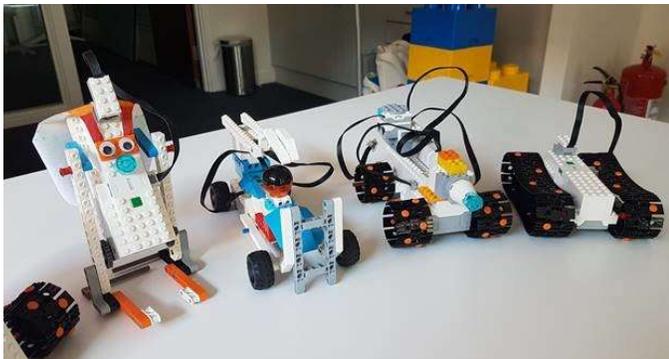


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# Evaluation of Tomorrow's Achievers Coding with Purpose Clubs

November 2021



*Figure 1: Lego robots constructed and programmed by children*



*Figure 2: Lego robots constructed and programmed by children*

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Figure 3: Children's drawings/models of their animation characters

## Summary

We evaluated the pilot of the Coding with Purpose / Cr8 and Code Clubs which took place on Coram Campus, London, between October 2019 and August 2021, using surveys, interviews and written feedback. Our findings are below, set out against the evaluation objectives.

### **Have children's confidence and social skills improved**

The majority of children (84%, 27/31) said they felt more confident learning new things after attending the club. The academic partner, student ambassador, and Virtual Schools said they noticed improvements in the children's confidence and social skills throughout the week.

### **Have children's problem-solving, critical thinking and team working skills improved**

The academic partner, student ambassador, and Virtual School representatives said they saw an improvement in children's problem-solving, critical thinking and team working skills.

### **Whether children enjoyed attending the coding club**

Most children (94%, 30/32) said they enjoyed attending the club. All interviewees confirmed that the children seemed to enjoy the coding activities and working together with other children. The majority of children reported improvements in how much they said they knew about coding, before and after attending the coding club.

### **What are children's aspirations for the future, and has the coding club influenced this**

It may be too soon to determine to what extent the coding club has influenced children's future aspirations, however children thought what they had learnt at the club would help them in the future. All children gave positive feedback about the club and wanted to attend again.

### **If a wider range of children (compared to Tomorrow's Achievers masterclasses) have attended the clubs**

The Coding with Purpose Clubs / Cr8 & Code Clubs had a more equal gender balance, a greater representation of Black and minority ethnicities (including in comparison to looked after children in London), but a smaller age range than those who have attended Tomorrow's Achievers masterclasses. The donor said they were keen to roll out the programme further with looked after children, and the academic partner and student ambassador were also enthusiastic about extending the programme to other children in the future.

## Introduction

Tomorrow's Achievers is a Coram service that provides specialist masterclasses for children with high learning potential. Tomorrow's Achievers developed Coding with Purpose clubs with the aim of helping to improve children's coding skills and reach a wider range of children than previous masterclasses – attract more girls and those from disadvantaged backgrounds. The programme also seeks to build children's confidence and social skills, and improve their problem-solving, critical thinking and team working skills.

Tomorrow's Achievers have joined with an academic partner to develop and run the clubs with student ambassadors. The academic partner, Dr. Safia Barikzai, works as an Associate Professor at a London university where she teaches engineering. She also leads an academic enrichment programme. The Coding with Purpose clubs encourage children to identify a community or societal problem and develop ideas for computer-based solutions to help address and alleviate that problem.

Four clubs were funded by a private donor, and took place between October 2019 and August 2021<sup>1</sup>. All clubs ran on the Coram campus in central London. The first two clubs took place over 5 days and, after review by Coram Life Education (CLE), the second two clubs took place over 4 days. All bookings by attendees came as a result of hearing about it from their local authority virtual school leads<sup>2</sup>. For the first two clubs, Coram engaged virtual schools in neighbouring London boroughs to recruit young people, resulting in the majority of children coming from Islington and Hackney. Each club started by inviting children to think about one of the UN Sustainable Development Goals, and using it as a launch pad for ideas to be brought to life via the creation of a computer generated short-animation. Up to 12 children attended each club, and no previous experience of coding was required. The clubs were led and facilitated by Dr. Barikzai and a group of student ambassadors, themselves STEM undergraduates.

