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General Certificate of Secondary Education

GCSE Information and Communication Technology 3521 Full and Short Course
Specification A

3521/P **Project**

Report on the Examination
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Project

For full GCSE course certification, candidates must complete the equally weighted AQA Set Assignment plus this component, and currently there is no stipulation as to which should be completed first. However, as one of the aims of the project is to further develop skills built in the set Assignment, and it is recommended that the project component is completed in the second part of the course. Recent reductions in the number of components in the Assignment give every opportunity for candidates to further develop their software expertise as the course progresses, and these enhanced skills can then be used the project.

On the project component, candidates are required to submit a report on an investigation into a problem and the implementation of its solution; the solution should comprise a **re-usable system** in which the **flow of data and links between the various components are clearly documented** in each section. Is the need established, and are the jobs that have to be done understood by the candidate? Examiners need to see the solution doing the jobs for the scenario if they are to get the highest marks.

Initial discussions between the teacher and candidate will play an important role in the choice of project to be undertaken and the eventual method of solution to be used, and account must be taken of the ability and needs of the individual candidate. Experience of this component suggests that evidence shows candidates selecting a problem of interest, which they can genuinely research and understand, gives them the opportunity to achieve better results than those directed on to a set problem, although the final choice should be after negotiation between the candidate and their teacher. At the higher levels, it is important that candidates tackle a problem that is enough to provide them with necessary *breadth and depth* to achieve the higher marks but do not take on the solution to a problem that will be unachievable in the time available. Interests, hobbies, part time jobs and relation to work experience placements are often a good starting point.

Unlike the task-based approach of the Assignment, candidates should, depending upon their ability, be producing a *holistic system* which should consider the **input, processing and output requirements** of the problem to be defined. In this context it is therefore recommended that all the documentation for each section from analysis through to completion of the user guide is holistically addressed.

When considering the choice of problem to be undertaken, candidates should initially think carefully about how they will produce their solution. Whilst final justification of their software choices will not appear in their documentation until the design section, how they will approach the solution to their defined problem is a major consideration. Will the solution allow the necessary breadth and depth? The introduction and more widespread use of powerful database and spreadsheet packages has offered greater opportunity to show the system requirement using just one package and it is strongly recommended that where possible this approach is used.

Candidates may still use of a range of packages to develop their solution although this does raise one issue with regard to the eventual solution to be used; if a candidate is using a range of packages to produce their eventual solution, they will often need to include further skills in DTP type tasks, databases, spreadsheets etc. Some of those components are not going to greatly enhance their productions in areas such as implementation and testing, so would it not be more appropriate to just further develop the use of one package? Similarly, will components such as web page production contribute to the overall system?

To differentiate the work for lower ability candidates, a task-based approach is not explicitly prohibited. To give weaker candidates a chance to succeed, this approach can be taken rather

than pushing them into an area of work where they are less likely to be successful. Use of multiple packages may be the most appropriate way forward, but whichever way is to be used, the role of the teacher will be to ensure that the selected choice of topic matches the ability of the particular candidate and that those candidates do not take on board something too simplistic or repetitive that will limit the mark range nor take on a problem that they could not complete in the time allocated.   In so doing, candidates can improve and further develop their skills. It should, however, be borne in mind that this is a GCSE component and the assessment criteria is used on that basis, but it also offers the opportunity for candidates to gain the necessary skills to have a solid preparation for higher study in ICT.

Once the topic has been agreed, by outlining a detailed scenario at the beginning, candidates would have every opportunity to reach the higher bands in the marking criteria, outlining the actual problem rather than any task driven assignment such as the AQA Set Assignment. It should be remembered that unlike the Assignment in which candidates have only to list the required tasks, in the project the sub problems should arise from the initial exploration of what the actual problem is. Hence the scenario at the beginning must, especially for the higher mark bands on the analysis, give sufficient detail to generate the problem and its sub problems. If this detail is not included then the 'problem' effectively becomes just listing tasks. It is likely that this scenario, for the higher awards, is likely to consist of several pages.

