

ITGS

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 22	23 - 34	35 - 46	47 - 57	58 - 69	70 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 21	22 - 34	35 - 46	47 - 56	57 - 69	70 - 100

General comments

General observations from the May 2009 Session

- Candidates clearly do not understand the hierarchy of different command terms, and consequently what this entails in answering questions in **both** the externally assessed components **and** the depth of response for certain internal assessment criteria.
- Insufficient or inappropriate use of ITGS terminology, this means terminology and (in many cases) knowledge relating to IT systems as well as terminology relating to social and ethical impacts.
- An absence of planning in developing extended responses.

Internally assessed work

- Some teachers were not aware that from May 2009 session onwards criteria B and D have changed for the Portfolio and criteria H and J have changed for the Project. The complete and revised assessment criteria are posted on the OCC under internal assessment and supersede the information in the Guide.
- Teachers need to provide means for students to acquire the necessary skills in order to successfully complete the internal assessment. This should also include guidance in learning how to manage their time wisely.
- For either internal assessment component, the assessment criteria should be made available to the students and be thoroughly explained before the students embark on their work. Teachers should use the checklist that has been posted on the OCC.

- The teacher should supervise the process using the checklist on the OCC, so that the final result emerges as a result of the different stages of development with appropriate teaching and guidance at each stage.

Higher level Portfolio and Extension

The major issues that need to be resolved are:

- Lack of effective analysis and evaluation
- Selection of inappropriate news article for Criterion A
- A lack of knowledge about IT systems in Criterion B
- Lack of reference in the Extension to the Portfolio in criteria O and P

Standard level Project

The major issues that need to be resolved are:

- Not appreciating the importance of continuous communication and consultation with the client throughout the development of the product.
- Students submitted simplistic products that fall short of the expected level of complexity, design and functionality of an ITGS project. A document for determining the complexity of an ITGS product has been posted on the homepage of the OCC under internal assessment.
- Inadequate time is allocated to the acquisition of IT skills and following the process for maintaining the logbook, developing the product, testing and completing the report.
- Products were not thoroughly tested; reports lacked detailed descriptions and visual evidence; logbooks were not well maintained; the Appendix of the report did not contain the required information.

Externally assessed components

The major issues that arose in the externally assessed components were:

- Candidates often strayed off course in their responses, misread questions or tried to make the question 'fit' their pre-rehearsed response.
- Lack of knowledge in questions such as databases and spreadsheets which requires practical 'hands-on' experience of using the software. This was particularly the case on Paper 1.

- Candidates had difficulties in the extended response parts of questions, for example Paper 2, part (d) and Paper 3, question three. The responses to these questions should be planned (briefly in pencil is fine) to ensure they refer to the stimulus material, have a balanced analysis and can substantiate any conclusions (see diagram on page 4) Candidates cannot reach the upper markbands unless they use ITGS terminology (both terminology referring to IT systems and terminology referring to social and ethical impacts).
- Lack of explicit citing of evidence obtained from independent research on HL Paper 3, Question 3. Independent research involves primary research gathered by the ITGS class or a student from a wide range of sources including visitations, presentations, hands-on experiences and other investigative activities.

Teachers should:

- Visit the OCC where you can share resources and join the very active ITGS discussion forum
- Check the IBO events calendar on the OCC for details of workshops, both ‘face-to-face’ in your region and online
- Check the OCC for details of Special Events that will be held between September and November 2009

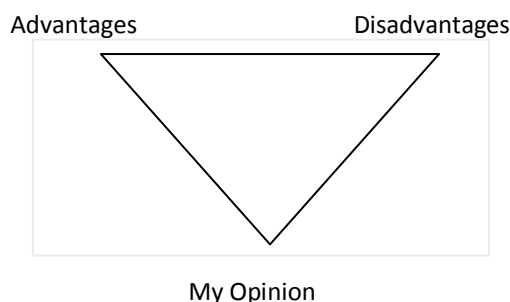
Teachers should ensure students:

- Prepare a glossary of IT terminology – this will improve their answers to early parts of each question
- Understand the nature of the social and ethical issues – for example many candidates write about reliability when asked about privacy and security
- Understand the requirements of the command terms, see table below:

Depth of response to command term	Skills required	Command terms used	Marks allocated
Low (short responses)	<ul style="list-style-type: none"> ▪ Knowledge ▪ Understanding ▪ Description 	<ul style="list-style-type: none"> ▪ Define ▪ Describe ▪ Identify 	2- 4
Medium	<ul style="list-style-type: none"> ▪ Explanation 	<ul style="list-style-type: none"> ▪ Compare ▪ Contrast ▪ Distinguish ▪ Explain 	4 - 6

