GCSE EXAMINERS' REPORTS

ICT

SUMMER 2014
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Annual Statistical Report

The annual Statistical Report (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

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ICT
General Certificate of Secondary Education
Summer 2014
UNIT 1 - Understanding ICT

Principal Examiner: K. Butcher

General comments

The paper was extremely well answered by most candidates. Candidates made a good attempt to answer most questions and demonstrated very good examination technique. Candidates have clearly been taught the topics and examination techniques extremely well by teachers. Many answers seen during the marking period were well above GCSE standard. The examination was again marked online and is proving to be an extremely successful and fair method of marking candidate’s responses.

Comments on individual questions

Q.1  This question was very well answered by all candidates and they could mostly identify which item was data, information and knowledge. Candidates understand the format of this question as it has appeared on past papers

Q.2  (a)  This question was very well answered by all candidates. Almost all candidates clearly understood the difference between broadband and dial-up.

(b)  Most candidates found this question very accessible and were able to give both an advantage and disadvantage of using Wi-Fi. However some candidates did give advantages and disadvantages of broadband by mistake.

(c)  This was a new topic and was answered fairly well.

Q.3  (a)  Well answered.

(b)  Well answered by most candidates.

(c)  Most candidates gained at least two marks here and gave two out of the three required advantages of email.

(d)  Well answered by all candidates.

Q.4  Candidates found this question extremely accessible and it was very well answered by all candidates. Candidates clearly knew the features of a GIS.

Q.5  (a)  Most candidates could identify Student ID No. as the key field.

(b)  Well answered - to make each record unique or similar was given by most candidates.
(c) Candidates struggled with this question and confused ascending and descending order. It was very poorly answered.

(d) Poorly answered, most candidates did not attempt this and when they did an incorrect answer was given.

(e) Poorly answered by the majority of candidates. Number was given by most candidates instead of the most appropriate data type which is text.

(f) Mostly well answered, candidates have been taught the advantages of encoding data well.

(g) Well answered – candidates understand the format of this question as it has appeared on past papers. Again, some candidates lost marks due to spelling the search criteria incorrectly.

(h) Well answered and most candidates achieved at least one of the two available marks here and were able to name a suitable validation check. Some candidates gained no marks as they were discussing verification methods.

Q.6 (a) Very well answered by all candidates – June was correctly identified by almost all candidates as being the data in cell A9.

(b) Extremely well answered by most candidates.

(c) Quite poorly answered by many candidates. Many candidates did not recognise that absolute cell referencing had been used. Very few candidates achieved the full two marks here as they could not explain why that type of referencing was used.

(d) December was identified as the correct answer by the majority of candidates.

(e) Candidates sometimes struggled to state a What IF investigation and the results. Most candidates who attempted the question achieved at least one mark for naming the What IF investigation, but the second mark was not often given as candidates did not state the result of the investigation.

Q.7 Fairly well answered by most candidates. Candidates are still confusing a light sensor with a movement sensor and this meant they could not achieve the full four marks available.

Q.8 (a) Very well answered by most candidates. “Do not have to leave the house” is not accepted on its own.

(b) Most candidates gained at least one mark here. Categories alone is not accepted – the answer must include the use of menus.
Q.9  (a) Poorly answered by most candidates – they were able to give a use of an MIS; however the candidates who attempted this question could not always give a correct advantage and disadvantage.

(b) Candidates were easily able to give three specialist input devices. For the second part of the question candidates could name voice recognition software but struggled to describe how it is used.

Q.10  (a) (i) Fairly well answered, candidates gave gaming specific input and output devices.

(ii) Well answered by most candidates and most candidates were able to gain at least one mark here.

(iii) Fairly well answered although some candidates did not describe the health issue.

(b) Extremely accessible to all candidates as the question was a new format allowing candidates the option of selecting from a choice of three topics – social networking, interactive digital TV and webcams. This gave candidates the opportunity to select the topic they feel more confident about. This question was well answered and candidates could easily give uses, advantages and disadvantages of their chosen topic. Social networking seemed to be the preferred choice by candidates and was also the topic that was answered best.

