

3   Whether there were structural factors that made young people more
or less willing to give Code Club a try

By gaining a better understanding of young people's motivations for and
potential barriers to choosing to attend a Code Club, we hoped to find
out how the Foundation may be able to make our programmes more
accessible to all groups of young people.

Motivations for attending Code Club

It could be assumed that young people choose to come to Code Club because they want to learn how to code, or because they see themselves as someone who is interested in technology. In most clubs this did not seem to be the case: young people's identity and learning goals did not appear to influence their decision to attend. Other motivations, such as curiosity or wanting to have fun, seemed to have a much stronger influence.

This may be related to the young people's age: in Years 3 to 5, many young people do not yet have the strong sense of identity based on their interests that teenagers do, and they do not always intentionally choose hobbies that fit with their self-image. Instead, they are willing to simply have a go at something new.

We asked a few Code Club members for reasons why friends of theirs did not attend Code Club. These young people did not have answers they could give with certainty; they thought the reason was either that the friends were not aware of it, or that they weren't motivated to try and therefore did not have the chance to discover how much fun Code Club was.

Using computers

Many Code Club members we spoke to liked playing computer games and using computers in general, and perceived Code Club as an opportunity to spend more time using a computer. They generally did not strongly distinguish between coding and other activities they engaged in at a computer (such as playing games). Some young people did not have a computer at home, or did not have access to it, so the club was their only chance to use a computer in an extracurricular setting. Some said that although they had known that computers were fun, they had not realised that coding would be fun too.

In term of pre-existing technical knowledge, some young people had had more understanding of programming before starting at their club than others. This was due to various amounts of previous experience of coding gained in computing lessons or outside of school.

Interests and hobbies

Code Club attracted young people with different interests and hobbies. Some young people did not attend other after-school clubs and spent their free time watching TV or playing computer games. Others attended additional clubs, mainly sports clubs or art-related clubs such as dance clubs or choirs.

Some young people worked on their coding projects in their free time outside Code Club.

Demographics

To assess whether we are reaching a diverse group of young people, we discussed demographics of the club with the teachers. We were interested in young people's gender, ethnicity, socio-economic background, and academic performance.

We tackled the data protection challenges inherent in the collection of demographic data by relying on teachers' assessment of whether the demographics within their club reflected the demographics of the general school population. For example, in schools with 30% DPP population, we asked teachers whether this proportion was the same in their group of club members. This approach meant that we did not need to collect sensitive information about individual young people. This level of information is sufficient to help us begin to form an understanding about the context in which Code Clubs run, and to get a first insight into the situation in schools.

The teachers we spoke to seemed to be aware of, and confident about their knowledge of, students' backgrounds. Therefore, we believe that, for the purposes of this project, we can rely on their subjective assessment of the situation in their club. Nonetheless, we are aware that this approach has drawbacks.

Firstly, different teachers approached our question about demographics differently. Whereas some of them answered straight away, others thought for some time about their answer, and in some cases counted the young people that they knew belonged to different demographic categories. It is therefore reasonable to assume that some estimates we received were more precise than the others.

Secondly, teachers' estimations were clearly subjective, in that they had different conceptualisations of diversity, as well as the tendency to focus on the diversity within their club rather than on how that diversity compared to the diversity within the school's population as a whole. For example, one teacher noted that there was "a real mixture of academic abilities" in their club, and then realised that the club did not include any young people who were in a low-performance group in their class. But the teacher still conceptualised the club's membership as a mixture, as the group contained both high-performing and lower-performing students. We also observed a bias in perception when teachers estimated their club's gender ratio: one teacher reported that there were many more girls than boys in their club, when in fact the ratio was very close to 50:50, with seven girls and six boys in the session we visited. It is possible that the number of girls was unusually high in comparison with the teacher's previous experience, and it therefore seemed to them that there were many more girls than boys.

Finally, the small sizes of some clubs made it difficult to discuss any kind of diversity.

