

The Evaluation of Computer Clubs for Girls:

Final Report to SEEDA

July 2009

Alison Fuller, Helen Connor,
Brenda Johnston and Jill Turbin

School of Education
University of Southampton

Email: a.fuller@soton.ac.uk

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The CC4G Evaluation Team
School of Education, University of Southampton
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EXECUTIVE SUMMARY

FINAL REPORT OF THE EVALUATION OF COMPUTER CLUBS FOR GIRLS

The overall purpose of CC4G is to help address the persistent gender imbalance in the IT sector. SEEDA funded the creation and piloting of CC4G from 2002 to 2004 and also supported the first post-pilot year (2005-06). As a result of SEEDA funding, CC4G was offered free to schools in the South East of England. The Sector Skills Council for the IT and Telecoms industries, e-skills UK, led the development and implementation of the club.

The CC4G initiative was targeted at 10-13 year old girls (in school Years 6-8. It was offered to schools, for no cost, as a set of professionally produced resources designed to appeal to young females. From Year 2 of the pilot, the club became web-based and the site has continued to be developed and expanded. The CC4G project objectives were:

- to change the perception, within the target group, of IT as a career for women by offering inspiring and compelling activities which appeal to girls in a voluntary computer club environment, and
- to counter the perception, within the target group, that IT is a male profession.

The evaluation has been conducted over a four year period (August 2005 to July 2009). Its primary focus has been on evaluating the CC4G pilot and its subsequent effects. The objectives have included: to identify good and less effective practice and key lessons; and to draw on these to recommend how the benefits of the club can be built on and sustained in the longer term. The final report includes an analysis of the data collected in Stage Three as well as a summative account of the evaluation findings.

The evaluation has been conducted in three stages¹ using a variety of qualitative and quantitative data collection techniques to generate a large evidence base. The data collected in each phase is summarised in the table below.

¹ See Stage One Report (November 2005), *Preparing the Ground*; First Annual Report (July 2006); Stage Two Report (July 2007), *CC4G in Practice*; and Stage Three Annual Report (July 2008).

Stage 1 Scoping Phase (August– November '05)	Stage 2 Questionnaire Survey and School Case Study Phase (December '05–July '07)	Stage 3 In-depth Interview Phase (August '07–July '09)
<ul style="list-style-type: none"> • Relevant background documentation read. • Key informant interviews (20). 	<ul style="list-style-type: none"> • A questionnaire survey of 166 current CC4G members in 14 secondary schools, geographically distributed across the south-east region, in Spring and Summer 2006. • A questionnaire survey of 89 past members of CC4G in nine out of the 14 schools in Spring and Summer 2006. • Collection of profiling data on the schools involved, including information about the school's overall levels of attainment. • Case studies in nine schools, six secondary (selected from the 14 schools surveyed), and three primary schools (one from each SEEDA region) in Spring and Summer '07. • The case studies involved: 9 observations of clubs in action; 15 focus group interviews with past and present members; 21 interviews with facilitators and other relevant school personnel. • Tracking of school participation across the region to track churn and sustainability. 	<ul style="list-style-type: none"> • Interviews with 54 girls in first year of Stage 3. • Interviews with 41 girls in second year of Stage 3. • Interviews with 21 boys in second year of Stage 3. • Total Interviews: 116. • Ongoing tracking of school participation to track churn and sustainability.

The first two stages of the evaluation focused on current and past CC4G members exploring their experiences and perceptions of the benefits of membership. The third Stage of the evaluation explored the 'additionality' of CC4G by incorporating girls (in the same schools) who had *not been members* to help reveal the particular effects the club has had on its participants. It also included interviews with a small sample of boys to expose any differences in the attitudes to, and levels of knowledge of, IT between similarly aged males and females. The evaluation collected data from the same girls over time, which enabled a

longitudinal analysis of the impact of CC4G on changing girls' propensity to engage in IT courses and to consider IT careers.

Main findings and conclusions

A range of issues is relevant to contextualising the findings and should be borne in mind when trying to judge the overall success of SEEDA's CC4G initiative in meeting its objectives. In particular, the voluntary and individual nature of the club means that it is not possible to claim that CC4G will always have the same or similar effects on its participants. The way the club runs varies from school to school and from year to year. Hence, the experience of being a member can be highly variable: no two clubs are ever the same. Some clubs consist of little more than an opportunity for girls to play games on the CC4G (or other websites) for twenty minutes or so during the lunch-hour, once a week. Some clubs involve a mixture of games and the shorter term activities associated with CC4G modules; while others engage in and follow the much more structured longer-term activities that are also available through the website. The evaluation has shown that members can find all three approaches enjoyable and fun, although the impact on their learning, and on changing their views about IT, varies accordingly.

The voluntary and individual character of the club raises an important question about what can realistically be expected, in terms of behavioural outcomes and attitudinal change in relation to IT, from the relatively brief exposure members (aged 10 to 13) have had to the initiative.

The evidence relating to age and the appropriateness of targeting an initiative at this age group is mixed. While participants perceived that CC4G had made them aware of a wider range of uses and applications for IT, the club had not increased their propensity to pursue IT as a career. This was for two main reasons: a) they felt that they were too young to be thinking about careers; and b) they had very little knowledge, if any, about what IT careers and occupations entail.

By restricting membership of the club only to girls and to producing materials that were deliberately designed to appeal to young females, the intention was to create an environment which would encourage them to view IT and IT-related work as possible career options. The evidence has indicated that the girls found the topics and activities and the 'girl-friendly

'design appealing. On the other hand, there is no evidence that this approach has altered their perceptions about IT as a career for women or for them as an individual.

The evaluation tracked girls and schools who participated in the pilot (2002-2004) as well as in the first post-pilot year (2004–2005) (see Section Three for details). The longitudinal analysis revealed that ex-CC4G members were keen to stress that females (in general) can do any job and that they are certainly just as capable of pursuing IT careers as males. On the other hand, they argued from a personal perspective that IT was not an area of career interest to them. There was little evidence that girls' knowledge about the range of jobs in the IT industry increased as they moved through secondary school (see Sections Four and Five).

The longitudinal analysis of the member sample was complemented with a sample of similarly aged non-members. The strengths of this comparative dimension included: a) revealing the relevance of intra-group differences such as between girls of higher and lower academic ability; and b) revealing the range of factors affecting decision-making and career aspirations and, therefore, the array of significant influences within which participation in CC4G sits (and competes). Including a sample of similarly aged boys contributed to the development of a richer understanding of how IT is perceived by young people.

The findings (see Section Four) indicated that male and female interviewees often had similar attitudes to and experiences of ICT in schools and beliefs about their capabilities. Like girls, many boys suggested that they were not considering IT jobs because of their own lack of interest or their other preferences. For female and male academic 'high fliers' IT was not viewed as a priority subject.

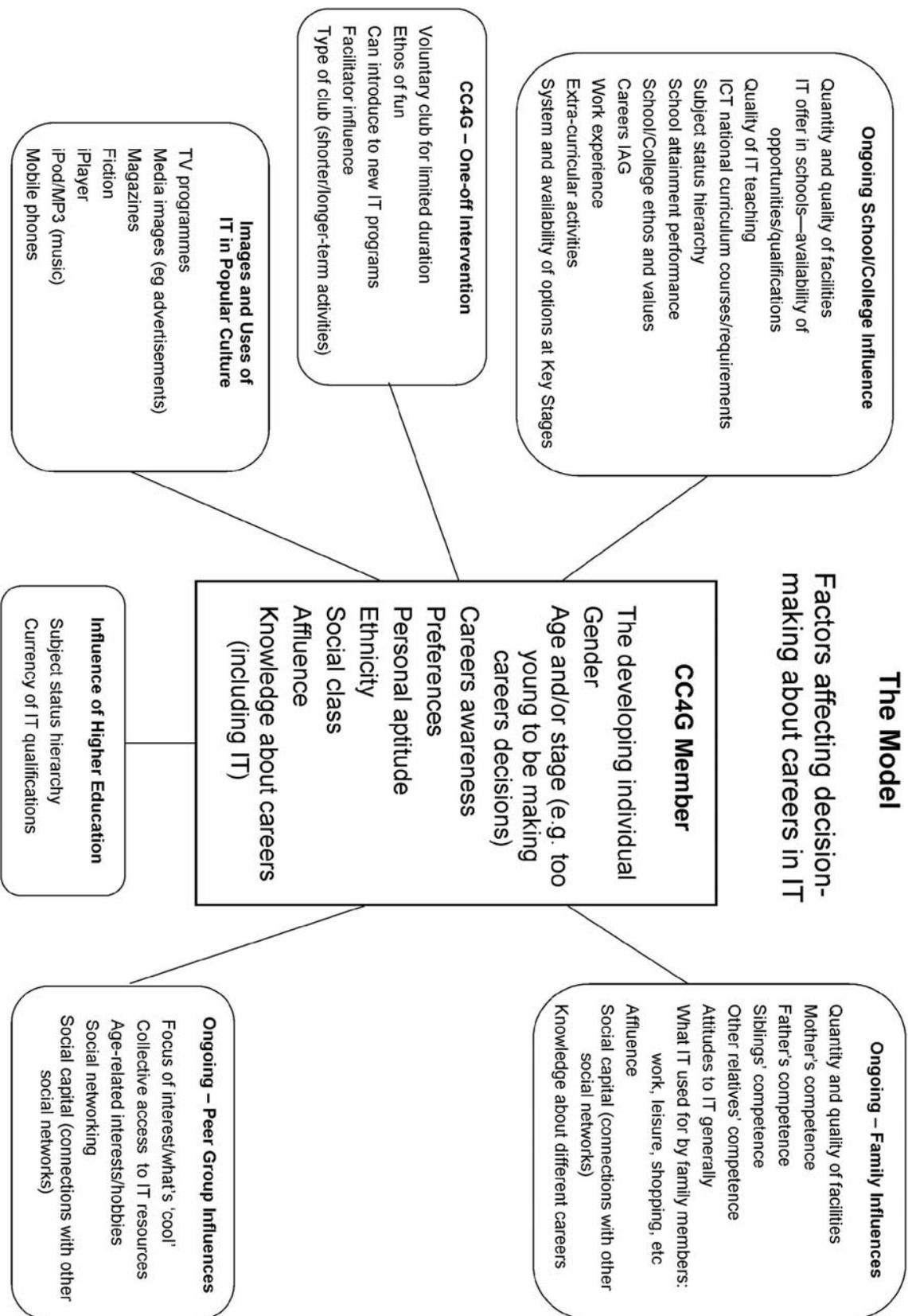
A small number of the boys displayed a level of technical interest in and knowledge about IT that was not found in the girls' data. This interest and knowledge was not automatically leading these boys to consider IT careers but it did differentiate them from the rest of the boys and all the girls.

An initiative such as CC4G was not implemented in a vacuum. The girls (and boys) in our study were subject to an array of influences - educational, social, financial, emotional and cultural - on their attitudes to and abilities in IT. As time went on, the mix of factors affecting girls who had been members of CC4G became ever more complex and the effect of one factor, such as being a past-member of a voluntary, extra-curricular club for a relatively short period of time, became ever more difficult to determine. The model (below) provides a visual representation of the complexity of the influences on decision-making and locates the CC4G intervention within this context (see Section Five).

Impact

It is important to distinguish between the sorts of impacts associated with participation in CC4G. Evidence from the surveys and case studies conducted in Stage Two of the evaluation indicated that members and facilitators perceived that the involvement in the club had a number of benefits and to a large extent these were irrespective of the type of club. Despite 'the problem' of fading memories, members interviewed during Stage Three tended to confirm the earlier assessments of these same benefits (see Sections Four and Five):

- Enjoyment and the social benefits of belonging to the club
- Showing that IT can be fun (often contrasted in this regard with ICT lessons)
- Increasing IT confidence particularly for those (mainly the older girls) whose confidence in IT was low at the start of their membership
- Raising awareness that IT has a wider range of uses than those encountered in mainstream ICT lessons.



There was also evidence, deriving mainly from the Stage Two case studies but to some extent from the Stage Three interviews, that participating in clubs which enabled members to engage in structured, longer-term projects created more and better opportunities for girls to

develop new IT-related knowledge and skills. This was less likely to be the case for those clubs which revolved around short-term activities, such as game playing or which did not progress beyond the initial easy tasks available at the beginning of a CC4G module. The evidence from the clubs using longer term activities indicates that where the circumstances of the project's implementation allow for it to be run along the lines envisaged by its sponsors and developers, then there is potential within the voluntary club environment for its activities to be compelling, to extend learning and for new skills to be achieved. The reality, however, is that the voluntary and individual nature of the club means that this is rarely members' experience.

In line with the original objectives of CC4G, the evaluation evidence and longitudinal analysis have enabled the longer term effects on girls' attitudes to IT and propensity to consider IT careers to be explored. The evidence has indicated that, despite the positive immediate impact on girls' views about IT, the participation in the club has had little lasting or substantive impact on their likelihood of pursuing ICT courses or career aspirations. In relation to CC4G's longer term impacts there is:

- Little evidence that the club has increased members' take up of, or propensity to take ICT courses pre- or post-16 or into higher education
- Little evidence that the club has increased members' propensity to consider IT careers, and
- Little evidence that the club has changed members' perceptions of IT as a career for women.

In light of the range of influences on decision-making, it is not surprising that participation in CC4G over a relatively short period, and at a young age, has weak longer term effects. Collecting data from non-members showed how potent other influences are on all girls and indicates how challenging it is to change their perception of IT as a career for women. Girls' perception that it is their lack of interest in IT, rather than weak confidence or competence which explains their decisions not to consider IT as a career makes changing their perceptions an even tougher nut to crack.

Collecting data from a sample of boys indicated that they are subject to many of the same influences as girls. However, a few boys differentiated themselves from other males and the females in the study by displaying a more extensive technical interest in IT and propensity to consider IT as a career.

The analysis suggested that some factors have a particularly significant influence on girls' (and most boys') attitudes to IT and their lack of propensity to choose IT courses post-16 or to consider IT careers.

- ICT as a school subject, particularly at KS4 and ICT GCSE generally fails to stimulate further interest and fosters a sense that students have 'enough' IT skills;
- The ICT curriculum and teaching promote IT as mainly relating to office and administrative activities, which are generally viewed by girls (and boys) as uninteresting;
- The status associated with different subjects affected subject (and also career) plans. IT is seen mainly as a supporting rather than a priority subject at Level 3. It carries lower status than subjects such as Maths and Sciences and this has a negative effect on perceptions of IT in terms of university study.
- Young people have a lack of knowledge about IT careers. In this regard, the CC4G experience lacked an explicit link to careers information, advice and guidance (CIAG), or contact with employers or work experience and so had done little to change members' perceptions of IT work.
- The 'student-led approach' to CIAG in schools supports existing choices and aspirations, which misses an opportunity to expand and challenge individuals' ideas and horizons through practical initiatives like CC4G..

Sustainability

Our evaluation focused on the pattern of take-up and involvement of schools in the SEEDA region in the CC4G pilot and subsequent years (see Section Six) and tracked the continuing participation and 'drop out' of schools taking part in the SEEDA pilot years. The statistical data collected in the course of the research indicated the level of CC4G penetration and 'churn' that occurred in the region since the introduction of the pilot in 2002/03.

Penetration of CC4G across the region grew considerably over the six year period from 2002/03 to 2007/08. By the end of the period, about one in five primary and secondary schools had participated in CC4G at some point. There was a considerable amount of 'churn' with a lot of new schools joining in each of the years and others discontinuing either completely or for a year or two and then starting up again. Our research indicated that reasons for not continuing a club were often related to staff changes affecting the availability

of a facilitator or other school related matters not connected directly with CC4G. Whilst schools see good reasons for participating in CC4G it is unlikely to be a top priority (in comparison, for example, with schools' statutory duties). Its positioning as an extra-curricular activity that does not form part of the compulsory workload of staff, makes it vulnerable to being suspended or halted as circumstances in schools change.

Despite the operational challenges of sustaining a club's availability over time, there were schools in which CC4G appeared to become a longer term feature (e.g. a quarter of the schools involved in Year 1 of the pilot were still running a club in Year 6).

There were no explicit objectives specified with regard to churn or penetration of CC4G across the region, and so it is not possible to assess whether the achieved figures were higher or lower than envisaged by the sponsor. However, an important purpose of this analysis has been to investigate the extent of churn that has occurred in relation to a new voluntary school club. The figures that have been produced should provide insights which will be helpful in the planning of any similar future initiatives.