Q.11 This question was well answered by most candidates. Candidates could easily think of at least four different types of software and describe how they could be used. Candidates sometimes lost marks by giving brand names instead of the software type and by repeating the example of use whereas the question asked for a different example of use for each software type. The responses for this question were extremely impressive - there were some excellent answers and descriptions of how the software could be used to help organise the play – very creative.
It was notable this year, centres continued to make the same mistakes despite detailed comments from moderators about where centres were going wrong. This was true of centres that were scaled last year and centres that just remained in tolerance. Unless some centres heed the warnings in the moderators reports they could be in danger of being scaled if they make any further errors. Centres should ensure the reports go to the person responsible for GCSE ICT.

GENERAL COMMENTS

Centres must ensure that all work awarded marks is present on the electronic versions and that they are well organised and easy for moderators to follow.

Centres that used the one sheet marking grid or their own version of the grid were generally more accurate and moderators could clearly see where marks had been awarded.

Some centres only completed the official banded mark form from the WJEC but this gave no indication of where the centre had actually awarded the marks. Comments from the centres as to which features marks were awarded for would aid the moderation process.

Most centres have a good understanding of the requirements of the controlled test and most assessed accurately.

The good practise and problems found by moderators were not new and were the same as last year.

FILE HANDLING

Most centres provided good evidence but some areas need highlighting.

- there are still some candidates who mix folders and files up so they should not be given the organisation marks.

- evidence of backup folders on an external device; Screenshots should show the end process not just the copying. The screenshot must show the root folder not just one file saved on a USB or external device/different network drive.

- demonstrate careful version management: this applies to the several files not including the draft and final DTP / presentation documents they are already required to do.

- there should be evidence of two different folder operations e.g. copy, move.
RESEARCH AND DATA COLLECTION

- For full marks in searching the internet, there are a minimum of three screenshots required of searches and their results.
  1. 1 key word search using a search engine.
  2. A second keyword search for a different purpose using a search engine.
  3. 1 URL search **showing the keyword search box empty** and typing the URL address directly into the address bar. This is generally misunderstood with screen shots of pages of links. There should be **no produced links** on this screenshot.

- Questionnaires must be filled in to show they had acquired information. Blank questionnaires should not be awarded marks.

- The same applies for email. Emails should be to some external source and not the peer group as in the later section. They should also have received a reply with some information in before they can be awarded a mark.

- Sources logs should have more than 2 different types of link. Candidates should be encouraged to show about 4 links at least with a variety of types e.g. some links to websites and some to pictures.

EMAIL

Some of the screenshots again were barely decipherable. Candidates must produce evidence of emailing the centres; saying they did it is clearly not sufficient.

The email must be in line with the requirements of the controlled test task. Some centres show screenshots of candidates doing email activities but have no content, or no content which has any bearing on the stated task in the examination controlled test paper. Therefore they should not be awarded any marks.

The mark for using a contacts list is not for selecting a contact. It is for using a contacts list to add and amend and delete entries. All three must be evidenced.

It seemed to be common that formative evaluations contained within emails were generally very weak and very limited.

They tended to be of a general nature and would do little to help the candidate show they had responded to those comments in improving their individual work.
COMMUNICATING INFORMATION
Centres are encouraged to look at the CPD material provided by the WJEC on how to assess the quality of these comments.

Formative evaluation: (8 marks)

<table>
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<tr>
<th>Comments</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Own comment on document to improve it</td>
<td>2</td>
</tr>
<tr>
<td>Comments from others on document to improve it</td>
<td>1</td>
</tr>
<tr>
<td>Evidence of responding to comments in document</td>
<td>1</td>
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<tr>
<td>Own comment on web or presentation to improve it</td>
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Comments from others and own comments to improve the work.
Although this was stressed in this report last year and at CPD, it is still an area where many centres are generous with their marking.

Comments were again very weak and general e.g. ‘Change the font/add more text/add more pictures.’
Such general comments were not worthy of a mark.

Some centres seemed to adopt a system where if they wrote anything; no matter how brief and unconstructive; they gave the candidates the mark. This is an area which needs to be improved with more in depth comments and suggestions for improvements.

Drafts and final documents
Most candidates produced drafts and final documents although sometimes it was difficult to know which was which; there seemed to be very little difference between them.
Again centres should note the following;

‘Accuracy and plausibility and fitness for purpose of document’

Some documents had many spelling and grammar mistakes and the information and pictures where not fit for the controlled test purpose and yet marks were awarded freely.

If the document or presentation produced does not match the requirements of the controlled test this should not be awarded e.g. showing a mailmerged template to be used in a mailmerge.