## Evaluation aims

Coram's Impact & Evaluation team was commissioned to evaluate the Coding with Purpose clubs on behalf of Tomorrow's Achievers.

This evaluation sought to understand:

1. If children's confidence and social skills have improved;
2. If children's problem-solving, critical thinking and team working skills have improved;
3. Whether children enjoyed attending the Coding with Purpose club;
4. What are children's aspirations for the future, and has the coding club influenced this;
5. If a wider range of children (compared to Tomorrow's Achievers masterclasses) have attended the clubs.

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<sup>1</sup> The Covid19 pandemic meant that two of the clubs were delivered in 2021 instead of 2020, and the pilot was not concluded by October 2020 as initially planned.

<sup>2</sup> Virtual schools were contacted by email. The clubs were also advertised on social media (Facebook, Twitter).

## Methodology

We carried out surveys with children, and interviewed and gathered written feedback from adult stakeholders.

We designed two surveys for the children attending the club to complete; a 'pre' survey to be completed at the start of the first session, and a 'post' survey to be completed at the end of the last session. The pre survey asks children about their experience of coding and why they wanted to attend the coding club. The post survey asks children for their feedback of the club and what improvements could be made. All children attending the four Coding with Purpose clubs were asked to complete the surveys by the facilitators. The pre surveys were viewed by the facilitators to help inform them about the children and their interests. A total of 71 surveys were completed in total, with all 38 children who attended the club completing a pre survey, and 33 completing post surveys.

We also carried out four interviews in November 2019, with: the academic partner, a student ambassador, the donor<sup>3</sup>, and a foster carer of children who attended a club. The student ambassador, involved and present at all the clubs, was interviewed again in September 2021, and a Virtual School Deputy Head Teacher was interviewed in November 2021. The Deputy Head was present at the second club in February 2020 and the final club in August 2021 club, and was involved in the organising and bringing of children to the final club. The donor interview was conducted face-to-face; all other interviews were carried out remotely, either via the telephone or video conferencing. Interviews were transcribed<sup>4</sup> and we then carried out a thematic analysis.

We also obtained written feedback from Virtual School staff who attended the final club in August 2021. This is inclusive of the Deputy Head, who attended the whole club, and two colleagues who attended two days.

## This report

This report provides an analysis of children's feedback from the coding clubs as well as feedback from the interviews and written feedback.

Forty one children signed up across the four clubs, and 38 attended. The August 2021 club was the only club where not all children who had signed-up, attended, with CLE informing us that 3 of the 12 signed-up to attend did not do so due to clashes with other activities. Mostly, children attended all days of the clubs. There were two exceptions to this. Firstly, one child dropped out after the first day of the October 2019 club. This child was slightly older than the other children who attended, and decided to not attend further sessions as they did not think the programme was suitable for their age. Secondly, two siblings left the July 2021 club a

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<sup>3</sup> The donor interview took place with two people speaking on behalf of the donor with one voice.

<sup>4</sup> A technical issue meant we did not record one interview, with the Virtual School Deputy Head, so we analysed interview notes instead.

day early due to a prior family engagement and post-feedback forms were not received from them.

We analysed survey responses from all four clubs:

	<b>October 2019</b>	<b>February 2020</b>	<b>July 2021</b>	<b>August 2021</b>
<b>Pre</b>	11	12	6	9
<b>Post</b>	10	10	4	9

CLE told us they speculated that the low attendance at the July 2021 club was due to proximity to the end of the school term and fears amongst foster carers around Covid19.

## Feedback from children's pre and post surveys

### Demographics of children attending the club

A mix of 20 girls and 18 boys attended the clubs. Around half (51%, n=21) of children identified as Black or Black British (20) or Black African (1), 18% as dual heritage/mixed background (7) and 11% as White British (3) or White Other (1). Two children identified as 'Asian, British and Jamaican', and 1 child each identified as African British, Arab/Somali, Asian or Asian British, and "Brazil and Portuguese". Children's ages ranged from 7 (n=2) to 13 (n=1) years old, with 71% of children aged between 8 and 10, and the (mean) average being 9.6 years old.