Lessons Learned and Recommendations

The following recommendations emerge from the evaluation's main findings and conclusions over the three phases, and represent our perspective on how the 'lessons learned' might be addressed.

- It is important that the sponsors of interventions such as CC4G recognise that the experience of beneficiaries is set within their other, often far more substantial and ongoing influences. Their objectives should be constructed in light of this context.
- It is important for the developers of interventions such as CC4G to define at the outset what counts as a 'valid' experience of the club and might be realistically be expected to have an impact in line with its objectives.
- If interventions like CC4G are to have greater impact long term on career choices, then the immediate benefits need to be sustained and reinforced with participants over time through other school or external activities.
- Initiatives like CC4G which have clear objectives relating to careers and work should be more joined up with careers related activities in schools.

- It is important not to rely solely on extra-curricular activities like CC4G to try to influence and change views on IT and IT careers but also to consider more the role of the IT curriculum and how such activities can link with it.
- Urgent action needs to be taken among both boys and girls to give them a greater awareness of the breadth of IT work and careers, especially technical roles. It is clear that information, advice and guidance in schools about careers is currently ineffective in doing so.
- An important factor in post-16 choices (and ultimately career choices) is the status associated with different school subjects; IT and computer science have comparatively low status and this affects students' decision making.
- It is important not to generalise too much about gender differences in relation to IT and to recognise the diversity that exists among boys' and girls' experiences and views on IT when planning interventions like this.
- More research should be carried out into the optimum age range for implementing interventions such as CC4G which are trying to change persistent attitudes and into the effectiveness of girls-only, girl-friendly interventions in challenging gender stereotypes.

SECTION ONE: INTRODUCTION

- 1.1 This is the final report of the external evaluation of the Computer Clubs for Girls (CC4G) initiative for the SEEDA region. The overall purpose of CC4G is to help address the persistent gender imbalance in the IT sector. Females continue to be significantly under-represented in IT jobs¹ and particularly in those such as software developer and systems analyst, which require substantial technical expertise. Women are also less likely than men to participate in higher level IT courses². It is unlikely that industry's demand for IT skills will be met without a substantial increase in the numbers of women entering the sector.
- 1.2 SEEDA funded the creation of CC4G and the two-year pilot from 2002 to 2004 and also supported the first post-pilot year (2005-06). As a result of SEEDA funding CC4G was offered free to schools in the South East of England. The Sector Skills Council for the IT and Telecoms industries, e-skills UK, led the development and implementation of the club, including its resources. In the first year of the pilot, most of the club's materials were paper-based but, by the second year, the club became a web-based initiative. Since the pilot, e-skills UK has continued to extend the website's range of courseware and activities. In 2005-06 CC4G was made available nationally following the decision by the (then) Department for Education and Skills (DfES) to fund the club.
- 1.3 In the pilot years CC4G was targeted at girls in the 10 to 13 age group (Years 6 to 8). This includes girls in their final year of primary school and first two years of secondary school. Since the national roll out of the club, 14 year olds (Year 9) have also been eligible to become members.
- 1.4 To fulfil the aim of enhancing females' propensity to enter careers in IT, it was envisaged that CC4G would contribute to the following strategic objectives (as set out in the SEEDA specification):

¹ In the UK, the proportion of women in the IT and Telecoms workforce fell from 24 to 19 per cent between 2001 and 2006 (LFS, 2006 cited in e-skills UK, 2006).

² Females are under-represented on IT related courses in Higher Education (HE) as they account for just under a quarter of this population of students (HESA 2005, cited in e-skills UK, 2006).

- To help redress the forecast skills shortage of IT professionals in the South East
- To increase the number of women who enter jobs and careers in the IT sector, and
- To engage the IT industry so that the future needs of industry are properly met through the joint efforts of government, industry and education providers.

1.5 The CC4G project objectives (as per the specification) were:

- Within the target group, to change the perception of IT as a career for women by offering inspiring and compelling activities which appeal to girls in a voluntary computer club environment, and
- Within the target group, to counter the perception that IT is a male profession.

1.6 The overall aim of the evaluation is to provide SEEDA with a detailed and comprehensive evaluation of the club's benefits and impacts. The national roll-out of CC4G is outside the scope of this evaluation.

1.7 The evaluation has addressed three broad objectives: to assess the impact of the CC4G project; to identify good and less effective practice and key lessons; and to draw on these to recommend how the benefits of the project can be built on and sustained in the longer term. These objectives have been pursued through a three stage evaluation process. The three phase evaluation process included scoping work in Stage One as preparation for the main data collection phases (Stages Two and Three) of the evaluation³.

1.8 This final report includes an analysis of the data collected in Stage Three as well as a summative account of the evaluation findings. The report is organised in seven main sections focusing on the evaluation design (Section Two); the

³ See Stage One Report (November 2005), *Preparing the Ground*; First Annual Report (July 2006); Stage Two Report (July 2007), *CC4G in Practice*; and Stage Three Annual Report (July 2008).

fieldwork and data collection undertaken in Stage Three (Section Three); the Stage Three findings (Section Four); CC4G members' reflections on their experience (Section Five); an account of growth in the club's take-up by schools and its sustainability (Section Six); and overall evaluation conclusions (Section Seven).

CC4G

- 1.9 The club has been offered to schools, at no cost, as a set of professionally produced resources. Schools wishing to run the club register with e-skills UK which produces, provides and updates the resources (primarily the CC4G website) and offers training and support for facilitators. Every school that joins CC4G receives the same resources and access to the website which means that, at the level of the adoption of the club, there is consistency.
- 1.10 However, it is important to note that, because of the voluntary nature of this initiative, no two realisations of the club will be the same. The implementation of CC4G depends on the specific and individual circumstances of each school and the member(s) of staff responsible. The various ways in which clubs can differ include: the reasons for (schools and staff) getting involved; when, how, and how often the club is run and by whom; the girls who choose to join; the choice of pedagogical approach, and so on. Therefore, members' experiences will differ between schools and often between members in different years in the same school.
- 1.11 The club is voluntary (and individual) at three different levels (the school, the facilitator(s) and the students): the school can choose whether to adopt the club; facilitators and other helpers usually give up 'free time' to run the club and can choose how they manage it; and students are under little or no pressure to attend. This voluntary principle leads to a 'let a thousand flowers bloom' approach to CC4G, leading to a wide variation in how the club is experienced by members. If a Martian were to land and ask us to take it to CC4G, we could take it to e-skills UK for a full demonstration of the scope and capability of the website and explanation of the concept and support material, but we could not point to

one club as representative of CC4G in action. Nonetheless, there are some operational dimensions (such as the extent to which the club is directed by the facilitator and the focus on short or longer term activities), against which the models of the club encountered in this evaluation can be contrasted. These were drawn out during the course of the second stage of the evaluation.

- 1.12 CC4G is a 'gendered' project in that it is directed solely at girls and has objectives that are explicitly about changing the perceptions and behaviour of its participants. It does this by creating an all-girls' environment coupled with the presentation and delivery of IT through a website designed with the interests of girls in mind. The 'girls-only' concept and the website's aim to be 'girl-friendly' are clearly central to the club⁴. The experience and impact of the girls-only nature of the club has been a theme throughout the evaluation.

⁴ e-skills UK has recently announced that the club, now funded by DCSF, will in future be offered to boys as well as girls (e-skills UK news update, June 2009).

SECTION TWO: EVALUATION DESIGN AND EVIDENCE BASE

The evaluation has been conducted in three phases using a variety of data collection techniques to generate a large evidence base (see Table 1 below).

Stage One

- 2.1 Stage One (August–November 2005) provided a scoping phase to prepare the ground for the main data collection stages of the evaluation. Its particular focus was to validate the evaluation design; explore the availability of relevant existing pupil data; and confirm the type and size of the survey and case study samples for the following stage, as well as to develop some initial understandings of how the club functioned in practice. In addition to reading relevant background documentation, 20 key informant interviews including CC4G funders, designers, providers, club facilitators, and ‘intermediaries’ such as employers and local authority representatives were completed. We interviewed club facilitators with different levels of experience of CC4G from a range of types of schools in various geographical areas throughout the South East of England.

Stage Two

- 2.2 The aim of Stage Two (December 2005–July 2007) was to develop an evidence base from which to begin to assess the club against the evaluation objectives. During this stage we used a combination of quantitative and qualitative data collection strategies in order to maximise the type of information we gathered (quantitative survey evidence relating to ‘how many’ and ‘how much’ as well as more focused information about ‘how’ and ‘why’). The particular focus in this stage was on CC4G ‘in action’: on current and past members’ experiences of and perceptions of being involved in CC4G; and on the experiences and perceptions of club facilitators and other relevant staff. In 2006 data were collected via questionnaire surveys of members and past members in clubs across the region

- and the profiling data on the schools, including information about each school's overall levels of attainment. In 2007 we conducted case studies in a range of primary and secondary schools selected from the schools participating in the survey (see Table 1 for details of the data collected).
- 2.3 The survey samples included all the main types of schools (single and mixed sex, comprehensives, secondary moderns and grammar schools). The GCSE A-C attainment figures also indicated that the sample included a wide range of school performance from well below the national average (which was 56 per cent in 2004–05) to well above it.
- 2.4 Surveying past members created an opportunity to evaluate the longer term influences of CC4G on a group of students currently approaching the end of compulsory schooling and who were considering their post-16 education and career options. Surveying current members provided a lens for examining their recent and ongoing experiences of the club as well as their attitudes to IT courses and careers, and their future plans.
- 2.5 In contrast to the surveys, the case studies in Stage Two collected largely qualitative evidence from the facilitators and, where possible, other relevant staff as well as from members themselves. The particular purpose of the case study work was to generate evidence about a range of themes including: the factors influencing the implementation of the club in primary and secondary schools; respondents' experiences and perceptions of benefits, good and less effective practice and the implications for sustainability; and impact on members' attitudes to further IT study and also to IT careers. The case studies involved observations of CC4G sessions, focus group interviews with members and interviews with facilitators (see Table 1 for details of the data collected).

Stage Three

- 2.6 After discussion with SEEDA at the end of Stage Two, it was decided that the two-year, third Stage of the evaluation should concentrate on collecting qualitative data by way of one-to-one interviews with girls. This would enable

emerging themes to be explored in more depth than a survey technique would allow. In order to explore the 'additionality' of CC4G, we incorporated girls (in the same schools) who had *not been members* into this phase of the evaluation to help reveal the particular effects CC4G has had on its participants. At the end of the first year of Stage Three, it was further decided (in consultation with SEEDA) to probe boys' views of IT to help explore any differences in the attitudes to, and levels of knowledge of, IT between similarly aged males and females.

2.7 In Stage Three the focus has been on particular themes appropriate to girls some years on from CC4G, or appropriate to girls (and boys) who had never been members. The themes included: attitudes to and experiences of IT; propensity to engage in IT courses and careers; CC4G's influence on future education and career plans.

2.8 The aim over the course of Stage Three has been to conduct 100 interviews with girls – 50 in Year 1 and 50 in Year 2 – as well as (in Year 2) to interview a sample of boys (20). The rationale behind the sample selection was to:

- Include both members and non-members in order to have some basis for comparison between the two groups
- Include both boys and girls in order to have some basis for comparison between boys and girls
- Focus on groups of girls whom the findings from Stage Two suggest are of particular interest e.g. high attaining girls
- Include girls of different ages, covering a) those whose memories of CC4G and its effects were recent, and b) older girls whose memories of CC4G are more distant, but who were closer to making career decisions and advanced educational choices
- Include girls from a range of CC4G schools to achieve a sample that contained members who have participated in a range of types of schools and clubs, and
- Follow up of girls' evolving experiences and attitudes via a longitudinal data collection strategy.

Table 1: Summary of evaluation activities and data collected

Stage 1 Scoping Phase (August–November '05)	Stage 2 Questionnaire Survey and School Case Study Phase (December '05–July '07)	Stage 3 In-depth Interview Phase (August '07–July '09)
<ul style="list-style-type: none"> • Relevant background documentation read. • Key informant interviews (20). 	<ul style="list-style-type: none"> • A questionnaire survey of 166 current CC4G members in 14 secondary schools, geographically distributed across the south-east region, in Spring and Summer 2006. • A questionnaire survey of 89 past members of CC4G in nine out of the 14 schools in Spring and Summer 2006. • Collection of profiling data on the schools involved, including information about the school's overall levels of attainment. • Case studies in nine schools, six secondary (selected from the 14 schools surveyed), and three primary schools (one from each of the SEEDA regions) in Spring and Summer 2007. • The case studies involved: 9 observations of clubs in action; 15 focus group interviews with past and present members; 21 interviews with facilitators and other relevant school personnel. • Tracking of school participation across the region to track churn and sustainability. 	<ul style="list-style-type: none"> • Interviews with 54 girls in first year of Stage 3. • Interviews with 41 girls in second year of Stage 3. • Interviews with 21 boys in second year of Stage 3. • Total Interviews: 116. • Ongoing tracking of school participation to track churn and sustainability.

2.9 As many as possible of the same girls have been interviewed in both years of Stage Three and, where possible, girls surveyed in Stage Two were included in the interviews in Stage Three as well, to explore:

- The effects of CC4G on attitudes over a longer time span
- The effects of other factors on attitudes to and experiences of IT⁵
- The development of attitudes to IT and employment over time, and
- Ongoing experiences of IT.

2.10 The interviews in Stage Three were semi-structured to allow for focused questions about experiences and choices, and also for girls and boys to elaborate on aspects of CC4G, their attitudes to IT, attitudes to employment, and so on, which were of interest and importance to them. Additionally, we completed a proforma for each girl and boy to enable collection of factual information about attainment levels, qualifications held, grades, subjects studied, ethnicity, the nature of club attendance (where appropriate), and current participation in IT courses, if any.

The analysis of 'churn'

2.11 A key component of our evaluation has been the tracking of participating schools over the six years (2002–2008), to indicate the extent to which CC4G has been taken up by schools across the region. Our longitudinal analysis also enables the extent of 'churn'; that is, the pattern of participation of schools from year to another to be revealed. This evidence offers an important insight into the sustainability of CC4G in schools and can be taken as a more general indicator of the challenge of sustaining a voluntary club in schools over time.

⁵ The acronyms IT and ICT are used throughout this report. Interviewees used the acronyms interchangeably and, although ICT tends to be used to refer to the school subject, IT is commonly used as well.

2.12 A detailed account of the analysis of 'churn' is provided in Section Six. The analysis is based on a range of information on members (girls), schools and facilitators with which e-skills UK has provided us at different times⁶. It includes data for the years:

- 2002/03 and 2003/04 (Years 1 and 2), which we obtained in January 2006 (and has been reported in earlier project reports)
- 2003/04 (Year 2) schools with members, presented in e-skills UK 2004 Evaluation Report on outputs of CC4G for Year 2
- 2005/06, 2006/07 and 2007/08 (Years 4, 5 and 6) which we obtained from e-skills UK records in September 2008. The latter updated the earlier, partial year data we had obtained on the 2005/06 schools.

2.13 We have obtained data on SEEDA region schools for each of the six years except 2004/05. This was when the scheme was no longer being funded by SEEDA and before the national funding came in. Some schools did continue to run CC4G clubs at this time and the website was maintained by e-skills UK. As far as we can ascertain, no reporting of CC4G membership data was undertaken that year by e-skills UK or SEEDA (and schools did not keep their own membership data on a consistent basis), so we do not know how many schools and girls were active members in 2004/05.

2.14 As highlighted in previous reports, there have been a range of operational challenges involved in the collection of the data. The selection of schools and obtaining their agreement to participate was difficult for several reasons. Many schools which had run clubs in the early years did not continue to do so, and therefore did not have a facilitator with whom we could work or have a steady developmental pattern of activity over the years. Once we had found out to whom we should speak, it was often difficult for the teacher to find time in a busy school day and without easy access to telephone lines to speak to us. Emails were often not a fruitful source of contact. As running a CC4G club was a voluntary activity, there tended to be a high turnover of facilitators in any one

⁶ We are grateful for the assistance from staff at e-skills UK in supplying the requested data.

school, making it hard to locate past members or the people who had knowledge of what a club had been like in any one year. Maintaining contact over a number of years in such circumstances has been challenging.

2.15 The next section (Section 3) provides a full account of the fieldwork and data collection undertaken in Stage Three of the evaluation.

SECTION THREE: FIELDWORK AND DATA COLLECTION IN STAGE THREE

- 3.1 The information presented below provides a summary of the fieldwork undertaken and data collected during Stage Three (August 2007–July 2009) and builds on the account presented in our last annual report (July 2008).

