

THE LONG-TERM IMPACT OF CODEPLUS



CODEPLUS

Coding for Girls

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Ethics Declaration

Ethics approval for this project was granted by the University of Limerick's Faculty of Science and Engineering's research ethics board (reference no. 2024_02_08_S&E).

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1 Executive Summary

This report presents the findings of a longitudinal evaluation of CodePlus, conducted in response to a Lero review which recommended to consider conducting a more sustained long-term, cohort-level, longitudinal evaluation.

CodePlus

CodePlus is a national computer science engagement initiative aimed at increasing female participation in Computer Science (CS) at third-level education in Ireland, addressing the persistent gender imbalance in the field. Established in 2015 at Trinity College Dublin and now operating nationwide in collaboration with Lero, University of Limerick and University of Galway, the programme targets Transition Year students through a multi-level model that includes coding workshops, career talks, webinars, and company visits, designed to build confidence, broaden awareness, and support informed career decisions in CS.

Quantitative Key Findings:

- The majority of respondents indicated plans to pursue third-level education. Among those considering CS-related courses, the most influential factors were personal interest in computers, perceived job security, and the potential for well-paid careers. For those who opted not to pursue CS, common reasons included a stronger preference for other subjects, interest in people-oriented careers, and perceptions of CS as overly difficult.
- Encouragement to study CS came primarily from family members and teachers, with friends playing a moderate role.
- While some respondents identified role models in CS, often male family members, a significant proportion reported having no role model, highlighting a potential gap in representation.
- Perceptions of CS were generally positive, with most participants associating it with problem-solving, programming, and creativity. Stereotypical views of CS as a “male subject” or linked to “geeks and nerds” were less commonly held.
- The programme’s activities were highly valued, particularly the workshops. Participants liked the emphasis on team-based learning and real-world projects. Career talks and company visits were also well-received, especially for providing insights into CS careers and opportunities to meet female role models.
- Overall, participants agreed that CodePlus improved their confidence with technology, helped them make more informed decisions about pursuing CS or related fields, and enhanced key skills such as teamwork, communication, and creativity.

Qualitative Key Findings:

- Participants had overwhelmingly positive experiences with the CodePlus programme, highlighting the workshops as engaging, supportive, and confidence-boosting. The programme served as an accessible introduction to coding and CS, often sparking new interests and challenging prior misconceptions. Compared to traditional school learning, CodePlus offered a more hands-on, creative, and collaborative environment that encouraged critical thinking. Participants viewed the programme as a unique opportunity for personal growth, skill development, and social connection, with many expressing a desire for a longer or extended version of the experience.
- Participants highlighted three standout features of the CodePlus programme that enriched their experience: groupwork, which fostered collaboration, peer learning, and social development; the all-girls environment, which created a sense of belonging and comfort in a traditionally male-dominated field; and company visits, which inspired participants by

showcasing real-world applications of CS and the visibility of women in tech. These features collectively helped challenge stereotypes, build confidence, and deepen participants' interest in CS.

- The short-term one-week workshop was a positive experience for participants. The workshops had the potential of influencing participants' decisions on courses and careers in the long-term. Participants described CodePlus as having a lasting impact on their personal and academic development. The programme helped them build transferable skills such as creativity, communication, teamwork, and problem-solving, which they found valuable beyond coding. It also inspired a sense of giving back, with some participants returning to mentor others or volunteering to teach coding. Importantly, CodePlus influenced career and course choices, either reinforcing existing interests in CS or introducing new possibilities in STEM. For some, it clarified that CS was not the right path, helping them make more informed decisions about their future.
- Participants' decisions about their courses and careers were shaped by a mix of personal interests, practical considerations, and external influences. While some had clear goals early on, others went through a longer decision-making process, often influenced by career talks, work experiences, and the desire for financial and job stability. Family influence played a significant role, though many participants ultimately chose fields aligned with their own interests. Transition Year experiences, including CodePlus, were often pivotal in helping participants clarify or rethink their career direction.

Conclusion

Overall, CodePlus is shown to be valuable in promoting inclusive, engaging, and effective CS education, and its continuation is strongly justified. This evaluation underscores the importance of early exposure, creative learning environments, and sustained engagement in promoting diversity and inclusion in computer science education. The findings support continued investment in and expansion of this outreach initiative.

2 Lero, the Research Ireland Centre for Software

Lero, the Research Ireland Centre for Software, brings together expert software teams from universities and institutes of technology across Ireland in a co-ordinated centre of research excellence with a strong industry focus. Lero's research spans a wide range of subjects including software engineering, information systems and human-computer interaction in areas such as driverless cars, artificial intelligence, cybersecurity, fintech, govtech, smart communities, agtech and healthtech.

Hosted by University of Limerick, Lero's academic partners include Atlantic Technological University, Dublin City University, Dundalk Institute of Technology, Maynooth University, Munster Technological University, South East Technological University, Technological University Shannon: Midlands Midwest, Trinity College Dublin, University College Cork, University College Dublin, University of Galway.

Lero's overall vision is to establish Ireland as a location synonymous with high-quality software research and development, to the extent that 'Irish software' can enter the lexicon in the same way as 'German automotive' or 'Scandinavian design'.

Sixteen out of the top 20 global technology firms have strategic operations in Ireland¹. Ireland is recognised internationally as a leading location for companies in the software sector and Lero is a key pillar of that.

Since it was founded in 2005, Lero has become one of the best-known, and most highly regarded, software research centres in the world.

- Lero is ranked second among software research centres worldwide for citations.
- Lero partners with three of the top 10 technology companies in the world².
- Lero researchers engage directly with more than 10,000 members of the public every year.
- Lero has introduced software and computer science programmes in the Irish education system from primary to graduate level.
- Every €1 invested in Lero contributes more than €5 to the economy³.

The centre is funded under the Research Ireland Research Centres programme, which has established a network of Research Centres focusing on key research areas in Ireland.

¹ <https://www.idaireland.com/explore-your-sector/business-sectors/technology>

² Dell, Microsoft, Intel: <https://www.investopedia.com/articles/markets/030816/worlds-top-10-technology-companies-aapl-googl.asp>

³ <https://www.lero.ie/research/economic-impact>

3 Research Project Rationale

In a recent Lero review (in February 2023), the Lero Education and Public Engagement (EPE) programme was asked to consider the sophistication of the Centre's EPE evaluation process and to consider conducting a more sustained long-term, cohort-level, longitudinal evaluation. This project was undertaken in response to this recommendation and to the fact that there is a gap in the research literature on the longitudinal impact of CS outreach initiatives (Lawlor et al., 2025). The review highlighted the importance of understanding the sustained impact of Lero's EPE initiatives on participants. Evaluating these impacts is critical for ensuring that the EPE programmes continue to meet strategic objectives and deliver meaningful benefits to participants.

To address this recommendation, a flagship programme—*CodePlus*—was selected as the primary focus due to its scale, strategic importance, and alignment with EPE goals of promoting STEM engagement among underrepresented groups and school children. This programme has been running for several years, providing a unique opportunity to examine longitudinal outcomes and gather insights into programme influence on participants' skills development, perceptions, career decision-making, and many other aspects.

The evaluation aims to inform future programme design, enhance impact measurement, and contribute to evidence-based policy and practice. Ultimately, this project supports EPE's commitment to continuous improvement and its broader objective of fostering diversity and inclusion in computer science education.

4 CodePlus

4.1 CodePlus Overview

CodePlus is a national Computer Science (CS) engagement project aimed at increasing the participation of female students in CS at third-level education. It addresses the persistent gender imbalance in the field in Ireland, where women are still far less represented than men. By engaging female students at the secondary school stage, CodePlus seeks to broaden awareness of CS, build confidence through hands-on CS activities, and help them make more informed decisions about studying CS courses and pursuing careers in the field.

The programme was established at Trinity College Dublin (TCD) in 2015, initially focusing on female second-level students in the Dublin area. In 2020, the programme expanded to Lero, University of Limerick and University of Galway, ensuring a nationwide reach. The programme is aimed at female adolescents, typically aged 15-16, in Transition Year, i.e., fourth year of second-level education. CodePlus offers a multi-level engagement model, consisting of coding workshops, career talks, webinars and company visits, as depicted in Figure 2 below. The coding workshops, in particular, introduces CS and coding through topics and activities such as Scratch, micro-bits, and Python. These take place during the school day and are delivered by dedicated facilitators either on a university campus, in school, or on-line. In the 2024-2025 school year (September 2024 to June 2025), the coding workshops were delivered to 775 students, while 458 students engaged in the company visits and 5,217 students participated in the career talks and webinars combined. Figure 3 illustrates a summary of the CodePlus programme from its establishment in 2015 up to 2025.