National statistics<sup>5</sup> from 2020 show that looked-after children in London are White British (35%) followed by Black or Black British (30%), Mixed (17%), Asian or Asian British (10%) and other (7%).

Data from the Tomorrow's Achievers masterclasses held in 2018-19<sup>6</sup> also provide a comparison, and help us find out whether a wider range of children have attended these clubs. Here, children's ages ranged from five to fourteen years old, over half of children who attended were White British (55%), and the majority were boys (61% boys and 39% girls). This indicates that the Coding Clubs had a more equal gender balance, a greater representation of Black and minority ethnicities (including in comparison to looked-after children in London), but a narrower age range.

### Pre survey feedback

Self-reported prior knowledge of coding was substantial among the children attending the club. Most (59%) responded that they knew 'a little' or 'a lot' about coding, and 61% responded that they had been taught coding before. About one in ten children (11%, n=4) responded that they were not sure whether they have been taught coding before. Of the 11

<sup>5</sup> <https://www.gov.uk/government/statistics/children-looked-after-in-england-including-adoption-2019-to-2020>

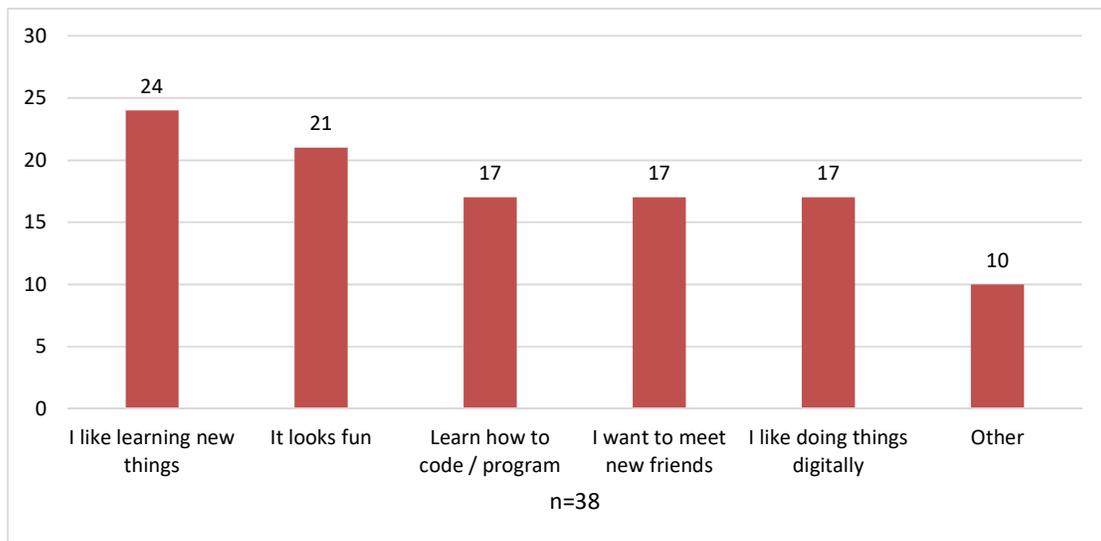
<sup>6</sup> Demographic information was collected from surveys completed by 49 children. The response rate was 44%.

children who had not been taught coding before, 1 child responded that they knew 'a lot' about coding, 2 responded that they knew 'a little', and 3 that they knew 'not very much'.

We asked children what their aspirations were for the future, to help understand whether coding might be linked to their interests, and to what extent it was present in their interests before their participation in the club. Mentioned among the responses were becoming an artist (n=4), teacher (n=4), don't know (n=4), photographer (n=2), footballer (n=2), mum (n=2), YouTuber (n=2), and vet (n=2). About one in 10 children (11%, n=4) made mention of activities that might most obviously be associated with coding: YouTube gamer, coder and game developer, computer engineer, and gaming.