The range of schools

- 3.2 We have carried out interviews in eleven schools, all of which participated in either the past or current members' surveys in Stage Two (apart from the one primary school). Five of these were also case study schools in the same phase of the evaluation. See Table 2 below for details of the longitudinal continuity of schools in the evaluation.

Table 2: Summary of longitudinal participation of schools

	Stage 2 Survey	Stage 2 Case Studies	Stage 3 (Year 1) In-depth Interviews	Stage 3 (Year 2) In-depth Interviews
Numbers of schools involved	2 schools			
		2 schools		
				1 college
	2 schools	2 schools		
		1 school		1 school
	2 schools		2 schools	
	4 schools		4 schools	4 schools
	4 schools	4 schools	4 schools	4 schools
Total number of schools	14 schools	9 schools	10 schools	9 schools and 1 college

- 3.3 The sample contains a range of types of school (see Table 3 below). Three are girls-only and eight are mixed-sex schools. Three secondary schools have pupils from Years 7–11 and seven from Years 7–13. All the schools have specialist status. The sample includes schools with attainment above and below the national average for GCSE attainment. Eight are comprehensives, one a grammar school and one a 'modern'. There is a geographical spread: four schools are in the south of the SEEDA region, four in the north and two in the east.
- 3.4 In the second year of Stage Three, two of the schools were unable to continue (School 1 and School 5 in the table above). The other schools (apart from the primary school) participated in both years. We also interviewed six girls, now in Year 10, who had attended a CC4G club in their primary school (a feeder school for one of the secondary schools in the sample and which had been a case study primary school in Stage 2).
- 3.5 The interviews with girls in Stage Three were distributed across ten schools in the first year and eight schools in the second year. The interviews with boys took place in three schools and one FE college.

Table 3: Summary of information about the schools and the college in Stage Three of the evaluation

Schools or college	Mixed or girls only	Years taught in school	Specialist School Status	GCSE attainment above or below national average	Type of school or college	Location within SEEDA region
A	Girls only	7–13	Languages	Above	Comprehensive	North
B	Mixed	7–13	Performing Arts Maths and Computing	Below	Comprehensive	North
C	Mixed	7–13	Maths and Computing	Below	Comprehensive	North
D	Mixed	7–13	Maths and Computing	Above	Comprehensive	North
E	Mixed	7–13	Performing Arts	Below	Comprehensive	North
F	Girls only	7–13	Technology	Below	Modern	East
G	Girls only	7–13	Maths and Computing	Above	Selective	East
H	Mixed	7–11	Maths and Computing	Above	Comprehensive	South
I	Mixed	7–11	Business and Enterprise	Above	Comprehensive	South
J	Mixed	7–11	Business and Enterprise	Below	Comprehensive	South
K	Mixed	Post-16	NA	NA	FE college	South
L	Mixed	Year 0–6	NA	NA	Primary	South

Number and range of girls and boys

3.6 In the first year of Stage Three, we interviewed a total of 54 girls, four more than our target of 50 (see Table 4). As planned, the majority (35) of interviews were with past members of the club and the minority (19) were with non-members. Of the 35 past members, 30 also took part in the survey two years ago. This made it possible for us to follow some girls through longitudinally from the survey in Stage Two to the interviews in Stage Three.

Table 4: Sample breakdown by younger and older girls, and members and non-members – first year of Stage Three

	Younger Years 9–10			Older Years 11–13		
Totals	Members	Non-members		Members	Non-Members	Overall totals
Overall total	17	9		18	10	54
Overall desired quota	15	10		15	10	50

3.7 Girls in Years 10 and 11 were following GCSE courses. The older girls, those in Years 12 and 13, had already made their post-16 decisions and were pursuing A levels or equivalent, or programmes of study designed to facilitate their transition to Level 3 courses (A level equivalent). Most of them had not yet reached the stage of making final decisions about education or employment beyond school, but most of those in Year 13 were intending to go to university.

3.8 Of the 35 members interviewed, ten attended the club in Year 7, four in Year 8, three in Year 9, and 17 for more than one year. For one, it was not clear which year she attended the club. It is interesting that the club was sometimes made available to girls in Year 9, when it was originally designed for those in Years 6 to 8.

- 3.9 Of the total number of 54 girls interviewed, 39 were attending or had attended comprehensive schools. Ten attended a selective school and five a secondary modern school. Four were currently at a sixth form college. About two fifths of the sample (21 girls), were from girls-only schools while the rest (33) were from mixed schools. Of the past members, 12 were from girls-only schools while 23 were from mixed schools.
- 3.10 In the second year of Stage Three we interviewed 41 girls. Of these, 29 had been club members and 12 were non-members (see Table 5). We achieved close to our proposed quota in all areas apart from younger non-members, as a particularly high proportion of these girls attended the two schools unable to participate in the second year. As a consequence of the schools' withdrawal, we lost 10 girls in the younger age-group from the second round of interviews. In addition, five girls in various schools had left to go on to college and were not traceable. One had unexpectedly left sixth form college. Two girls did not wish to be re-interviewed.

Table 5: Sample breakdown by younger and older girls, and members and non-members – second year of Stage Three

	Younger Years 10–11		Older Years 12–13 and left school		Overall totals
	Members	Non-members	Members	Non-Members	
Totals					
Interviews completed	18	3	11	9	41
Desired quotas	15	10	15	10	50

- 3.11 There were 35 girls from the original sample of 54 in the second year of Stage 3. Of these 35, 22 had also participated in the surveys in Stage Two and the first round of interviews in Stage Three, allowing for longitudinal follow-up over a

period of four academic years. Table 6 indicates the degree of longitudinal follow up achieved for individual member girls over the period of the evaluation. Table 7 indicates the degree of longitudinal follow-up achieved for non-member girls over the two years of Stage 3.

Table 6: Summary of longitudinal participation of CC4G members

	Stage 2 Questionnaire Surveys (December 2005– July 2007)	Stage 3 (Year 1) In-depth Interviews (August 2007– July 2008)	Stage 3 (Year 2) In-depth interviews (August 2008– July 2009)
Number of participants	225 girls		
	8 girls	8 girls	
	22 girls	22 girls	22 girls
		1 girl	1 girl
		4 girls	
			6 girls
Total number of participants	255 girls	35 girls	29 girls

Table 7: Summary of longitudinal participation of non-members

	Stage 2 Questionnaire Surveys (December 2005– July 2007)	Stage 3 (Year 1) In-depth Interviews (August 2007– July 2008)	Stage 3 (Year 2) In-depth Interviews (August 2008– July 2009)
Number of participants	N/A	7 girls	
	N/A	12 girls	12 girls
Total number of participants	N/A	19 girls	11 girls

3.12 We interviewed 21 boys in the second year of Stage Three from a range of age groups (see Table 8). Boys in Year 11 were of particular interest as this year is the period during which they consider their post-16 destinations and subject choices.

Table 8: Sample breakdown by year group for boys

Totals	Year 9	Year 10	Year 11	Year 12	Year 13	Overall totals
Interviews completed	3	3	8	3	4	21
Desired quotas	4	4	4	4	4	20

Other information about the sample

- 3.13 The sample contained girls and boys with a range of attainment levels in terms of SATS results at the end of Key Stage 3, and GCSE results at the end of Key Stage 4, although the information was not available for all those interviewed. The majority of the interviewees who had sat their GCSEs (and for whom we had results) had achieved at least five GCSEs at grades A* to C.
- 3.14 Seven girls, four ex-members and three non-members⁷, were studying or had studied IT at A level or at OCR IT Diploma level (see Table 9 below). Four boys were studying IT⁸ courses at Level 3. Participation in ICT at this level of study is important because it is beyond the GCSE (level 2) at which students normally study in Key Stage 4 (i.e. pre-16). Therefore, taking up a Level 3 ICT course⁹ implies that the individual has chosen this option above others. As we have highlighted, following an ICT course at Level 2 was mandatory for most of the individuals in our samples.
- 3.15 Table 9, below, shows the numbers of boys and girls with, or studying for, a wide variety of IT qualifications. Sometimes individuals had multiple qualifications.

⁷ It should be remembered that approximately two thirds of the Stage Three female interviewees had been members and one third had not been. Therefore, the higher number of members pursuing Level 3 IT qualifications should not be taken as an indicator that members of CC4G were more likely to pursue these advanced level IT courses than their non-member peers.

⁸ We utilise the abbreviations 'IT' and 'ICT' in this report. Interviewees tended to use them interchangeably, although it was more common for ICT to be used to refer to IT as a school subject.

⁹ We do not include Key Skills in this point as they are mostly taken as compulsory components of a programme of study.

Table 9: IT qualifications held or being worked towards by students in the sample

Level of IT qualification in National Qualification Framework	Qualification name	Girls	Boys	All
Level 2	GCSE IT	13	6	19
	Half GCSE	11	4	15
	GCSE Business and Communication Studies	12	0	12
	Key Skill IT	6	2	8
	BTEC IT	4	4	7
	OCR IT Diploma	2	1	2
	CLAIT	0	3	3
	European Computer Driving Licence	3	0	2
Level 3	AS IT	5	0	5
	Key Skill IT	8	1	9
	BTEC IT	0	3	3
	OCR IT Diploma	2	0	2
Without IT qualifications		5	0	5

3.16 In terms of ethnicity, our interview sample is predominantly White British (56). Four were Asian or Asian British. Four were Chinese or of other ethnic group. Seventeen participants are of unknown ethnicity, as we did not ask this question in the first year of Stage Three, but they are likely to be predominantly White British, as well. The sample also included interviewees from a range of socio-economic backgrounds, but it was not possible to collect systematic data from the young people in relation to this characteristic.

SECTION FOUR: FINDINGS FROM STAGE THREE

- 4.1 This section presents an analysis of the findings and issues emerging from the Stage Three interviews conducted during 2007–08 and 2008–09 and builds on the preliminary analysis of the first round of interviews provided in the Annual Report (July 2008).
- 4.2 To investigate the longer-term effects deriving from girls' participation in CC4G, the final phase of the evaluation adopted a qualitative data collection strategy. Interviews were conducted with younger and older past members of the club who during Stage Three were in Years 9 to 13 or had recently completed Year 13. The follow-up interviews in the second year of Stage Three were designed to explore any ongoing effects of CC4G and their possible influence on members' decision making about educational options and careers. In addition, to help identify the effects of CC4G in relation to changing attitudes to IT and propensity to engage in IT courses and careers, interviews were also conducted with female non-members and boys. The interview schedules are located in the appendices. The key themes to be explored in this final phase of the evaluation are as follows:
- Girls' and boys' attitudes to and experiences of ICT
 - Girls' and boys' propensity to engage in ICT courses, and
 - Girls' and boys' propensity to engage in ICT careers.

Contextualising the findings

- 4.3 There are substantive challenges involved in collecting data from young people over time. The first of these relates to the shifting territory of IT, girls' lives and the clubs themselves. The nature of the IT scene is ever-changing. When the older girls (those aged 16 plus during Stage Three) report on their early IT experiences, they are frequently referring to their experience in primary school where there was usually only one computer available for occasional use. Often

they did not have computers at home. These girls were more likely to lack confidence and basic IT know-how on entry to, and in the early years of, secondary school. Younger girls tend to have had a much more extensive experience of IT at school and frequently have also had access to IT facilities at home. They find it harder to remember a time when they have not had access to a computer. These differences mean that it is difficult to generalise the findings relating to IT capability and confidence, and the impact of CC4G, across the different age groups or to future participants. In addition to the changing IT environment, CC4G itself has changed in response to needs and as the materials and website have been developed.

4.4 CC4G was an initiative for girls in either the last year of primary school or the first two years of secondary school. Therefore, each age at which we could speak to the girls raised particular issues. For older girls, the mix of factors described above was compounded by the issue of fading memories. Some of the girls we spoke to had been members of CC4G several years previously. Typically they had only hazy and partial memories of the club and its activities and were able to articulate only impressions about their experiences. Even girls who had attended the club within the last year or two did not necessarily retain overly clear memories. Younger girls found it particularly hard to say what their future career plans were and how these might include IT, as they were some years away from making employment-related decisions. Many of the younger participants were still at the stage of choosing subject options and some of the older girls envisaged going to university.

4.5 In addition, it is important to make the point that there are various routes into the IT sector and to achieving a career in IT. Unlike professions such as Medicine or school teaching, IT is one of those occupations that does not require particular subject-related qualifications for entry. Gaining experience of, and qualifications in, IT at school and in further or higher education may be seen as an indicator of an individual's likelihood of going on to work in IT and this underpins the rationale for exploring girls' attitudes and experience of IT. However, it is important to bear in mind that the relevance of this to predicting future career choices will be uncertain.

Girls' and boys' attitudes to and experiences of ICT

4.6 We were able to explore interviewees' attitudes to and experiences of ICT as a subject across the National Curriculum Key Stages 3, 4 and 5. Interviewees were asked to describe their experience of ICT lessons and related subjects at different stages of schooling. ICT as a subject is part of the National Curriculum and is therefore taken by all students. It is important to investigate girls' and boys' experiences and perceptions of ICT as these are likely to be important factors in their decisions about whether or not to choose it as a subject, post-16 and in their propensity to pursue it as a career. Collecting data from non-members and from boys, as well as from members, helps reveal the influence of CC4G participation when set alongside students' wider experiences of ICT in and outside of school and the range of factors that are relevant to their decision-making.

Key Stage 3

4.7 Most girls (members and non-members) had neutral attitudes towards ICT in Key Stage 3 (KS3), seeing it as a useful rather than an interesting subject. The remainder were split between a few who were very positive and a few who were very negative about their experiences. ICT lessons were mostly seen as being about business administration and about learning to use common 'office type' programs (e.g. Word, PowerPoint and Excel) that they could use in a range of other school subjects.

4.8 Overall, boys' attitudes towards their ICT lessons were not dissimilar to girls. Like girls, most boys saw the work they did in KS3 ICT as useful and, similarly, a small number also complained that it was boring and repetitive. In contrast, a few boys were very enthusiastic.

4.9 There were some differences in attitudes by school. This seemed to be a by-product of the strength and staffing of the department, which had an impact on learning experiences of boys and girls.

4.10 For the majority of girls, there were no significant differences in the attitudes of CC4G members and non-members to ICT. However, as might be expected, those girls with more negative attitudes towards ICT were more likely to be non-

members and those who were very keen were more likely to be members. As detailed in the Stage Two report, the fact that so many members were already keen on ICT makes it harder to gauge the impact CC4G has had on improving attitudes towards ICT. As CC4G is a voluntary club, it is unsurprising that many of the girls who joined reported feeling positive about ICT prior to the club. Girls who reported significant changes in attitudes were more likely to be those who joined because they wished to improve their skills and confidence.

- 4.11 CC4G members reported that the main differences between CC4G and ICT lessons was that CC4G was 'fun', whereas the function of ICT lessons was to learn about and be assessed in ICT. The fun/learning distinction was seen across all schools.
- 4.12 There is a concern that girls are more likely than boys to arrive at secondary school with fewer IT skills, lower confidence and more limited experience of IT. However, the range of experience and IT competence that girls brought with them to secondary school was very similar to boys. Some reported being confident with computers prior to coming to secondary school, whilst others had limited experience. Similarly, more of the older boys (as was the case with the older girls) seemed to have had limited experience and access to computers. In some cases boys' early 'experience' of computers was limited to gaming. The opportunity to collect the perceptions of younger and older girls and boys about their early experiences of IT has brought out the similarities in the experiences of both sexes and challenges the assumption that girls are more likely than boys to lack IT confidence at the start of secondary school.
- 4.13 In general, then, boys and girls expressed similar attitudes to IT, and to ICT as a subject, in KS3. What is different, however, is that there are a small number of boys who indicated, from their responses, a wider, often more technically-driven, interest in computers. For some boys this indicated a curiosity in both hardware and software skills such as programming and in the technological aspects of the subject. This technically-focused interest was absent from the responses of girls, both members and non-members. This is illustrated later in this Section by Example 1, which shows the enthusiasm of boys for IT within Key Stage 4 (KS4).

Key Stage 4

- 4.14 For most of our interviewees (particularly the younger ones), taking an ICT course at KS4 was compulsory, usually in the form of a short course (half GCSE) or full course GCSE (ICT or Business and Communication Studies). Most interviewees accepted that ICT at this level was useful and that the skills being taught were relevant to a wide range of occupations, subjects and life more generally. A number of girls liked the project-based approach to coursework. Girls were more likely than boys to say they enjoyed the learning style and liked, for example, building on their existing skills such as Excel, as well as learning new ones such as Dreamweaver.