Gender

The average gender ratio across all the clubs in our sample was close to 50:50. Among the six clubs, two had approximately equal numbers of girls and boys (one with more girls and one with more boys), two clubs had more boys than girls, and one club had significantly higher attendance from girls than boys. One club included boys only.

	Gender ratio	Girls	Boys
Club 1	More boys	3	10
Club 2	More girls	18	6
Club 3	No girls	0	3
Club 4	Balanced	5	6
Club 5	Balanced	2	5
Club 6	Balanced	7	6
Total	**Balanced**	**35**	**36**

It is hard to say what made some clubs more successful at recruiting girls than others, and some cases contrasted with what may be expected. For example, a female role model might be expected to promote female participation. However, even though Club 1, Club 3, and Club 4 had a female leader, only one of them had equal participation from girls and boys. On the other hand, Club 2 and Club 6 were both led by a male Computing Coordinator or teacher, who had nevertheless successfully recruited girls.

Given the circumstances, there was an interesting contrast between the proportion of girls in Club 1, Club 3, and Club 4. All of these clubs had a passionate female leader who had taught Computing or Maths to the group of young people in the past, and appeared to have built a positive relationship with them. However, only one of the clubs had equal numbers of male and female participants. Club 1 only had three female participants: two from Year 6 and one from Year 3. Club 3 did not have any girls, which surprised the leader. However, the club had only started running in the summer term, and had a very low number of participants. It is possible that once the club becomes more established and the number of participants increases, some of them will be girls. Club 4 was run by a female teacher and a male volunteer and had a relatively high proportion of girls. Both adults believed that this was due to a number of reasons, mainly their promotion of computing as a fun activity.

It seems likely that the gender ratio in clubs was influenced by the schools' culture, young people's previous computing experience, and the way the club leader viewed and presented a Code Club to students.

Socio-economic background

Conversations about young people's socio-economic backgrounds are often less straightforward than conversations about their gender. To assess young people's backgrounds, we framed the interview around the DPP index, and often relied on teachers' understanding of this in relation to their school's context; we assumed that they would have sufficient knowledge of this because socio-economic background is frequently discussed and assessed in schools, and often shapes schools' initiatives and policies.

In our sample, the leaders of four clubs stated that they had a mixture of young people coming from different socio-economic backgrounds; one club was led by a volunteer who did not have access to this information; and one club was based in a school with a low proportion of deprived pupils overall, and the teacher stated that DPP was therefore "not a major factor [t]here".

	Teacher's assessment of socio-economic backgrounds	School DPP population
Club 1	Mixture	25–30%
Club 2	Mixture	~30%
Club 3	Mixture	~45%
Club 4	Mixture, but no young people from the most deprived backgrounds	40–45%
Club 5	Volunteer-led; no access to information	40–45%
Club 6	Missing information (teacher reported a low proportion of DPP students in their school)	10–15%

Each teacher in Clubs 1, 2, 3, and 4 stated that their club contained a mixture of young people with different socio-economic backgrounds, which they thought was representative of the community their school serve. These estimates were to some extent impacted by the limitations discussed above. For example, the leader of Club 4 reiterated that despite the club consisting of a reasonable mixture of young people from all sorts of backgrounds, they could not think of anyone coming from the most deprived group. The significance of this claim is difficult to assess, because it is possible that the percentage of young people coming from the most deprived backgrounds is very low in the school and that this is why none of these young people ended up amongst the 13 club members.

Despite their caveats, these findings were encouraging: teachers could often think of specific young people who they knew were supported by the DPP, or could provide examples of club members coming from households that did not have the resources to send children to other, paid-for clubs. Code Clubs also included young people who did not have access to a computer at home and who appreciated having the opportunity to use one at an after-school club. The detail in these teachers' assessments gives us confidence that the clubs in our sample were attended by young people who were representative of the schools' communities.