We asked children about why they wanted to join the coding club (Figure 1). The most popular reasons given for wanting to attend was due to liking learning new things (n=24) followed by because the club looked fun (n=21). Learning how to code / program, wanting to meet new friends, and a liking of doing things digitally were all equally popular (n=17) reasons for wanting to attend. Four of the 10 reasons given as 'other' related to being made to, told to, or not having a choice in attending, while 3 did not elaborate, 1 appeared to be a returning attendee, saying "I've been once and it was really nice", 1 response was "I don't know", and 1 response was illegible.

**Figure 1. Why children wanted to join the coding club**



### Post survey feedback

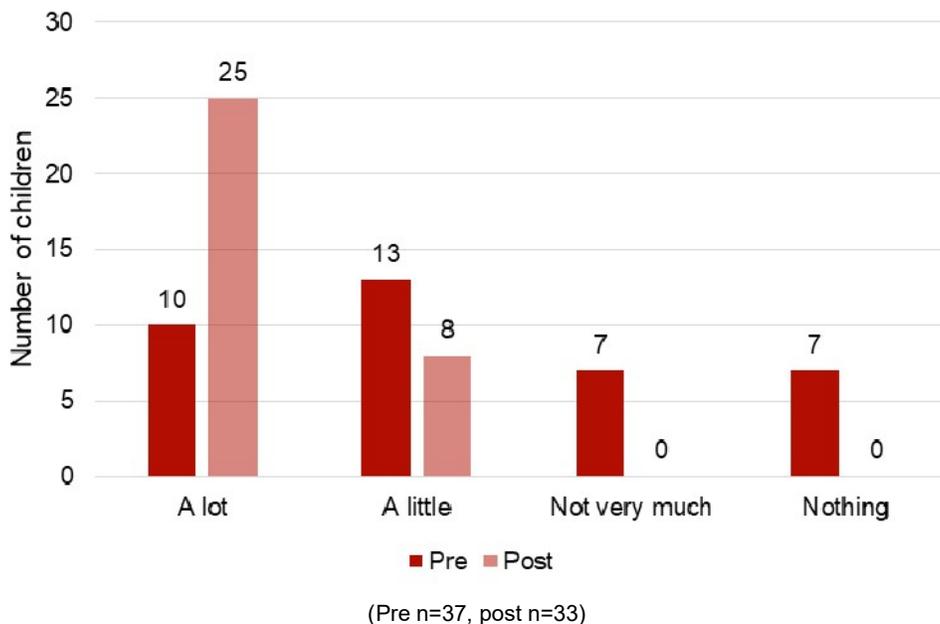
All children gave positive feedback after completing the programme. Thirty children said they enjoyed the coding club, two children answered 'not sure', and one did not provide a response. Particular aspects of the club that children said they enjoyed included: the coding, going on laptops, building robots, learning new things, lunch, drawing and learning about climate change. One child said they enjoyed meeting new friends, which they had mentioned as a reason why they wanted to attend the club in their pre survey.

After attending the clubs, 25 children said they knew a lot about coding and eight children said they knew a little about coding (Figure 2). No children said they learned 'not very much'

or 'nothing' about coding. This compares well to the pre surveys, where only 10 children said they knew a lot, 13 said they knew a little about coding, seven said 'not very much' and seven said 'nothing'.

Of the 32 children where we can match their pre and post responses, 18 reported a higher level of knowledge about coding after their club (56%). For 41% of children there was no change, with eight children reporting that they knew 'a lot' both pre and post, and five children 'a little' at both time points. One child reported 'a lot' in the pre survey and 'a little' in the post.

**Figure 2. How much children knew about coding before and after attending the coding club**



We asked children what they had learned at the coding club. Among 32 comments, most children said they had learned to code, or to code better, or about coding or programming, or how to use Scratch<sup>7</sup>. Four children mentioned climate change, the theme explored in the first two clubs, and others wrote about building or making or using a robot and/or Lego. One child who said they have learned to code in Scratch has said that was one of the reasons why they wanted to join the coding club.

