Baccalaureate Interdisciplinary Project

Science - Exemplar 7

Grade: B

"Security of mobile telephones"

SCIENCE 4

Science: Interdisciplinary Project

Proposal

Candidate name									
SCN									
Centre name									
Assessor name									
Project title	Security of mobile telephones								

Project outline (what it is I want to do and how will I go about it)

The goal of my project is to investigate the security of mobile devices that can carry a large amount of personal data as portable devices, such as iPhone's, contain personal information that, if the device is lost, could be useful to criminals trying to steal someone's identity. Conversely, the same techniques could be used by the police to gain information to prevent and solve crime and to successfully get a criminal conviction. The aim of my project is to investigate techniques for gaining access to information stored on a portable device that could be potentially useful to either a criminal or the police.

I intend to use reference material from the library and my tutor to research how to enter the mobile device and acquire any important information stored on it. I will use a software emulator to examine the effects of these techniques on a device. I will present my findings on the web.

I will also consider the security measures that are standard on a phone to prevent unauthorised access and what the average user can do to improve the security of their phone and the data stored on it.

I would also like to explore what information the average person stores on their mobile phone and how much of this could be of use to the high-tech criminal or the police.

Reasons for choosing this project (eg personal interest, future plans, links to other subjects I am studying/have studied)

I have had a personal interest in computing from a young age and I have studied computing topics throughout my years at school. I hope carrying out this project will aid me in my future plans to continue my education at university where I plan to study Computer Science. As well as the knowledge I intend to gain in this area, I am also looking to improve my research and interpersonal skills which I think are important in future life.

As I am currently studying Advanced Higher Computing and Advanced Higher Maths, I would like to use these subjects together to accomplish the aims of this project.

This project will explore an important issue; with the increase in computer crime and the popularity of mobile devices that contain large volumes of personal data, these devices can be used by criminals not only to help them carry out a crime but also to steal vital data that can assist them with fraudulent activity.

The broad contexts this project will cover are:

☒	Citizenship	☒	Employability	☐	Enterprise
☐	Economic development	☐	Sustainable development		

Learning environments I will access are

I intend to carry out this project at home, school and at the University of Abertay.

I will also use the internet to find records of criminal activity involving mobile phones and how evidence is gathered and analysed to help bring a case to court.

I would also like to use an online survey to gain data about how people use their mobile phones and what data they store on them.

The skills I will develop and/or improve in the course of this project are

Application of subject knowledge and understanding: I will use the skills that are required to complete Advanced Highers in Computing and Maths. These will be needed to carry out certain tasks in the project.
Research skills – plan, research, analyse and evaluate: I will need to plan this project thoroughly before I start. This will involve clearly setting out aims, how long each section will take, the resources available to me and how I am going to use them. I will also need to keep a diary of progress. I will need to analyse my results carefully and evaluate effectively at the end.
Interpersonal skills – negotiate and collaborate: I will need to take other people's advice and be confident to ask for help if necessary. I may need to approach people in a professional capacity. This is something I have not done before.
Planning – time, resource and information management: As well as keeping track of how long tasks are taking to complete I will need to try and prevent any possible problems occurring before they happen, minimizing hold-ups. All my information must be kept organised in order to be useful.
Independent learning – autonomy and challenge in own learning: I will have to ensure that my project is progressing all the time and make it my responsibly to get things done when required and meet deadlines. I must also take advantage of any opportunities available and not take the easy options all the time.

Problem solving – critical thinking, logical and creative approaches: I am generally quite a logical person and I hope to use this trait to take a logical approach to my work. I sometimes struggle thinking up ideas and hope to improve on this. I can already look at sources and quickly assess whether they will be useful, relevant and/or accurate.
Presentation skills: I have carried out a number of presentations before but still find this challenging. I will have to ensure that I choose the best presentation methods available and that they are suitable for my target audience of professional people.
Self evaluation – recognition of own skills development and future areas for development: I will ask for feedback from people involved with my project and accept this feedback, positive or negative. I would also like to use the experience of this project to help me carry out other projects later in life.

Assessor comments
Good title and aims meeting project requirements. This project clearly sits within the citizenship category and employability. This should be able to be done within the timescale. The project is realistic and achievable. There is the potential to provide challenge and for you to meet these challenges.

Using a software emulator is a good idea as is presenting your findings via the web.

Proposal approved	YES	**Further work required**	NO
Candidate signature		**Date**	12/11/09
Assessor signature		**Date**	12/11/09

Science: Interdisciplinary Project

Plan

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Security of mobile telephones

Is this a group project? yes ☐ no ☒

If a group project, what will your role or responsibilities be?
N/A

Timescales (start, finish and milestones)
This is shown within my Gantt chart. The project started when I first met my tutor in September 2009 and I will have completed the project by March 2010. The main milestones in the project are shown in red in the Gantt chart.

Planning – state how you are going to meet the agreed objectives of your project

I plan to carry out the project within the time scale shown in my Gantt Chart.