As last year most of the basic features could be seen. Only features which appear on the final document or presentation should be credited.

- insert, crop or resize and position an image fit for purpose needs a before and after screenshot

If submitted on paper.

- on a web page or in a presentation, sequence a set of events needs a screenshot showing the selected custom animation
Advanced features
Evidence was generally clear but it is still worth noting a few points.
- use a **second** different source for data. Some centres used original animations or sound but evidence of these was needed.
- headers or footers must appear on final document on more than one page or slide.
- page numbering **on more than one page or slide** must appear on final document.

MODELLING
This tended to be well done with most candidates gaining the maximum marks for basic features and most gaining advanced features.

As last year the marking of ‘Explanation of formulas/function/feature’ tended to be generous.
Please use the following for guidance.
- **Sum is used to add up the range of numbers** = 0 mark band
- **Sum(B2:D2) is used to give the total points gained** = 1 mark band
- **Sum(B2:D2) is used to give the total points gained by adding up the points given for goals, assists and appearance** = 2 mark band

Accuracy and plausibility mark should only be awarded if the candidate covers all the requirement of the controlled test for the modelling task.

Some candidates still MUST screenshot or print out their spreadsheets in formula view or any formula marks or relative referencing marks are not available to them

**What if investigations are still a problem area.**
What if investigations need **to have a reason** for undertaking them **and a conclusion.**
Candidates should not change data or formulas without a purpose and they must discuss the knock on effect of the changes they have made. Not just say everything changed/ totals changed.
What was the total before and what was it after the investigation.

Advanced features
Again it was often left to moderators to detect these features. Candidates or centres should annotate their work or provide evidence to show what they have done.

DATA HANDLING

**Basic features**
This was generally accurately marked

**Produce lists**
Please note that only the database, the searches and the sorts required by the controlled test task should be given any credit.
**Advanced features**
The following should have reasons why the data produced as a result of these operations is needed. If there are no stated reasons for the search or sort no marks should be given.

- use logical operators and at least one wild card/parameter search
- sort on multiple fields

Calculations must be shown in design view so the formula can be seen.

**EVALUATION**

The marks for the formative evaluation earlier (8 marks) are added to the seven marks for the summative evaluation on the banded IT2 form.

**Summative evaluation (7 marks)**
Although the majority of centres accurately marked this section, there are still some candidates and some centres who do not understand that an evaluation is not a description of what they have done. It is a critical consideration of what has added value to their solution, what detracts or is poor about what they produced and concrete suggestions for improving their work. Candidates are expected to write a critical evaluation on each of the following not just make one brief comment on each.

The summative evaluation should cover all of the following:

- analysis of data and information used in modelling (Data/formulas graphs)
- analysis of data and information used in data handling (Keyfield, extra fields+ data validation)
- concrete suggestions for improvements (modelling and data handling)
- evaluation of other tools + techniques (all tasks: Final choice of DTP features/ investigations/sorts/searches etc.)
- review of feedback (Just a statement saying they considered improvement)
- analysis of research methods/ data collected/data used (Internet/ paper sources/email)
- evaluation of working practice (data protection/security/health and safety).
ICT

General Certificate of Secondary Education

Summer 2014

UNIT 3 - ICT in Organisations

Principal Examiner: M. Thomas

Q.1 (a) Very well answered. Most candidates stated that both devices are used for input.

(b) Very well answered. Most candidates were able to name two different devices and state whether they are used for either input or output.

(c) Quite well answered although a large number of candidates gave the incorrect answer for the first and third statement about MP3 files.

(d) Quite well answered. Some candidates incorrectly named human-computer interfaces for this question.

(e) Not well answered. A number of candidates failed to address the question by explaining why sound signals need to be converted before they can be processed by a computer. This included a large number of candidates discussing the effect of the type of signal on quality.

Q.2 (a) (i), (ii) & (iii) Well answered. Although some candidates confused the descriptions given for parts (i) and (ii).

A significant number of candidates incorrectly answered HTML for an image containing a hyperlink.

(b) (i) Quite well answered. Popular correct advantages included the time saved when producing each the slide or that the developer only has to fill in their own content. Consistent layouts were also a popular correct answer.

A significant number of candidates said that templates are more professional. This was not awarded credit as candidates were expected to state why this is true, e.g. they ensure corporate house style.