The large majority of children (84%, 27/32) said they felt more confident learning new things after attending the club. One child did not think they were, and four answered 'not sure'.

Most children (81%, 26/32) also thought what they had learned during the week would help them in the future; others were not sure. One child said it would help them in case they work with coding in the future. Three other children said it would help them teach others how to code, such as other children or their family.

Most children did not offer any suggestions for improvements to the coding club in response to the prompt 'What could have been better about the coding club?' The 12 who did offer

<sup>7</sup> Scratch is a block-based visual programming language targeted at children.

suggestions, mentioned able to watch YouTube, having their phones with them, better Lego supplies, more people coming, and being able to play football.

We also asked children if they would recommend the coding club to their friends. Twenty six children said they would, and one child said they were not sure. Five children did not provide a response to this question.

## Interviews and written feedback

We asked the academic partner, student ambassador, donor and Virtual School staff about their involvement in the programme, how they thought the club went, if they had seen any changes in children's confidence and skills at the end of the programme. We also asked if any improvements to the programme could be made, and asked for ideas for future development of the coding clubs. We asked the foster carer how their children found the club, if they had noticed any changes in their children's confidence, and if anything could be improved. We asked Virtual School staff if a sense of community or group belonging had been created among the children, whether they had made friends, and if they thought those friendships would continue beyond the club. We also asked the Virtual School Deputy Head asked about the potential further development of the club, how it might fit into their work, and what logistical considerations there may be.

## Project development

The academic partner and the lead student ambassador developed the coding club. Together they developed the activities, structure of the days and discussed what developments could be made to future clubs.

Neither the academic partner nor student ambassador had heard of Tomorrow's Achievers before they got involved in the project, but the academic partner had worked on a similar past project that looked at playful coding and how to get children to work collaboratively. The academic partner said they were interested in Tomorrow's Achievers as they wanted to continue teaching coding in a creative way. The student ambassador volunteered as a STEM ambassador (science, technology, engineering and mathematics) and was involved in encouraging children these subjects via fun means in place of textbooks. The Student ambassador told us the coding club appealed because the programme targeted a specific age group and children from disadvantaged backgrounds.

The academic partner, student ambassador and donor all had similar goals and objectives for the programme, and felt that these had been achieved. The academic partner wanted to create a sense of community and belonging for the children, to make the children feel more comfortable within them, and build trust and relationships with others. The student ambassador wanted children to feel more confident and to learn how to make a Scratch animation.

The donor's goals were for looked after children to gain access to various skills from learning coding, such as being creative and learning how to problem solve. While the coding was

important, the learning, creativity and confidence that come from learning about it was felt to be of key importance by the donor. The donor felt it incredibly important that disadvantaged and looked-after children (being among the most disadvantaged) received the skills being offered by the club. Similarly, they highlighted diversity as being critical, citing "engineering in this country [being] very male-dominant and lacking ethnic minorities".

*"Of the ten children in there, there might be one or two that will end up becoming a coder or a software engineer. However it is important for the children to understand that coding will develop their digital making skills, so that they can become fashion designers, jewellery makers or artists – if they can use the skills from this club to do that then that is mission accomplished"* – Donor

After the first two clubs, we wrote an interim report and CLE carried out a review of the programme. CLE made the age range of children eligible to attend narrower, to 9-11 years (primary school years 4-6). After the first club, CLE met with the donor and academic partner and agreed to further enhance the creative aspects and benefits of the programme, and a local artist was brought in thereafter. The coding clubs were funded on the premise that they were inclusive and appealed to disadvantaged children. CLE told us that the donor was keen that this was refined further for the remaining two clubs and that fun and creativity was emphasised together with the clubs' suitability to children with curiosity and a love of learning in the marketing. The programme was renamed *Cr8 & Code Club*, and aimed to appeal to a wider cohort of children and their carers. The *purpose* aspect of 'Coding with purpose', was also reviewed by CLE. The first two clubs focused on climate change action, one of the UN Sustainable Development Goals. For the remaining two clubs, other goals were the focus: Reduced Inequalities and Sustainable Cities & Communities.