Objective - Carry out prep work
I attended several meetings at Abertay University prior to starting the project. These meetings gave me ideas for possible subjects within the overall topic of computing and discussed what would be suitable and within the scope of the baccalaureate. There was also some administration within this objective, attending library inductions and obtaining computer access details.

Objective - Background Research
The main aim of this objective is to get the project to a stage where it is possible to start practical work. This involves getting a topic, researching and writing appropriate documentation.

Objective - Create a basic website for reporting
The main aim of this objective to get a functioning website that can be used to document findings. Find out what is suitable and best option.

Objective - Use a virtual environment to access a mobile phone
This is the main objective of the project. The main aim of this objective is to attempt to access a iphone device by using emulation software. Find out what can be obtained and analyse how useful this information might be to a fraudster.

Objective - Analyse general mobile phone security
This small objective will aim to find out what security is currently on mobile phones to prevent unauthorised access. This will be a research task and involve no practical work.

Objective - Questionnaire on usage of mobile phones
The main aim of this objective is to find out how much people think they have on their mobile and how valuable they think this information is.

Objective – Presentation
Present findings by way of a talk

Objective – Reporting
Produce a short report on the project
Objective - Review and Evaluation
Complete relevant paperwork and attend interim meetings.

Resources (people, materials, places)

Throughout the project I will use all the resources available to me. I have been able to make use of the University of Abertay library and the electronic resources available to me there. I will be able to use my tutor at the university and my teacher in school to help if needed. I also have access to the electronic and library resources in school. For this project, most of the resources required will be electronic. I will need an iphone emulator to simulate accessing the device. Due to computer network restrictions on installing software it is likely that this work will be done at home.

Research methods (contacting companies, surveys, focus groups, experimentation)

In the project I will use as many research methods as are relevant to fulfil the requirements and specification of the project. I intend to send out a survey to research what valuable information the average mobile phone contains. Also, there will be some experimentation in this project as I have never previously used an iphone simulator or carried out any similar work previously. There is also a great deal of relevant websites and forums that contain a large amount of information and ideas. Contributors to these have done/are trying to do what I am doing.

Presentation

- **Who do I think will benefit from listening/reading/looking at my presentation of my project findings/product?**

  I think that the project is relevant to anyone that owns a mobile phone. As the vast majority of the UK population now owns a mobile device, they are all exposed to at least some of the potential security risks that I will be exploring in this project. I hope that someone reading and/or listening to my findings may think about what data they store on their mobile phone, whether voluntary (call records etc) or not.

- **What methods are appropriate to the audience (for example demonstration, presentation software, websites, oral, report, piece of theatre, DVD, wiki/blog or any combination)**

  To show my findings I intend to create a website that I will update as the project progresses.
  I will also report in a presentation my results.
  A short word processed report will also be created.

Dependencies (what is required for your project to go ahead ie reliance on other people or resources, steps in plan that must be completed before starting the next step)

One of the biggest dependencies in this project is that I get an iphone emulator that can reliably emulate an iphone being accessed.
Another dependency is having enough people complete my survey to gain reliable results. However, I do not anticipate this being a problem.
Some parts of my project can run at the same time as other parts. E.g. My iphone practical activity and the survey.

Contingencies	
Any anticipated problems? I cannot use the online/software emulators to carry out my project.	**My plans for overcoming the anticipated problems.** Potentially buy a iphone with a broken screen on internet.