Centres are advised to prevent candidates from tackling problems that are too broad or too complex for them and that they are likely to fail with because their life experiences are such that they are not likely to fully understand what the problem requires.   Do they possess the necessary skills, knowledge and understanding they would require to produce a working solution?   They are likely to be intellectually beyond them. The list below shows examples where successful projects were in evidence centred around a single package:

Bookings or stock control
- Video rental
- Take away food outlet
- Hair beauty salon
- Online CD/DVD shop
- Ticket bookings
- Driving school
- Newsagent
- Theatre
- Warehouse

Sales
- Car sales
- Estate agency

Club membership:
- Health/leisure
- Sports
- Hobby

School events:
- School trip
- Concert
- Prom
- Presentation evening
- Open day
- Parents' evening
- Work placement

Financial
- Telephone tariff
- Simple payroll for a small business

Analysis

Analysis was still sometimes disappointing and candidates did not always take enough time to consider significant aspects of the problem. Candidates need to define a problem that can be solved using IT; in a number of cases a typical definition of the problem was 'X requires me to create a database' rather than 'X has a problem ….. and would like a system which would ……..'. On the positive side, more and more candidates adopted a 'systems' approach to the project, and this increase was particularly evident for candidates working at C/D levels, where perhaps previously they may have adopted a task driven approach. It is still, however, disappointing to note that some candidates, although showing clear signs of ability, tended to adopt a task-oriented approach rather than the essential problem solving work that is required by this specification. The lack of depth which followed usually restricted the awards not only in this section but throughout the coursework.

The problems need to come out of the analysis and some centres were able to encourage candidates to do exactly this. Each problem needs to be broken down into sub-problems. The better work shows that the candidate has an appreciation of the audience and the uses of the solution they are developing and these candidates do explore the problem and only eventually come to a conclusion as to the precise nature of the issues involved. Less good work reaches conclusions about the problems much sooner. It was not uncommon to find the whole analysis taking no more than a couple of sides of A4 paper. This volume of work is not sufficient for a full analysis and consequently would not be highly marked. It would be very valuable for the centre to state this in their own annotation of the candidates' work.

There are still candidates who were including transcripts of 'interviews' carried out with the 'end user'. Questionnaires, unless specific to the requirements of a real system and user, are of little value in this section. What is the purpose of the interview? How does it inform the analysis? Some candidates claimed to have had a conversation with someone who gave them a set of tasks that need to be completed, rather than analysing the information handling and processing requirements of the scenario.

One area showing distinct improvement was the links between sub-problems; links were explored meaningfully this year although some still linked through a logo as in previous years. Often links were identified between defined sub problems, a common one being the aims of linking a central storage system to letters etc to be produced from that central system. Marks were much more limited in this and other areas where candidates identified booklets, websites etc. with no links, and whilst this me be appropriate for less able candidates, they would not offer the opportunity to achieve the middle to higher awards.

Re-usability continues to be an area where candidates could make improvement to their work; many candidates included a heading for this section but included little evidence as to the impact on the input, processing and output involving new and redundant data; often this was limited to a statement such as 'a database is re-usable every day'. Much better examples were seen where candidates were incorporating their re-usability work in to their overall documentation, clearly recognising which aspects were re-usable over time. It should be remembered that for this part of the component, re-usability only begins to gain credit in the 7-9 marking band, so any relevant evidence in the presentation, no matter how minimal, relating to this aspect must achieve an award of 7.

Many candidates used their previous Assignment knowledge related to desired outcomes and performance criteria to produce reasonably detailed components on this requirement which could then be used to evaluate their systems during the remainder of the coursework.