## Running the club

In the first club, the academic partner ran each day of the club with assistance from the student ambassadors. The student ambassador we spoke to attended most of the days, but other student ambassadors attended different days across the week. The donor observed one afternoon of the club. The Virtual School Deputy Head observed the February 2020 club, which was not attended by any children from their borough, and the August 2021 club, which was. Two other VSH team members observed two days of the August 2021 club.

In each clubs, children designed, created, coded and made a digital storytelling animation to tell a story about the focal sustainable development goal. In order to design, build and develop their story, each child would:

- Work in small teams
- Research a UN sustainable development goal
- Use their creative writing skills to create a script
- Define and design characters and background scenery for their story using arts and crafts supplies
- Code using Scratch
- Build and programme Lego robots

For example, in the first club, children were first given an activity where they had to keep count of how many fish a shark would eat. They were also asked to come up with a story related to climate change, to build a storyboard around their story, and to turn it into an animation in Scratch. Children were then taught how to build their own Lego robot and programme the robot to move and dance. The ambassador did not think the activities were too challenging for the children, but said that if they noticed that an activity was taking too long or was too challenging, they would stop the activity, start another, and at a later time go back and continue with the first activity.

*"I noticed [throughout the week] that children started believing in their own ability to complete the activities, that they thought 'Yes, I can do this, I can learn something'. They felt a sense of achievement and that they were not scared of learning new things" – Academic partner*

This was echoed by a Virtual School staff member - "they were focused and were asking for support when stuck". Moreover, the Virtual School staff thought the level of the club was pitched "just right", and that "all ages were catered [for] appropriately[,] and the one to one support provision was reassuring to the level of their abilities".

The academic partner thought it was important for the children to feel included and involved in the programme throughout the week. In the first club, the children suggested a reward system with points for good behaviour called 'golden time'; the partner took that on board and implemented this. The partner was mindful to give every child a point and not exclude anyone. The partner said 'golden time' was about ensuring children felt part of the club, included and listened to.

All interviewees were positive about how the coding club had gone. It was said the set-up of equipment was good, and that there was a happy atmosphere and children were engaged. The academic partner and student ambassador thought all children responded very well to the activities and that they seemed to enjoy the club. This was echoed by the Virtual School staff who attended the last club: "they all found the club very interesting and fun"; "they enjoyed the sessions and after the first one they were looking forward to the sessions"; "they said they loved it". One said "every morning they were ready and keen to come. No one dropped off". The foster carer of some of the children who attended the first club gave similar feedback: that the children wanted to go every day and that the club made them full of energy.

The foster carer was pleased with the academic partner and student ambassador and thought they were enthusiastic and engaging with the children. Praise for the facilitators and student ambassadors was also given by the Virtual School staff: "the facilitators were brilliant and very patient"; "a big thank you to the three young teachers for their patience and hard work". The foster carer mentioned that one of their children was often anxious but that they felt comfortable and were engaged well with the club throughout the week. They told us that the children enjoyed the club so much that they asked for another club to run over Christmas, and asked if they could bring their friends to the next club.

*"The team leading the coding club were really good. I have difficulties with some of the children to get them to focus, but they loved it at the club and they were so happy at the end of the day. One child has now downloaded his own coding game" – Foster carer*

The academic partner mentioned that the children started to take their own initiative throughout the week (of the first club) as their coding skills progressed. The partner gave the example of the children changing the design of their own programme to be a game after realising that was something they could do.

*“The feedback we received from the children was amazing and it made it all worth it. You do this mainly for the children, when they come back with such great feedback it makes you want to do it more often.” – Student ambassador*

### Improvements in children's confidence, critical thinking, team work and social skills

The club was near universally seen to have made a positive impact upon the children. Both the academic partner and student ambassador noticed a change in children's confidence at the end of the first club. Interviewees described and gave accounts of several children being shy and quiet at the beginning, but then as the week progressed becoming more confident when creating the animations, bonding with each other, and offering help with tasks. The student ambassador, Virtual School staff this led to an improvement in children's social skills. Children worked in pairs and by the end of the week they were socialising, sharing interests and learning from each other. The academic partner felt that children's confidence had grown as they became more outgoing and even started negotiating the 'golden time' system and whether they wanted to have 'golden time' before or after their lunch break. While one of the three Virtual School staff thought the children at the last club "were already quite confident", the other two both saw confidence and skill improvements in the children – "they definitely have learned new skills, be that technical or social" – and even explicitly linked this to the structure of the club.