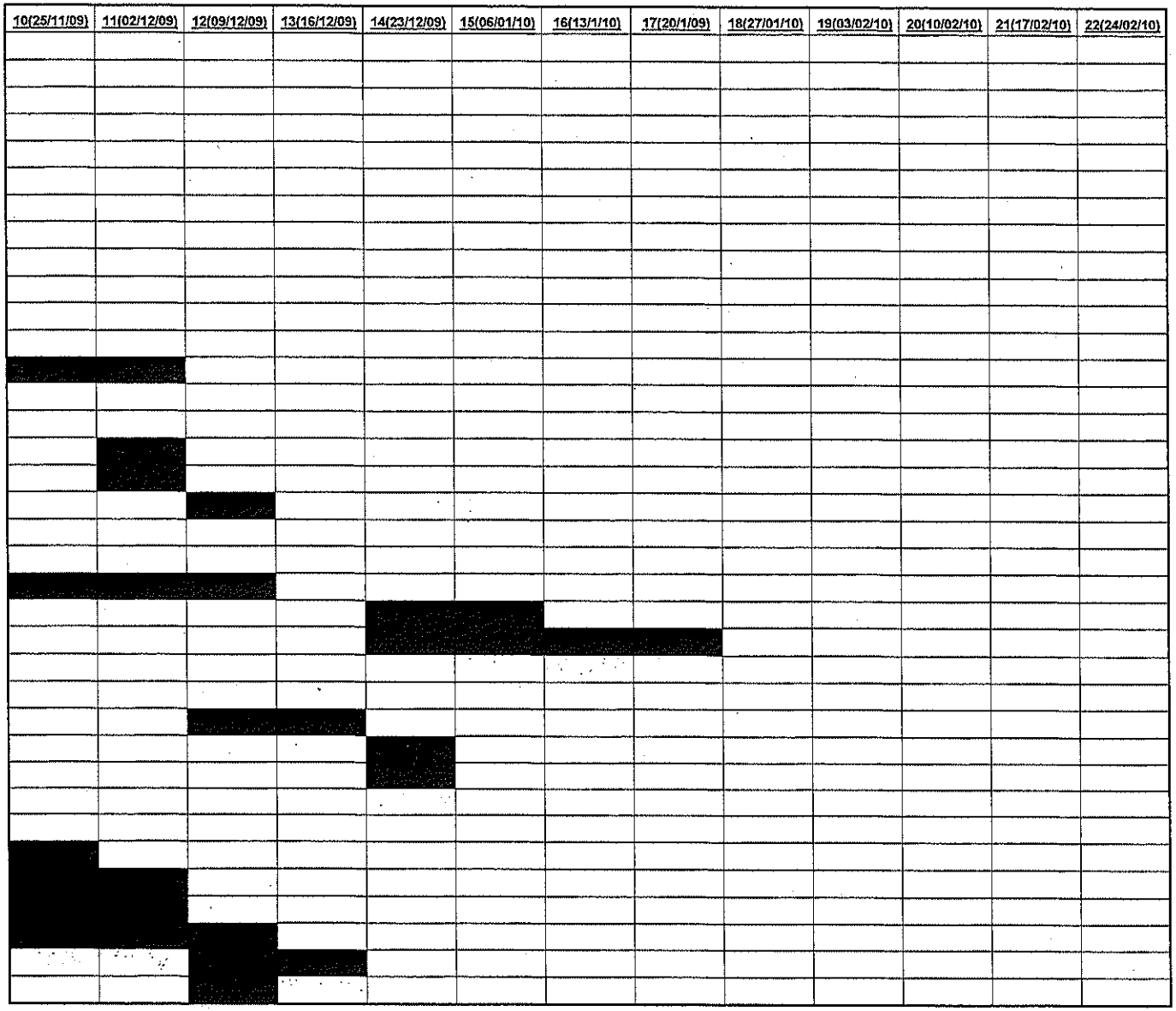
Method for recording own skills development and future areas for improvement
Throughout this project I intend to create a progress log. This will be completed regularly as I carry out work on the project. As well as recording what I have done I plan to record the skills used to complete any tasks as well as how I feel my skills are developing as the project progresses. My initial skills evaluation will be used when completing the evaluation at the end of the project.

Assessor comments

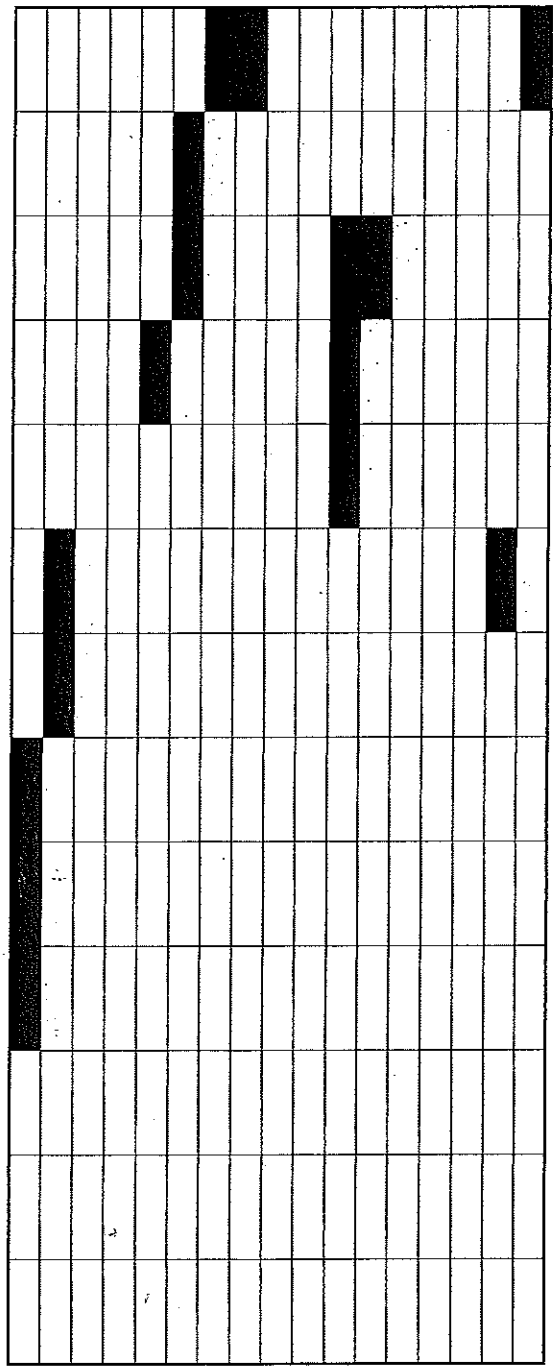
The timescales and planning are very detailed and thorough.
Resources and research methods are well thought out.
Careful consideration has been given to the presentation stage, with who will benefit and what methods you will use.
I like the idea of the website, the presentation and the word processed report.
The dependencies are clear as is the method for recording your own skills.