As indicated above, there were distinct improvements in the way candidates working at grades C and D addressed their work. For future series, it may be helpful to centres to realise that a candidate working at the minimum level for a grade C on this section (approximately 7 marks out of 15) would be looking at producing at least half a page (in approximately 12 point font) of relevant background detail that describes at least three aspects of the problem, leading to sub problems. There may additionally be reference to inputs and outputs from the system. A way of tackling the problem needs to be stated with an outline of at least one way it will help to do it. There should be a statement as to one way in which the information will change over time and at least five conditions stated against which the system may start to be judged. Additionally, some consideration will need to be given to the presentation, spelling, punctuation and grammar.

Design

Design sections showed improvement in many cases this year, particularly relating to the use of databases, both flat file and relational, although there is still a need to give more consideration to the information requirements rather than the way candidates would chose to solve the sub-problems. Candidates need to fully explore the possible systems that could provide solutions, and justify the choices they made.

Apart from what constitutes re-usability, the overall improvements in design areas such as plans etc. appear to have got through to the candidates, thus enabling them to produce plans that could be actually built by a third party. They need to identify the techniques that they feel are most appropriate and use the software tools appropriately. Candidates need to keep in mind their analysis and constantly refer to the problem being solved. If they have identified effective performance criteria they are more likely to produce evidence that can be seen as a good solution to the problem. They will attempt to link the various parts of the problem where this is appropriate and address which parts can be re-used and how. If the system is analysed from the point of reuse then the design should reflect that. How is the solution designed to handle the transactions that the scenario requires?

If only one package is to be used the design must reflect complex usage e.g. queries, reports, mail merge, etc. depending upon the package being used

There were an increasing number of candidates who included quite detailed hardware specifications in this section; this is not part of the requirements of the specification.

An additional requirement of the marking criteria in this section is the test plan. Candidates should indicate what is being tested and why, with the test plan being designed to show how well the system responds to the information handling/processing required by the scenario. For higher mark awards, candidates need to create comprehensive test plans (a range of tests over the breadth of the project) to additionally allow for erroneous and extreme data sets together with relevant validation testing. For many candidates these seem too much of an afterthought.

The notions that the system has to do jobs for the scenario seems to pass some candidates by, and tables of testing are constructed often at the testing stage (not at the design stage as required) or retrospectively. Test plans were, however, generally much improved although there is still room for more progress in this area. Tables with ticks are still in evidence, although more seem to be supplying evidence to support the tests; the lack of use of extreme and erroneous data did not be considered by many candidates, and sometimes database testing was too general. Many did repetitive tests of buttons and queries, ignoring validation, masks etc. In a similar vein, it was also noticeable that fewer candidates made use of AND and OR searches but nearly always searched on a single field with a single criterion.

A candidate working at the minimum level for a grade C on this section (approximately 9 marks out of 20) would be looking at producing table(s) with at least eight fields and at least three different data types e.g. text, numbers, dates, drop down lists, etc which also includes a key field. There should be at least two of input (e.g. forms), processing (e.g. sorts and searches), output (print results of searches OR reports OR mail merge documents) stages AND a description of how at least two parts of the planning stage will link together. This could be such as tables being linked or how a form adds data to a table. The re-usability aspect should include a statement as to how at least one change made to the data will affect some parts of running the system over a period of time. For the lowest mark available, this may be implicit by the design of a database system to be used (on at least 2 occasions). For the test plan requirement, the test should be stated and the purpose of the test may be known. Some test data will be outlined as will some expected results of some data entry or of some processing of data stages. There should be a minimum of seven tests.

Implementation

Implementation continues to be carried out well by many centres, although there were many instances of high marks awarded where candidates had produced solutions to what were simple tasks. It is here where the report should really come into play, with the candidates clearly indicating the levels of skill, knowledge and understanding of the software tools that are being used to achieve the solution. It should additionally be remembered that efficient and complex use of one-package systems is required, which currently are not always being displayed to sufficient depth. There are some issues affecting candidates who do not annotate and explain their work well. These candidates risk having their mark adjusted because there is not enough evidence for the award of the skill level. It must be noted that moderators may not be familiar with the particular software being used, so they need the candidate to annotate the work in order to be able to make a judgement. Production of evidence is not just printouts of the answer, nor is it just lots of screenshots. It is a mixture of the two. Candidates should be reminded that they are producing a report into their solution that shows evidence of levels of skill etc. They have to convince a third party that they really do know and understand what they are doing.