*“Yes, their confidence and social skills has improved. The structure in teams was very good in helping them to develop the skills” – Virtual School staff member*

The student ambassador, in their second interview with us, repeated and elaborated on the idea that children had gained in confidence, noting that some children "who wouldn't even talk at the beginning of the week, at the end [were]... delivering their whole project... and ... presenting it to a live audience". The student ambassador detailed lots of 'ice-breaking' activities and pair working, to get the children to know each other and each other's work. The student ambassador also detailed explicitly teaching the children to be kind to one another and support each other.

*“That's what I really enjoyed about Coram – building a family with them is really important.” – Student Ambassador*

The academic partner was keen for the children to make friends and a sense of community to be built, while the student ambassador emphasised a desire for, and the groups being, family like. This was explicitly put to the Virtual School staff: they all thought friendships were made, and two wrote that they thought friendships would continue after the club.

*“The children were meeting ... for the first time. They very quickly blended into a homogenous group. New friendship pairs developed as the result of working together” – Virtual School staff member*

Children's critical thinking skills were also said to have improved. The student ambassador said that the children had learnt how to solve problems together and critically evaluate a task by looking at it from different perspectives. The children would ask for help but then solve the problem by themselves. The Virtual School Deputy Head said that the Coding Club provided an opportunity to build skills that schools do not focus on, as well as social, teamwork and collaboration skills.

Although these changes were noted by the partner, student ambassador, and Virtual School staff, the foster carer thought it was too soon to notice any changes in the children.

### Suggested improvements to the coding club

Although interviewees were generally positive about the coding club, a few improvements were suggested when we asked for them. After the first club, the academic partner and student ambassador wanted to recruit more ambassadors for the next club so that they have an equal number of ambassadors at the club throughout the whole week. Ideally they would like the same ambassadors present throughout the whole week, so children can build trust and relationships with them. After the fourth club, the student ambassador noted that more ambassadors would enable more 1-to-1 work with the children.

Feedback from the first club was that a more child-friendly venue and environment would be desirable, as the children at times wanted to go out and play or stretch their legs during lunch. This was taken on board and subsequent clubs took place in a room which had an enclosed outdoor area.

*“[T]he learning environment: the rooms, the facilities are excellent.” – Virtual School staff member*

After the first club it was suggested that it could have been made clearer whether lunch was provided or not. The foster carer first brought in packed lunch and then noticed that lunch was provided throughout the week. However, the academic partner explained that, because some of the children did not end up bringing any lunch, lunch was provided after a few days, so that children were on equal terms. Disparities in packed-lunches that the children came with was seen as problematic by the partner. With the final two clubs occurring during the Covid19 pandemic, CLE decided that not providing lunch was safest. However, one Virtual School staff member noted that the children “were disappointed they couldn't have lunch provided by Coram”.

The academic partner also reported that during the first club, a few children noticed a map of Coram with the word 'adoption' on it and asked questions. The partner suggested this be avoided for the next clubs, as they did not want the children to feel different from other children or think that they were only allowed to attend the club because they were looked after.

Two Virtual School staff thought expectations could be improved in the club, with one suggesting students be introduced to the laptops during the first afternoon, so that “it meets that eager expectation of coding”, while the other thought an outlining of activities for the week ahead at the start of the programme would raise expectations. The student ambassador, who said lessons were learnt after every club, mentioned that one lesson learnt was not giving the children the laptops straight away; an agreement was made with CLE to focus on other creative aspects of the club to begin with.

### Suggested developments and future coding clubs

Interviewees provided suggestions for how the coding club could be developed in the future. These included targeting a wider age range of children to attend the club, where younger children could learn basic programming and older children more advanced programming.