Plan approved	YES	**Further work required**	NO
Candidate signature		**Date**	18/12/09
Assessor signature		**Date**	18/12/09

Week	Jun-09	1 (23/09/09)	2(30/09/09)	3(07/10/09)	4(14/10/09)	5(21/10/09)	6(28/10/09)	7(04/11/09)	8(11/11/09)	9(18/11/09)
Objective - Carry out prep work										
Attend Abertay meetings (what the baccalaureate contains)										
Discuss available options with all subjects										
Library Introduction and Computer logon										
Choose a general subject for project - Computing										
Meet with tutor to discuss ideas										
Objective - Background Research										
Take out and read library books										
Use the internet to carry out research on topic										
Discuss the topic with tutor/teacher										
Store information for later use										
Write project proposal and plan										
Objective - Create a basic website for reporting										
Research available options										
Find one most suited to needs										
Set up site										
Objective - Use a virtual enviroment to access a mobile phone										
Research possible emulators that suit the task										
Carry out practical work to access the device										
Record and analyse results										
Objective - Analyse general mobile phone security										
Use internet to reasearch standard industry security										
Record findings, make conclusions										
Update website										
Objective - Questionnaire on usage of mobile phones										
Find out about online surveys										
Think about target audience										
Devise possible questions										
Check questions with tutor										
Trial questionnaire with class mates										
Work out when survey should be available										


10(25/11/09)
11(02/12/09)
12(09/12/09)
13(16/12/09)
14(23/12/09)
15(06/01/10)
16(13/1/10)
17(20/1/09)
18(27/01/10)
19(03/02/10)
20(10/02/10)
21(17/02/10)
22(24/02/10)

Administer questionnaire										
Work out how to analyse findings (Discuss with Maths teacher -statistics)										
Objective - Presentation										
Negotiate a date and time for presentation										
Invite audience										
Practice presentation										
Give presentation										
Objective - Reporting										
Pull all findings and analyses together										
Write up of final report										
Objective - Review and Evaluation										
Meeting with tutor										
Interim review										
Self-evaluation of skils										



Science: Interdisciplinary Project

Presentation of project

Candidate name									
SCN									
Centre name									
Assessor name									
Project title	Security of a mobile phone								

Presentation *(Clear presentation of main findings/outcomes at Grade C minimum)*	Excellent	Satisfactory	Unsatisfactory
Title and presenter properly identified	✓		
Easy to understand how presentation was to be organised	✓		
Presentation adequately summarised (e.g. future work? technical hurdles?)	✓		
Amount of information appropriate to delivery time		✓	
Clarity (volume, pronunciation and appropriate pace)		✓	
Presenter avoided reading verbatim from notes	✓		
Presenter kept good eye contact	✓		
Presenter fairly confident and fluent	✓		
Presenter showed enthusiasm for their project	✓		
Any visual aids significantly helped me understand the project	✓		
Any visual aids legible (lettering size, no crowding)	✓		
Key features drawn to audience attention	✓		
Enough time given to take in essential information	✓		
Presentation made the subject reasonably understandable	✓		
All technical terms properly explained	✓		
Methods & Resources			
Presenter explained the practical methods used during project *(Grade C)*	✓		
Evidence of time management) *(Grade C)*	✓		
Evidence of management of project (e.g. problem solving; collaboration; feedback) *(Grade C)*	✓		

Evidence of research planning and prioritisation of interlinked stages of projects *(Grade C)*	✓		
Rationale for use of methods is well reasoned and argued *(Grade C/A)*	✓A		
Extent of use of resources (physical, human and information) in project are clearly defined *(Grade C/A)*	✓A		
Knowledge and Understanding			
Presenter reacted well to questioning and answers were clear and concise *(Grade C)*	✓		
Subject knowledge and understanding evidenced (Grade C)	✓		
Easy to follow how different stages of project were prioritised and interlinked *(Grade C)*	✓		
Evidence student is aware of the wider context of project results and the interdisciplinary nature of the work *(Grade C)*	✓		
Evidence of specialist knowledge of specific field *(Grade C/A)*	✓A		
Conclusions are convincing, supported and well defended *(Grade A)*	✓		
Evidence of analysis and reflection of the findings and skills developed *(Grade A)*	✓		
Presenter appreciates implications of his/her findings and has shown they have deepened their understanding of the chosen context. *(Grade A)*	✓		

Comments

presentation was professional and fluent and it was good to see him talk to the slides. He set the scene from the early stages through to his findings. He was very well prepared and produced handouts for distribution and to further explain matters. He fielded questions from the audience well.

Science: Interdisciplinary Project

Evaluation of project

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Security of a mobile telephone

How successful has my project been overall (planning, implementation, and findings/outcomes in terms of strengths, weaknesses and learning points)? Justify your response using supporting evidence

Although I did not meet the main objective of the project, accessing an iphone using emulation software, I think the project has still been a success. I have been able to create a technical report which details exactly how I would have accessed the iphone had I been able to. As part of the objective was to research how the iphone would be accessed this report would have been created whether the project succeeded in this respect or not. Incorporating this therefore means that I partially met this objective.