Like, last year I had quite a bit of knowledge of like the 'equals if' things on Excel where you like to the sums and everything, but now it's, like, using look-up tables and like more in-depth charts so, like, when you change something in the table it will change the statistics thing, then it will change the chart...so it's quite good. (Zandra, Year 10, School D, Member)

- 4.15 There were many boys and girls who found the ICT GCSE rather boring (particularly in Year 11) – they just didn't like it:

I don't like the fact that it's all every single lesson is sat in front of the computer just carrying on with different things...I'm not the type of person who just likes to sit and just plod through almost like the same thing day after, like lesson after lesson, just adding to it bits and pieces. (Hayley, School C, Year 10, Member)

- 4.16 Two main issues relating to GCSE were highlighted: coursework and the repetitive content of the syllabus. In the former case, interviewees complained that the coursework involved a lot of writing up and evaluation and that this detracted from learning about ICT. Whilst some girls also complained about coursework, the boys were even more vocal in their criticisms. Some boys felt that their final attainment levels (e.g. GCSE grades) were undermined by their failure to complete coursework in line with requirements. In Year 10, the course was seen as being quite interesting, but by Year 11 there was little new ICT

content being introduced. There were boys and girls who complained that year on year they were expected to learn about the same Microsoft Office programs such as Excel, Word and PowerPoint:

It could just be a bit more, they could use a wider range of programs instead of just using Office. (Oscar, School J, Year 11)

- 4.17 Unlike girls, boys frequently complained that ICT at KS4 did not really teach them enough about hardware, and sometimes programming. Boys on the more intensive courses such as the BTEC First Diploma also felt that this course did not contain enough on hardware and programming. A number of boys said that they wanted to learn what was inside computers and how to build them:

And it would possibly be a bit different, say taking part a computer and seeing what's inside it and things like that...we've done about an hour and a half on that...I would have thought we'd have done that for longer and to work out how to do it properly. (Paul, College K, Year 12)

- 4.18 Boys also said they wanted to do more programming: *'Visual Basic and things like that, because I think that's proper interesting, like coding.'* (Quentin, College K, Year 12) There were not any girls who made this kind of comment. Girls were more likely to say that they wanted more media or graphics-type learning.

- 4.19 Another key difference was the animated way some boys spoke about the skills they had learnt in ICT – even Excel.

...we got to use like more advanced and then be able to like important and export data from one part, bit of work to another, and like make more advanced data sheet and things, so you could like work calculations out or just some calculations or work a whole lot of sums about and like if you like accounts like money accounts. (Will, College K, Year 12)

- 4.20 Overall, a number of the boys showed a much more positive attitude towards IT skills and learning that went beyond anything learnt at school. The enthusiasm some boys have for the technical aspects of computing can be illustrated by looking at two boys in particular. Both of these boys clearly see computing as

something they enjoy, and both have taken the time to teach themselves aspects of computing to which they did not have access at school.

Example 1: Niall

Niall is currently in Year 12 at a college studying A Levels, one of which is Media. He describes himself as having always had an interest in computers from an early age and refers to his early experiments – at the beginning of his secondary education – making animations. He has continued to be interested in the subject and displayed, throughout the interview, a knowledge and use of a wide range of programs both administrative and creative. Niall studied ICT in the double award GCSE at school, but did not like the course because of the coursework and evaluation element. He did not feel that this was really IT. Instead he says that he learnt ‘95 per cent’ of what he knows at home by loading up programs and exploring what they could do. He decided to study Media A Level because he has continued to use computers to edit sound and film and to make animations. He has also taught himself programming and has made simple games. Niall, talking negatively about his experience of ICT at school, is only positive about his computer experience and his attitude is summed up by the following quotation:

Well at the beginning I probably would have been oh this fun. And then it would have developed into this is useful. And then it would have developed into this is brilliant, I can do practically anything ... So it's just increased I suppose with the more things I can do the more I appreciate it.

Mike is a Year 11 boy at a mixed comprehensive. Mike's story illustrates how computers can become a central part of life – in social terms – for boys.

Example 2: Mike

Mike enjoys all work on the computer but gets frustrated with the facilities at school because he knows they could be much better. He continually talks about upgrading his own computer and his desire to build his own computer to his own specification. He says that he is frustrated by the Internet speed at home and is aware that it could be better. He also criticised his IT course at school because it did not teach him how to program or how to take a computer apart and says that he has had to go home and teach himself. Mike takes out books on computers to help him to learn new things and has tried programming. He is also good at networks and has managed to form a 'network' with a group of friends so that they can play games together. In fact, whilst many boys who play on computer games do not necessarily show any interest in furthering their skills, Mike's motivation for his learning is about gaming – something he would love to pursue. He is not, however, taking computing or IT at A Level, because his parents wish him to be a doctor and so his A levels are prescribed by this goal. He feels some regret at leaving IT behind and as he says, when asked what type of person he sees doing an IT job:

I actually think about myself when I think about it. Well I'm not sure if I should say that but I'm an ICT fan. Whenever there's new technology or the computer component is out I'll always want to buy it.

- 4.21 In most cases, girls did not go into any detail about the work they carried out in KS4 ICT. By contrast, particularly older boys often spoke at length about the projects they had undertaken in terms of the use of software and what they had been able to create. This was the case for boys who were not intending to pursue ICT after KS4 as well as those that were.

4.22 There were differences in the content and learning embodied in different course specifications, as promoted by the different exam boards. In this sense a 'school effect' might actually be a proxy for a particular qualification.

4.23 It was clear that the creative ICT skills taught on related courses, such as Media and Graphics, were often seen as more enjoyable than the business administration skills of ICT GCSE. In this respect girls and boys held very similar views.

...because in media, and, like, since we last spoke, I had to do a music video and I was working with programs that seemed a little bit more complex and because over the rest of the school years that I've had it's always been very spreadsheet and Word and its all been the same thing over and over again and but to be honest I learnt exactly the same in Year 11 as I probably did in Year 7 and...now I can understand some more complex programs, which is so much better. And it was much more creative as well. (Valerie, School C, Year 13, non-member)

Whilst girls and boys seemed to prefer the graphics and media projects within IT or related courses, it was apparent that, for a number of girls, this was the only part of the course that they were considering taking up at Key Stage 5 (KS5) or beyond.

4.24 Very few of the girls in our sample were interested in IT-related careers. Those who were tended to veer towards graphics or media careers, seeing these as creative. Lou is an example of a girl whose enthusiasm for IT is very much contained within the graphics applications.

Example 3: Lou

Lou is currently in Year 11 at a mixed comprehensive. She was a member of CC4G and credits the club with interesting her in IT at this stage in her school career. Lou went on to take the DIDA qualification offered at the school. However, she hasn't found IT particularly interesting except for the parts she sees as 'creative', or 'the pretty bits'. These are the graphics-type applications which Lou contrasts with the 'boring' administrative functions such as Excel or Word. Lou was deciding which AS levels to take after Year 11 at the time of the interview and said that she would not go on to take AS ICT or any other straight IT course, but would be taking Graphics so she could pursue her interest. Lou's attitude to IT careers is similar. She sees most IT careers as being 'boring' and would not consider them, but does see herself doing 'something' with graphics and computers. Lou typifies the attitude that there are 'creative' parts to IT, but that these are not found within mainstream ICT courses and likewise that girls' interest in IT-related careers is very much focused on areas that are seen as being 'creative' and this is equated with graphics or media-type applications, not programming or software development.

- 4.25 While it was clear that many of the boys interviewed quite liked ICT (even with the complaints made), about half of them did not show any real differences in attitudes towards the subject when compared with girls. Moreover, like girls, a small number of boys showed no interest in ICT beyond the acceptance that the skills it taught were useful and likely to be sufficient to fulfil their needs. For many interviewees, there was a view that they had learned 'enough' ICT by the end of KS4. They would be able to build on their knowledge and skills in the future and as necessary to fulfil the specific requirements of particular jobs or to help them in other subjects. It was apparent that for some girls and boys their experience of ICT at KS4 had put them off pursuing ICT at KS5. For girls who might have

benefited from CC4G in terms of improved attitudes and confidence in the subject, the impact of CC4G may have been undermined by poor experiences later on.

- 4.26 One of the key findings of the evaluation has been the fragility of any long-term impacts on girls' attitudes towards ICT because other factors and experiences take over. Dinah is an example of a girl whose experience of CC4G had been really positive, but whose subsequent experience of ICT lessons made her disillusioned. She dropped ICT after GCSE:

Example 4: Dinah

Dinah is currently in Year 12 at a single-sex school doing a mixture of science and arts A Levels. In Year 8 she attended CC4G which she says she really enjoyed and which she credits for helping her see ICT as 'fun' and 'enjoyable'. Because of this Dinah opted to take the ICT full course at the school, whereupon she quickly 'went off' ICT. She explains this as being a mixture of the course itself and some issues of staffing that left the class unsupported. Dinah's current attitude towards ICT is very negative – she sees IT careers as being 'boring' and, whilst she recognised that ICT was a 'useful' subject, her attitude and experience were both very negative, despite a more positive attitude at the start of her secondary school career.

Kat is another example of how the content and structure of the GCSE might be turning students off ICT.

Example 5: Kat

Kat is a Year 11 student at a mixed comprehensive. A previous member of CC4G, she also reported that the club had been instrumental in helping her see that IT could be interesting and fun. She opted for the full GCSE because she enjoyed the subject and wanted to pursue it further. However, she reported that the course was actually quite 'boring' and that it revolved around the write-up and evaluation of project work, to the extent that by Year 11 there did not appear to be any new learning. Although Kat did not know what she wanted to do for a career, she said that her experience of GCSE had 'put her off' ICT and that she had not considered taking it onto A Level.

Key Stage 5: post-16

- 4.27 There were few girls who had taken or were taking Level 3 ICT courses in KS5. Two girls were following the OCR Level 3 Diploma and eight had, or were taking IT Level 3 Key Skills. Five had or were taking AS ICT (although three in one school had taken this qualification in Year 11). Their experiences and attitudes were variable and seemed to depend on the quality of the teaching, the particular course they undertook and personal factors such as preferences and ability.
- 4.28 Two of the girls who had taken AS level ICT said that the volume of work was much greater than it had been for GCSE ICT. Some girls who took AS ICT in Years 10 and 11 did not pursue it to A2. Their choice of A2 courses was determined primarily by their grades at AS level and the subjects they were aiming to study at university.
- 4.29 The two girls following a Level 3 OCR Diploma in IT were on a different type of course which was geared more to Business Administration skills. However, bridging courses can be seen as being particularly important for helping girls who

might not have previously thought of IT as a potential career to reassess their view of IT as a subject to study, and perhaps then as a career.

- 4.30 Very few girls go on to take ICT at A level, and within the sample those who did take this subject did not see themselves taking the subject further. The following two examples show why two of our Key Stage 5 girls will not go onto higher education to study ICT.

Example 6: Jill

Jill attended a mixed comprehensive and was a member of CC4G – the experience of which she credits with her decision to take ICT at A level. She is currently in Year 13, is of above average attainment level and plans to go to university to study a science-based degree. Jill was originally thinking that she might study a combined degree with ICT and was very positive about the subject, even at one time considering an IT related career. However, after her AS results she was advised to drop ICT as this was the subject in which she achieved her lowest grade. Jill did so, and does not now see ICT as a potential career, despite her previous positive attitude.

Molly illustrates a similar experience.

Example 7: Molly

Molly is in Year 12 and attends a single sex school. She also attended CC4G in Year 8 and found it to be a rewarding experience, although she saw it more as 'fun' than 'learning'. She is extremely positive about ICT and saw it as an important part of her future career, albeit not its sole focus. She is taking ICT AS level, and is about to enter the A2 year. However, the experience of studying at A Level has had a negative effect on her perception of her own competence. Although Molly says there was little support for the AS students, she also saw herself as not being 'good enough' for the course. She says that it is unlikely that she would go on take ICT in higher education as it would clearly be 'too hard' and, whilst she still thinks ICT will be useful in her future career, she doesn't see it as being something she will pursue further.

- 4.31 If the examples above show the negative outcomes of school study, there are some positive ones. A group of students, both boys and girls, show how young people can come around to the idea that ICT could be a possible career route.

Example 7: Nola

Nola is currently in Year 12 at a mixed comprehensive. Although she was a member of CC4G she did not opt to take ICT at GCSE but instead took Business Studies, which she did not enjoy. Nola did not achieve the requisite number of GCSEs at Grade C or above to go straight into study at AS level, but instead did one of the bridging Level 2 courses run by the school. In this case, Nola opted for the ICT Level 2 course and found that it was something she excelled at, completing the course with the highest grades. As a result of this experience, Nola decided to progress to the Level 3 course and now sees that it is very likely she will study ICT at university.

- 4.32 Four boys were following ICT courses post-16 at Level 3. One boy was doing a Key Skills course and felt that this was giving him more useful skills (more practical) than his GCSE ICT course had done. The other three were on a Level 3, BTEC National IT practitioner course (at the college). The boys following the BTEC demonstrated an engagement with their course which was noticeably different to the GCSE. They enjoyed learning about networks, virus attacks and protection, and programming, as well as a broader range of applications. If anything, they wanted more hardware teaching. They were also able to explore the relevance of what they were learning to commercial environments:

Now, we're, like, like having assignments where the company is employing us and we've got to, like, make a network for them and I've got to like say what type of hardware's going to be needed, actually you know the software, how everything's going to work and how it's going to benefit the company. (Richard, College K, Year 12)

Attitudes and experiences of ICT beyond ICT lessons and in the home

- 4.33 Female and male interviewees provided similar accounts of the computing facilities available in their schools, but the boys tended (without prompting) to provide more detailed descriptions of the computer specifications and the quality of the equipment.
- 4.34 Girls and boys reported similar engagement with ICT in other subjects. In the main, they talked about using ICT for completing homework or coursework, doing research on the Internet and compiling PowerPoint presentations. In some cases, especially in Mathematics, Science and Geography, more extensive use was made of Excel for calculations and graphs.

IT use in the home

- 4.35 Overall, interviewees used their IT facilities in the home for the same sorts of purposes: social networking, homework/coursework and using the Internet. One difference between girls and boys was the type of games played. Girls reported playing social games (e.g. The Sims), whereas the boys usually played 'first person action' games (e.g. Call of Duty) or military strategy games (e.g. Tournament). However, an important point here was that not all the boys who used computers played games very much, and not all the boys who played games used the computer much: '...most of my friends at school, they were really into games and stuff but most of them didn't use computers that much...' (Steve, College K, Year 12). One of the most avid gamers did not have a computer that worked at home. There was not, then, a straightforward association between game playing and interest in, and use of, computers for either boys or girls.
- 4.36 Although girls and boys used their computers for similar activities outside school, there was some evidence that a small number of boys were more likely to engage in more 'advanced' activities. For example, a few of the boys were more experimental with the software and tried to learn programming.

- 4.37 The longitudinal data available for the girls indicated that the types of activities that they engage in changes over time. Typically, younger girls who used the computer for games activities reported that the amount of time they did so had diminished. However, often the reduced time they were playing games was compensated for by an increased use of social networking sites. Sometimes girls reported changing from using networking sites designed for younger children and teenagers to those designed for an older age group (e.g. Bebo to Facebook). They also reported 'growing out of games'. Girls also reported using the computer more for school and college work and less for leisure pursuits. Where girls' use of computers had increased, it related to increases in the amount of homework and coursework they were being required to do. Girls studying subjects such as Graphics or Media Studies, particularly at A level, reported using programs they had encountered during these courses e.g. Photoshop.
- 4.38 Those girls at university reported using computers far more and for different purposes, e.g. the use of specialist software (GIS, Matlab, SPSS), use of the university intranet and resources (e.g. lecture notes and on-line journals) and a greater use of search facilities. They also tended to use university facilities as well as their own personal computers. Some of the reported increased use was for leisure purposes (e.g. watching DVDs) associated with the move away from home.

Household competence

- 4.39 Interviewees were asked to comment on their parents' attitudes towards, and competence in, IT in an effort to explore the possibility of a link between 'IT competent' households and girls who were more likely to see IT as a possible career path. Overall, the findings do not suggest a strong link between the level of household IT competence and the attitudes of girls towards IT as either a subject or possible career. This is an interesting result which challenges the assumption that coming from a highly IT competent household with positive attitudes to IT is likely to increase young people's propensity to pursue IT.

However, further research on this issue involving a much larger sample of girls and boys would be necessary to confirm our finding.