High (extended responses)	<ul style="list-style-type: none"> ▪ Analysis ▪ Evaluation 	<ul style="list-style-type: none"> ▪ Analyse ▪ Discuss ▪ Evaluate ▪ Examine ▪ To what extent 	8 - 12
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- Have the opportunity to write responses to past exam questions in class tests and markschemes that have been discussed in class. (Students need to be cautioned that markschemes are an indication of a response and not the entire response.)
- Clearly appreciate the need to carefully read the stem of the question and underline keywords - *preventing them going 'off course' in their response*
- Use opening sentences that clearly refer to the question and the stimulus material such as 'From the perspective of the government' - *this should keep answers focused*
- Can plan an extended response, this includes knowing how to develop a balanced analysis and provide well supported opinions as well as avoiding repetition and going off course. See the opinion triangle below:



- Understand how markbands are used for extended responses - *this can be done by using them in class tests*
- Have the opportunity to debate issues that are likely to be included in extended response questions where students represent stakeholders and opposing views – *this should assist with planning extended responses*
- Share current news items in class and explain the technology, identify the stakeholders, discuss the impacts and formulate substantiated conclusions – *this is good practice for extended responses and learning how to use the ITGS triangle as an analysis tool.*
- Start each question on a new page and separate parts of each question with line spaces – *marking can be very difficult when writing is illegible and it is unclear where the next part starts*

- Have read this part of the Subject Report

Higher level internal assessment – portfolio and extension

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 – 4	5 - 9	10 - 15	16 - 21	22 - 27	28 - 33	34 - 45

The range and suitability of the work submitted

Most portfolios followed the required regulations for presenting the portfolios and extension being based on news items about current, relevant topics from three different areas of impact. However, there were still a significant number of problematic topics. The best work used significant research into both the impact of the issue and the IT system involved and from a variety of sources.

The changes to Criterion B, and to a lesser extent Criterion D, were not taken into account by many schools. Criterion B has been simplified by the removal of the requirements for 'trends and developments'. Many schools did not seem to know about the changes to Criteria B and D that were published a significant time ago and came into effect for this session.

A major concern was the lack of knowledge about IT, and the use of specific IT concepts, displayed in Criterion B and elsewhere in the portfolio and extension. The portfolio does not only require the student to investigate the impacts of the use of IT but also to investigate the IT system as well. The knowledge that is presented in the classroom about the IT system is often not detailed enough for use in the portfolio. Also the solutions presented in Criterion D often lacked detail and did not display significant research.

Another concern was the rare appearance of good analyses and evaluations in the portfolio. It was apparent, particularly from the work in the extension, that many students had the capability to provide analyses and evaluations, and a significant number of students did attempt them but were not clear about the requirements. One of the reasons seems to be that students are not being taught how to write an analysis and an evaluation based on the research presented. The analyses and evaluations are an opportunity for students to display their higher order thinking skills which are required for the higher level marks in each criterion. Unsupported short critical comments are not sufficient. The analyses and evaluations must include direct reference to the research material that has been presented previously. Requiring students to include separate paragraphs for analyses and evaluations is a good starting point.

There have been some problems with the selection of the news item that starts the investigation into the issue. The news item, the issue and the associated IT system should be

chosen to allow the students to achieve the highest levels. News items about the following topics were often found difficult by students to research and discuss:

- Robots in medicine and surgery, in industry, in the army – the IT system is complex and the main focus is usually the positive impacts
- A specific item of hardware or software, often of interest to the student, that does not lead to research about a significant issue with the use of the IT on real people
- The future or narrow use of IT that often forced the students to discuss hypothetical impacts, especially in health
- Case studies of a specific use of IT with few negative impacts that could not be easily researched
- News items that discussed generalised impacts that were not linked in enough detail to a specific IT system and/or real people, e.g. the loss of a CD that contained medical records, the impact of viruses, the impact of hacking, the impact of music downloading, the general problem of e-waste
- News items that were only about the positive impact of the use of IT

The best news items were about the **negative impacts** from the use of a specific **IT system** on **real people**. If these three elements are not in the news item another one should be chosen. The news item should lead the students to further investigate and deepen their knowledge and understanding of the issue, and the IT system. It is often useful to start with an issue discussed in class and then find a news items with the three elements in it. The monitoring of the selection of topics and news items needs to be significantly improved in some centres. When students used a good news item the marks were higher than for their other portfolio pieces.

There was an improvement in the quality of the extensions and it was not uncommon for students to improve their marks in the extension compared to those achieved in their portfolios. The number of interviewees was usually more than one and the probing nature of the questions about the issue is improving. But there is still a significant problem with the lack of supportive quotes from and detailed references to the portfolio in Criteria O and P.