Choosing to attend Code Club seems to come especially easily in a school setting where attending an after-school club is a common thing to do. The schools we visited seemed to have a strong culture of after-school clubs and often offered a range of them for free. This is likely to help eliminate unequal opportunities among young people with different backgrounds.

It is important to bear in mind that although young people's socio-economic background did not seem to affect their attendance at Code Club, it may pose some obstacles to young people's further development. It would be especially beneficial to determine whether a young person's lack of access to technology at home prevents them from improving their coding skills at the same rate as others, or whether socio-economic background has any other negative impact on pupils' meaningful engagement with digital making. Further research with a more varied sample is needed to answer these questions.

Ethnic and cultural backgrounds

In terms of ethnic and cultural diversity, three Code Clubs were highly diverse, with a mixture of young people from different backgrounds, and two clubs had very little or no diversity. Five leaders thought that the proportion in their Code Club was representative of the community in their school or local area. One leader could not form an opinion about whether the diversity in their club reflected the student population's diversity, because as a volunteer, they did not have access to this information. In general, ethnic and cultural diversity did not seem to be a source of inequality in the clubs we visited.

A discussion of different nationalities emerged from some of the interviews, despite not being the primary focus of this research. Some teachers reported a high proportion of young people of Eastern European or Asian descent in their schools. Interestingly, none of these young people were present at the respective Code Clubs. One school appeared to have a strong Polish community, with signs on walls written in Polish alongside English. However, no young people of Polish descent attended the club. It is hard to say what the reason for this is, and establishing the cause would require further research.

	Teacher's assessment of ethnic and cultural diversity
Club 1	No diversity, which represents the student population
Club 2	Diverse, representative of school's wider community
Club 3	Diverse (hard to say as only 3 young people)
Club 4	Very little/no diversity, which represents the student population
Club 5	Volunteer-led; no access to information
Club 6	Diverse

Academic performance

As was the case for other criteria we collected teachers' assessments on, the Code Clubs in our sample were attended by a mix of young people with different levels of academic performance. All club leaders stated that their group was mixed in this respect, apart from the person running Club 5, a volunteer who did not have access to the necessary information. While some young people were identified by teachers as 'high-fliers' in many subjects, others were thought to show medium- or low-level academic performance. One teacher realised during our conversation that although their club was attended by a mixture of students with different levels of academic performance, young people coming from the lowest-level performance group were not represented in the club.

Some teachers made it clear to us that there were young people in their club who performed less well than others during their standard lessons in the school day. Based on our observations, these young people were still engaged with their projects and did partly or fully complete them. Occasionally, a child was marked as less skilled or as a 'weaker coder', but we did not observe any obvious effects of this on their engagement. Although young people worked at different paces, to us it appeared that a small number of them seemed markedly faster or more precise than others, rather than that some of the young people underperformed.

One of the clubs was attended by a young person who struggled academically in general, including with reading, and needed additional support from the club leader. In the club setting this was challenging due to the difference to other young people's skills. Two other young people were reported to be highly skilled; they worked independently and were more confident with technology. They were also friends and worked together when one of them needed support. The club leader

inferred that, while the two other young people had a profound interest in computing, the young person who struggled was attending for other reasons, such as parents' need for an extra hour of childcare. Despite all the observed challenges, this young person enjoyed working on their project, progressed through the steps, and stayed engaged and motivated to improve. It is worth thinking about how to maintain such a positive attitude in Code Clubs where there are palpable differences in young people's skills and confidence.

In general, Code Club was seen as an informal rather than an academic activity, and one that young people should use to have fun and be creative. Despite never describing it as an academic club, some teachers saw clear links between the club and the school curriculum. Firstly, teachers would sometimes target young people who they felt could perform better or needed more confidence with technology; as mentioned earlier, they would make a club available for everyone, but would particularly encourage some young people to attend. In the case of younger children, one teacher assessed their reading skills in order to decide whether they would be able to read the project instructions well enough to keep up with older children.