- 4.40 Most boys and girls reported that at least one of their parents was reasonably competent at using a computer. However, there was much variation in what this actually meant, with some parents being highly competent and able to use IT for a range of purposes and others using it in a more limited way. At the highly competent end of the spectrum, some parents were working or had worked within the IT industry, for example, in software engineering, Computer Aided Design or network and systems. Some parents were competent because of the extent to which they used (rather than create) IT at work, including those who use it extensively for administrative purposes. Competent parents were able to maintain IT systems in the home and troubleshoot IT problems. At the lower end, some perceived their parents as reasonably proficient if they were able to use the Internet for basic searching, shopping and emails and carrying out routine installation tasks. There were a few cases where neither parent had any computer skills.
- 4.41 Although there were exceptions, fathers were nearly always the more competent of the two parents. There were indications that many parents gained IT skills through their work. This seemed to be particularly the case for females and a number of girls reported that their mothers had not been IT literate until it had become a requirement of their jobs. There was no clear relationship between parents' competence and girls' interest or competence. Clearly a factor here was the generational divide. Many girls had parents who had not learned any ICT during their education and not all had jobs that brought them into contact with computers. There were also girls in the sample who have parents that did not use ICT, or had low levels of competence, but who had gone onto to study ICT at AS Level.
- 4.42 Conversely, girls with a highly competent parent(s) did not show any greater desire to pursue IT-related study or work, than girls with parents who were less competent or interested. Most did not feel that their parents' attitudes to and competence in ICT had been particularly influential on their own decisions: *'...if I was really keen, into IT I think they'd encourage me but I don't think the reason*

why I'm not has anything to do with that [her parents' lack of IT competence and interest]' (Hayley, School D, Year 10, Member)

- 4.43 Boys were more likely than girls to see themselves as the competent member of the family in terms of IT support and troubleshooting at home. However, it is important to note that not all boys described themselves in this way.

Girls' and boys' propensity to engage in ICT courses

- 4.44 In Stage Two we reported a lack of evidence that CC4G was increasing members' propensity to engage in ICT courses post-16 and at university. It appeared that an important part of the explanation for this was that a wide range of factors was relevant to their choices, with the influence of CC4G membership appearing minimal in the vast majority of cases. In Stage Three, therefore, it seemed sensible to explore this finding further by comparing members', non-members' and boys' propensity to consider participating in ICT courses and IT careers. In this connection, the interview data from the members and non-members collected from girls during the first and second years of Stage Three and boys during the second year of Stage Three have been analysed in relation to factors affecting propensity to pursue ICT post-16 and in further and higher education.

Factors affecting decision-making post-16 (at KS5)

- 4.45 All female interviewees were asked whether they would consider taking ICT after KS4 or, for those girls already in Year 12 or above, whether they had done so. This has enabled us to generate prospective (for Years 10 and 11) and retrospective accounts (for Years 12 and above) of the factors affecting decision-making. A range of explanations emerged including: need and interest; timetabling and availability; and perception of ICT and other subjects; sufficiency of existing ICT skills; and ICT as a bridging course to further study.
- 4.46 The two primary factors affecting decisions after KS4 were perceptions of what subjects students may 'need' (or have needed) to pursue their specific higher education goals, and/or which subjects they enjoy or may have enjoyed. In the first case, girls may consider, or take, a combination of A Levels (or International

Baccalaureate options) because these subjects were seen as being relevant to their future aspirations, e.g. sciences for Medicine or Veterinary Science, or Maths and Physics for those wishing to pursue Mathematics degrees. For this group, ICT may not be seen as necessary at KS5 level:

...I think it's just science is more important to what I want to do and so it's a bit like I could do ICT, but its more work that perhaps isn't relevant – so long as I've got my GCSE in it, it's a good qualification but I don't really need to take it further.
(Yvette, School C, Year 10, Member)

- 4.47 In the second case, girls' decisions were influenced by their wish to continue the subjects that interested them and which they enjoyed. Alternatively, they were keen to try out new subjects in KS5, which they felt they might enjoy.
- 4.48 The range of options available to students at KS5 varies. In some schools, some subjects are not available post-16. There can be timetabling issues such as subject clashes which affect individual students. Constraints on availability may affect ICT more than some other subjects. It is a consortium option at some schools and, hence, may not be available in the 'home school'. Moreover, in some schools (e.g. the high-attaining schools in our sample), ICT may be seen as less important than more traditional academic subjects. There were very few instances where taking ICT at KS5 was a priority for either members or non-members.
- 4.49 Generally, ICT is perceived as a supporting rather than a priority subject. It is not seen as an essential or high-status choice in comparison with subjects such as Maths, the sciences or some of the Arts and Humanities such as English and History. Subjects regarded as more academic attract higher status and are seen as having more academic currency in terms of university admissions. More able girls (and boys) are often not encouraged to take ICT at A level, as it is seen as a relatively 'soft option'. These views are feeding into young people's (particularly the academically-able) post-16 subject choices. High achieving girls were unlikely to pursue ICT either at KS5 or at university, even where they had particular aptitude or interest in the subject. Examples 8 and 9 later in this section illustrate this for two of the girls in our sample.

- 4.50 It was quite common for interviewees (boys and girls) to view ICT as a useful subject and qualification to have gained at KS4, but one they saw no value in pursuing further because they felt they already had adequate skills.
- 4.51 Some girls were taking ICT qualifications after Year 11 as a way of helping them attain the level (at Level 2) that would facilitate their transition to A levels and other Level 3 options, or as part of a mixed programme of Level 2 and 3 study. In contrast to the girls who rejected taking ICT A level in favour of other A level subjects, these girls did not have sufficient qualifications at Level 2 to progress to a full Level 3 programme of study. As seen above, these bridging courses could be a way of bringing students who may not have thought of pursuing ICT back to the subject and possibly into ICT careers.
- 4.52 The boys who opted for ICT courses in Year 12 and above were keen to develop their knowledge and skills. This was particularly the case for the three boys taking the Level 3 BTEC National IT Practitioner course who envisaged further vocational progression in the area.

Beyond KS5 – ICT and higher education

- 4.53 The more academically-able students (girls and boys) were not considering or had not considered pursuing ICT at university level. A few girls were thinking about related courses such as Graphic Design or Media Studies. There were no girls interested in the more technically or science-driven courses such as Computer Science or other courses with significant programming components. However, there were girls (seven) who were interested in pursuing pure Science or Mathematics courses at university and who would, therefore, have the qualifications to pursue a degree in Computer Science (but were not considering this as an option).
- 4.54 With some similarity to choices at KS5, some interviewees' future higher educational plans were linked to vocational aspirations such as needing a particular type of degree to pursue a specific career (e.g. Medicine, Veterinary Science, Pharmacology). Others may have also linked their interest and aptitude in subjects to their higher education aspirations. One girl was considering taking ICT or a related course at university as a fallback if she did not achieve her first

choice. Many girls had ruled out future study of ICT at an earlier stage in their educational trajectories and expressed neither regret nor interest in taking it up again. The girls who pursued ICT at A level were not considering taking the subject in higher education.

- 4.55 Not surprisingly, the younger girls and boys in the sample were less likely to know what they wanted to do after KS5, with the exception of those who had aspirations towards careers requiring specific A levels and degrees. However, none of the younger girls seemed to think that their plans would involve ICT, even when they did not know what they would study. In contrast, some of the younger boys, often the more average achievers, planned to progress to college to take IT courses at KS5 because it was a subject they enjoyed:

It's just I've found it quite easy doing the IT the last couple of years and it's something I would continue with. I do it well and I find it easy and I quite enjoy actually working with computers. (Zac, School J, Year 11)

- 4.56 Very few girls, even those with Physics and Maths A level whom universities would have viewed as highly eligible candidates to pursue Computer Science degrees, indicated any interest in pursuing IT or a related subject after KS5. Overall, factors other than members' experiences of CC4G, such as their engagement with formal ICT courses in school, personal preferences and aptitudes, exam grades, the logistics of timetabling and option choices, and vocational aspirations, were more significant influences on their subject choices.
- 4.57 High achieving girls in our sample, particularly those with Science and Maths ability, do not see ICT or Computer Science as a potential higher education route. However, many young people take more generic subjects at degree level and then move into ICT at a later date. The examples of Carol and Olivia illustrate their perception of ICT and also show that ICT could still become a possible career route.

Example 8: Carol

Carol went to a mixed comprehensive and is now studying Geography at a high-ranking university. She was extremely positive about her CC4G experience and liked ICT, but did not take it up at either KS4 or 5. Despite her obvious ability at the subject, Carol did not see ICT as being a priority subject and at A Level felt that there were more appropriate, or just more interesting, subjects to pursue. Once these decisions had been made she did not consider ICT as a potential route at either higher education or as a career, although she sees it as being 'important' and, in fact, since studying at university has been made to change her mind from seeing it as peripheral to her future job to being potentially very important, as the course has included the teaching of a range of software appropriate to her subject. Carol continues to see ICT as a 'tool' which helps her in her primary interest and has no desire to pursue ICT in its own right. However, her ICT experience on her degree programme could well provide her with a route into an IT related career despite her views at present.

Example 9: Olivia

Olivia went to a mixed comprehensive followed by a sixth form college. She did not attend CC4G. She is currently studying Physics at university and as part of this course has to master a whole range of programs at a high level. It is also possible that this will include programming in the future. Olivia is studying Physics at a high-ranking university because of her interest in and aptitude for the subject, and never considered ICT at either A Level or beyond. She sees IT as a tool and has no interest in IT as a career, although her ideas about IT jobs are limited at this stage. However, she is another example of a girl whose degree may, in fact, lead to a number of options, one of which could be the more technical high-end IT careers.

Girls' and boys' propensity to engage in ICT careers – career plans

- 4.58 The interviews with girls (members and non-members) revealed their relatively limited knowledge about IT careers and jobs. Many girls only think about IT jobs in terms of administrative roles, IT technicians or IT teachers. These occupations accord with those that they come into contact with and see around them. The types of jobs that boys associated with IT were similar, although a small number of boys (particularly those on the IT Practitioner course) were more likely to mention 'super-user' type roles such as web design and more technical roles such as hardware design and development and network management. This lack of awareness of and knowledge about IT careers is an important backdrop to the findings about girls' and boys' propensity to engage in ICT careers.
- 4.59 The career options mentioned by girls (members and non-members) tended to centre on a core of well-known options such as teacher, nurse, doctor, veterinary assistant, manager and accountant).
- 4.60 Only a small number (four) of girls were considering IT-related occupations. Two girls were considering computer graphics or advertising. Both of these girls came to this decision after doing Graphics at GSCE. One of the girls had not taken ICT at either GCSE or A Level. Another girl, currently studying an ICT Level 3 Award alongside A Levels, thought that she might work in an office, maybe designing websites. This 'career choice' was part of an acceptance that she may not be able to study her preferred subject (Psychology) at university because she would not achieve good enough A Level results. One of the younger girls was interested in music technology and saw this as an IT-related job. However, she offered this as a possibility rather than a career goal.

Perceptions of IT jobs and workers

- 4.61 Attitudes to and perceptions of IT work are likely to be factors affecting girls' (and boys') propensity to consider IT occupations and careers. The interviews explored participants' awareness of, and views about, IT work and workers, and whether IT jobs were as seen as appealing or not to females. The evidence helps us consider whether CC4G was improving members' perceptions of IT as a career for women.

- 4.62 There are jobs where IT is used extensively as a tool and jobs where IT forms the content of the work. However, girls and boys often do not distinguish between the content of the job and the use of IT as a tool in a job. Many gave administrative work (e.g. secretarial, clerical) as an example of IT work on the basis that administrators use computers most of the time. Girls and boys mentioning 'office-type' jobs saw them as boring, dull and routine and as requiring workers 'to sit at a computer all day'. Professional and managerial roles, where the use of IT was also considered to be necessary, were not seen as negative to the same extent although there was still concern about them being 'office-based'. Most girls did not hold positive images of office work and aspired to something more active and sociable.
- 4.63 The ICT National Curriculum, particularly as it is expressed at KS3 and KS4, is intended to develop IT skills around communication (e.g. Word, PowerPoint) and research and analysis (use of the Internet, spreadsheet use and simple analysis) rather than technically-focused skills such as hardware maintenance or programming. This emphasis could lead young people to equate IT with office and administrative activities. Consequently, it is common for students who are not interested in pursuing this occupational area to lose interest in taking IT any further.
- 4.64 Where interviewees perceive that IT forms the content of a job (such as for the IT technicians they saw working in their schools), they perceived the job holders to be knowledgeable and 'smart'. However, there was also the perception that the work they carried out could be routine. As one girl said: '*... it's too mundane almost, just getting up each day and fixing computers, it's just a bit sort of, it doesn't have anything in it that particularly attracts me*'. Many girls were interested in becoming teachers, but none were considering teaching ICT.
- 4.65 Boys were more likely than girls to distinguish between different types of technical jobs (e.g. technical hardware and software design and development) and to see them as challenging and interesting. Girls perceived people doing these sorts of jobs as intelligent and highly-skilled but the content of the job (to the extent that they were aware of it) did not appeal to them. Some girls saw the

work as being unsociable, and boys and girls were concerned that the work would still be office-based and might become repetitive.

- 4.66 Many of the boys and some of the girls also mentioned 'super-user' type jobs such as web design and other media and design work. These roles were often viewed positively, mainly because they were seen as having a strong creative dimension and the people doing them were appealing:

Well, people who work in an office job doing IT, they're boring. And people who work like in games design, web designing or Google, they're really fun. (Trevor, School H, Year 11)

- 4.67 Interviewees did not associate creativity with technically demanding IT roles. This is interesting because IT professionals and specialists contrast the creative end of IT work, designing and developing computer systems and program, with the 'user end', which they perceive as much more routine.

Gender stereotypes and IT work

- 4.68 Girls and boys were asked to comment on whether they thought IT jobs were suitable for both sexes. Most interviewees felt such jobs were suited to men and women, although they recognised that males predominated in some IT occupations (e.g. IT technicians, software and hardware engineering) and females in others (e.g. secretaries). Girls usually attributed the difference in the numbers of males and females in particular occupations to differences in interest rather than ability:

I think technicians tend to be men, well that's just my experience of being at school, but I think like women in general are more people-orientated... Obviously, this is a massive generalisation but like I don't think that in general women would want to be enclosed in a room fiddling with computers all day, I don't know if it's more of a man thing. (Ursula, School G, Year 12, non-member)

I think there is a slightly more female element to it (administrative role), just like you think of it and you think of you know people in call centres or whatever and secretaries and stuff like that and you perhaps start to think of the traditional woman role there. (Carol, School B, Year 12, Member)

- 4.69 Similarly, boys pointed to a difference in the interest in IT between females and males:

I don't personally think they're [sic] any difference between males and females. I just don't think females don't feel interested, as interested as males are into the IT business. I think females look at IT as an add-on to qualifications and may not want to take it further... (Vince, College K, Year 12)

- 4.70 The focus on lack of interest as an explanation for the under-representation of females in IT careers is supported by girls in our sample. In talking about their own decisions not to pursue IT careers, they were keen to stress that this was not because they did not have the ability or were concerned about working in an environment that was populated mainly by males: rather, it was because they were not interested.

- 4.71 It was common for girls (but not boys) to take the view that technically-oriented jobs appealed to males, while creatively oriented jobs appealed to females. The (uncreative) characteristics that girls tend to ascribe to the IT occupations in which females are under-represented ensure that they do not consider them as suitable jobs for themselves. There appears, then, to be an enduring and implicit barrier, and self-fulfilling prophecy, relating to females entering technical IT occupations (e.g. software engineering). As mentioned above, ironically, it is the jobs at this end of the IT spectrum which computing specialists suggest are the ones which require creativity.

- 4.72 In a few cases, girls suggested that peer pressure might deter some females from IT work as it could be seen as 'odd' and atypical. Some girls recognised the power of gender stereotypes, even on themselves:

...I think it's probably 'cos I stereotype IT with men as just men sitting at a computer but I know I'm sort of very against that anyway, so I don't know why I automatically think of a man when I think of it. (Georgia, School B, Year 13, Member)

- 4.73 Some girls and boys perceived that the industry, and society generally, was changing and that gendered occupational stereotypes could be broken down and that the tendency for IT to be male-dominated could change as more females became interested.
- 4.74 Overall, more of the boys were positive about jobs that could be defined as IT occupations because of their IT content and could see themselves in such roles, even if they had previously reported that they would not be pursuing an IT career. The older boys on IT related courses, or younger boys who were keen on IT, were strongly defensive about negative images of IT work and workers:

You can like IT and still be like other people. You don't have to be a geek just because you do IT. (Quentin, College K, Year 12)

Careers information, advice and guidance

- 4.75 As highlighted earlier, few girls or boys reported that they were well informed about IT careers. The student-led approach to careers provision in schools means that, unless individuals ask for information about a particular occupation or seek it out for themselves, they are unlikely to become better informed about a wider range of occupations. There is a circular problem here. If girls (or boys) perceive themselves to be uninterested in pursuing IT occupations, they are unlikely to receive any input or guidance that might trigger their interest. This default position is worrying as it limits the possibility for young people's assumptions to be challenged and misses an opportunity to increase their knowledge and create new interests. A related problem is that lack of awareness of IT careers, whatever the cause, enables the perpetuation of gender stereotypes both in the narrow range of IT jobs that interviewees mentioned and in what they entail.