Teachers are requested to include comments providing reasons for their marks on the work itself or a separate sheet of paper. The comments need to relate to the key command terms in the various mark levels of the criteria, 'describe', 'explain', 'analyse', 'evaluate' that are defined at the back of the subject guide. Highlighting the sections that show the student's analyses and evaluations is also recommended. Comments and highlighting enable the moderator to provide more constructive comments to the teacher and provide valuable feedback and guidance to the students.

Recommendations for the teaching of future candidates

- Discuss subject reports for the portfolio and the extension with your students, developing a checklist to avoid past pitfalls (see attached sample checklists)
- Visit the OCC regularly: ask questions in the forum and read responses from other teachers

Portfolio pieces:

- The time allotted for a portfolio piece from start to finish, including research and drafting, should be about four weeks.
- Students should attempt at least 4 portfolio pieces in the first year of the course, and 2 in the first half of the second year of the course.
- At the start of the second year of the course the students should select one portfolio for the basis of the Extension

The portfolio process should have the following stages:

- Choice of area of impact and issue, and choice of news item
- Proposal for Portfolio: checking that the news item is not out of date and is a news item, the availability of sources for detailed research into the issue and the IT system, clarification of the issue in the news item, check the area of impact has not been covered previously
- Research into the issue and the IT system – at least 10 sources should be found
- Presentation of research to teacher for discussion: details of the research into the issue in the news item, details of the IT system, the analysis and evaluation of the impacts, the problem and the solution
- Presentation of full written draft for comments by the teacher (including checking for plagiarism)
- Checking of other details: cover sheet details, bibliography format, citation format, word count, copy of original news item attached.
- Advise students to choose the news item carefully. Ensure it raises a relevant social and/ or ethical issue that can be investigated, contains some details of the associated information system, and includes some details of the stakeholders.
- Ensure that students understand the meaning of the command terms “describe”, “analyse”, “evaluate” defined at the back of the subject guide.
- Ensure the students understand the criteria by discussing exemplar portfolios.

Method of Using the Criteria Mark Levels:

In all the criteria the student cannot obtain a mark for a higher level unless the lower levels have been achieved.

- If a student evaluates the impacts in Criterion C but has not explained and analysed them first the student cannot be awarded the 5 marks for the evaluation, but must be awarded 2 marks for a description of the impacts.
- The marks cannot be awarded from a global impression of the work of the student: e.g. a good well written criterion cannot be awarded 4 out of 5 on this basis. The student must meet the requirements for each mark level of the criterion starting from mark level 1 and moving higher.

Teachers need to be stricter in their marking: do not award marks unless there is significant evidence that the student has achieved the previous levels and the level for which you want to award the marks. The definitions of the command terms are at the back of the subject guide.

Sample portfolio cover sheet (a similar one is required for the Extension)

- **Title - IT System and Issue:** Instant Messaging – Blessing or curse to businesses?
- **Area of Impact:** Business and Employment
- **Date completed:** July 2006
- **Date of news item:** 13 March 2006
- **News item:** Hu, J. & Festa, P. "AOL aims to stop the IM erosion", ZDNet (a CBS Company), 2006. Found at <http://zdnet.com.com/2100-1104-996837.html> [Accessed 21 May 2006]
- **Word Count:** 976 (not including the bibliography)

Recommendations for the extension

- Advise students to choose their extension topic and stakeholder early – at least by the early part of the second year of the course
- Stress the importance of choosing suitable stakeholders for their interviewees early
- If the student does only one interview, encourage them to choose a top-level stakeholder not an end-user, and encourage them to find a second interviewee with contrasting involvement in the issue
- Students should not use students under 18 as interviewees, or teachers from their school.

- Ensure that guidelines for the choice of stakeholders, questions and the interview process are understood and applied.
- Suggest that the students test the interview to check that the questions are logical, non-repetitive and elicit useful responses. They may use other ITGS students for this.
- Ensure that the interview process allows for the availability of the interviewees for further questions and clarifications. Encourage face-to-face interviews, or at least a series of emails.
- Surveys and questionnaires are NOT interviews.
- Use a similar process for the extension as described for the portfolio above.

Standard level internal assessment - project

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 8	9 - 12	13 - 17	18 - 21	22 - 26	27 - 35

The range and suitability of the work submitted

Most candidates identified an appropriate client and real problem requiring the use of applications to create an IT solution. Most problems were related to a client within the school or a person from outside of school, but in almost all instances well-known to the candidate.