I also think that the objective to create, distribute and analyse the results of a survey was met appropriately. The survey was carried out using SurveyMonkey, a online survey website. Although I only had 37 responses I feel that it did have a worthwhile part in my project. It showed that mobile phones are being used to store sensitive personal data and it showed that people were concerned about this; however, they were not necessarily implementing the security features.

My website has not been used as much as I had wanted it to this was mainly due to me feeling that I had nothing to report. This was partly down to the free web hosting service being blocked in school although I should really have done more at home.

I felt the planning process generally went quite well. However, I now realise the importance of having contingency plans in place. In the context of my project the only other possible solution to access an iphone would have been to purchase an iphone and use this. This was explored at the time but the cost proved prohibitive. Although this dependency was clearly indentified and stated in my plan I should have checked the dependencies in my project as close to the start of the project as possible, leaving enough time to change if it was not possible. This is something I have learned from this process. I would put the reason as to why this was not carried out at the beginning of my project as inexperience and a lack of technical knowledge as to what was possible with the software currently available. I also had high hopes the emulator software discussed with my Abertay tutor would have been forthcoming and would have allowed me to meet the requirements. Unfortunately, it was not.

I also think I should have paid more attention to my Gantt chart during the project as I sometimes allowed timescales to slip. This was difficult at the start of the project as I felt I had quite a lot to do and had to work out a way to prioritise tasks effectively. This is in direct contrast to school where I usually only having one task to do at a time. I should also have tried to get my survey out for responses earlier as this would have allowed a bit more time for analysis of the results.

Abertay University has proved to be an invaluable tool when carrying out this project. Meeting with my tutor helped to keep the project moving in the right direction and ensured that problems were dealt with quickly. I also could not have done without the library resources although I quickly found

that there is very little material available on this subject; what there is quickly becomes out of date.

Similarly, it was also helpful to keep in contact with in school when problems occurred. This was straightforward due to me being in the department frequently.

During the presentation I had to present and explain complex, technical processes and code. The audience was predominantly made up of individuals that were not familiar with the field of computing, so care was taken that essential technical terms were explained at an appropriate level. I found it challenging to shorten an 80 hour project down into something that I could present in 10 minutes, and had to make sure that the information that I was presenting was essential. I also felt that I reacted to questioning well.

How effective were my communication methods?

My school e-mail proved to be extremely helpful when I encountered problems or for keeping in touch with tutors at the university and teachers in school. It allowed me to keep everything related to the baccalaureate organised and together and quickly look up relevant dates and information.

A better record of what I did and when would have assisted me at the evaluation stage of the project. I did start using an online-calendar built into the Abertay e-mail system and recorded the first few months of my project; however I started missing weeks and never really caught up with it again. The system was also blocked in school which provided less incentive to carry out this task as I did spend a substantial amount of free time in school doing the project.

During my presentation, I thought that I communicated well. I used more than one method of communication by handing out some background information prior to the start of the talk. This allowed the audience to become familiar with my topic and some technical information about the iPhone that I would later go on to discuss. As I was presenting my talk, I handed out relevant information as I was talking about it, e.g. my survey.

My main method of communication was my talk and I felt that I was prepared before I presented it. I had taken time to practice in front of friends and family. I think the audience reacted well as I presented. I felt that I changed my approach to explaining technical terms depending on the audience's reaction; I did not want the audience to lose interest as they didn't understand it.

Is there any aspect of my project that could be taken further? What might next steps be?

There is always the possibility to carry out the practical work again if the relevant software became available. However, this would only prove that it can be done, rather than discovering anything new.

I think there is potential for the project to be taken further, especially with research that was explored within the survey. When collecting responses the survey initially went out to my tutor's first year ethical hacking university students. This group mainly consisted of 18-20 year old males, most of whom owned a smart phone. The initial results were surprising; they seemed to carry a large amount of personal data around with them.

I also think it would be interesting to carry out this research again at some point in the future, perhaps 3 years, and then 5 years. The complexity and uptake of mobile phones is ever increasing and it would be interesting to see if this results in an increase in personal data. Another possible topic of consideration could explore manufacturers' commitments to security and finding out if this is any better or worse than that existing.

Candidate signature		**Date**	19/3/10
Assessor signature		**Date**	19/03/10

Self evaluation of generic and cognitive skills development

Candidate name	
SCN	
Centre name	
Assessor name	
Project title	Security of a mobile phone

When evaluating your generic and cognitive skills use the information in the left hand column to help you consider your skills development.