Other sources of information, advice and guidance

- 4.76 Some girls reported that family members, particularly fathers and brothers, 'did something in IT'. However, having a close family member in IT did not have a noticeable impact on the individual's career decision-making, perhaps as the nature of the family member's work did not seem to be discussed.
- 4.77 By far the most important source of information, and one which has a far reaching impact on images of IT work, is the experience of ICT lessons at school. This can lead them girls and boys to conflate IT with business administration and jobs that predominantly use Microsoft Office products. It was notable that girls who had taken subjects such as Media or Graphics, that used other types of programs, had a broader understanding of IT-related jobs that incorporated the applications and learning within these subject areas: *'Like with Media, that's how I know about the CGI...Like talk about how they make films and stuff. But apart from that I haven't really like known anything about it'*. (Ruth, School C, Year 13, Member) The girls undertaking ICT at a higher level, or a more extensive course (e.g. BTEC) demonstrated a wider understanding of IT work. However, there were few girls in these categories.
- 4.78 Another source of influence is the portrayal of IT workers through the media. A number of girls said that their knowledge of IT work came from TV programmes, such as 'The IT crowd' and also seeing images of offices with people 'just sitting at computers': *Well in like programmes you see all these people typing on computers'*. (Sophie, School C, Year 12, non-member)
- 4.79 Boys reported similar influences to girls, but also mentioned other factors. More boys appeared to have had 'work experience' in IT-related jobs. Those boys who liked gaming seemed to understand the various design and programming jobs that might be available in the games development industry. Those participating in the BTEC IT Practitioner course received tailored careers advice and support from their lecturers, who also acted as an important link between the industry and the course.

Summary longitudinal findings

- 4.80 The longitudinal and cross-sectional analysis (by age) that we were able to undertake for some of the female participants indicates that there are as many similarities as differences between different cohorts and the same girls at different ages. Analysis by year group would tend to suggest that some older girls become better informed about careers more generally and this can sometimes have an impact on their ideas of IT work. Older girls who studied either AS Level ICT or a related subject (e.g. Graphics or Media) were amongst those who provided a broader range of jobs, as were those taking more extended courses at KS4 (e.g. BTEC). However, overall most of the girls, regardless of year group, showed very little understanding about IT work.
- 4.81 Longitudinal analysis would suggest that for a small number of girls there are changes over the years. For example, there are indications that work experience, the experience of part-time employment and attendance at careers sessions (especially if there are outside speakers) increases awareness. However, many of the girls appeared to hold very similar views about IT careers, including stereotypical ideas involving gender that remain consistent over a period of time. Even where they showed some awareness of stereotyping, these attitudes were still strong, indicating that attitudes about IT careers could be enduring and resistant to new information.
- 4.82 Some girls did not change their career aspirations from Year 10 to Year 12 or 13. The choices they made at each decision-making stage were based on this goal and tended to reinforce existing behaviour. Other girls, both younger and older, had no clear career ideas. For one group this was because they lacked any sense of what they might like to do but, for others, it was not seen as a decision that needed to be made until later: *'I don't really know what I want to do. I guess I'd probably work that out while I'm at uni or possibly not until afterwards...'* (Tanya, School G, Year 12, non-member)

4.83 In the next section, we turn specifically to ex-CC4G members and their reflections on the experience of participating and the club's influence on their views about ICT.

SECTION FIVE: REFLECTIONS ON THE CC4G EXPERIENCE AND IMPACT

- 5.1 In contrast to Section Four, this section focuses specifically on the experiences and perceptions of girls who have been members of CC4G. It explores the link between CC4G participation and subsequent views on, and behaviour in relation to, IT. With the CC4G project objectives in mind, girls who had been members of CC4G either relatively recently or up to five years ago were asked in their final interview to reflect back on their experience and whether it had encouraged them to study ICT further or increased their propensity to pursue IT careers.
- 5.2 Confirming findings presented in our earlier reports, many girls commented on the positive effect that CC4G had had on their awareness and understandings of the functions IT could serve. They also indicated that it had widened their knowledge of IT related activities:

Yeah, it definitely got me more interested in computers and I definitely wanted to learn how to do more things, yeah. It made more interested, it showed me that there's more things to do with a computer... (Abigail, Year 10, School G)

I think it made IT more interesting and it helped me to see what computers could do because we didn't have Broadband [at home] so would only use the Internet occasionally. (Barbara, Year 12, School G)

- 5.3 CC4G was also seen to have given IT a less 'geeky' image. As one girl, now in Year 12, said: it [CC4G] kind of made it a bit more cool. In some cases, it had helped girls develop closer relationships with teachers which they found beneficial.

I just remember enjoying it and whatever, I mean we had the opportunity to do different projects and I think it also, I got to know the IT lady and she was really nice, so in terms of in our lessons it was nice ... because when you do get, like form a relationship with teachers, like you get to know them better, I think you do get a lot more, you tend to do a lot more, you can go, you feel more comfortable like asking for helping with computers

and stuff. So I think in terms of that, yeah it was good. (Carol, University, School B)

- 5.4 Several girls commented that attending CC4G had made them realise that ICT could be fun, comparing it favourably in this respect to ICT lessons:

When we were using IT like in Years 7 and 8 not for CC4G, it was just like the work, and I think like definitely that gave me like a bad image of using computers just for working, but CC4G I think just made it fun and made me want to know more about the fun things you can do on them. (Dinah, Year 12, School F)

- 5.5 Reiterating earlier findings, some girls said that the girls-only nature of the club had been beneficial in that they were not in competition with the boys or distracted by their behaviour.

- 5.6 Some girls reflected that they had been interested in IT before they joined CC4G and that it did not contribute anything specific to the development of their interest or skills: 'I don't think it did [have an influence] to be honest because I've always been into ICT.' (Eileen, Year 10, School C). In some clubs, CC4G had consisted of playing games or doing homework, so it had not affected their perceptions of IT as a subject or career:

I don't remember what was on there, that's the thing, all I remember was games and I think that was all our class ever did... (Fiona, Year 12, School F)

It started of using CC4G and then it just got into a free for all and you could do what you liked, we didn't really use CC4G, we just went along, went on the internet and played games and stuff. (Eileen, Year 10, School C,

- 5.7 Girls were asked whether the club could be improved. Their comments indicated that it was the way the club was implemented that affected their perceptions of its quality. Girls appreciated the experience of participating in interesting, well-planned project activities that they could work on with their friends. They stressed the importance of having the help of an enthusiastic facilitator.

- 5.8 Those who had less satisfactory experiences of the club would have liked the opportunity to participate in interesting projects where they could learn 'new things' but which, as one girl said, should not be 'school-like':

I'd say to make it more, not structured, but I know a lot of the time at the beginning, um, and when I'd finished the project I spent a lot of time on the games just sort of fiddling about and having fun, um, but in the long run if I'd done more of the project I think I probably would have had a larger skill base but... coz I like the achievement of actually learning something new and making something out of it. I like that but I know that for a lot of people that's probably a put off being sort of told this is the structure you've got this day to start your project so. (Georgia, Year 13, School B)

- 5.9 When reflecting about whether CC4G has had a lasting influence on their attitudes to IT and their capabilities, some girls recognised the limitations of clubs which were mainly restricted to playing games. An older girl from one school said that the games had little impact:

[The projects are] the bits I remember because they're the bits that took the most time and concentration and hard work and the bits that I can remember really enjoying doing but the games I could only remember like little bits about them. (Georgia, Year 13, School B)

- 5.10 Some girls had difficulty remembering much about the club at all.

Encouragement to study ICT

- 5.11 Generally, CC4G was perceived to have had a positive influence on members' enjoyment of ICT and to that extent was seen as beneficial. As outlined in Section Four above, a range of factors extending well beyond the influence of CC4G were significant in explaining interviewees' decisions about whether or not to continue taking ICT courses. These included which ICT courses were available at KS4 in particular schools. In one school, IT GCSE was not available at the time some of our older interviewees made their options' choices. Nevertheless,

one of the girls from this school had gone on to take IT at AS level and suggested that CC4G had been a strong contributory factor in this decision.

- 5.12 In the main, there was no explicit attempt by facilitators to link CC4G activities with ICT lessons. Although many of the activities were relevant to developing the same sorts of skills as ICT lessons, the club was positioned as extra-curricular provision. Some girls liked the distinction between CC4G and lessons, others would have liked there to have been a more explicit relationship. In one school that there was no connection between what the girls learned in CC4G and the work they did in the ICT lessons, which they found discouraging:

It was something that I only went to when I was in Year 7 but it seemed to me as though the website was like one thing but then what we were doing in lessons was totally different and I kind of thought, 'oh, right, well, that is what we could be doing, but we're not, so it kind of just seemed a bit pointless. No, just the fact that they were kind of saying, 'yeah, this is what we can do in IT but that's what you are doing', so we got like, we kind of went on CC4G and were like, 'oh yeah, this is really good, I really like it', but then when we actually got back to our lesson we thought it was really boring. (Hayley, Year 10, School D)

Increasing girls' propensity to consider IT careers

- 5.13 Ex-members were asked to reflect on whether CC4G had helped them view IT as a desirable career. Many said that CC4G had not had any effect on their views for a variety of reasons but, probably most commonly, because they perceived that they had been too young to have any interest in or to consider careers.

At the time I thought oh, wow, you know, this is a really good website but I think at that stage I wasn't thinking about a career and stuff, I was only what 12, so I was, I think I just kind of thought oh, this is a website which is pink and you get to design rooms and stuff, I think that was all I really saw with it. (Hayley, Year 10, School D)

I don't really think I was thinking about careers at that point. It was too far away and even when I did think about careers like journalism, it was only very fleeting. ... Oh yeah I think it was too young to be honest. When you're in Year Seven you've got the whole of secondary school and you need to get through that before you start thinking about what you're going to do later on. (Barbara, Year 12, School G)

- 5.14 Others said that there had not been any careers information available though the club. Although it may have indirectly raised their awareness of possible careers, it had not encouraged them to pursue an IT career:

I remember doing some sort of fashion design sort of thing. So there was sort of some sort of careers' stuff, but it was mainly just trying to get you used to sort of the computer skills I think." (India, university, School B)

- 5.15 For some girls, CC4G had simply been a fun activity and they had never considered IT as a career option:

I had a focus on working with horses for ages so it's just I don't think it would have impacted me. (Eileen, Year 10, School C)

- 5.16 One girl suggested that CC4G had encouraged her to study IT and that this, in turn, might encourage her in future to have an IT career:

I suppose when you're like using them you don't really associate what you're doing with your future career because you're not really thinking about it, but I suppose looking back on it it might have, it probably influenced me to do GCSE like I said so maybe in future it will influence me to like have a career, I don't know. (Dinah Year 12, School F)

- 5.17 Another girl mentioned that CC4G had encouraged her to consider IT as a career:

It did show me that ICT could be a really good career to go into. ... I really liked making like, using Photoshop. ... I liked that because I could take photographs and um, take photographs and just making a magazine

cover and stuff, that's all ICT-based nowadays and I like doing that. I don't mind doing that. (Jade, Year 13, School B)

- 5.18 Interviewees were invited to suggest how CC4G might have had more effect on their career decision-making and propensity to consider IT as a career. This issue again raises the question about the extent to which CC4G could or should be linked to mainstream curricular activities in order to foster the development of links between the enjoyment of IT, development of IT knowledge and skills, enjoyment of IT and knowledge about how these could be linked to particular IT or IT related occupations:

I think it would best for them to just kind of go oh yeah, these are really, really fun things to do and they are linking back to my actual lessons so I'm being able to learn and revise the skills that I've already learnt and then say, and then on the website you know, with these skills that you've already got you can go on to do this, which I think would have been quite useful. (Hayley, Year 10, School D)

- 5.19 It was clear from girls' reflections that a more explicit focus on careers would have been helpful and might have helped break down the sorts of gender stereotyping about IT occupations which have been identified. Careers-related provision could include providing materials which made specific connections between job-related information and the club's activities:

I suppose if you had a set of games that were job-based so it was just a nice sort of, I dunno, something like 'Become a Graphic Designer' and then you did a few activities that were designing and computer based that way then you'd, I'd naturally know, oh, so this is the sort of thing a graphic designer will do coz that's what it's called and then I'd know oh, this is really interesting or ah, this isn't really for me, I don't really like that so. (Georgia, Year 12, School B)

Summary longitudinal findings

- 5.20 Overall, the evidence from CC4G members strongly suggests that the club often had short-term effects and benefits. It was enjoyable, showed girls that IT could be fun and helped raise or reinforce their IT confidence. Where clubs involved participants in structured projects lasting over several weeks, girls were more likely to say that they learned new IT skills and become aware of a wider range of ways and contexts in which IT could be used. Whilst these perceptions of the clubs' benefits have stayed with some of the girls, there is little evidence that these have translated into an increased propensity for girls in Years 9 – 13 and into the first year of higher education to consider IT as a career, or take ICT as a subject post-16 or in higher education.
- 5.21 It was difficult to identify any substantial or lasting impact CC4G has had on its members over time, either through the cross-sectional or longitudinal analysis. Although there is evidence to indicate that CC4G has a short-term influence, this tended to wane as other influences and factors came into play. For example, CC4G was perceived to raise some of the girls' confidence with IT, but the extent to which this effect was sustained depended on their subsequent experience of ICT as a school subject. Members who initially reported that CC4G had made them choose ICT as a subject, later (and after further experience of ICT lessons) became more negative about it.
- 5.22 The potential of CC4G to increase girls' propensity to choose ICT courses in KS5 and beyond was undermined by the status of ICT as a subject and the extent to which it was perceived to be necessary to pursue at an advanced level. Hence, some girls' attitudes remained constant; they liked ICT, but it did not fit into their educational plans, or they did not see the need for any further learning. The longitudinal data suggested that most girls reach an 'IT saturation point'.
- 5.23 There are a small number of girls who went on to take ICT or a related subject at KS5, but there is no indication that CC4G was the determining factor in this choice for most of them. Their route into ICT at this stage and level was linked to a wide range of factors. GCSE results, the availability of school options and career aspirations were particularly influential indicators.

- 5.24 Looking at all the longitudinal data, it is not easy to spot the girls in the early stages of their secondary school journeys who were likely to pursue ICT at KS5 and beyond. Generally, CC4G experiences, interest and aptitude in ICT at the survey stage of the evaluation were not good predictors of future behaviour.
- 5.25 Most members did not want or were not considering a career in IT at survey, first or second interview stage; thus indicating either that their perception of IT careers is formed early on in their educational trajectories or that they have no knowledge of what an IT career might consist. This opens up the possibility for a club such as CC4G to find ways of showing girls the variety of possibilities within IT and challenging the view that working in the sector means being 'stuck at a computer' all day, doing routine tasks. This negative perception was held and retained by many members (and non-members), over time.
- 5.26 It is important to note that the lack of evidence that CC4G has, as yet, increased members' propensity to pursue IT careers does not mean that these girls will not decide to do so in the future. For example, many girls in our sample were making educational rather than career decisions up to university level, as they wanted to leave the door open to a variety of career options. After gaining experience in employment and/or via further education and training, it is possible that they may decide to seek work in the IT sector. Whilst CC4G is unlikely to be a major influence in any subsequent decision to do this, it may have an indirect legacy.

SECTION SIX: SUSTAINABILITY OF CLUBS

6.1 This section of the report focuses on the sustainability of the CC4G scheme in schools in the South East (the SEEDA region) over the last six years using data on school participation in CC4G across the region – from the first SEEDA funded pilot year, 2002/03 (which we call Year 1) to 2007/08 which we call Year 6). The purpose of the analysis is to indicate the extent to which schools involved in the pilot have continued to operate in subsequent years and to provide an indication of the growth, and turnover of clubs ('churn') that has taken place over the period. The analysis addresses:

- 1) The extent to which the 24 schools that participated in Year 1 of the pilot (2002/03) continued to run CC4G clubs in subsequent years, including the years after SEEDA funding finished and CC4G was rolled out nationally in 2005/06.
- 2) The pattern of school participation over the whole six year period. This includes the pilot schools but also those schools which joined in subsequent years and up to 2007/08.