Successful projects demonstrated that the candidate regularly consulted with the client throughout the process from criterion G through criterion K. Most products were websites followed by a number of relational databases, presentations, videos, animations and published products. In some instances all of the products submitted from a school were similar in nature. This indicated that the students had been guided to develop the same type of product, which is not in the spirit of the ITGS project. Candidates must be given the opportunity to identify their own client and develop an IT solution for the problem that needs to be solved.

Candidates need to acquire the necessary IT skills and be allocated a sufficient span of time in order to develop their ITGS projects. In general, products are too simplistic and fall short of the expectations of the ITGS project.

Candidate performance against each criterion

Criteria G: Identifying the problem within a social context

The client/end-user is the person who has the problem that requires an IT solution and who will work with the student from criterion G through criterion K. Too many students are vague with their client/end-user(s). They identified groupings, such as the students in my class, the people who belong to the club. Students need to identify by name a particular person as their client. The client may not be the ITGS teacher.

Most students were able to clearly identify and set in a social context the need or problem. There is often a great concentration on the social context, with a description of the need, but the inadequacies of the present system were sometimes outlined, but not described. The client needs to be consulted on the current situation and the inadequacies.

Criteria H: Analysis and feasibility study

It is very important that students identify two IT solutions and that one of those solutions is then used in Criteria I. Some students identified two solutions, but only one was an IT solution. The solutions supplied must use IT. For example, it is not sufficient for a student to say that they are going to produce a video. It must be clear that the student will edit the video using a computer and video editing software.

Again this year many students identified a booklet as a solution, but did not indicate that it was a DTP solution. This means that this solution was not considered as an IT solution.

It is important to describe both approaches well and their advantages and disadvantages, not just the selected approach. Students need to look at their explanation of how this product will solve the original problem and to justify why they select one product over another. Many students did attempt to provide justification, but just repeated a number of the advantages.

Criteria I: Planning the chosen IT solution

Many students followed the five stages of development of the project by dividing this section into five sub-sections.

Schedule

Too many students outlined a plan or gave very broad time frames. There should be a detailed timeline identifying when the various stages will happen. This should include who does what, and when it should be done. Students need to identify when various tasks will happen, by a specific date.

Design

The report must contain visual evidence of the planning and design of the product. A number of students used screenshots of the completed project only. This does not demonstrate the on-going process. This evidence can be in the form of sequences of screenshots showing

changes in design, and diagrams of layouts. The screenshots must be included within the report under criterion I and not in the Appendix of the report.

Software

Most students identified the software used and the basic information necessary, but did not fully describe how they were used in the making of the final product. Many students did not mention all of the software (i.e. utilities) that they used in their projects. Students wrote about using the Internet, image software, compression software, but failed to identify the specific type and discuss how it was used. Screenshots should also be used to explain how the various IT tools are used in the **making** of the product.

Hardware

Again, students failed to include the names of scanners, video cameras, digital cameras, printers, and other peripherals used. The use of the hardware was not well covered. Students often neglect backup, servers and the client's computer if it will be used for the product.

Data Collection

Many students identified obvious data that they collected, but failed to provide the bibliographic information about these resources or the specific types of data collected. They need to describe the various forms of data necessary for the completion of their product. They need to describe what content material is needed and how it will be collected. If surveys or interviews are used for data collection, a summary of the responses must be included in the appendix.

Criteria J: Testing and evaluating the solution

When students are testing their projects they should make sure that the client/end-user of the project is the last tester. A knowledgeable person should test the project for content and technical aspects. Testing should be carried out in a structured manner using a questionnaire.

The student should identify and justify the refinements made, including before and after screenshots to provide evidence of changes that were made. The testers' expertise level, the number of trial runs should be indicated. Students should use a variety of testers to match the product. For example, if the end product is a printed booklet, then parent who is a graphic designer could do the testing.

The use of "before" and "after" screen shots are recommended and should be included within criterion J. Most candidates managed the test, refine, and test, refine cycle. However, they often failed to obtain an evaluation from the client. Students must remember to conclude one test/refine stage with justification and proof before moving on to the next test/refine stage. A number of students completed testing by all testers before indicating any refinements. This is then considered as one testing sequence not as the three that the student thought they were conducting.

Completed questionnaires must be included in the Appendix of the report. Wherever possible these should be specific to the type of testing that the person is completing. They should be signed and dated.

Criteria K: Assessing the social significance of the product

The observed impact must emerge from the development of or use of the product. The client is a valuable resource for both the observed and projected impacts. Teachers need to spend more time discussing social issues with students so that they better understand what is required. Most students experience difficulty in describing one projected impact and describing one observed impact of their product.