Generic and Cognitive Skills	Self evaluation
Application of subject knowledge and understanding	
• Candidates should think about practical uses for the science(s) they have learned. • Build these ideas into meaningful and realistic contexts, chosen from one or more of the Broad Contexts (citizenship, economic development, employability, enterprise and sustainable development). • Plan how they can use their knowledge of sciences effectively as part of a successful project. • Use their sciences to help them carry out various aspects of the project.	I was pleased with my presentation and the audience seemed interested in my findings. Prior to my talk I don't think that they were aware of the type of information that is stored on mobile phones. I think if I have made my audience think about what is on their mobile phones or perhaps mention it to those that they teach and this results is someone changing their habits or implementing security then I have covered the context of citizenship well. I think this project will enhance my employability as my skill set has developed to one of a more mature student. The skills that I have developed in the subjects I have studied alongside the baccalaureate have proved invaluable. It was helpful to have some physics electronic knowledge when researching the processor. Also, knowledge gained in computing at Higher and Advanced Higher was also used extensively. I was surprised at how much I relied on this knowledge in order to understand the important parts of this project.

Research skills – plan, research, analyse and evaluate	
Plan • Define your research subject by identifying its scope and key concepts. • Define your research process by identifying tasks and creating a schedule. • Show initiative in choosing methods of research eg contacting companies, surveys, focus groups, experimentation. • Identify and use relevant tools, resources and contacts for your research process.	Overall, my project concerned the security of all mobile phones, although it was agreed at an early stage that the scope of the technical and practical side of the project would only concern an iPhone. The project would be split between the technical research with practical implementation and a survey which would explore the use of mobile phones today. When planning my project, I decided to break the project down into a small number of objectives; these were the essential components of my project. I then broke these objectives into their component parts. This method allowed me to think about everything, even the small things that I needed to do. I then took these objectives and their component parts and thought about how long each would take to carry out. This allowed me to create a Gantt chart. I felt that the Gantt chart helped to ensure that I was carrying out everything that needed to be done, and that it was done early enough in the project to be effective. This was particularly true for my survey. I ensured that items in the Gantt chart that could run concurrently were carried out at the same time whenever possible. I felt that the timescales given in the Gantt chart were realistic, although it would have been more effective if I had looked at it more often.

Research • Carry out research from a variety of sources. • Keep records and notes on strategies, sources, tools and resources used. • Adopt a referencing methodology (where appropriate).	I think I researched this project well, using a variety of sources. As the topic of my project was ever changing, it was important to use the most up-to-date information. I found that e-books were particularly effective in this area as well as the internet. I kept an electronic record of the e-books, websites and books used for referencing purposes. This is an area that I identified early on in the project that needed to be carried out. In the initial stages of the project I kept an online diary of the project and all the meetings that I attended. Unfortunately, as my time became focused on other things in the project, this is something that I did not complete as well I wanted it to.
Analyse • Analyse the usefulness and reliability of materials gathered and resources consulted. • Return to research stage as necessary	Using a wide variety of sources, I thought that I picked up on the information that was relevant and at the correct technical level for this project. I had to research the possible ways of carrying out the practical aspect of the project, and, when this aspect proved not feasible, research why it had gone wrong. It was important to distinguish between websites that had been created by enthusiasts and those of a more reliable nature, such as university research papers. Throughout the project I found it necessary to find out more information and research further. Further research not only helped to enable me to complete the project but also further my understanding of the field of mobile computing in general. I felt that this made me feel more knowledgeable and thus more confident when giving my presentation.
Evaluate • Evaluate the research process.	Overall, I think my research was effective and well carried out. I gathered the relevant information, analysed it and drew the essential information from it. I was then able to present this in a concise format by way of a presentation to an audience that had a wide range of technical knowledge in my field of research. Throughout the project, I kept a note of the important findings and the sources that these came from.

Interpersonal skills – negotiate and collaborate	
• Consider other peoples' views/feedback. • Discuss issues of concern, seeking resolution where needed. • Adjust approach in response to a situation/environment. • Have positive self belief. • Be confident enough to offer and ask for support.	At the very beginning of the project I was collaborating with my Abertay tutor. We discussed appropriate topics. This was a two-way process with me considering the possible options and my tutor taking into account my views on the proposed topics. In this project, the practical aspect of the project proved not to be possible. When I thought that this may be the case I was in contact with my tutor at the university and although she wasn't familiar with this area, she put me in touch with a lecturer that was. He agreed that the software environment that I had initially planned to use was not suitable for use. In response to this major setback, I decided to continue the project as a research only project with some practical work by means of an online survey. I think this approach allowed me to continue with the subject, which I was genuinely interested in, at the same appropriate technical level. My confidence has definitely grown by carrying out this project. In the initial stages I was unsure of asking for help in some areas from my tutor and teacher at school. I soon realised that in order to progress at a suitable speed, problems had to rectified as soon after they are discovered as possible. Through asking for this help, my confidence grew and I feel I would be in a much better position were I to carry out this project again. I think that I also have increased confidence in myself and what I believe I can do.