(ii) Quite well answered.

Q.3 (a) Quite well answered although some candidates are still naming the features of a graphical user interface, such as windows, icons, menus and pointers as opposed to naming the type of interface.

(b) Well answered.
(c)  (i) Well answered. The most popular answer for a touch sensitive device was a *tablet screen*.

Some candidates gave proprietary names, such as *iPad*, which was not accepted.

(ii) Quite well answered. A number of candidates wrote “easy to use”. This was not accepted without further qualification, e.g. easy to use as the user simply touches what they see on the display or that the user does not need to learn commands.

(iii) Well answered. The most popular disadvantage given for using a touch sensitive screen is that they can be easily damaged/scratched.

Q.4  (a) Most candidates were able to give three techniques used to manipulate digital images. “Red-eye” on its own was not awarded credit as the full name of the technique was required, i.e. red-eye *removal*.

(b) A number of candidates gained one mark for this question, but were unable to give two advantages of vector graphics over bit mapped graphics.

A popular correct answer given was that vector graphics can be enlarged without loss of quality. A significant number of candidates incorrectly stated that the quality of vector graphics is improved when they are enlarged.

Q.5 Poorly answered. A significant number of candidates were able to gain credit for barcode scanning and the automatic re-ordering of stock. However, most failed to describe the other key processes.

A number of candidates also discussed the use of PoS systems for producing reports on the most/least popular items sold. This was not awarded credit as the question specifically asked how PoS systems are used in supermarkets for *automatic stock control*.

Q.6  (a) Quite well answered. Most candidates were able to state that a storyboard is primarily a plan, but did not elaborate by stating that the plan detailed key elements or was frame-by-frame/scene-by-scene.

(b) Most candidates were able to name two appropriate animation techniques, but a significant number of candidates were unable to explain how these animation techniques would be used to produce the car animation.

Q.7  (a) Well answered. Most candidates were able to identify the problem with encoding colours and suggest a suitable solution to the problem, e.g. use codes with more than one letter.

A significant number of candidates stated that a solution to the problem would be to store the whole name of the colour. This answer was not awarded credit, as this is not a *suitable* solution for encoding colours.
(b) Responses to this type of question were much better in this session than in the past.

A significant number of candidates are still writing that it is “easier” to back-up, search and sort data. These answers were not awarded credit, as it is “faster” to complete these tasks when data is stored on a computer system.

Q.8 (a) Quite well answered, although a significant number of candidates stated that an operating system is a type of hardware.

(b) Poorly answered. Candidates seemed unfamiliar with the term *processing method*.

Q.9 (a) Quite well answered. Popular answers included view account balances and transfer funds between the customer’s accounts.

A number of confused the difference between the advantages and services of online banking.

(b) Quite well answered.

A significant number of candidates stated that you can bank from the comfort of your own home. This was not awarded credit as candidates are expected to qualify their answers by stating that it saves travel time or saves travel costs.

(c) Very well answered with security issues given by most candidates.

Q.10 (a) Well answered, although a number of candidates stated that teleworking meant just working from home. Further qualification is required. Note also that “working from home using ICT” was condoned in this session, which means this answer will not be accepted in any future examination papers.

Some candidates confused teleworking with teleshopping or a call centre.

(b) Quite well answered. Flexible working hours and work can fit around family commitments were popular answers.

A significant number of candidates stated that you can work from the comfort of your own home. This was not awarded credit as candidates are expected to qualify their answers by stating that it saves travel time, saves travel costs or that it is more convenient for people with a disability.

(c) Quite well answered. Popular answers included less office space needed and reduced office overheads such as gas bills.

(d) Quite well answered with the most popular answer being that there are fewer greenhouse emissions with teleworking.

Some candidates seemed unfamiliar with the advantages of teleworking to society, often confusing these with advantages to the employee.
Q.11 For both applications, a significant number of candidates confused the use of ICT and the advantages of using ICT. As a result, these candidates were only awarded credit once for the same answers.

The method of data capture in both applications was a particularly poorly answered question.

The disadvantages of using ICT in both applications were quite well answered.

Q.12 Many of the candidates were able to give a clear, coherent answer that fully and accurately identified crimes, outlined consequences and described different measures to minimise or prevent those crimes.

The most popular crimes discussed were associated with the Computer Misuse Act, e.g. hacking and deliberately spreading viruses. A number of candidates also wrote in depth about illegal music downloads and other crimes associated with the Copyright Act.