The donor was keen for the programme to continue focusing on looked-after children, but were open to expanding the programme to other children at some point in the future. They were interested in expanding the programme on a broader scale with Virtual Schools across London, and potentially expanding it to other parts of the country. The academic partner mentioned that she would like other children, in addition to looked-after children, to attend future clubs. The student ambassador mentioned expanding the programme to older children. The Virtual School Deputy Head thought the experience would have been richer if there were children from more local authorities.

The student ambassador stressed the importance of the ambassadors and retaining a ‘family environment’. They thought that proximity in age of the ambassadors to the children helped, with the children seeing them as role models, and that in a few years they could be doing something similar. Having STEM ambassadors of under-represented groups, like the student ambassador themselves, was also mentioned as important to inspiring the children into STEM (diversity in STEM is highlighted by the donor). The student ambassador thought that keeping the numbers small, not above 15-20, would retain a family environment over a classroom environment. They claimed the children became close and started looking out for each other, detailing how the children ensured each other’s hands were sanitised, pulled chairs out for one another and shared the laptop chargers. They also detailed how information about the children provided by Coram and knowing the children’s interests from the pre survey forms helped them tailor the teaching to the children and their projects to their interests.

*“they were kind of looking out for each other and they weren’t so scared to raise their opinions or be themselves because we built a little family or community” – Student Ambassador*

The Virtual School Deputy Head organised a minibus to take children to the club from her outer London borough. She explained that it takes an effort to get children in care to attend events. She had seen from her prior attendance of an earlier club that clubs being ‘too far, too much bother’ for foster carers is an important consideration, particularly if 1 to 2 hours of travel are involved – carers have to decide whether to hang around or return home then come back. She explained how her team had worked closely with the foster carers to make sure the children attended, and praised the Coram team (CLE) for doing a ‘brilliant job’

managing and supporting them. She suggested that, knowing Virtual Schools enjoy the clubs, consideration then needs to be given to how the clubs are taken to them.

Thinking about future engagement of Virtual Schools, she advised that reaching out requires persistence (1 or 2 emails are not enough). The Deputy Head suggested producing a short video with interviews with the children before they left the club, and a presentation of the robots, to showcase the programme and bring it to life.

## Conclusion and recommendations

The pilot of Coding with Purpose / Cr8 & Code Clubs was a success. We received positive feedback from the children, academic partner, Virtual Schools and a foster carer of attending children. The children reported enjoying the club, and most reported knowing more about coding after the club. The children reported greater confidence in learning new things after attending the club, and that what they had learnt would help them in the future. The academic partner, student ambassador and Virtual School staff all observed confidence and skill improvements in the children, and that children had developed social skills, such as showing kindness, and they made friends. When comparing the demographic range of children attending compared to Tomorrow's Achievers masterclasses, the clubs had a more equal gender balance, a greater representation of Black and minority ethnic children, but a smaller age range (by design). The small size of each club instilled a sense of community and 'family' according to the student ambassador. Enthusiastic praise was given to the academic partner, student ambassadors, and CLE. There was enthusiasm and patience shown by the partner and student ambassadors. Developing and continuously improving the programme took a flexible, responsive approach, with CLE and these stakeholders.

## Recommendations

The Coding Clubs seem to have been well designed, well run, and to have been a positive experience for the children. In discussion with stakeholders, any continuation of the clubs or roll-out should look to retain or consider:

- Further develop the partnership between Coram, the academic partner and donor
- Consider a variation of the coding clubs to form part of the core Tomorrow's Achievers weekend workshops, led by student ambassadors and targeting disadvantaged children
- Sufficient numbers of STEM ambassadors, as lead facilitators
- Meeting the expectation of coding on the first day, by either signposting to the week ahead or brief interaction with laptops, whilst balancing children's time on laptops with time to create, make and build team-working skills
- Continuing the generation and provision of knowledge about the children's needs and interests to the facilitators by the administering of pre survey forms and/or other
- Adequate provision of food for the children, which they perceive as fair
- Facilities that give children a safe space to stretch their legs and/or have a break
- The production of a short promotional video.