Planning – time, resource and information management	
• Estimate time needed and set milestones (targets). • Monitor/record progress using tools such as schedules, diaries, logs and calendars to help completion of activities. • Consider any probable barriers to achievement and take steps to minimise them.	I did spend a large amount of time at the beginning of the project planning what I would do and how I would do it. I knew how long I had to complete the project and planned it to ensure that all objectives were complete with time to spare. This was detailed in my Gantt chart. By referring to this I could see how far I was through the project and provided an incentive to carry out additional tasks. I recorded crucial information electronically and kept these folders neat and concise. This helped when putting together my presentation. When planning I did have contingency plans in place for the problem that I encountered. Unfortunately, when these were researched it was agreed that it would be too expensive to buy an iPhone to complete this research.
Independent learning – autonomy and challenge in own learning	
• Use my skills responsibly to make things happen. • Take initiative to establish links with other learning environments/opportunities. • Look for challenges and don't necessarily take the easy option.	I do feel that I completed the vast majority of this project on my own and I am pleased at how much I have achieved. Although I did get help from my tutor and teacher, I had to first ask them in order to gain access to this help. This meant that I directed my own learning as much as possible. In school, I gave up most of my free periods to ensuring that the project was running effectively with my objectives being met and e-mailing the appropriate person for meetings and time off school to attend them. Being exposed to the university learning environment was exciting although it did sometimes have its challenges. Many library books had become obsolete and it was time-consuming to go through material, only to find it was of limited use.

Problem solving – creative approaches; critical thinking; logical approaches	
• Generate and explore ideas to support my project. • Use creative approaches such as lateral thinking. • Use logical, step by step thinking approaches. • Consider how a situation may have arisen and possible contributory factors. • Think critically about possible actions/changes that would improve the situation. • Analyse points of view in source materials in order to support findings from research eg flaws in the reasoning; relevance; reliability; supporting evidence; credibility of sources of evidence.	I discussed with my Abertay tutor the ways that my project could evolve in the early stages. This again became important when I ran into problems with the practical aspect; we discussed how this would affect the overall outcome of the project. When thinking it through, it became clear that the project was still viable as a research-only project and that my findings from this would directly relate to my findings from the other half of my project, the survey, which I had already started. I think the situation that I found myself in stemmed from a lack of experience in carrying out a project of this scale. It did not occur to me at the time that I should check my dependences in the planning process. It would also have been helpful to use some more advanced project management tools such as critical path analysis, to see the steps that I had to be sure were viable at the beginning of the project.
Presentation skills	
• Choose appropriate formats and apply effectively eg written, oral, video, multimedia. • Consider my target audience, the layout, structure, degree of formality of my presentation. • Gather, select and include relevant information or ideas, emphasising the main points. • Present information/ideas/ reflections with supporting detail in a logical order, reaching a reasoned conclusion.	I think the method (talk using computer and projector) used to deliver my presentation was appropriate to the project I carried out. In my presentation I had to ensure that highly technical pieces of information were conveyed to a non-technical audience in a way that was not too confusing. The presentation was delivered in a logical manner, with my technical research first and then my survey findings following. I felt I linked the two well. At the end of the presentation my conclusions were displayed as explained each, this helped the audience to understand my project. As this was a formal presentation, my slides were formatted to look as professional as possible. I also ensured that the slides were used as a visual aid rather than as the main focus of the talk. This meant that the text displayed was concise and served to re-enforce points, not deliver them.

Self evaluation – recognition of own skills development and future areas for development	
• Ask for feedback and deal positively with praise, setbacks and criticism. • Reflect on my experiences and feedback from others to assess the development of my knowledge, skills and understanding. • Learn from my experiences and use to inform future progress.	Having completed the project I think it would have been useful if I had completed the initial self-evaluation before beginning the project. I have found reflecting hard when having to think back to my skill set prior to starting. I think I dealt with the setbacks in my project well and when criticism was given, this usually involved time scales slipping, it was taken on board and was something that I thought I improved in as the project progressed. I felt reasonably confident going into the presentation. I thought that I knew my topic well and has practiced it in front of family an friends. Their feedback undoubtedly helped to improve my presentation. The feedback given after my talk was positive and I would ensure that I carried out this peer-assessment process before presenting an important presentation again.

This section is not mandatory. It has been included to allow the candidate the opportunity to undertake an overall reflection of their project.

Reflection on my experiences throughout this project (for example things I feel I have achieved, things I have done that I feel particularly proud of, anything I would do differently were I to do something similar in future).

The main thing I have learned from this project, other than the technical knowledge, is in project management. Prior to starting I thought that the planning process was a minor part of a project and had to be encouraged to ensure appropriate time was spent on this stage. With my project tuning out the way that it did, it only serves to further emphasise the importance of planning. Had I realised earlier that this project had a potential major problem, another could have been chosen before I had started researching etc.

Although it didn't go to plan I do feel proud of the outcome of the project. I think that the presentation went well and the work that I put into the project showed.

Are there any skills that you have used in this project that you would like to develop further? (for example, using skills in even more challenging situations, more working on own, more team working).

Having researched university courses it has become clear that a team-project is an important part of the course. I would like to combine the skills I have learned from carrying out the project on my own with the new ones required to make a team project work well.