Figure 1. CodePlus programme structure

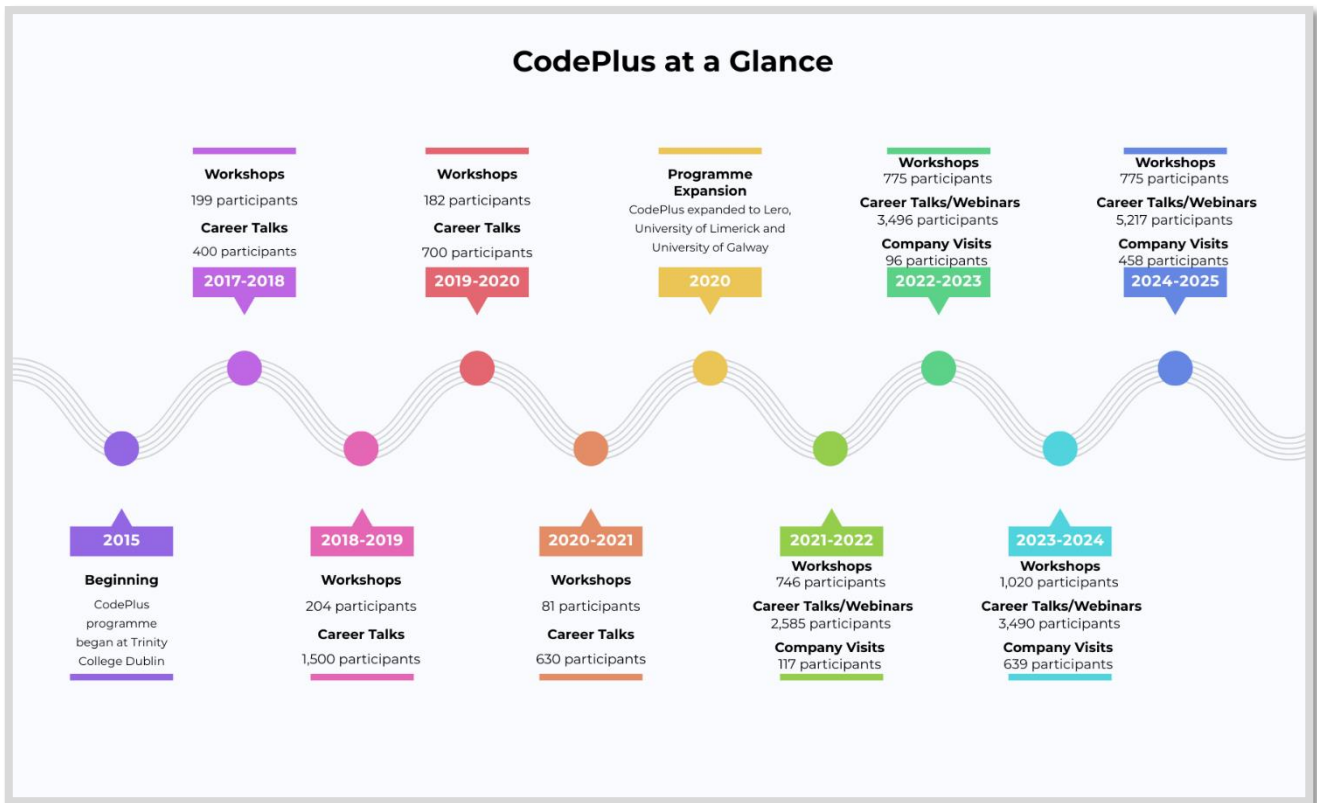


Figure 2. CodePlus programme from 2015-2025

4.2 Methodology

A mixed methods approach was adopted to effectively assess the longitudinal impact of the CodePlus programme. The quantitative component consisted of an online survey and analysed various aspects of the participants' engagement with the programme and educational experience. The qualitative component consisted of interviews which sought to further understand the impact of the programme from the perspective of the participants.

A convergent parallel design (figure 3) was followed as both quantitative and qualitative data were equally significant in the investigation of the programme's impact (Creswell & Clark, 2018). Both quantitative and qualitative data were collected simultaneously, analysed separately, and then merged for the overall interpretation of the findings. This design allowed for a more comprehensive understanding of the phenomenon being investigated, as well as enhancing the validity of the findings through triangulation of the data. In addition, this design combined the strengths and offset the weaknesses of the quantitative and qualitative methods.



Figure 3. Steps for convergent parallel mixed methods approach

4.2.1 Participants

During participants' initial interaction with the CodePlus workshops, they were asked for their contact information and consent to be contacted for further study. Participants were contacted and invited to take part in the current longitudinal study using the email addresses they gave during the workshops. These email addresses were used to get in touch with participants who had completed second-level education (the post-school cohort) and ask them to complete the online survey. The post-school group had taken part in the program three to eight years prior to the data collection. As for those in their last year of school (the in-school cohort), who had taken part in the programme two years prior, their teachers were contacted and were asked to encourage the students to complete the survey. School visits were also made to encourage participation in the survey. Participation was entirely voluntary, and those under the age of 18 were required to get their parents' consent before filling out the survey. Teachers and/or school representatives also gave their informed consent.

The online survey was completed by 223 female participants who had participated in the programme at least two years before the data collection. A total of 1,393 former participants were contacted, representing a 16% response rate. Of the 223 respondents, 73 (33%) were referred to as the post-school cohort as they had completed the programme 3+ years before the data collection stage. The remaining 150 participants (67%), the in-school cohort, were in their final year of second-level education and had finished the program two years prior to the data collection. Eighteen participants volunteered for the interviews. Six interviewees were from the post-school cohort and twelve were from the in-school cohort.

A power calculation was conducted, using G*Power (Faul et al., 2009), to determine the appropriate sample size for the quantitative survey data. The power calculation indicated that a sample size of a minimum of 143 participants was required to detect a medium effect size with an alpha level of 0.05 and a power level of at least 80%. This threshold was surpassed with the 223 responses obtained in the survey.

4.2.2 Materials and Procedure

Quantitative Data

The longitudinal online survey used in this study was developed by Lawlor (2022). Slight modifications were made by the research team for the purposes of this study. The survey was hosted on the Qualtrics platform. Responses were regarded as missing data if at least one of the survey's main sections was incomplete. Incomplete surveys were not included in the analysis. The full survey can be found in the appendices. The survey contained the following main sections:

1. Demographic information
2. Plans for third-level education, course preferences and influencing factors related to course preferences
3. Intentions to study a CS-related course and influencing factors, encouragement to pursue a CS-related course and having role models in the field
4. Self-reported perceptions of a CS-course and of CS in general
5. Engagement with other CS activities in the school and non-formal spaces
6. Engagement with the CodePlus programme and its impact

Throughout their participation in the CodePlus programme while in Transition Year, participants were asked to complete pre and post-workshop surveys. In these surveys, participants indicated their perspectives of the IT profession, their opinions of undergraduate CS courses, their intentions to study a CS course at third-level education, their computer self-efficacy, and their feedback on the workshops. Previous studies have used the information from these pre- and post-workshop surveys to examine the CodePlus programme's short-term effects (Lawlor, 2022; Lawlor et al., 2020). That work reported positive impact on attitudes after participation in the program. The current study retrieved the post-workshop survey data for participants in order to compare if their intentions to pursue a CS-related course and their perceptions of a CS course and IT profession had changed or remained the same 2+ years following participation. The post-workshop survey data for 182 (82%) participants were retrieved and matched to the current longitudinal survey. Data for the remaining participants were incomplete or could not be found. This data is hence referred to as the Comparative Data.

Qualitative Data

Upon completion of the survey, respondents were asked if they would be interested in participating in an interview with the researcher. The interviews were conducted in-person or online using Microsoft Teams, depending on the participants' preferences and availability.

The interviews were one-to-one semi-structured interviews, which were recorded and lasted approximately 45 to 60 minutes. The interview guide is shown in Table 1. Probing questions were also used, as appropriate, to encourage participants to elaborate or expand on their answers. The interview guide was adapted from a guide used in a prior study (Lawlor, 2022). The same interview guide was used for the in-school and post-school cohorts. The interviews were conducted by the first author who had no affiliation or connection with any of the schools or participants.

Table 1. Interview guide for semi-structured interviews

Topic	Questions
Learning/School experience	Can you tell me about your school experience? <i>Probes: Learning experiences, Leaving Certificate subjects</i>
Post-secondary education	Can you tell me about your plans for after school? <i>Probes: If applied for college, what courses applied for; if not applying for college courses, what are your plans?</i>
Decision-making process	How did you decide on what courses to apply for? <i>Probes: main influences, interest, set on course, change of mind, encouragement</i>
CS as an option	If pursuing CS... How did you come to choose CS? <i>Probes: main influences, role models, encouragement, decisions, change of mind</i>
Other outreach programmes	Are/were you involved in any other CS activities apart from CodePlus? Can you tell me about them? <i>Probes: other clubs/activities, personal interest, external influence, influence on course options, prior experience with coding/CS</i>
CodePlus	What can you remember about your experience with CodePlus? <i>Probes: describe workshop activities, describe CodePlus, elements that stood out, favourite/least favourite aspects, learning experience, company visits, career talks, personal interest, changes/improvements</i>
Impact of CodePlus	Would CodePlus have influenced your plans for third-level education in any way? <i>Probes: influence on college options, help make an informed decision, impact of CodePlus on course/career options, other impact from CodePlus, participation in other CS-related activity since CodePlus</i>

4.2.3 Data Analysis

Quantitative Data Analysis

SPSS Version 29 was used to analyse the data from the longitudinal survey. After being exported from Qualtrics to SPSS, the survey data was anonymised. An overview of the analysis conducted can be found in Table 2. Descriptive statistics were employed to summarize the data. These tests were conducted separately for each cohort of participants, and for the full survey dataset. Independent samples *t*-tests were used to compare responses obtained between the two cohorts i.e., post-school and in-school cohorts. Descriptive statistics and paired-samples *t*-tests were used to

analyse the comparative data to compare participants' responses obtained during the post-workshop survey and the current longitudinal survey. While the longitudinal survey used in the research project was largely composed of Likert scale measures which are of ordinal nature, parametric tests were still used as previous research has determined that parametric tests are sufficiently robust and therefore appropriate to analyse Likert scale responses (Norman, 2010; Sullivan & Artino, 2013).

Table 2. Summary of analysis conducted

Dataset	Sample Size	Analysis Conducted
Post-school (survey)	n = 73	Descriptive statistics
In-school (survey)	n = 150	Descriptive statistics
Full data (survey)	N = 223	Descriptive statistics T-tests
Comparative data (survey)	n = 182 (82%)	Descriptive statistics T-tests
Interviews	n = 18	Thematic analysis

Qualitative Data Analysis

The interview data was analysed using Braun and Clarke's (2022) approach to thematic analysis. This approach was deemed suitable as the study aimed to obtain an in-depth understanding of participants' subjective perspectives and how they interpret their experiences with the CodePlus programme. The six phases of thematic analysis were used to identify themes within the dataset and to provide an interpretation of the data. An inductive approach was employed with the data coding and theme development being driven directly by the data, without preconceived frameworks or theories.