More 'one package' solutions were evidenced this year, with some candidates producing excellent work; more candidates were producing well annotated, screen dumped solutions that showed the structure of their solutions well, although a number of candidates did not show end results very well, either on printouts or on screen. Often more can be gleaned from the testing and User Manual than their implementation. Verifiable evidence for the moderator is required to include full database printouts that will allow verification of such as what a search should produce, print outs of results of queries that can be verified and complete formulae print outs of a spreadsheet including the cell headings.

Two further areas that could improve candidates work would firstly be to show interrogations of a more complex nature that are related to the jobs that need to be done for the scenario. For example, what would a list of people whose surnames began with 'B' realistically going to do for the scenario? Secondly, some candidates would be better advised to plan a time schedule for this component as some evidence suggested that as the implementation work progressed, the presentation began to tail off with either incomplete or incorrect solutions, sometimes being awarded high marks. Often candidates set up their databases but then failed to actually use them, perhaps because in some cases they had no real purpose in the first place

Whilst there has been a general improvement in the way candidates show development, candidates (and staff marking the work) should additionally be reminded that they should not misconstrue development as tinkering with the cosmetic aspects of the work; structural aspects need to be dealt with more evidence of worth rather than just cosmetic.

Modifications as a result of testing were still rare. This was probably because of the very limited testing that some candidates undertook. Candidates who scored high marks generally recognised the links between various parts of their solution. They moved data around where appropriate, and where possible, identified advantages to the user in not duplicating material. They produced not only good solutions but also efficient solutions where the power of the software and of the particular systems used was most effective.

A candidate working at the minimum level for a grade C on this section (approximately 17 marks out of 35) should be showing the creation and use of their system which should reasonably link to the design and testing. It should tell 'the story' about how the system was created and works. For related files within a database, it would need to show the creation of each table for the system to include the types of data for each field (at least three different types), include key fields and at least eight fields across the tables as specified in the plan. Simple relationships between the tables should be created and a print out of the complete original tables. Use of the table by the system should show possibly some input stages showing data being entered to the database table and will include some processing stages to show dating being added or amended to the system and may additionally show deletion. The creation of at least one simple search / sort from each table (or one related search) and their use should be shown together with printed evidence of all processing. Finally some output stages should be included to show printed evidence of the creation of at least one simple output and its use and the creation of at least one report and its use. Modifications are required for any processes which do not work (made by testing or judgement after use).

Testing

Whilst improving, much more detail is still required on this component and candidates need to be taught how to test and how to set up testing plans. The testing plan, which can be copied and pasted from the design stage, would identify how the developed solution would be used and would identify typical data. This test data would be entered into the system to check the functionality and correctness. Candidates would document this fully, giving screen shots with annotation where appropriate, to show that the testing had been carried out and then to show typical outputs. Modifications would also be documented. Erroneous data would be entered and the outputs compared against stated expected results. Extreme data would also form part of the testing. The candidates would comment on the output from this testing and say how they would alter their system to deal with such input

On the work presented, the Testing section is still where some candidates are weak; the notion of 'a range of tests on a range of fields' passes those candidates by and a tendency is made to focus on repetitive tests which are very much alike and do not show how well the system works. Sometimes these do little more than checking as would be required in the set Assignment.

Test plans were improved although there were some poor examples in evidence. Tables with ticks are still in evidence although more and more candidates are supplying evidence to support the tests, albeit it limited in terms of data other than normal (a requirement to achieve awards in the top two boxes of the mark criteria). Test statements seen were also of a vague and general nature, often just relating to repetitive testing of buttons and queries, ignoring validation, masks, etc.