Science: Interdisciplinary Project

Assessment checklist

Candidate name:

Candidate number:

Centre:

Project proposal	Tick as appropriate
Grade C criteria	
Clear aims and reasoned arguments to support the relevance and practicability of the project.	✓
Identification of opportunities for:	
• own skills development	✓
• collaborative working	✓
• accessing less familiar learning environments	✓
• application of science subject knowledge in a broad context	✓
• use of knowledge and skills across different disciplines	✓
• making connections between subject knowledge and the wider world.	✓
Grade A criteria, includes all of above plus	
Well conceived proposal which sets creative and challenging goals which are at the same time realistic, achievable and practicable.	✓
Robust and carefully argued justification of the proposal.	✓
Substantial links and understanding of possible connections across disciplines contributing to the project.	
Comments Andrew thought carefully about his proposal for his project and has chosen an area which is of relevance and concern to anyone with a mobile phone. He has clearly identified the skills that he will develop and use for this project.	

Project plan	Tick as appropriate
Grade C criteria	
Development of clear project objectives in line with the project proposal.	✓
Relevant and detailed planning strands to enable the project to be implemented, monitored, presented and evaluated.	✓
Realistic timescales and achievable milestones for each stage of the project.	✓
Clear identification of resources needed, research methodologies to be used, opportunities for support and feedback.	✓
Grade A criteria, includes all of above plus	
Careful selection and effective use of research/investigation techniques.	✓
Anticipation of probable and possible factors which may impact on the project.	
Clear identification of dependencies or reliance on the success of other strands of work and of necessary adjustments to the plan.	✓
Outline the process for achieving own identified development needs.	
Comments has clearly thought his plan through and identified how he will meet all the objectives. The Gantt chart he provided showed, in detail, the timescale and areas he would need to cover. These were realistic. The resources he needed were clearly stated and consideration was given to research techniques. Dependencies are clearly identified and stated.	

Presentation of project findings/product	Tick as appropriate
Grade C criteria	
Evidence of effective and critical use of: resources, research methodologies, information and time management, prioritisation, problem solving approach to reach objectives, feedback, collaborative approaches, self monitoring.	✓
Application of specialist and interdisciplinary subject knowledge to establish meaningful connections within the broad context.	✓
Clear presentation of main findings/outcomes.	✓
Grade A criteria, includes all of above plus	
Critical thinking, analysis and reflection used at key stages in the project to construct rigorous arguments, draw convincing, well supported conclusions, identify and resolve issues.	✓
Skilful and creative use of resources, including people, information and learning context to progress the project.	✓
Accurate and deepening of understanding through application of subject knowledge in the chosen context, with meaningful connections well established.	
Comments An interesting and well thought through presentation clearly provided links to the subject areas. All the main areas were covered – resources, research methodologies, etc.. had produced handouts to give additional information for those from a non-specialist background. The presentation slides were informative and commentary was knowledgeable. He reacted well to questions asked and his responses were good. Conclusions were well supported. Throughout there was evidence of critical thinking, analysis and reflection.	

Evaluation of project	Tick as appropriate
Grade C criteria	
A critical and justified evaluation of all stages of the project process: planning, implementation and findings/outcomes in terms of strengths, weaknesses and learning points.	✓
Effective use of chosen communication method(s).	✓
Grade A criteria, includes all of above plus	
Incisive, well balanced evaluation of the project outcome against project aims, supported convincingly by well selected evidence.	✓
Careful choice and skilful use of communication and presentation methods(s).	✓
Comments has produced a thorough, well considered, well balanced evaluation of his project. It is critical where this is necessary and fully justified.	

Self evaluation of generic/cognitive skills development	Tick as appropriate
Grade C criteria	
A critical evaluation of own skills development against the list of specified generic/cognitive skills.	✓
A reasoned evaluation of own strengths and key goals for development in the specified list of generic/cognitive skills, which takes account of feedback sought and evidenced from others throughout the project.	✓
Grade A criteria, includes all of above plus	
Insightful, balanced and well structured self evaluation of own development.	✓
Assertive and justified use of feedback from others in evaluation and identification of development areas.	✓
Comments A well written, detailed self evaluation of the development of his skills during the project. is obviously well aware of his own strengths and of areas requiring development. He is honest and forthright and this is balanced, insightful and well structured.	

The overall grade will be:

A indicative of a highly competent performance which meets all the additional Grade A criteria and consistently demonstrated a high degree of autonomy, initiative and effective information management across the five pieces

B indicative of a competent Grade C performance across the five pieces, but with some aspects of work meeting the criteria for highly competent performance (as outlined by the Grade A criteria)

C indicative of a competent performance across the five pieces, with all aspects of the work meeting the criteria identified for Grade C performance

Overall grade awarded	**A** (**B**) **C** **Unsuccessful**

Assessor comments

A good, well thought through and well executed project which evolved when an unexpected, major difficulty arose. never lost his focus and has produced work that is highly competent in many areas. He communicated well with both his tutor at University and his supervisor in school and kept us informed of his progress. He showed a great deal of initiative and never missed any of the deadlines for submission of work. He certainly benefited from the experience of this interdisciplinary project, with his skills and confidence increasing. He has produced work of a high standard. The evaluation and self-evaluation were particularly good.

Assessor signature _____ **Date** 19th March 2010

Internal verifier signature _____ **Date** 24/03/10