- **Phase 1: Familiarisation with the data**

The research assistant conducted and recorded the interviews, transcribed and read the interview transcriptions for familiarisation with the data.

- **Phase 2: Generating initial codes**

The research assistant conducted two rounds of coding. The data was first coded manually with the transcripts being read line and line and initial codes being written in the margins of the printed document. For the second round of coding, the transcripts were uploaded to NVivo Version 15 which helped organise the codes. Sections that were sparsely coded were re-read to ensure that important data was not overlooked. A total of 183 codes were initially generated.

- **Phase 3: Searching for themes**

Related codes were grouped together, and patterns were identified. Visual aids were used to explore connections and candidate themes and subthemes were generated. These were reviewed by the research team.

- **Phase 4: Reviewing themes**

Ten themes were initially developed, which were then reviewed and further condensed into four themes.

- **Phase 5: Defining and naming themes**

The themes and subthemes were defined, refined and named.

- **Phase 6: Producing the report**

A narrative of the data was produced for this report.

4.3 Findings

This section presents the results from the online longitudinal survey, the comparative analysis and the interviews. Data for the longitudinal element of the research project was collected over a one-year period from April 2024 to April 2025.

4.3.1 Survey Findings

This section presents the results of the survey organised by the order in which the questions were presented to the respondents.

Section 1: Demographics

Respondents were from 40 schools across Ireland. Twenty-six schools (65%) were from the Dublin region. Eighty-six (39%) participants were from DEIS schools. Nineteen of the 40 schools (48%) represented here were DEIS schools.

Section 2: Third-level Education

Out of the 223 respondents, 209 (94%) indicated they progressed or were planning on progressing to third-level education. Six (3%) respondents did not wish to attend a third-level course while 8 (4%) were unsure. Respondents indicated the course categories they pursued or had applied for (Table 3). These categories reflected the Higher Education Authority (HEA) fields of study in Ireland. More than one category could be selected by respondents.

Table 3. Third-level course categories chosen by respondents (N=209)

Course Category	Frequency	Percentage %
Business, Administration and Law	61	29
Arts and Humanities	58	28
Health and Welfare	51	24
Natural Sciences, Mathematics and Statistics	42	20
Information and Communication Technologies	31	15
Education	29	14
Social Sciences, Journalism and Information	27	13
Engineering, Manufacturing and Construction	23	11
Services	10	5
Agriculture, Forestry, Fisheries and Veterinary	8	4
Other (unspecified)	3	1
Generic Programmes and Qualifications	2	1

Respondents selected in order of importance the factors that influenced their choice of course of study. Having a strong personal interest in the subject area (60%) was rated the most important factor, followed by a future with guaranteed employment (22%). The factors rated the most and second most important are presented in table 4 below. The 'other' factors indicated by respondents included "Bridge21 experience", "career in academia", "CodePlus", "easy to do conversion masters from", "helping people and getting people out of a tough situation", and "influence of people I admire in the area".

Table 4. Factors influencing choice of course of study (N=209)

Factor	Rated most important n(%)	Rated 2 nd most important n(%)
Strong personal interest in course area	126 (60%)	29 (14%)
A future with guaranteed employment	45 (22%)	66 (32%)
Well-paid jobs in the area	18 (9%)	50 (24%)
Secondary school experience with subject	11 (5%)	39 (19%)
Someone in my family has influenced me through their experience in the area	6 (3%)	10 (5%)
Other	2 (1%)	6 (3%)

Section 3: Computer Science and Related Courses

Out of the 209 respondents who planned on progressing to third-level education, 42 (20%) intended on pursuing or were already pursuing a course related to CS, computer engineering, computing or IT. One hundred and sixty-seven (80%) indicated they did not intend on pursuing a CS-related course.

For respondents who indicated they did not intend on pursuing a CS-related course, they selected in order of importance the reasons for not choosing a CS-related course. Preference to study other subjects (62%) was rated as the most important factor. The reasons rated the most and second most important for not choosing a CS-related course are presented in Table 5 below. The percentages are based on 167 respondents who did not wish to pursue CS. 'Other' factors indicated by respondents included "career progression seemed less interesting than my main course", "coding is more of a language than a science", "I changed my mind last minute", "no good resources and not enough help", "started diploma in cybersecurity and communications whilst working full time, dropped out as it was too much to manage, I did really enjoy it though!", "still thinking about it", "the Leaving Cert subject turned me off of it", and "did consider it but other topics caught my interest more".

Table 5. Factors influencing respondents to not choose CS-related courses (N=167)

Factor	Rated most important	Rated 2 nd most important
Preference to study other course(s)	104 (62%)	26 (16%)
Dislike of computers and preference towards more people-based professions	36 (22%)	49 (29%)
Studying CS or working in the IT profession seems too difficult	14 (8%)	39 (23%)
Lack of prior opportunities to get involved with computers in the home or school environment	7 (4%)	22 (13%)
Other	4 (2%)	2 (1%)
Unemployment in the profession	2 (1%)	7 (4%)

For respondents who indicated they did wish to pursue or did pursue a CS-related course, they selected in order of importance the reasons for choosing a CS-related course. Having a strong personal interest in computers (36%) was rated as the most important factor, followed by having a profession of the future with guaranteed employment (29%). The reasons rated the most and second most important for choosing a CS-related course are presented in Table 6 below. The percentages based on 42 respondents who did pursue CS. 'Other' factors indicated by respondents for choosing a CS-related course included "CodePlus", "CTYI activities", and "Bridge21".

Table 6. Factors influencing respondents to choose CS-related courses (N=42)

Factor	Rated most important	Rated 2 nd most important
Strong personal interest in computers	15 (36%)	9 (21%)
Profession of the future with guaranteed employment	12 (29%)	6 (14%)
Well-paid jobs	9 (21%)	16 (38%)
Secondary school experience with CS subject	3 (7%)	6 (14%)
Other	2 (5%)	-
Someone in my family has influenced me through their experience in the area	1 (2%)	3 (7%)

Respondents indicated the levels of encouragement they received to pursue a CS-related course. The Likert scale ranged from 1=no positive encouragement to 4=a lot of positive encouragement. Encouragement sources included family, friends, teachers and others. Table 7 below presents the frequency and percentage of each category, as well as the means and standard deviations for the responses. 'Other' sources of encouragement indicated by respondents included "coaches", "CodePlus", "other outside workshops", "lecturers", "my peers", "partner", and "strangers/from networking".

Table 7. Levels of encouragement to pursue CS-related courses (N=223)

	Family n (%)	Friends n (%)	Teacher(s) n(%)	Others n (%)
No positive encouragement	41 (18%)	64 (29%)	40 (18%)	54 (24%)
A little positive encouragement	37 (17%)	54 (24%)	58 (26%)	22 (10%)
Reasonable positive encouragement	71 (32%)	55 (25%)	63 (28%)	32 (14%)
A lot of positive encouragement	53 (24%)	29 (13%)	41 (18%)	20 (9%)
Mean	2.67	2.24	2.52	2.14
Standard Deviation	1.08	1.05	1.03	1.14

Respondents indicated whether they had people they considered role models studying/working in the area of CS or related courses. Respondents could select more than one option. Ninety-nine respondents (44%) indicated not having any role model. It can be noted that respondents indicated having more male role models than female role models (Table 8). 'Other' role models were specified as "Influencers or social media", "family friend", "friend", "friend's brother", "friend's sister", "godbrother", "fiancé", "sister's boyfriend", "stepfather", "supervisor", and "women on social media who do computer-related jobs".

Table 8. Role models in the CS field (N=223)

Female Role Models	Number of Respondents	Male Role Models	Number of Respondents
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Mother	14	Father	24
Sister	6	Brother	19
Aunt	15	Uncle	39
Female Cousin	7	Male Cousin	32
Female Friend	11	Male Friend	14
Female Teacher	9	Male Teacher	9
Total female	62	Total male	137

Section 4: Perceptions of CS-courses and CS in General

Respondents indicated their perceptions of a CS course (Table 9) on a 5-point scale where 1=strongly disagree and 5=strongly agree.

Table 9. Self-reported perceptions of CS-related courses (N=223)

	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)	Mean	Standard Deviation
Solving problems	-	1 (0.5%)	8 (4%)	82 (37%)	132 (59%)	4.55	0.59
Spending a lot of time programming	2 (1%)	2 (1%)	10 (5%)	128 (57%)	81 (36%)	4.27	0.67
Learning different programming languages	2 (1%)	9 (4%)	21 (9%)	105 (47%)	85 (38%)	4.18	0.83
Being creative	4 (2%)	14 (6%)	22 (10%)	98 (44%)	85 (38%)	4.1	0.94
Learning how to communicate	6 (3%)	19 (9%)	35 (16%)	92 (41%)	71 (32%)	3.91	1.03
Working in groups	2 (1%)	19 (9%)	47 (21%)	85 (38%)	69 (31%)	3.9	0.97
Doing a lot of mathematics	2 (1%)	13 (6%)	41 (18%)	120 (54%)	46 (21%)	3.88	0.83
Designing computer games	3 (1%)	30 (14%)	79 (35%)	72 (32%)	38 (17%)	3.5	0.97
Spending a year abroad	13 (6%)	28 (13%)	127 (57%)	36 (16%)	19 (9%)	3.09	0.93

Respondents further indicated their perceptions of CS (Table 10) on a 5-point scale where 1=strongly disagree and 5=strongly agree.