Data issues

6.2 As mentioned in Section Two, the nature of data varies between years because of changes to the way data were collected, in particular the registration systems operated by e-skills UK for CC4G clubs. So:

- In Year 1 (2002/03), the registration system was paper-based. It is uncertain how reliable the data are on member numbers in clubs that year, although we feel the number of clubs reported as setting up and operating that year, 24, is probably correct. More schools registered interest that year - another 90 school facilitators registered, but most of these 90 schools set up CC4G clubs in the following year.
- In Year 2 (2003/04), the website came on stream and reporting improved. Girls were registered electronically via a unique identifier by their school club facilitator. Membership numbers reported are based on

this. However, being registered was not an indication of being an active club member, or even whether a girl attended many sessions.

- The data for Year 4 (2004/05) are not available (see 2.13, Section Two, above).
- In Years 4, 5 and 6 (i.e. from 2005/06 – 2007/08), the definition of membership changed. It became confined to girls who logged on the CC4G website at least eight times during the year, so were viewed by e-skills UK as 'active' members (rather than simply registered).
- In Years 4, 5 and 6, a facilitator may have been registered as being active but, as was shown by our own experience when contacting schools directly and also the pattern seen in the first year of CC4G, not all of these schools will have had clubs actually running during the year. Some staff may have logged on to prepare to set up a club in the following year or because they had an interest in using the materials on the CC4G website. But it can be taken as one indicator of 'CC4G involvement'.
- A further variation affects Year 6 data in that the reporting of membership by e-skills UK in the previously-obtained format ceased midway through the year (at the end of January 2008), although girls and facilitators could continue to log on during the whole year. Therefore, the Year 6 dataset on members does not cover the whole year so is not directly comparable with the previous years, and it is likely to under-report total member numbers. We have separate data on facilitators for 2007/08 but these were also only reported up to end January. It is unlikely, however, that many new clubs were set up after January, although it was possible (also new schools can register interest but not set up clubs in the same year) so the facilitator data are likely to be a good indication of CC4G participating schools for the year.

6.3 Despite these data issues, in particular having slightly different data in each year, it has still been possible to undertake a reasonably good longitudinal analysis which tracks schools' participation over time and identifies patterns in participation. This can contribute to conclusions about the sustainability of CC4G in the region. In particular, the fuller set of data we have now

assembled has enabled us to update information on 'churn' in school participation from year to year, an issue which we highlighted in earlier reports to SEEDA and encountered when selecting our sample of schools to take part in our fieldwork

Results: Pilot schools only

6.4 In the first year of the pilot, (2002/03) 24 schools ran CC4G clubs: 14 secondary and 10 primary schools. In total, they had 789 registered members and 107 facilitators in 2002/03. The numbers involved in each school are shown in Table 10. The average school membership in 2002/03 was 33, although some schools had considerably more members registered (one school had 110 members) and some fewer (three clubs were very small with fewer than 10 members). The number of facilitators per school varied from one to five, suggesting that several members of staff were involved in the club at some schools. This sub-section focuses primarily on the pattern of subsequent involvement of the 24 CC4G schools that participated in Year 1 of the pilot.

Table 10: Pilot schools' participation from 2002 to 2008

	Primary - Secondary	Members	Facilitators	Members	Facilitators		Active members *	Facilitator	Active members *	Facilitator	Active members **	Facilitator **
		Year 1		Year 2		Year 3	Year 4		Year 5		Year 6	
		2002/03	2002/03	2003/04	2003/04	2004/05	2005/06	2005/06	2006/07	2006/07	2007/08	2007/08
1	Primary schools	46	8	20	4	No data available						
2		37	5	41	4		1					
3		30	4	30	4							
4		29	3	16	5			1		1		
5		25	9	47	9		16	1	7	1	6	1
6		20	6	20	5		6	3	4		3	
7		18	2	19	3							
8		18	3	9	3		2	1	1			
9		15	5	10	5		8	3	1			
10		5	4	10	3							
11	Secondary schools	110	7	93	4							
12		61	7	8	6		4	4			1	2
13		60	4	10	2		11	1	16	1	2	3
14		49	4	106	8		6	2	9	1	10	2
15		42	5	44	4					1		1
16		41	7	39	5							
17		37	2	55	2							
18		36	5	11	5							
19		31	6	68	5							
20		28	4	28	4							
21		19	3	5	3			1		1		
22		17	1									
23		8	1									
24		7	2	17	2		1					
	Total	789	107	706	95		55	16	38	5	22	9

*from 05/06 logging of membership data changed, these are members who logged on 8 or more times

** for 07/08, partial info for year (till Jan 08 only)

□ Indicates no club

- 6.5 All but two of the Year 1 pilot schools continued into the second year of the pilot, 2003/04¹⁰. As can be seen in Table 10, total registrations of members (706) in Year 2 (2003/04) were similar to the previous year's total (789) but there were wide variations between schools in their individual numbers, with some considerably expanding CC4G clubs and others reducing over the two years.
- 6.6 We do not have any information on what happened to the Year 1 pilot schools in the next year, Year 3 (2004/05), but by the following year, Year 4 (2005/06), nine were reported as having active members (see above changed definition of membership) and a further two were reported as having a facilitator logging on to the CC4G website during the year. The latter is likely to be where clubs existed but with no active members (as defined by eight or more unique log-ins to website), but we cannot be sure, as equally it could simply reflect where a member of staff was still interested in using the website but no club was running. However, we can conclude from these data that almost half (11) of the original 24 pilot schools retained a CC4G 'involvement' three years later. See Table 11 for a summary of school involvement from Years 1-6 (2002-2008).

¹⁰ This is four more than we reported in our earlier report, based on information provided to us by e-skills UK in 2006, but the higher figure aligns with output data reported in the e-skills Evaluation Report, and so we feel that it is the more accurate figure to use. It is not entirely clear why there is a difference between the two, but it is likely to be to do with the changes in reporting systems which took place at that time (the move from paper to e-based registration in the second year of CC4G operation).

Table 11: Involvement in CC4G over time

	Pilot year schools with active members or facilitator who had logged on	% continuing involvement
Year 1 2002/03	24	N/A
Year 2 2003/04	22	92%
Year 3 2004/05	Data not available	
Year 4 2005/06	11	46%
Year 5 2006/07	9	38%
Year 6 2007/08	6	25%

- 6.7 Tracking the participation over Years 4, 5 and 6, of the schools which had taken part in Year 1 of the pilot indicates that there were relatively small numbers of active members in 2005/06 at individual schools, as Table 10 shows. In total, 55 were active members at the nine schools with active members (two schools involved in this year only had a registered facilitator and no active members), an average of six per school. (NB Because of definitional changes these numbers cannot be compared directly with the earlier years' membership numbers). In addition, 16 facilitators had logged on during the year.
- 6.8 By Year 5 (2006/07) nine of the schools which had participated in Year 1 of the pilot were still involved in CC4G. Six of the nine still had active CC4G members and the other three reported a facilitator logging on in the year but no active members, making nine schools in total with CC4G 'involvement'. A total of 38 active members were reported at the six schools, an average of six per

school. One of these schools reported having members but no facilitator, possibly suggesting that a club may not exist any longer but that the girls already registered there were continuing to log on to website. Three schools had both active members and a facilitator:

- 6.9 By Year 6 (2007/08), six of the schools which had participated in Year 1 of the pilot were still involved in CC4G. Five of these schools had active members and one reported having a facilitator logging on but no active members. There were 22 active members and nine facilitators across the six schools making an average of four active members per school.

Summary of Year 1 Tracking

- 6.10 From the above tables, it can be seen that nearly half of the 24 schools in Year 1 of the pilot sustained their involvement beyond the SEEDA funding period. Approximately a quarter of these schools had active CC4G members five years later, in 2007/08, see Table 10. Three (one primary and two secondary) of the 24 schools (one in eight) had members and facilitators logging on in each of the five subsequent years reported, providing evidence of a sustained level of active involvement with CC4G from year to year at these schools. A few schools had a more uneven pattern of participation including:

- one school with no members nor a facilitator in 2006/07 but having both in the previous and following years;
- one school with no facilitator logging on in 2005/06 but doing so in the next two years (but no active members in either).

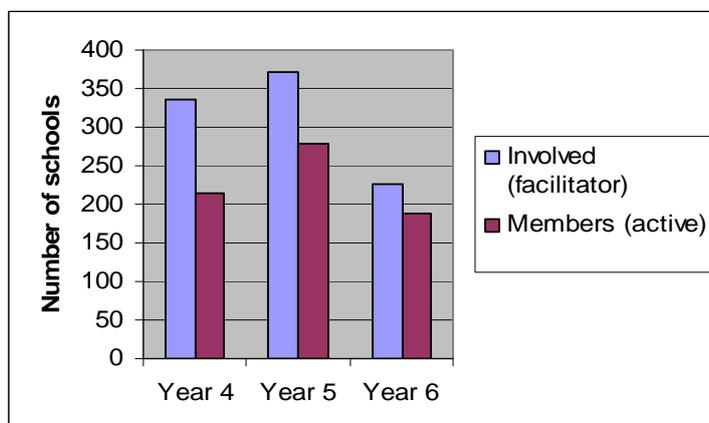
Year 2 of the pilot phase

- 6.11 In Year 2 of the pilot phase a further 85 schools became involved in CC4G. This means that a total of 109 schools participated in the pilot over the two years and that 107 schools were participating in Year 2 (two of the schools in Year 1 of the pilot did not continue to Year 2). A total of 3,464 girls were registered for CC4G in Year 2 of the pilot (2003/04), which was an average of 32 members per school. In addition, there were 291 facilitators registered at these schools. The pattern of school participation after the pilot phase of CC4G is the focus of the next section.

Results: all SEEDA CC4G schools, Year 4 onwards

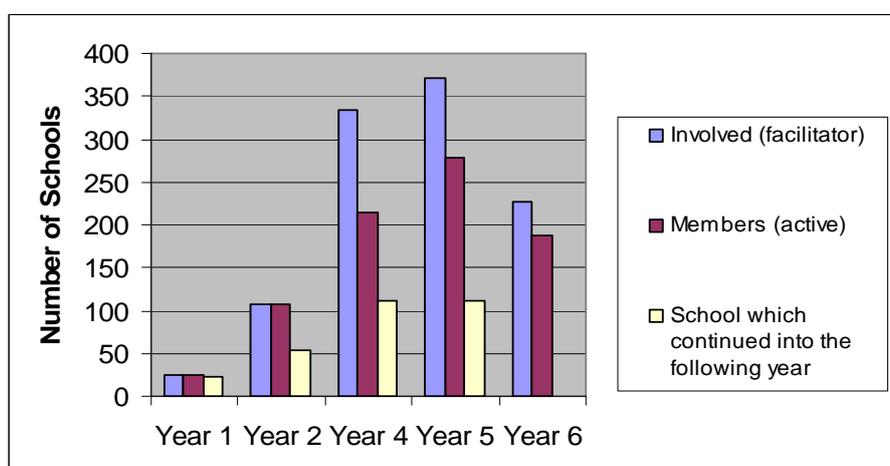
- 6.12 A large number of primary and secondary schools (644 in all) have participated in CC4G over the period 2002/03 to 2007/08 in the SEEDA region. The majority of schools participated in more than one year. The year with the largest number of schools was 2006/07 (Year 5) when 335 schools participated (as measured by facilitators logged on to CC4G website during the year). The 644 CC4G schools represent one in five (21 per cent) of the 3,091 (total number) primary and secondary schools in the SEEDA region. The majority of them joined CC4G in or after 2005/06 (i.e. after the pilot phase – 2002-2004).
- 6.13 By Year 4 (2005/06), 335 schools in the SEEDA region were involved in the initiative (see Figure 1) (as measured by facilitators logged on to CC4G website during the year). Over two hundred schools, or 64 per cent of the 'CC4G involved' schools had active member clubs in Year 4, that is, they had members who had logged on to the CC4G website eight or more times during the year. It is not possible to know exactly how many more than the 214 schools identified in this way had clubs with fewer active members. Nevertheless, it does show that the number of schools with members had increased markedly by Year 4 (at least doubled from the 107 in Year 2, 2003/04). In Year 5 (2006/07), the number of CC4G 'involved' schools (as measured by facilitators logging on in the year) had grown to 372 schools and 'active member' schools to 278. The latter represents 75 per cent of the 372 'involved' schools, a higher proportion than in Year 4. In Year 6 (2007/08), 226 schools were involved with CC4G (school facilitators had logged in) and 188 had active members (both recorded up to Jan 08 only not the whole year). The active schools represent 80 per cent of the total involved CC4G schools. (It is likely that both these measures underestimate the total CC4G school activity in the region in the whole of 2007/08).

Figure 1: CC4G schools from Year 4 (2005/06), Year 5 (2006/07) and Year 6 (2007/08)



6.14 Of the 214 active member schools in Year 4, 53 schools had participated in Year 2 of the pilot, and the remainder had started subsequently (see Figure 2). This means that nearly half (48 per cent) of the total schools participating in Year 2 were still involved in Year 4. Of the 335 schools with a CC4G involvement (rather than the 214 which had active members in Year 4), 57 of them had members in Year 2 (17 per cent) and so the vast majority, 83 per cent, were new joiners. The continuation rate, in terms of 'involvement' rather than 'members', works out as 53 per cent. But this could also be viewed another way, almost half of the 2003/04 schools did not continue to be involved in CC4G. Over a hundred schools (111) had active members in both Years 4 and 5, a continuation rate on this measure of 52 per cent.

Figure 2: CC4G schools in each year ¹¹



¹¹ NB Year 6 data only for part of year, so likely to undercount total schools in whole year.

- 6.15 Forty one of the active member schools in Year 5 had had CC4G members in Years 1 or 2 (the pilot), this translates into a continuation rate of 38 per cent from Year 1 or 2, to Year 5.
- 6.16 112 schools had active members in both Years 5 and 6, and 48 schools had active members in each of the three years, 2005–2008 (that is Year 4, 5 and 6). Thus, almost two thirds of the Year 6 active member schools (62 per cent) had continued from the previous year and around one third were new clubs. This is a higher continuation rate than in the previous year and suggests that the CC4G initiative was becoming a more sustained activity in many schools. Nearly three out of ten (29 per cent) of Year 6 schools had active members in both Years 4 and 5; that is over three years.

Overview of the whole period

- 6.17 Looking across the six year period from 2002/03 to 2006/7, it is clear that the school coverage of CC4G in the SEEDA region grew considerably. Over the whole period, 644 schools were involved in CC4G at some point (i.e. in at least one year). There was a considerable amount of 'churn' with many new schools joining in each of the years and others discontinuing either completely or for a year or two and then starting up again.
- 6.18 Reasons for not continuing with a CC4G club were often related to staff, for example: the facilitator leaving and no replacement being found among other staff or new recruits, or the facilitator choosing or having to take on other responsibilities resulting in them not having enough time to continue to run the club. Other reasons were more school-related, for example – a refurbishment of the IT suite, often resulting in a temporary closure of the club; or a change in school priorities or an impending OFSTED inspection resulting in staff energies being focused elsewhere. Discontinuation of a club from one year to the next was less likely to be due to problems with or disinterest in the CC4G objectives, website or the materials produced (although we can only base this judgement on the schools we contacted and visited and not a wider survey of schools who discontinued).
- 6.19 Thirty three schools which had members in Years 1 or 2 of the pilot still had active members in Year 6, so demonstrating sustained involvement in the

initiative. These schools seem to have been able to make CC4G a long-term feature of the school's extra-curricular activities (and we saw this in a few of our case studies).

SECTION SEVEN: CONCLUSIONS

7.1 In this final section, we present the evaluation's overall conclusions. These relate to the themes of impact, sustainability and lessons learned that have been addressed throughout the study and which are included in the following discussion. First, however, it is important to offer some comments which should be borne in mind when trying to judge the overall success of SEEDA's CC4G initiative. The issues raised have been identified earlier in this and in our previous reports, but need to be restated to help contextualise the extent to which CC4G has fulfilled its objectives, which were to:

- change the perception, within the target group, of IT as a career for women by offering inspiring and compelling activities which appeal to girls in a voluntary computer club environment, and
- counter the perception, within the target group, that IT is a male profession.