A candidate working at the minimum level for a grade C on this section (approximately 7 marks out of 15) should be presenting a copy of the plan produced in the Design section here. Additionally, evidence of the completed tables should be here (or shown in the Implementation section). There should be a minimum of seven data entry tests of at least two different types (normal, extreme and erroneous) across at least two fields OR a minimum of seven functional tests of at least two different types across at least two different fields OR a combination of the above with at least seven tests across at least two fields. In at least three cases the plan must

be compared with the record of results (evidence) which is referenced to the plan (i. e. simple numbering will suffice). This must be presented by filling in the testing plan AND / OR using written comments on test evidence about the success / failure.

Evaluation

Evaluations are very good where candidates have identified performance criteria in the analysis section for the whole system. If these are used to identify how well the solution solves the problem, then it is relatively easy to gain high marks. However some candidates are not using these performance criteria. Evaluations must relate directly to the holistic nature of the problem initially identified. If the problem is in fact a set of tasks, then candidates will find this process difficult, if not impossible. All they can report is that they succeeded in completing the task. Unfortunately they do not in these circumstances evaluate the solution, and so can gain little credit.

It was disappointing to note that a large number of candidates of obvious ability included a copy of the desired outcomes and performance criteria and included little else other than a statement to the effect that they had done them. Whilst there were some good reviews, the effectiveness was not well understood nor was there much evidence of description or discussion as required in the mark criteria.

5 marks : discussion   [equates to 9 – 10 in the set Assignment]
3 marks : indicates HOW they have done it   [equates to 5 – 6 in the set Assignment]
2 marks : indicates they have done it   [equates to 3 – 4 in the set Assignment]

A candidate working at the minimum level for a grade C on this section (approximately 2 marks out of 5) should list the desired outcomes and performance criteria from the analysis and state they have done at least five of them. To achieve a mark of 3, candidates must say HOW they have done the desired outcomes/performance criteria of at least five of them.

User Guide

User guides are often full and detailed and they offer one of the main vehicles for describing the reusability of the solution. The user guide needs to be divided into sections and better guides will include formatting techniques e.g. table of contents, index, footnotes etc. together with the use of screen dumps to provide evidence to support the user. Candidates must avoid the temptation to produce a software manual. This is not what is required. The assumption can be made that the end-user can use the software (as indicated in the implementation section), and therefore the user guide should inform the user how to use the built system to do the required jobs.

A candidate working at the minimum level for a grade C on this section (approximately 5 marks out of 10) should include some evidence that tells the user how to use the built system to do the required jobs.. It must form a 'self contained' part of the project and produced most ('more than half') of the following criteria:

- Show how to install the system
- Show how to produce at least two different ways of inputting data (or into at least two different tables / files) but is not clearly presented e. g. direct entry to a table, using a form or specialist field [drop down list]

- Show how to produce at least two output stages but is not clearly presented e. g. formatted print out, report, mail merge
- Include at least on example of data being amended in the system but is not clearly presented e. g. data in a field being updated
- Include at least one example of data being deleted from the system but is not clearly presented e. g. a record being deleted directly from a table / use of a command button to delete a record
- Include at least one simple piece of help advice (which may refer to the above) but is not clearly presented
- Format could include a contents/index page and/or page numbering but is not clearly presented.

Additionally, some consideration will need to be given to the presentation, spelling, punctuation and grammar.

Administration matters

There is a need for centres to:

- Internally standardise. If this is not done then students risk have downward adjustments applied because of the inaccurate marking of one teacher on one set of students' work;
- Ensure that where a different moderator is allocated from the Assignment component, full paperwork for the required component is forwarded to each moderator;
- Ensure that paperwork has been completed as per the specification, as delays are inevitable if the correct documentation is not provided;
- Remove work from bulky folders before posting to the moderator;
- Ensure that, if plastic wallets are used, all the work is visible without the moderator having to remove it from the wallets;
- Inform AQA if the work is likely to be delayed (several centres were very late in despatching the work to the moderator);
- Annotate the work as required by the specification. Teachers must show why they have awarded the marks. They potentially disadvantage their candidates by not doing this.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results Statistics** page of the AQA Website.