One leader used Code Club in their school to assess how well the curriculum is structured and where the gaps in young people's knowledge were. It helped them to see which areas worked well and which ones need more space in the curriculum and lessons. They also used it to informally assess young people's individual performance and to help them improve in the less pressured environment. They believed that this can improve young people's confidence and transform into more success in computing lessons as well.

	Teacher assessment of academic performance
Club 1	Mixture
Club 2	Mixture, but half of the group were Digital Leaders, who were obviously above average
Club 3	Mixture (hard to say as only three young people)
Club 4	Mixture of medium- and high-performing students, none from lowest level
Club 5	Volunteer-led; no access to information
Club 6	Mixture, but those confident using technology were more likely to attend

Parental influence

We were interested in the extent to which parents' occupation, interests, and attitudes impact young people's participation in Code Club. Nevertheless, getting accurate information about this was challenging, since we could not speak to parents directly. Young people's understanding of their parents occupation is often quite limited. Therefore, we decided to ask open questions about parental involvement and young people's view on how good with technology their parents were. We also asked teachers whether they saw any connection between parents' occupations and children's attendance at Code Club.

It appeared that clubs were attended by young people whose parents had mixed interests and occupations. Most young people were not sure whether their parents worked with computers. Some only had a vague idea about the way in which their parents work with computers. For example, they knew their parents work with a computer every day, but they were not sure about the nature of this work.

Parents did not seem to have very strong influence on the young people's decision to attend Code Club. They were more influenced by in-school factors, such as a relationship with a teacher or the school's culture. However, the household did shape the patterns of young people's attendance in practical ways. For example, some young people would attend only if their carers could pick them up after the club, or, in one case, if parents needed them to stay at school for longer. Some young people did not attend before-school club sessions because their parents thought these started too early.

Teachers generally thought that the majority of parents did not have an occupation directly related to technology or computing skills. However, even though parents could not code themselves, they seemed to support their children's attendance of Code Club. In one club, this was apparent when the teacher organised an open session for parents to come to the club and see their children working on projects: every child had at least one adult attending this session. Parental support is a beneficial influence even if it is unrelated to specific technical proficiencies or interests.

Conclusion

This work has given us an insight into representation of different demographic groups in Code Clubs. Visiting this small sample of clubs in schools that cater for young people from a range of backgrounds showed that these backgrounds were relatively well represented in the clubs. Coupled with the fact that we know Code Clubs are spread across schools that closely match the national picture in terms of areas of deprivation, this gives us confidence that we are reaching young people from a wide range of backgrounds in the UK.

We found that Code Club is part of the range of after-school offerings many schools provide to let students have fun and broaden their range of experiences. Young people in the Code Clubs we visited generally chose to attend because it was a fun activity, rather than because they had a strong interest in computing. This is positive, because it shows that Code Club is giving young people with a range of interests a taste of computing and programming. Club attendance was not generally influenced by academic performance; clubs were mostly attended by young people who their teachers identified as having a range of performance levels.

Teachers generally reported that the demographic, academic, and cultural groups served by the schools were represented in their Code Clubs. We visited one club where no young people with the lowest-level academic performance (as identified by the teacher) were present, and there were some schools that had significant minority communities in their intake that were not represented in the respective Code Clubs. We plan to undertake more research projects to look into how Code Clubs cater for academically lower-performing young people, as well as projects in schools with different minority communities, so that we can better understand how Code Club is offered to and perceived by these groups.

This project represents a first step of going beyond the school level and to the child level to understand how Code Club is reaching different groups of young people. The project's scope is limited by the relatively small sample size, and by our focus on qualitative interviews rather than on collecting data on individual young people. As such, we have gained promising indications related to the topics we wanted to explore, which we will use to inform our perspective on future research. We plan to continue to explore these topics with other groups of clubs as well as with different research methods in the future.

Raspberry Pi

CoderDojo