Table 10. Self-reported perceptions of CS (N=223)

	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Standard Deviation
CS mainly involves programming	-	26 (12%)	56 (25%)	112 (50%)	28 (13%)	3.64	0.85
Knowing programming will help me earn a living	16 (7%)	42 (19%)	59 (27%)	70 (31%)	35 (16%)	3.3	1.16
I will use programming in many ways throughout my life	20 (9%)	53 (24%)	59 (27%)	63 (28%)	28 (13%)	3.12	1.17
I expect to have little use for programming	23 (10%)	44 (20%)	63 (28%)	76 (34%)	16 (7%)	3.08	1.12
Men are by nature more inclined towards CS than women	44 (20%)	38 (17%)	53 (24%)	59 (27%)	29 (13%)	2.96	1.32
I'll need programming for my future work	26 (12%)	66 (30%)	58 (26%)	47 (21%)	26 (12%)	2.91	1.2
Programming is of no relevance to my life	29 (13%)	67 (30%)	64 (29%)	41 (18%)	21 (9%)	2.81	1.17
CS is for geeks and nerds	76 (34%)	74 (33%)	39 (18%)	20 (9%)	14 (6%)	2.2	1.19

Section 5: Engagement with CS Activities

Respondents specified if they had participated in other CS outreach activities apart from the CodePlus programme (Table 11). The majority of participants did not participate in other CS outreach activities (57.8%). Other responses included “IBM”, “STEMETTES”, “Compute TY”, “Degree”, “Ctrl-Alt-Compete”, “SheCodes”, “Computer classes in TY”, “CodePlus - Coding for Girls in 1st year and Online courses”, “Teen-Turn Summer Internships”, “Salesforce, Microsoft Dreamspace and Career ready”, “Coolest project Rds”, “VEX Robotics”, “6th class module in Citywise Education on Scratch”, “Workshop at UCD and Vodaphone day-long HTML coding workshop”, “Coding in computer class - Scratch”, “Youth academy Robotics and AI”, “Leaving Cert computer science”, “Scratch”, and “Coding workshop outside of school”.

Seventy (31%) respondents participated in one other activity. Fifteen (7%) respondents participated in two other activities. Five (2%) respondents participated in three other activities.

Table 11. Participating in CS outreach activities (N=223)

Outreach Programme	Number of Respondents	Percentage
No	129	57.8
CoderDojo	31	13.9
Courses delivered in my local library	2	0.9
After school or lunchtime clubs	10	4.5
CS-based summer camps	5	2.2
Walton Club	5	2.2
I Wish	14	6.3
Csinc - Computer Science inclusive	-	-
STEM Passport	14	6.3
CTYI	4	1.8
Other	30	13.5

Twenty-two (10%) respondents had participated in the National Scratch Competition, while 160 (72%) had not participated and 41 (18%) were unsure. As for the Short Course in Coding in the Junior Cycle, 24 (11%) respondents had the course available in their school while 144 (65%) did not. Of the 24 respondents who indicated that the Short Course in Coding was available to them, 18 (75%) indicated that they did take part in it.

Respondents also indicated whether the Leaving Certificate CS subject was available in their school. Eighty-seven respondents (39%) indicated that CS was offered in their school. Of the 87 respondents who had CS available in their school, 22 (26%) took CS as a Leaving Certificate subject. The remaining 136 respondents (i.e., those who did not have CS offered in their schools or were unsure) were asked to indicate on a 5-point scale the likelihood that they would take CS if it was available in their school (Table 12).

Table 12. Self-reported likelihood of taking CS as a Leaving Certificate subject (N=136)

	Frequency	Percent
Very unlikely	25	18.7
Unlikely	23	17.2
Uncertain	25	18.7
Likely	31	23.1
Very likely	30	22.4

Section 6: Engagement with CodePlus Programme

Respondents were asked to indicate which of the CodePlus activities they attended, besides the coding workshops. Seventy-four (33%) respondents attended the career talks and 51 (23%) attended the company visits. Thirty-nine (18%) respondents participated in all of the CodePlus activities (i.e., workshop, career talk and company visit). These 39 participants were asked to rank the activities according to their perceived value (Table 13). The coding workshops were generally regarded as the most beneficial component of the CodePlus programme (62%).

Table 13. Ranking of CodePlus activities (N=39)

	Most valuable	2 nd most valuable	3 rd most valuable
Workshop	24 (62%)	11 (28%)	4 (10%)
Career Talk	9 (24%)	16 (42%)	13 (34%)
Company Visit	9 (23%)	10 (26%)	20 (51%)

Respondents were asked to rate on a 5-point scale where 1=had no value and 5=very valuable, how valuable particular aspects of the CodePlus workshops were (Table 14).

Table 14. Value of CodePlus workshops (N=223)

	1(NV)	2(SV)	3(N)	4(V)	5(VV)	Mean	Standard Deviation
Learning in teams	4 (2%)	16 (8%)	23 (11%)	108 (53%)	53 (26%)	3.93	0.93
Activities/projects related to real-world problems	6 (3%)	15 (8%)	29 (14%)	91 (45%)	60 (30%)	3.92	1.00
Receiving encouragement to explore CS careers	6 (3%)	18 (9%)	38 (19%)	78 (38%)	65 (32%)	3.87	1.05
Learning in all-female environment	2 (1%)	21 (11%)	42 (22%)	78 (40%)	51 (26%)	3.80	0.98

Respondents were also asked to rate on a 5-point scale where 1=had no value and 5=very valuable, how valuable particular aspects of the Career Talks were (Table 15).

Table 15. Value of CodePlus career talks (N=74)

	1(NV)	2(SV)	3(N)	4(V)	5(VV)	Mean	Standard Deviation
Understanding about careers in CS/computing	3 (4%)	4 (6%)	12 (17%)	23 (32%)	30 (42%)	4.01	1.09
Learning the advantages of working in the industry	3 (4%)	4 (6%)	14 (19%)	25 (35%)	26 (36%)	3.93	1.08
Seeing a female role model in the industry	3 (4%)	8 (11%)	10 (14%)	24 (34%)	26 (37%)	3.87	1.16
Learning about the variety of jobs in the industry	9 (13%)	8 (11%)	14 (20%)	18 (25%)	22 (31%)	3.51	1.37

Respondents were then asked to rate on a 5-point scale where 1=had no value and 5=very valuable, how valuable particular aspects of the Company Visits were (Table 16).

Table 16. Value of CodePlus company visits (N=51)

	1(NV)	2 (SV)	3(N)	4(V)	5(VV)	Mean	Standard Deviation
Learning about the advantages of working in the industry	-	4 (8%)	8 (16%)	19 (37%)	20 (39%)	4.08	0.93
Learning about the variety of jobs in the industry	-	5 (10%)	7 (14%)	19 (37%)	20 (39%)	4.06	0.97
Getting to meet a female role model in the industry	1 (2%)	6 (12%)	5 (10%)	19 (37%)	20 (39%)	4.00	1.08
Seeing an actual tech work environment	-	6 (12%)	6 (12%)	22 (43%)	17 (33%)	3.98	0.97
Understanding more about careers in CS and computing	1 (2%)	5 (10%)	4 (8%)	28 (55%)	13 (26%)	3.92	0.96

Lastly, respondents were asked to select a level of agreement ranging from 1-5 (1=strongly disagree, 5=strongly agree) with a number of statements concerning other impacts that the CodePlus programme in general may have had on them (Table 17).

Table 17. Self-reported impact of the CodePlus programme (N=223)

	1(SD)	2(D)	3(N)	4(A)	5(SA)	Mean	Standard Deviation
Increased my confidence using technology	5 (2%)	11 (5%)	28 (13%)	94 (45%)	71 (34%)	4.03	0.95
Helped me to make an informed decision regarding a related third-level course	4 (2%)	17 (8%)	43 (20%)	71 (33%)	82 (38%)	3.97	1.03
Improved my attitude to working as part of a team	8 (4%)	10 (5%)	57 (27%)	81 (39%)	53 (25%)	3.77	1.01
Improved my communication and presentation skills	4 (2%)	16 (8%)	67 (32%)	62 (30%)	59 (28%)	3.75	1.01
Improved my creativity skills	4 (2%)	20 (10%)	57 (27%)	77 (37%)	51 (24%)	3.72	1.00

4.3.2 Comparative Analysis

The comparative data was also used to investigate the effects of the CodePlus programme in participants' career decisions. In the post-workshop survey (time 1), participants indicated the likelihood that they would pursue a CS-related course in the future. This data was compared to the findings of the current longitudinal survey (time 2; see Table 18).

Table 18. Intentions to pursue a CS-related course at third-level

Time 1 (<i>n</i> = 182)			Time 2 (<i>n</i> = 182) ⁴		
<i>Likelihood of pursuing CS</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Pursuing CS</i>	<i>Frequency</i>	<i>Percentage</i>
Very likely/Likely	57	31%	Yes	30	17%
Uncertain	77	42%	No	141	78%
Unlikely/Very unlikely	47	26%	No response	11	6%
No response	1	1%			
Total	182		Total	182	

⁴ 182 refers to the number of participants in the current longitudinal survey whose post-workshop data could be retrieved. Data for the remaining participants could not be retrieved or were incomplete.

The comparative data also helped understand the long-term effects of the programme on respondents' perceptions of CS. Paired samples *t*-tests were run to determine if participants' perceptions of CS courses changed significantly from post-workshop to the current longitudinal survey. Table 19 illustrates the significant results of this test, i.e., where there was a significant difference between the post-workshop survey and the current longitudinal survey. Higher mean scores indicated higher levels of agreement with each statement. The data was split into those who pursued CS and those who did not. Eleven responses were missing as respondents did not specify whether they pursued a CS-related course. There were more significant differences in perceptions among participants who did not pursue a CS-related course.