Most candidates were confident in their use of spelling, punctuation and grammar.
It was striking this year that despite detailed comments from moderators about where centres were going wrong, the centres continued to make the same mistakes. This was true of centres who were scaled last year and centres who just remained in tolerance. Unless some centres heed the warnings in the moderators reports they could be in danger of being scaled if they make any further errors. Centres should ensure the reports go to the person responsible for GCSE ICT.

Centres are reminded that samples of work should be submitted electronically not in printed form.

If websites are not published to an intranet then it is preferred that a USB is submitted as CDs and DVDs can be extremely slow to load. Centres should remember to label their Centre Number on the USB.

As stated last year Centres should publish the final websites so they are in a finished and readable form. Moderators should not be expected to download software and go through the original work files to find evidence of features.

Candidates should be encouraged to organise the work in their folders so they are understandable and easy to find evidence.

Some of the websites and presentations were of a very high standard.

Centres need to consider how they are going to publish the websites for the moderator to assess. Very few of the many websites and presentations seen ran as completely as they should. Videos and animations in websites and even in PowerPoint presentations sometimes did not play. Therefore the supporting evidence reports became crucial in supporting centre marks.

The report containing screenshots of features was invaluable. These need not be a complete record of every little step a candidate took but provide sufficient evidence of features used. A candidate statement saying ‘I did this etc..’ is not sufficient if the features cannot be demonstrated on the final website or presentation.

Many of the comments from last year are applicable this year as new centres had similar misinterpretations.
ORGANISATION OF FOLDERS AND FILES
Many of the issues this year were the same as outlined in last year’s report. Sensible naming of files and folders: this requires the moderator to be able to anticipate what might be in the file. If the file says ‘pictures’ then it should not contain a sound file. It is 1 mark for sensible naming of folders and files not just folders.

Evidence of backup folders on an external device: Screenshots should show the end process not just the copying. The screenshot must show the root folder not just one file saved on a USB or external device/different network drive.

Demonstrate careful version management: this applies to the several files not just one file.

Sources log: this came in many forms and was generally ok. Note: candidates should be encouraged to have at least 4 different links and not just all picture links. There must be some website links as well.

RESEARCH AND DESIGN
Analysis of websites
Again this was generally well done

Describe the target audience of each.
Candidates should be encouraged to be more specific. General phrases like customers/people are too vague. They need to say what age group/specific group of people etc.

Compare and contrast multimedia or web features.
As last year this proved to be a problem area.

- Candidates do not need to identify data/pictures/logos for this section. They should identify multimedia e.g. flash animation/movies/podcasts etc. or web features hyperlinks/hotspots/shopping trolleys etc.
- Having clearly identified them on the website by drawing an arrow to them not just listing them as a set of bullet points. Some centres set up a table and had pupils copy and paste a screenshot of the feature into the table and label it. This was quite a useful way of doing the analysis.
- Having identified the features, for maximum marks, they had to compare four similarities and four differences between the features on the websites. If they had not labelled the feature in one of the two ways outlined above then they should not be awarded any marks in this section.

Identify file type and file size of two different features on the websites.
Again this section was not well done.
- These could include images or multimedia/web features
- They could be on one web site they do not need two on each site.
- They must be different types - not 2 jpegs
- They must also identify or indicate the size of the file as well as the type.
Research individual presentation or web page

This is a design phase and there must be evidence of planning and design. No design marks can be given for an implemented system i.e. it cannot be inherent.

Candidates were expected to write a paragraph about the purpose of their web page or presentation. This should include purpose and target audience.

Candidates are expected to explain how or why their solution is fit for purpose and audience. They should describe the content of each slide or web page.

Candidates were expected to hand draw the design of a master page and scan it in or use a paint type package or use DTP features to design in outline their master page.

1 mark basic layout
1 mark adding navigation features to be used

Collection and design of mood colours/moodboard

Moodboards must consist of at least 2 out of the three of the following
– images/colour schemes/fonts

Colours or images alone should not be awarded a mark

IMPLEMENTATION

Please note the comments made under general points about publishing the website or presentation. Only features present on the webpages or presentation should be awarded marks.

Again it was a similar picture to last year but a few centres still do not understand the basic requirements of the specification.