7.2 The voluntary and individual nature of the club means that it is not possible to claim that CC4G will always have the same or similar effects on its participants. As the evidence presented in the Stage Two report showed, the way the club runs varies from school to school and from year to year. Irrespective of CC4G's stated objectives, each school has its own rationale for adopting the club and its understandings about its purpose. Similarly, each facilitator has her or his own reasons for getting involved; has a different level of IT knowledge and capacity; has their own expectations of what can be achieved, and has to contend with a unique set of constraints about the way the club can be offered (e.g. timing, frequency, length of time available, number of girls, year group and so on). Finally, the girls volunteer to participate. Who comes forward depends not only on their desire to join but on whether they can attend (e.g. because of other extra-curricular commitments or having to catch an after-school bus), and on their individual characteristics and expectations.

7.3 The upshot of the voluntary and individual nature of CC4G is that the experience of being a member can be highly variable: no two clubs are ever the same. As

the case study evidence (presented in the Stage Two report) showed, some clubs consist of little more than an opportunity for girls to play games on the CC4G (or other websites) for twenty minutes or so during the lunch-hour once a week. Some clubs involve a mixture of games and the shorter-term activities associated with CC4G modules; while others engage in and follow the much more structured longer-term activities that are also available through the website. The evaluation has shown that members can find all three approaches enjoyable and fun, although the impact on their learning, and on changing their views about IT, varies accordingly.

- 7.4 The voluntary and individual character of the club raises an important question about what can realistically be expected, in terms of behavioural outcomes and attitudinal change in relation to IT, from the relatively brief exposure members (aged 10 to 13) have had to the initiative.
- 7.5 The rationale for targeting the club at 10 to 13 year olds was based on the idea that it was important to try to influence girls' attitudes to IT as a career before they were exposed to and had internalised gender-stereotypical beliefs about male and female occupations as older teenagers. Our evidence relating to age and the appropriateness of targeting an initiative at this age group is mixed. While participants perceived that CC4G had made them aware of a wider range of uses and applications for IT, the club had not increased their propensity to pursue IT as a career. This was for two main reasons: a) they felt that they were too young to be thinking about careers; and b) they had very little knowledge, if any, about what IT careers and occupations entail. Where girls expressed having any career aspirations in their early teens, these were associated with the sorts of jobs they have come into contact with, or think they know about (e.g. vet, doctor or teacher); or were vaguely expressed in terms such as 'working with animals/working with children'. As we tracked girls through their school careers, ex-CC4G members and, indeed non-members, were keen to stress that females (in general) can do any job and that they are certainly just as capable of pursuing IT careers as males. On the other hand, they argued from a personal perspective that IT was not an area of career interest to them. There was little evidence that girls' knowledge about the range of jobs in the IT industry increased as they moved through secondary school.

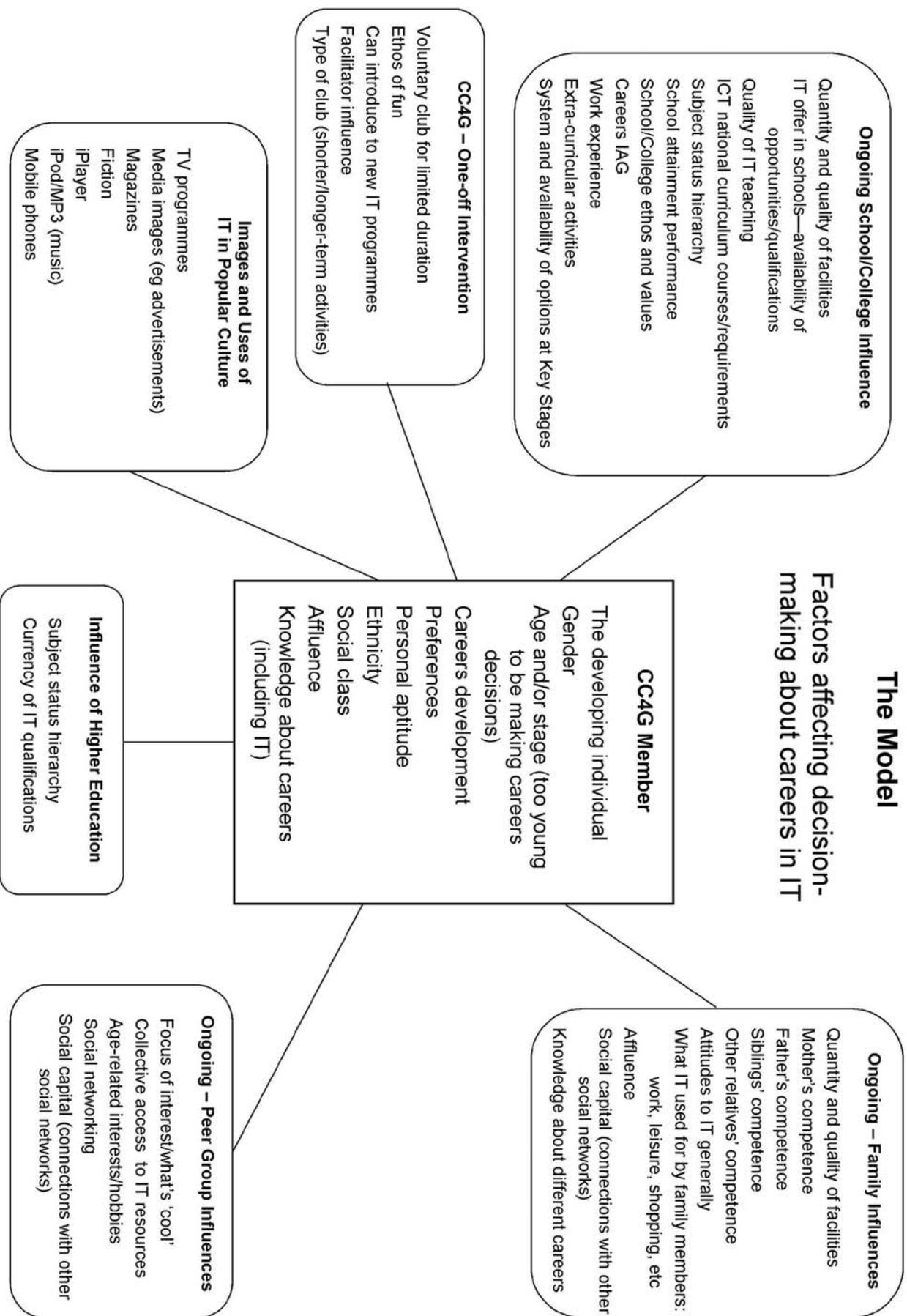
- 7.6 By restricting membership of the club to girls and producing materials that were deliberately designed to appeal to young females the intention was to create an environment which would encourage them to view IT and IT-related work as possible career options. The evidence has indicated that the girls found the topics and activities (e.g. DanceComposer or Fashion Model) and the 'girl-friendly' design (e.g. colours and look) appealing. On the other hand, there is no evidence that this approach has altered their perceptions about IT as a career for women or for them as an individual.
- 7.7 To enable us to gauge the impact of CC4G over the course of the evaluation, we have tracked girls and schools who participated in the pilot (2002–2004) as well as in the first post-pilot year (2004-2005). We have been able to create a longitudinal sample of CC4G members to investigate the 'stickability' of perceived benefits and whether these translate into an increased propensity to pursue IT courses and careers. The utilisation of a qualitative one-to-one interview strategy in Stage Three to investigate the girls' changing attitudes to and perceptions of IT and, where appropriate, their continuing reflections on the benefits of CC4G participation has allowed us to identify and explore the range of factors influencing (and changing) decision making over time.
- 7.8 The longitudinal analysis of the member sample was complemented in Stage Three of the evaluation with a sample of similarly aged non-members. The strengths of this comparative dimension included: a) revealing the relevance of intra-group differences such as between girls of higher and lower academic ability (for example, evidence presented in Section Four highlighted that ICT, as a subject, has much weaker status and currency in schools than traditional disciplinary subjects such as Maths, Physics, English or History and the relevance this has to explaining choices); and b) revealing the range of factors affecting decision-making and career aspirations and, therefore, the array of significant influences within which participation in CC4G sits (and competes).
- 7.9 Including a sample of similarly-aged boys in the final year of the evaluation contributed to the development of a richer understanding of how IT is perceived by young people. The findings presented in Section Four indicated that male and female interviewees often had similar attitudes to and experiences of ICT in

schools and beliefs about their capabilities. Like girls, many boys suggested that they were not considering IT jobs because of their own lack of interest or other preferences. For male academic 'high fliers', like their female counterparts, IT was not viewed as a priority subject. There was, however, one important difference in that a small number of the boys displayed a level of technical interest in and knowledge about IT that was not found in the girls' data. This interest and knowledge was not automatically leading these boys to consider IT careers, but it did differentiate them from the rest of the boys and all the girls.

- 7.10 An initiative such as CC4G was not implemented in a vacuum. The girls (and boys) in our study were subject to an array of influences – educational, social, financial, emotional and cultural – on their attitudes to and abilities in IT. For example, the extent and nature of their access to IT in the home was affected by the relative wealth of their families and also family attitudes to IT and competence in setting up facilities and maintaining them. Each girl and boy had friends whose attitudes to IT might affect them. The influence of individual teachers at crucial moments in their secondary education also affected attitudes and levels of knowledge. Views of IT careers were similarly constructed according to various influences and individual preferences. As time went on, the mix of factors affecting girls who had been members of CC4G became ever more complex and the effect of one factor, such as being a past-member of a voluntary, extra-curricular club for a relatively short period of time, became ever more difficult to determine.
- 7.11 Figure 3 (overpage) provides a visual representation of the complexity of the influences on decision-making and locates the CC4G intervention within this context.

The Model

Factors affecting decision-making about careers in IT



Impact

7.12 It is important to distinguish between the kinds of impacts associated with participation in CC4G. Evidence from the surveys and case studies conducted in Stage Two of the evaluation indicated that members and facilitators perceived that the involvement in the club had a number of benefits and, to a large extent, these were irrespective of the type of club. Despite ‘the problem’ of fading memories, girls interviewed during Stage Three tended to confirm the earlier assessments of these same benefits:

- Enjoyment and the social benefits of belonging to the club
- Showing that IT can be fun (often contrasted in this regard with ICT lessons)
- Increasing IT confidence particularly for those (mainly the older girls) whose confidence in IT was low at the start of their membership, and
- Raising awareness that IT has a wider range of uses than those encountered in mainstream ICT lessons.

7.13 There was also evidence, deriving mainly from the Stage Two case studies but to some extent also from the Stage Three interviews, that participating in clubs which enabled members to engage in structured, longer-term projects created more and better opportunities for girls to develop new IT-related knowledge and skills. This was less likely to be the case for those clubs which revolved around short-term activities such as game playing or which did not progress beyond the initial easy tasks available at the beginning of a CC4G module. The evidence from the clubs using longer-term activities indicates that where the circumstances of the project’s implementation allow for it to be run along the lines envisaged by its sponsors and developers, then there is potential within the voluntary club environment for its activities to be compelling, to extend learning and for new skills to be achieved. The reality, however, is that the voluntary and individual nature of the club means that this is rarely members’ experience.

7.14 In line with the original objectives of CC4G, the evaluation evidence and longitudinal analysis have enabled the longer-term effects on girls’ attitudes to IT

and propensity to consider IT careers to be explored. The evidence has indicated that, despite the positive immediate impact on girls' views about IT, the participation in the club has had little lasting or substantive impact on their likelihood of pursuing ICT courses or career aspirations. In relation to CC4G's longer term impacts, there is:

- Little evidence that the club has increased members' take up of, or propensity to take ICT courses pre- or post-16 or into higher education
- Little evidence that the club has increased members' propensity to consider IT careers, and
- Little evidence that the club has changed members' perceptions of IT as a career for women.

7.15 In light of the range of influences on decision making, it is not surprising that participation in CC4G over a relatively short period, and at a young age, has weak longer-term effects. Collecting data from non-members showed how potent other influences are on all girls and indicates how challenging it is to change their perception of IT as a career for women. Girls' perception that it is their lack of interest in IT, rather than weak confidence or competence, which explains their decisions not to consider IT as a career makes changing their perceptions an even tougher nut to crack.

7.16 Collecting data from a sample of boys indicated that they are subject to many of the same influences as girls. However, a few boys differentiated themselves from other males and the females in the study by displaying a more extensive technical interest in IT and propensity to consider IT as a career.

7.17 The analysis suggested that some factors have a particularly significant influence on girls' (and most boys') attitudes to IT and their lack of propensity to choose IT courses post-16 or to consider IT careers.

- ICT as a school subject, particularly at KS4 and ICT GCSE generally fails to stimulate further interest and fosters a sense that students have 'enough' IT skills.

- The ICT curriculum and teaching promote IT as mainly relating to office and administrative activities, which are generally viewed by girls (and boys) as uninteresting.
- The status associated with different subjects affected subject (and also career) plans. IT is seen mainly as a supporting subject, rather than a priority at Level 3. It carries lower status than subjects such as Maths and Sciences and this has a negative effect on perceptions of IT in terms of university study.
- Young people have a lack of knowledge about IT careers. In this regard, the CC4G experience lacked an explicit link to careers information, advice and guidance (IAG), or contact with employers or work experience and so had done little to change members' perceptions of IT work.
- The 'student-led approach' to IAG in schools supports existing choices and aspirations, which misses an opportunity to expand and challenge individuals' ideas and horizons through practical initiatives like CC4G.

Sustainability

7.18 Our evaluation focused on the pattern of take-up and involvement of schools in the SEEDA region in the CC4G pilot and subsequent years (see Section Six) and tracked the continuing participation and 'drop out' of schools taking part in the SEEDA pilot years. The statistical data collected in the course of the research indicated the level of CC4G penetration and 'churn' that occurred in the region since the introduction of the pilot in 2002/03.

7.19 Penetration of CC4G across the region grew considerably over the six year period from 2002/03 to 2007/08. There was a considerable amount of 'churn' with a lot of new schools joining in each of the years and others discontinuing either completely or for a year or two and then starting up again. Our research indicated that reasons for not continuing a club were often related to staff changes affecting the availability of a facilitator or other school-related matters

not connected directly with CC4G (a 'cost' of the voluntary nature or the initiative as discussed above). Despite the operational challenges of sustaining a club's availability over time, there were schools in which CC4G appeared to become a longer-term feature (e.g. a quarter of the schools involved in Year 1 of the pilot were still running a club in Year 6).

- 7.20 Whilst schools see good reasons for participating in CC4G, it is unlikely to be a top priority (in comparison, for example, with schools' statutory duties). Its positioning as an extra-curricular activity that does not form part of the compulsory workload of staff makes it vulnerable to being suspended or halted as circumstances in schools change.
- 7.21 There were no explicit objectives specified with regard to churn, or penetration of CC4G across the region, and so it is not possible to assess whether the achieved figures were higher or lower than envisaged by the sponsor. However, an important purpose of this analysis has been to investigate the extent of churn that has occurred in relation to a new voluntary school club. The figures that have been produced should provide insights which will be helpful in the planning of any similar future initiatives.

Lessons learned and recommendations

- 7.22 The following recommendations emerge from the evaluation's main findings and conclusions over the three phases, and represent our perspective on the 'lessons learned'.
- It is important that the sponsors of interventions such as CC4G recognise that the experience of beneficiaries is set within their other, often far more substantial and ongoing influences. Their objectives should be constructed in light of this context.
 - It is important for the developers of interventions such as CC4G to define at the outset what counts as a 'valid' experience of the club and might be realistically be expected to have an impact in line with its objectives.

- If interventions like CC4G are to have greater impact long term on career choices, then the immediate benefits need to be sustained and reinforced with participants over time through other school or external activities.
- Initiatives like CC4G which have clear objectives relating to careers and work should be more 'joined up' with careers-related activities in schools.
- It is important not to rely solely on extra-curricular activities like CC4G to try to influence and change views on IT and IT careers but also to consider more the role of the IT curriculum and how such activities can link with it.
- Urgent action needs to be taken among both boys and girls to give them a greater awareness of the breadth of IT work and careers, especially technical roles. It is clear that information, advice and guidance in schools about careers are currently ineffective in doing so.
- An important factor in post-16 choices (and ultimately career choices) is the status associated with different school subjects; IT and Computer Science have comparatively low status and this affects students' decision-making.
- It is important not to generalise too much about gender differences in relation to IT and to recognise the diversity that exists among boys' and girls' experiences and views on IT when planning similar interventions.
- More research should be carried out into the optimum age range for implementing interventions such as CC4G which are trying to change persistent attitudes and into the effectiveness of girls-only, girl-friendly interventions in challenging gender stereotypes.