Table 19. Results of paired *t*-tests for perceptions of CS third-level courses (N=171)

Pursued CS	Statement	Post-Workshop Survey	Longitudinal Survey	T-test Statistics		Effect Size
Yes (n= 30)		<u>M(SD)</u>	<u>M(SD)</u>	<u>t(df)</u>	<u>p</u>	<u>Cohen's d</u>
	Doing a lot of mathematics	3.34 (1.05)	3.62 (1.12)	-1.09 (28)	.284	-.20
	Spending a lot of time programming	3.97 (.82)	4.38 (.82)	-2.36 (28)	.026*	-.44
	Solving problems	4.41 (.57)	4.76 (.44)	-2.77 (28)	.010*	-.52
	Designing computer games	4.00 (.80)	3.24 (.95)	3.36 (28)	.002*	.63
No (n= 141)		<u>M(SD)</u>	<u>M(SD)</u>	<u>t(df)</u>	<u>p</u>	<u>Cohen's d</u>
	Doing a lot of mathematics	2.99 (.98)	4.01 (.75)	-9.46 (139)	< .001*	-.80
	Spending a lot of time programming	3.87 (.78)	4.29 (.64)	-5.08 (140)	< .001*	-.43
	Learning different programming languages	4.04 (.69)	4.21 (.74)	-2.07 (139)	.041*	-.17
	Working in groups	3.97 (.84)	3.72 (.94)	2.64 (140)	.009*	.22
	Being creative	4.28 (.65)	4.01 (.95)	2.89 (140)	.004*	.24
	Solving problems	4.26 (.63)	4.50 (.59)	-3.63 (140)	< .001*	-.31
	Learning how to communicate	4.06 (.69)	3.78 (1.02)	3.25 (140)	.001*	.27
	Designing computer games	3.85 (.72)	3.56 (.95)	3.14 (139)	.002*	.27
	Spending a year abroad	3.04 (.75)	3.04 (.88)	-.08 (140)	.934	-.01

*p < .05

The same was done for participants' perceptions of CS in general. Paired samples *t*-tests were run to determine if participants' perceptions of CS changed significantly from post-workshop to the longitudinal survey. Table 20 illustrates the significant results of this test, i.e., where there was a significant difference between the post-workshop survey and the current longitudinal survey. Higher mean scores indicate higher levels of agreement with each statement. The data was split into those who pursued CS and those who did not. Eleven responses were missing as respondents did not specify whether they pursued a CS-related course. Participants who did not pursue a CS-related course had greater significant differences in perceptions of CS.

Table 20. Results of paired *t*-tests for perceptions of CS (N=171)

Pursued CS	Statement	Post-Workshop Survey	Longitudinal Survey	<i>T</i> -test Statistics		Effect Size
Yes (n= 30)		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i> (<i>df</i>)	<i>p</i>	Cohen's <i>d</i>
	I'll need programming for my future work	3.45(1.02)	4.03(.87)	-2.55(28)	.017*	-.47
	Knowing programming will help me earn a living	3.93(1.03)	4.45(.57)	-2.82(28)	.009*	-.52
	I will use programming in many ways throughout my life	3.69(1.00)	4.14(.69)	-2.10(28)	.045*	-.39
No (n= 141)		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i> (<i>df</i>)	<i>p</i>	Cohen's <i>d</i>
	Men are by nature more inclined towards CS than women	2.67(1.27)	3.04(1.26)	-2.66(138)	.009*	-.23
	CS mainly involves programming	3.54(.74)	3.78(.79)	-3.05(138)	.003*	-.26
	I'll need programming for my future work	2.91(.91)	2.62(1.13)	2.50(137)	.014*	.21
	Knowing programming will help me earn a living	3.27(.98)	2.95(1.13)	2.87(137)	.005*	.24
	I will use programming in many ways throughout my life	3.24(.99)	2.79(1.13)	4.73(138)	< .001*	.40
	Programming is of no relevance to my life	2.47(1.01)	3.14(1.14)	-6.19(137)	< .001*	-.53
	I expect to have little use for programming when I get out of school	2.86(1.10)	3.38(.99)	-4.70(137)	< .001*	-.40

**p* < .05

4.3.3 Interview Findings

To further understand the impact of the CodePlus programme on participants, 18 interviews were conducted. From the thematic analysis, four themes were generated. An overview of the themes and subthemes are presented in Table 21 and described below using direct quotations from the interviews.

Table 21. Themes and subthemes generated in the analysis process

Themes	Subthemes
Experiencing CodePlus	<ul style="list-style-type: none"> • Workshop experiences • Introduction to CS • Learning experiences • Perception of CodePlus
Features of CodePlus	<ul style="list-style-type: none"> • Groupwork • All-girls environment • Company visits
Impacts of CodePlus	<ul style="list-style-type: none"> • Transferable skills • 'Giving back' • CodePlus influence on course/career choice
Deciding on Course/Career	<ul style="list-style-type: none"> • Decision-making process • Family influence • Work experiences

Theme 1 – Experiencing CodePlus. This theme elaborates on participants' experiences of the CodePlus programme and their views on it.

Subtheme 1: Workshop experiences. Across the interviews, participants described their experiences with the CodePlus programme. Many aspects of the programme were discussed as these were shown to shape their overall experiences with the coding workshops. In general, participants had a positive experience with the programme. The majority of them remembered in great detail the activities they did in the workshops and the key learnings that accompanied them. The workshops were described as a positive and enjoyable environment *"everybody was positive and everybody was really interested in solving the problems. So, I think that was the best part, being in an environment where everyone has the same passion and the same desires"* (P01). The instructors were described as encouraging and supportive *"I remember [instructors] like they were so understanding... And they were always there to help you"* (P04). The workshops gave participants a confidence boost to pursue new interests *"I think it definitely kind of gave me more encouragement to kind of just go for things"* (P07). When asked about their favourite aspect of CodePlus, groupwork and creating games featured as the main aspects for participants, as can be seen in the word cloud in Figure 5.



Figure 4. Word cloud of participants' favourite aspects of CodePlus

As participants had an enjoyable time with CodePlus, they expressed a need for a longer programme, given that the workshops currently run for a week. Participants claimed that although though they learnt a lot and accomplished a lot in a single week, they could have benefited from a longer programme, *"the only thing I could say is that it was too short, I think that generally speaking, had it been longer, there could have been more like opportunities to develop the programme a little bit further"* (P08). This was especially true for those with a strong interest in coding and a career in CS. Suggestions for a summer programme or an opportunity to go back and do a longer version of the programme were given.

Subtheme 2: Introduction to CS. While some participants already had some coding knowledge prior to the workshop, for many others, the coding workshop was the first interaction they had with coding and CS concepts, providing participants with foundational knowledge *"I remember considering CodePlus to be my introduction to coding, like that's the first time I'd ever done coding at all"* (P10), which often generated a new interest and encouraged them to pursue other coding activities *"from going to CodePlus I went to CoderDojo classes which got me into coding more"* (P03).

Participants claimed to find the workshops very accessible, especially for those who had no prior knowledge of coding. While some were nervous going into the workshop, as they did not know what to expect, and assumed they would need to have some coding and maths knowledge, they were quickly relieved to be met with introductory content and welcoming instructors. As one participant commented, for example, *"it's very much like introductory basic and like if you don't know how to do it, someone will help you and everybody else will be in the same boat"* (P12).

For those unfamiliar with CS, CodePlus helped address some of the views they had. After the workshops, one participant claimed to understand that CS was not only about coding *"we got to see like, if you want to do CS, it's not only just tech tech tech, it's not just like you're sitting there coding or it's not like in the movies when there is like a hacker or something like that... there was literally like so many other things you can do related to CS that's not coding"* (P13) while another participant who previously viewed CS as boring, understood that it could offer much more *"I'm not going to lie, I always thought it was kind of a boring thing, I was always a bit like oh like that sounds a bit like too smart for me, but then I feel like with that, it can be fun as well"* (P17). Another participant viewed that field as solitary but later learned about the collaborative opportunities that it offered *"I feel like my impression of coding before that was very like solitary, but it was like, I don't know, it was really collaborative, which was really nice... I feel like coding is like different than what you have an impression of if you've never done it before"* (P06).

Subtheme 3: Learning experiences. The learning experienced in CodePlus was described as different to the learning in school. Firstly, the workshop was described as being more practical and hands-on, whereas in school, the majority of subjects would require more theoretical learning. This, according to participants, created a more relaxed learning environment. Secondly, the programme exposed participants to coding and CS, which were often not available in the schools, providing participants with new experiences. Thirdly, participants reported a greater freedom where they were encouraged to engage in critical thinking as opposed to being given instructions on how to complete tasks. The quotes below reflect some of these differences.

"It was always very relaxed, which I really enjoyed because it was so different from school" (P02)

"It definitely like encouraged me to think for myself and like think outside the box for a lot of situations, which isn't like something you get to like do in most situations anyway, especially as a student" (P14)

"I really enjoyed it because it didn't feel like school... They were like, here's your task like go off with your group and like figure out how to do it" (P08)

Subtheme 4: Perception of CodePlus. In order to understand how participants viewed the CodePlus programme, they were asked to describe CodePlus in their own words. In summary, participants described the programme as unique; an educational experience; an opportunity to develop transferable skills; an introduction to coding; an opportunity for socialization; a way of developing interests and new perspectives; a chance to work with others with a similar mindset; a way of expressing creativity. Below are some quotes reflecting the participants' views.

"I think it's a programme that exposes you to opportunities and knowledge that you won't or most likely won't get in school... It's a programme where you do learn a lot about yourself and your intelligence and your ability. And you expose yourself to, I'll say aspects of yourself that you don't know, that you're not aware as of yet, if you haven't had any experience in tech at all" (P01)

"I'd say very informative, very like practical like instead of like having to sit there and just learn about it, you actually have to do hands-on work, which I think is what a lot of students actually want to do instead of actually just sitting in a classroom and just taking in information... Basically like it forced you to think outside of the box, you kind of have no choice. And I think that's a very like key trait that most people in this generation should definitely develop, especially because of AI and because of like tech being such a big influence in all of our lives that I feel like some people are forgetting to think for themselves. I think CodePlus actually did allow it, actually being able to put your mind into different situations and being able to use materials and being like you know what, I'll try to use this and like basically just force you to think outside of the box" (P14)

"A great way to express creativity in a way you wouldn't have expected to, you know. Like it's a nice environment, there's no wrong answer, you know, like everyone did their own thing, like. It's a great way of seeing a STEM subject, if you're interested in it as well, rather than... like, you know, you don't be afraid to do it either because you could open a lot of doors for yourself" (P03)

Theme 1 takeaway: Participants had overwhelmingly positive experiences with the CodePlus programme, highlighting the workshops as engaging, supportive, and confidence-boosting. The programme served as an accessible introduction to coding and CS, often sparking new interests and challenging prior misconceptions. Compared to traditional school learning, CodePlus offered a more hands-on, creative, and collaborative environment that encouraged critical thinking. Participants viewed the programme as a unique opportunity for personal growth, skill development, and social connection, with many expressing a desire for a longer or extended version of the experience.