In outline candidates should;

- Create an original master page or master slide with navigation features.
- Enter text fit for purpose on each slide or web page (to a max of 6)
  Some centres gave marks when there was no suitable text on the page only pictures.
- Create two discrete original images, one simple and the other using at least three layers. The simple image cannot form part of the complex one. Provide evidence of features used to create them. Consider compression choices for both.
- Create a detailed storyboard for a first original animation with timings.
- Create the first original animation and provide evidence of features used to create it.
  Consider timings and frame rate.
- Create a second different animated banner.
- Use and manipulate sound files.
- Use other advanced features that can be used to enhance the basic requirements outlined above.
- Evaluate their work
Most of this is well done but a few centres incorrectly double counted one feature especially with regard to images and animation. I repeat the following from last year’s report.

**IMAGES**
Generally well done but evidence of the use of at least 3 frames should be included for complex image.

Create two original images such as a logo or web icon or other image and optimise it and save it in an appropriate format. Most candidates created 2 clearly different images but many did not show any evidence of consideration of compression formats used. They should not be given the second mark for each image if they have not screenshot evidence and discussed this process.

**Illustrate the techniques used to create, each range of software tools.**
Sometimes it was clear what tools were used (shapes/fill/text) but at other times moderators could not support the centre marks. It would be useful if pupils annotated their images to say that they used some unusual tools, they should provide construction evidence e.g. lighting effects, removal of backgrounds etc.

**ANIMATIONS OR ANIMATED MOVIE**
In general these were very well done and candidates produced some very original animations.
An animated movie is not using still photographs to make a movie. It is using movie making software to make an animation.

Create a storyboard for the animation. Some centres interpreted this as a storyboard for a movie which was acceptable if the movie software was used to make an animation. The second mark was for planning the frame rate and/or timings involved in each frame group; where this was attempted it was well done but some centres gave two marks when frame rates/timing were not planned.

**Two animations are required.** Some centres created an animated banner combining graphics and text and counted this as both their main animation and their banner. This is not acceptable. Animations need clear evidence of features used and this is up to the candidate to provide. Many moderators struggled to see use of features for which the centre had awarded marks.
Complex animations require complex movement not just a cars moving straight across six frames.
Many centres misunderstood the backdrop mark in basic features to that in advanced features.
- In the basic features there is a background which does not move.
- In the advanced features the background moves as well as the animation in front of it.
Very few candidates explained their timing and/or frame rate which they went on to use but centres still awarded the mark.

**SOUND**
Create and manipulate sound or music
Centres approached this in a variety of different ways. Candidates could gain the three basic marks in one of three ways.

Use a sound file from a library/background to a movie. = 1 mark
The other two basic marks could come from two of the following:
- One simple edit on sound e.g. crop
- Second simple edit on sound e.g. change volume
- Discussion of compression used/or of movie compression if sound is in movie
- Extended discussion and justification of compression used and evidence of experimenting with different file compression types.

**Advanced features**
Use of advanced features in sound seemed more popular this year with widespread use of sound editing programs such as Audacity.

Most of the evidence for advanced features was generally provided in the report. However some centres appeared to award marks for advanced features when little or no evidence was provided and their marks could not be supported especially as the sound files did not play in the website or presentation.

**EVALUATION**
These were generally better marked than last year. Centres are becoming more demanding before awarding marks. Teacher comments would be useful in describing where they awarded the marks.
Evaluations should not be a description or log of what they did but should evaluate the good points and be critical of the weak points in their solutions. They should suggest concrete future developments, not just say add more pictures, add a video, add another animation etc.
However, some candidates were given full marks when some of the main sections were not covered e.g. how to publish/host their presentation or website to the web. They tend to talk only about compression.

For full marks, all of the following sections have to be covered.

**Evaluation of solution (website or presentation/ images/ sound /animations movies data)**
- **description** of the suitability and effectiveness of the features analysed
- **evaluation** of tools and techniques used
- **justification** of choice of image, movies, sound and animation optimisation.

**Critical analysis and problem solving**
- suggestions for **improvement**
- review of feedback given and received
- comments on modifications made

**Publication**
- **consideration of download/upload times and file size** (compression/optimisation)
- **consideration of output to the web (hosting)**

**Summary evaluation**
- **evaluation of effectiveness** of final solution (fit for purpose?)
- **evaluation of working practice** (research/ organisation /safe working)