Theme 2 – Features of CodePlus. Participants mentioned aspects of the programme that stood out for them and contributed to their experiences. This theme elaborates on three features.

Subtheme 1: Groupwork. A commonly mentioned aspect of the programme was the groupwork in the coding workshops *“I think the working with other people thing was like the biggest part of that” (P15)*. Participants valued learning in groups, suggesting it made it a more enjoyable experience and enhanced their learning. Those who had less coding experience were able to learn from those in the group who were more familiar with coding *“I learned a bit slower, but because I had my partner who knew what she was doing, I was kind of learning by looking at her and both trying new things” (P18)*. Working in groups also helped participants understand the collaborative side of coding. While some believed that coding was a solitary process, the workshop showed the role of teamwork in the CS field *“it kind of showed me that I like being collaborative in code” (P10)*.

In addition to enhancing their learning, participants described how the groupwork promoted socialization. One participant referred to this as ‘social development’, where despite their shyness, they interacted with other people and developed friendships that lasted beyond the programme *“so you’re talking to loads of different people and I’ve actually made really good friends from the programme and we’re still friends today” (P11)*. Participants pointed out that these interactions encouraged them to get out of their comfort zone *“working with the other people, I think it really kind of pushed me out of my comfort zone, but it also made me enjoy it more (P17)*.

Subtheme 2: All-girls environment. Participants particularly liked the all-girls environment of the CodePlus programme. As CS, and STEM in general, are often associated with males, participants described it as reassuring that there were many girls involved in the programme *“I loved how it was like, do you know the way it’s obviously for like girls. I loved that as well because I feel like STEM has always been like a very like male-dominated kind of field” (P17)*. A sense of belonging was created in the workshops, especially for those participants who often felt out of place for liking CS and found it difficult to share their CS interests with others *“it was the first time I’d seen that many girls actually interested in computers” (P03)*. Participants claimed that they would not have felt as comfortable in a mixed environment, where they imagined the male participants would take over, as it often happened in other programmes *“every time we did like [other outreach programme], there was always some guy in my group that was like ‘oh, I know this, I know this, I know this, like hands off’... But what I remember was being so excited that [CodePlus] was just all-girls” (P04)*.

Subtheme 3: Company visits. When asked about the company visits, participants’ responses focused mainly on the positive impact of seeing female professionals working in the CS field. Participants mentioned understanding more about the different routes and opportunities within CS after listening to these professionals and overall being inspired by them *“seeing so many female in tech, you’re kind of like if they can do it, so can you, and why shouldn’t we” (P04)*. Seeing an actual ‘tech’ workplace was also seen as important for participants to understand what a job in the field entailed. As mentioned by one participant who went on to pursue a CS-related course, the

company visit was the most impactful and memorable aspect of the programme for them *“to be honest, out of the week, I know I don't remember too much about CodePlus, but that site visit was probably the most important aspect of the programme for me”* (P11).

*Theme 2 takeaway: Participants highlighted three standout features of the CodePlus programme that enriched their experience: **groupwork**, which fostered collaboration, peer learning, and social development; the **all-girls environment**, which created a sense of belonging and comfort in a traditionally male-dominated field; and **company visits**, which inspired participants by showcasing real-world applications of CS and the visibility of women in tech. These features collectively helped challenge stereotypes, build confidence, and deepen participants' interest in CS.*

Theme 3 – Impacts of CodePlus. Participants talked about the impact that the programme had on them. This theme address and explains these impacts as discussed by the participants.

Subtheme 1: Transferable skills. When asked about the skills learned and developed during the programme, participants often mentioned that the programme helped them develop skills that went beyond coding. Transferable skills were mentioned and were described as being useful in other areas such as in school and in future careers. Skills identified by participants included communication skills, problem-solving, critical thinking, interpersonal skills, teamwork and collaborative skills, presentation skills, and leadership skills. Creativity, in particular, was identified as a critical skill by many participants who saw the programme as not only being creative itself, but that required participants to demonstrate their creative skills when completing the tasks and activities, *“in school they don't really nurture this creative idea unless you do like Arts... And so, for these workshops, it was just crazy that they're like 'ok now think'. .. And I think that was the first time I opened my eyes to the fact of what it's going to actually be like in the real world, because when you're so young and you're in school all the time, and they keep a hold on your creative juices, that you have none... And I remember the workshop really helped with that”* (P04).

Subtheme 2: Giving back. A number of participants, reflected on the influence that CodePlus had on their lives and how it awakened a desire for 'giving back'. One participant who went on to pursue CS a career, talked about how they now go back to CodePlus as a panel member representing women working in tech and talking to participants about her background in the field *“I go back and I just talk about my experience as a female in tech... it's a nice kind of full circle moment, like, I do believe in giving back. Someone like gave up their time to talk to me while I was, you know, kind of in Transition Year. So, it's nice to go back and be able to do it”* (P02). Another participant, who also went on to do CS talked about her experience as a tutor in coding while in college and later as a volunteer at work teaching coding to young people *“if I could provide like that experience for a kid to introduce them to code in a fun way and maybe get them interested in Computer Science, if I can do that for another kid like this programme did for me, I'd love to do that”* (P10).

Subtheme 3: CodePlus influence on course/career choice. Participants mentioned that the CodePlus programme had an impact on their career decision making. For those already interested in a CS-related career, the programme reinforced and boosted those interests, *“I would have definitely done something with computers, but I knew then, I can actually do this as a career”* (P03). Some believed that they would have eventually found their way into CS, but by engaging with the CodePlus workshops, they could make their decision faster as to what career path they would follow *“I would have ended up in like in CS, but it would have taken me a longer amount of time”* (P01).

For other participants, CodePlus presented them with new opportunities that they otherwise would not have followed *"it was that first opportunity for coding and CS for me, it definitely put CS as an idea for something that I could do... before that I might have done Physics or Maths or Engineering... after I finished that course and the subsequent courses I was like ok yeah Computer Science, that's what I'll do"* (P10).

While for some participants, it did not encourage a career in CS per se, they were still encouraged to pursue other opportunities in STEM *"it really just enhanced my want to go to college and to pursue a career in like a STEM-related kind of field"* (P14). As one of the aims of the programme is to help participants make informed decisions about a career in CS, it is important to note that participating in the programme helped some participants understand that CS would not be a suitable career for them *"it was actually the CodePlus programme that helped me realize that I have no talent for computers"* (P18).

*Theme 3 takeaway: These findings show how the short-term one-week workshop was a positive experience for participants. In summary, the workshops had the potential of influencing participants' decisions on courses and careers in the long-term. Participants described CodePlus as having a lasting impact on their personal and academic development. The programme helped them build **transferable skills** such as creativity, communication, teamwork, and problem-solving, which they found valuable beyond coding. It also inspired a sense of **giving back**, with some participants returning to mentor others or volunteering to teach coding. Importantly, CodePlus influenced **career and course choices**, either reinforcing existing interests in CS or introducing new possibilities in STEM. For some, it clarified that CS was not the right path, helping them make more informed decisions about their future.*

Theme 4 – Deciding on course/career. This theme explains how participants decided on the courses/careers that they pursued or wished to pursue. The interviews offered insights into other factors that contributed to participants' career choices, exploring the many factors that influenced any and all careers that were considered by the participants. Of the 18 interviewees, 14 pursued a STEM-related course and/or career, with 8 of those being CS-related.

Subtheme 1: Decision-making process. While some participants were already set on their preferred course solely due to personal interests *"I always wanted to do it"* (P03), other participants went through a longer decision-making process until they established their course preferences *"I think I've changed what I want to do in college like twenty times"* (P15). Participants who were unsure of what course to pursue, saw the benefits of having career talks in their schools, as this often led to a newly discovered interest in a particular course that contained elements that they liked *"when I kind of saw it like translate into like a subject that I could actually do, it seemed just really interested me"* (P17).

A number of participants described how they leaned towards courses which were considered 'safer' *"my initial course I wanted to do was nursing because I felt like it was a safer option"* (P01) while others preferred courses and careers that would offer them stability *"stability is very important... I want to have a stable future, a stable income, a stable job"* (P18). Financial stability was a significant motivator for participants, whether they picked CS or some other unrelated course, *"it was more like what's going to like sustain me the most, so I was like, ok Computer Science"* (P15), *"I wanted to make money, so yeah, that's the only way I see that. Like people make money"* (P02).

Subtheme 2: Family influence. Family influence also played an important role in the decision-making process for many participants. Some participants suggested that their families simply encouraged them to pursue a third-level education, especially parents who had not had the same opportunities for further education themselves, *“my mom didn't go to college, and she always said the best thing you can ever do is get a degree”* (P03). In other families, however, there was a pressure of pursuing more ‘traditional’ courses, especially families from other ethnic backgrounds *“I feel like it was a lot of pressure from family and, you know, especially in ethnic families and in different ethnic cultures, there's a big pressure to do, you know, be a doctor, be an engineer and whatnot”* (P07). Although families had a great influence in career choice, some participants still pursued the course that interested them, as opposed to the career reinforced by their family, *“I remember again following with my parents' whole ideals, I was obviously going to go into healthcare, be a doctor and all that. But I was like, oh that's not really me, and so things changed”* (P11).

Subtheme 3: Work experiences. A number of participants suggested that the work experience and workshop participation in Transition Year also helped them decide on their courses, with one participant describing Transition Year as *“a pivotal point in my life”* (P02). While some work experiences made participants decide against some courses and careers *“when I went to like the work experience as I saw what their day-to-day was and I was like I don't want to do that”* (P15), other experiences helped them settle on a specific course *“we did like loads of stuff, to kind of help you figure out what you want to do in the future, that I feel like if I didn't do Transition Year, I would be a bit clueless”* (P17).

Theme 4 takeaway: These findings show that deciding on what course or career to pursue is not a straightforward process with many elements playing a role on participants' decision-making process. Participants' decisions about their courses and careers were shaped by a mix of personal interests, practical considerations, and external influences. While some had clear goals early on, others went through a longer decision-making process, often influenced by career talks, work experiences, and the desire for financial and job stability. Family influence played a significant role – sometimes encouraging education, other times pressuring traditional career paths – though many participants ultimately chose fields aligned with their own interests. Transition Year experiences, including CodePlus, were often pivotal in helping participants clarify or rethink their career direction.

4.4 Discussion

This longitudinal evaluation of the CodePlus programme was conducted in response to Lero's review request to consider a long-term evaluation process of Lero's EPE, while also addressing critiques in the CS outreach literature that highlighted the lack of research assessing the lasting impacts of CS initiatives (Decker & McGill, 2017). The research aimed to assess the longitudinal impact of the CodePlus programme 2+ years after participation. By combining quantitative and qualitative methods, a more comprehensive understanding of the lasting impacts of CodePlus was obtained. In this section, the quantitative and qualitative data are summarised and integrated for an overall interpretation of the findings (Table 22).

Summary of Findings

Survey - The quantitative analysis demonstrated that the majority of participants planned to or were already pursuing a third-level course after secondary education, with strong interest in fields such as Business, Arts, Humanities, Health and other STEM-related fields. Among those considering CS-related courses, the most influential factors were personal interest in computers, perceived job security and the prospect of well-paid careers. For participants who did not choose CS, common reasons included a preference for other subjects, preference for more people-based careers, and perceptions that CS was too difficult. Encouragement to study CS came primarily from family and teachers, with moderate influence from friends. Role models in CS were present for some respondents, often through male family members, though a notable proportion reported having no role model. Perceptions of CS varied, with most agreeing that it involved problem-solving, programming and creativity, while fewer associated it with stereotypes such as 'male-subject' and 'geeks and nerds'. The majority of respondents only had CodePlus as a CS outreach experience. Regarding the CodePlus activities, the workshops were ranked as highly valuable, particularly for team-based learning and real-world projects. Career talks and company visits were also rated positively, especially for providing insights into CS careers and for meeting female role models. Overall, participants agreed that CodePlus improved their confidence with technology, helped them make more informed decisions about pursuing CS or related fields, and improved skills such as teamwork, communication and creativity.

Comparative data - The comparative analysis demonstrated the effects of the short-term influence of the programme. Immediately after participation in the programme, over 30% of participants claimed they would likely pursue a CS-related field. Over two years later, it could be seen that this figure decreased to 17% of respondents who actually applied for a CS course at third-level. As for perceptions of CS, those who eventually pursued CS mostly maintained their positive perceptions of CS along the years. Those who did not pursue CS often changed their perceptions, associating it more with programming and mathematics, and less with groupwork, creativity and communication skills after two years.

Interviews - The qualitative analysis of participants' experiences with the CodePlus programme revealed that the workshops were widely perceived as positive, supportive, and confidence-boosting, offering an accessible and creative introduction to coding distinct from traditional schooling. Key features such as collaborative groupwork, an all-girls environment, and company visits enriched engagement by fostering belonging and providing real-world insights into CS careers. Beyond technical skills, CodePlus helped participants develop transferable skills like creativity, communication, and teamwork, inspired some to give back as mentors, and influenced career choices—either reinforcing interest in CS or guiding participants toward other STEM fields. Career decisions were ultimately shaped by a combination of personal interests, financial stability, family influence, and work experiences, highlighting the programme's role in informing choices within broader socio-cultural and economic contexts.

Integration of Findings

Table 22. Summary of integrated quantitative and qualitative results

Qualitative Theme	Quantitative Result	Integrated Interpretation
<i>Theme 1: Experiencing CodePlus</i> – workshop experiences	Table 13: 62% rated the workshops as most valuable feature of CodePlus.	Survey rankings match emphasis on the value of the workshop and company visit as discussed in the interviews
<i>Theme 2: Features of CodePlus</i> – company visits	24% rated the company visit as most valuable; 42% second most valuable	
<i>Theme 2: Features of CodePlus</i> – groupwork	Table 14: ‘Learning in teams’ rated as valuable/very valuable (79%) – highest mean in value 3.93	Survey ranking match interviewees’ emphasis on groupwork
<i>Theme 2: Features of CodePlus</i> – all-girls environment	Table 14: ‘Learning in all-female environment’ rated as valuable/very valuable (66%) mean=3.8	Survey ranking match interviewees’ emphasis on the importance of an all-girls environment
<i>Theme 2: Features of CodePlus</i> – company visits	Table 16: ‘Getting to meet a female role model’ rated as valuable/very valuable (76%) mean=4.0	Survey ranking match interviewees’ discussion on the value of seeing female professionals in tech
<i>Theme 3: Impacts of CodePlus</i> – influence on course/career choice	Table 17: ‘helped make an informed decision’ rated as agree/strongly agree (79%)	Survey ranking match interviewees’ argument on the role of CodePlus in helping decide on a CS career
<i>Theme 3: Impacts of CodePlus</i> – transferable skills	Table 17: improved communication and presentation skills (58%); improved creativity skills (61%)	Skills development confirmed on both the survey and interviews; interviews added depth on creativity
<i>Theme 4: Deciding on course/career</i> – decision-making process	Tables 4, 5 and 6: factors influencing career choices	An interplay of personal interests and practical concerns revealed in both the surveys and interviews

The survey results indicated that participants found the coding workshops highly beneficial, with 62% of respondents rating the workshops as the most valuable feature of the CodePlus programme. These findings are complemented by the interview insights under *Theme 1: Experiencing CodePlus*, where participants described their workshop experiences as enjoyable, supportive and confidence-boosting. The emphasis on a positive learning environment and encouraging instructors was repeatedly highlighted in interviews, reinforcing the survey data and suggesting that the programme successfully created conditions conducive to engagement. Similarly, for the 24% and 42% of respondents who categorised the company visits as the most valuable and second most valuable, respectively, this was reinforced in the interviews with interviewees stressing the importance of seeing female professionals working in CS and understanding more about what a career in CS would look like.

Similarly, the survey rankings of programme features aligned with the interview findings under *Theme 2: Features of CodePlus*. Groupwork emerged as the most valued component in both strands, with participants reporting that collaboration enhanced learning and social development. The interview insights added depth by revealing that groupwork helped participants overcome shyness and build lasting friendships, illustrating the social dimension of learning that quantitative measures alone could not capture. As for the all-girls environment, a similar trend was noted with 66% of survey respondents rating it as valuable and the interviewees also identifying it as a critical

feature of the programme, emphasising its role in fostering belonging and providing a supportive learning experience that would have not been possible if it was a mixed environment. The result for the company visits in the survey also aligned with the interview findings. Getting to meet a female role model while in the company visits was rated as beneficial for 76% of respondents and further emphasised in the interviews. Not only was it inspirational for participants, but it also challenged the common gender stereotypes in CS.

The mixed methods approach also revealed complementary insights regarding the programme's impacts. While the survey data confirmed improvements in communication, presentation and creativity skills, the interview narratives under *Theme 3: Impacts of CodePlus* highlighted a broader set of transferable skills, including problem-solving, critical thinking, interpersonal, and leadership skills. These skills were perceived as valuable beyond coding, suggesting that outreach programmes can contribute to holistic skill development. Moreover, the interview accounts of participants returning as mentors or volunteers underscore the programme's long-term influence, an outcome not captured in the quantitative strand.

In keeping with the same theme *Impacts of CodePlus*, the results of the survey regarding the programme's influence on helping them make an informed decision on whether or not to pursue a CS career aligned with the interviewees narrative on the influence of CodePlus on their career choices. While 79% of survey respondents claimed the programme was influential in their decision, the interview narratives expanded on how it influenced them, claiming that CodePlus either reinforced the decision for those already interested in CS, it introduced the career to those who were unaware of CS opportunities, or it helped them clarify that CS was not the right path for them.

Despite the overall positive impacts of CodePlus, the qualitative findings under *Theme 4: Deciding on Course/Career* and the survey results on career choices showed that some participants ultimately pursued non-CS paths. The survey indicated that preference for other careers and a dislike for computers mainly determined the decision for those who did not wish to pursue a career in CS, while an inherent personal interest in computers and guaranteed future employment were the key factors for those interested in a CS career. The interviews, on the other hand, indicated that family expectations, cultural norms, and financial stability were significant factors shaping career decisions, sometimes outweighing programme influence. This highlights the complexity of career decision-making and suggests that outreach programmes, while impactful, operate within broader socio-cultural and economic contexts.

Implications

Taken together, these findings have several implications. First, the convergence between strands underscores the effectiveness of hands-on, collaborative learning environments in fostering engagement with CS. Programmes like CodePlus should continue to prioritize groupwork and supportive instruction. Second, the success of the all-girls environment and exposure to female role models indicates that gender-sensitive initiatives are critical for addressing underrepresentation in CS. Third, the development of transferable skills points to the value of framing outreach initiatives not only as technical training but as opportunities for broader personal growth. At a policy level, these findings support investment in extended or follow-up programmes, as participants expressed a desire for longer engagement. Additionally, partnerships with industry for company visits and mentorship can strengthen the link between outreach and career pathways.

5 Overall Discussion

This project was undertaken in response to a Lero review recommending a long-term assessment of the Lero EPE programme. By focusing on a flagship initiative – *CodePlus* – the study aimed to understand the overall sustained impact on participants.

CodePlus Programme

The longitudinal evaluation of the CodePlus programme reveals its multifaceted impact on participants' perceptions of CS, skill development, and career decision-making. The findings demonstrate that the programme successfully introduced participants to coding and CS in an engaging and supportive environment. Workshops, career talks, and company visits were consistently rated as highly valuable, fostering confidence, creativity, and teamwork. Survey data revealed that most participants planned to pursue third-level education, with strong interest in STEM-related fields. Among those considering CS, personal interest, job security, and earning potential were the most influential factors, while those opting out cited preferences for other subjects and perceptions of CS as difficult or overly technical. Encouragement to study CS primarily came from family and teachers, though many participants lacked role models in the field. Qualitative interviews reinforced these findings, highlighting the workshops as enjoyable, confidence-boosting, and distinct from traditional schooling. Key features such as collaborative groupwork, an all-girls environment, and company visits enriched engagement by fostering belonging and providing real-world insights into CS careers. Participants reported developing transferable skills, such as creativity, communication, teamwork, and some expressed a desire to "give back" through mentoring or volunteering. These findings align with research suggesting that gender-inclusive environments and exposure to role models can positively influence girls' engagement with STEM (Master et al., 2016). Importantly, CodePlus not only influenced those who pursued CS but also helped others clarify their interests in adjacent STEM fields, demonstrating its broader educational value.

Participants reported improved attitudes toward technology and greater awareness of CS careers, with many citing the CodePlus programme as influential in shaping their decisions about future study. However, longitudinal data revealed a gap between initial interest and actual uptake of CS courses at third level: while over 30% expressed intent to pursue CS immediately after participation, only 17% ultimately applied for CS-related courses two years later. This suggests that while CodePlus is effective in sparking interest, sustained engagement and broader structural factors – such as curriculum exposure, societal perceptions, and career guidance – play a critical role in long-term decision-making (Margolis & Fisher, 2002). The comparative data also underscore a key challenge: perceptions of CS among those who did not pursue it shifted toward a narrower view focused on programming and mathematics, with diminished recognition of its creative and collaborative aspects. This suggests a need for continued reinforcement of CS's interdisciplinary and human-centred dimensions beyond the outreach experience. These findings align with research emphasizing the importance of outreach programmes in bridging gaps in CS education and fostering interest among underrepresented groups. Outreach initiatives provide hands-on experiences and exposure to role models, which are critical for challenging stereotypes and promoting diversity in STEM (Das, 2024; FasterCapital, 2025).

Concluding Remarks

This study was conducted in direct response to Lero's review recommendation for a longitudinal evaluation of the EPE programme. This evaluation underscores the significant and lasting benefits of the CodePlus programme in promoting engagement with CS among young learners. CodePlus provided female secondary level students with a supportive, real-world introduction to CS, helping them build confidence and make informed career choices.

The programme demonstrated success in developing not only technical competencies but also essential transferable skills such as teamwork, communication, and creativity. These outcomes align with broader educational goals and the evolving demands of the workforce. While challenges remain, particularly in sustaining long-term interest and addressing misconceptions about CS, the evidence suggests that CodePlus is making a meaningful difference, affirming its value and relevance. Continued support and expansion of CodePlus is not only justified but essential to nurturing the next generation of creative, confident, and capable digital citizens.

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CodePlus Longitudinal Survey

- I consent to my participation
- I do not consent to my participation

1. Please provide your **first name**

2. Please provide your **surname**

3. Please provide your **date of birth** (dd/mm/yyyy)

4. Please write the name of your **school**

5. Are you planning on attending a third level (college or university) course following completion of secondary school?

- Yes
- No
- I'm not sure

6. If planning to attend a third level course, please select which subject areas you have applied to study (tick all that are relevant)

- Education
- Arts and Humanities
- Social sciences, Journalism and Information
- Business, Administration and Law
- Natural Sciences, Mathematics and Statistics
- Information and Communication Technologies (ICTs)
- Engineering, Manufacturing and Construction
- Agriculture, Forestry, Fisheries and Veterinary
- Health and Welfare
- Services
- Generic Programmes and Qualifications
- Other _____

7. Please rank the factors that influenced your choice of course of study
(rank all that apply in order of importance, where 1=most important)

- _____ A future with guaranteed employment
- _____ Someone in my family has influenced me through their experience in the area
- _____ Strong personal interest in subject area
- _____ Well-paid jobs in the area
- _____ Secondary school experience with subject
- _____ Other

8. Have you applied to study any course or courses related to computer science, computer engineering, computing or IT?

- Yes
- No

9. If **NO** was chosen above, please rank the reasons why you **did not** consider choosing a Computer Science-related course

(rank all that apply in order of importance, where 1=most important).

- _____ Preference to study other subject(s)
- _____ Dislike of computers and preference towards more people-based professions
- _____ Studying Computer Science or working in the IT profession seems too difficult
- _____ Lack of prior opportunities to get involved with computers in the home or school environment
- _____ Unemployment in the profession
- _____ Other _____

10. If **YES** was chosen above, please rank the factors that influenced you to choose a computer science, computer engineering, computing or IT related course

(rank all that apply in order of importance where 1=most important)

- _____ Profession of the future with guaranteed employment
- _____ Strong personal interest in computers
- _____ Someone in my family has influenced me through their experience in the area
- _____ Well-paid jobs
- _____ Secondary school experience with subject
- _____ Other _____

11. If **YES** was chosen above, please tick the qualification level of the computer science related course(s) you have applied for...

- Higher Certificate (Further Education - NFQ Level 6)
- Ordinary Bachelor Degree (NFQ Level 7)
- Undergraduate - Honours Bachelor Degree (NFQ Level 8)
- Other _____

12. To what extent would you say you have received positive encouragement to study a computing-related course from the following people?

	No positive encouragement	A little positive encouragement	Reasonable positive encouragement	A lot of positive encouragement
My family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A teacher or teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Do you have a family member, friend or someone you would describe as a role model studying or working in the area of computer science, computer engineering, computing or IT?

(tick all that are relevant)

- Mother
- Father
- Sister
- Brother
- Aunt

- Uncle
- Female Cousin
- Male Cousin
- Male Friend
- Female Friend
- Male Teacher
- Female Teacher
- Other _____
- No role model

14. Do you think a university course in Computer Science involves...

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Doing a lot of mathematics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spending a lot of time programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning different programming languages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working in groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solving problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning how to communicate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Designing computer games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spending a year abroad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Men are by nature more inclined towards Computer Science than women	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer Science mainly involves programming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer Science is for geeks and nerds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'll need programming for my future work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing programming will help me earn a living	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will use programming in many ways throughout my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Programming is of no relevance to my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I expect to have little use for programming when I get out of school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Have you engaged in any other computer science outreach activities (apart from CodePlus)?

(tick all relevant choices)

- No
- CoderDojo
- Courses delivered in my local library
- After school or lunchtime clubs
- Computer Science based summer camps
- Walton Club
- I Wish
- CSinc - Computer Science Inclusive
- STEM Passport
- CTYI - Centre for Talented Youth, Ireland
- Other _____

17. Have you ever participated in the Scratch Competitions?

- Yes
- No
- I'm not sure

18. Is the Short Course in Coding offered in your school for the Junior Cycle?

- Yes
- No
- I'm not sure

19. Did you take part in the Short Course in Coding in the Junior Cycle?

- Yes
- No

20. Is Computer Science offered as a Leaving Certificate subject in your school?

- Yes
- No
- I'm not sure

21. Are you taking Computer Science as a Leaving Certificate subject? (IF offered in your school)

- Yes
- No

22. If Computer Science was offered as a Leaving Certificate Subject in your school, how likely is it that you would take it? (Please respond only if Computer Science is **NOT** currently offered in your school)

- Very unlikely
- Unlikely
- Uncertain
- Likely
- Very likely

23. Which of the following CodePlus activities did you attend?

Please tick all that apply.

- CodePlus workshops
- Career talks (online or in-person in school)
- Visit to company

24. Rank in order of importance which of the following were more valuable to you

(1=most valuable) **Please only rank those you have attended.**

- CodePlus workshops
- Career talks (online or in-person in school)
- Visit to company

25. Overall, how valuable were the following aspects of the **CodePlus workshop**? (*if attended, otherwise leave blank*)

	Not applicable	Had no value	Somewhat valuable	Neutral	Valuable	Very valuable
Learning in an all-female environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning in teams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Activities and projects related to real-world problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Receiving encouragement to explore careers and study in the area of computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. How valuable were the following aspects of the **career talks**? (*if attended, otherwise leave blank*)

	Not applicable	Had no value	Somewhat valuable	Neutral	Valuable	Very valuable
Seeing (in-person or online) a female role model in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding more about careers in computer science and computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about the variety of jobs in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about the advantages of working in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. How valuable were the following aspects of the **company visit(s)**? (*if attended, otherwise leave blank*)

	Not applicable	Had no value	Somewhat valuable	Neutral	Valuable	Very valuable
Getting to meet a female role model in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding more about careers in computer science and computing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about the variety of jobs in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning about the advantages of working in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seeing an actual tech work environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. Has the CodePlus programme impacted you in any of the following ways?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Improved my attitude to working as part of a team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased my confidence using technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved my communication and presentation skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved my creativity skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helped me to make an informed decision as to whether or not I would like to study a related third level course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. Would you like to share any additional feedback regarding your experience with the CodePlus programme?

30. As part of this research project, we are planning to **interview** students to understand more about their experiences. Would you be willing to take part in the interviews?

- Yes No