Criteria L: The End Product

Many end products were well designed and functional, but too simplistic. They were simple solutions to simple problems and scored low on complexity. If a student is using the most recent versions of software it would be wise to include the proper viewer for that software on the CD-ROM/DVD. Students should also save their projects in at least two different formats. 8-10 annotated screenshots from the final product are also required in the Appendix of the report.

All products must be submitted on CD-ROM/DVD. Desktop Published products must also be submitted in final printed version. The URL for websites must also be provided. Any access information required for moderation must be included in the Appendix of the report.

Criteria M: The Log Book

The best logbooks were dated and well maintained containing descriptive and evaluative entries and accompanied by annotated diagrams and screenshots. Unfortunately, a large number of students neglected to address all of the stages required, especially evaluation and visual evidence. Consequently, they lost marks because the logbook was incomplete. Students also need to be reminded to include drawings, flowcharts, and screen shots to help document their work. ITGS teachers need to regularly monitor progress and initial pages in the logbook.

Appendix of the Report

The appendix of the report must contain:

- directions for accessing and using the product
- completed questionnaires from the three phases of testing
- 8-10 annotated screenshots from the final product

Recommendations for the teaching of future candidates

- Read the ITGS Guides and carefully check the criteria requirements and command terms. Note that the new criterion H and criterion J have been posted on the OCC to replace the ones in the current ITGS guide.
- Review the Project section of past ITGS Subject Reports (excluding criterion H and J).
- Review the Project feedback sent to the IB Coordinator for the M09 ITGS sample projects.
- Post questions concerning the ITGS project in the Discussion Forum on the OCC. Review Special Events-Project Folder and the Folder summarizing all of the postings relating to the ITGS Project. (access by clicking on the words "Group 3: individuals and societies" menu bar at the top of the ITGS Discussion Forum

or

access by using the URL

[http://occ.ibo.org/ibis/occ/fusetalk2/forum/index.cfm?FTVAR_SUBCAT=1349&nocookies=y&subcatname=Group%203%3A%20individuals%20and%20societies%20|%20Groupe%203%20%3A%20individus%20et%20soci%C3%A9t%C3%A9s%20|%20Grupo%203%3A%20Individuos%20y%20Sociedades\)](http://occ.ibo.org/ibis/occ/fusetalk2/forum/index.cfm?FTVAR_SUBCAT=1349&nocookies=y&subcatname=Group%203%3A%20individuals%20and%20societies%20|%20Groupe%203%20%3A%20individus%20et%20soci%C3%A9t%C3%A9s%20|%20Grupo%203%3A%20Individuos%20y%20Sociedades)

- Attend ITGS workshops to discuss the ITGS project and view sample products, reports and logbooks.
- The teacher should use a project management process to check that each student follows the process described in the assessment criteria and consults with their client regularly. The candidate must satisfy the criterion for each stage before he/she is allowed to proceed to the next stage. The process must be well documented in the logbook. Criterion G, H and I should be planned in the logbook before beginning to make the product.
- Teacher should add comments in pencil and/or blue ink within the logbook and report the right margin indicating how the product, logbook and report were assessed. The teacher can provide the student with feedback on how well they have met the criteria on one draft of the report which the student is permitted to use to submit his final version.
- Provide candidates with the assessment criteria and the checklist of questions (see the OCC). These have been updated from the May 2007 Subject Report to reflect changes to criterion H and criterion J.

Higher and standard level paper one

Component grade boundaries

Higher and standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 9	10 - 14	15 - 18	19 - 22	23 - 26	27 - 40

The areas of the programme and examination that appeared difficult for the candidates

There were significant difficulties shown in both the technical knowledge and the ability to explain issues. The severe lack of subject knowledge was more evident than usual. Many candidates seem to have neglected to study several core topics on the syllabus. Knowledge of spreadsheets was lacking in many cases to the extent that it seemed as if students had never used them. Artificial intelligence was often not understood.

The levels of knowledge, understanding and skill demonstrated

The better candidates had clearly had plenty of practical experience with software such as spreadsheets and were thus able to make meaningful responses to the questions. However, such well prepared candidates were in a minority. What was too often lacking was detailed knowledge of the material specified in the syllabus. Technical knowledge was too often weak and social issues were too often dealt with in a common sense manner, showing little evidence of having studied many examples of scenarios in any depth.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question One

- a) The failure of many candidates to score full marks here was astonishing, given that the functions were clearly shown in the stimulus material. Many examiners wondered whether some candidates had ever used the SUM, or any other functions.
- b) (i) Similarly, it often seemed that candidates had no idea that a colon is used to indicate a range of cells. It is difficult to imagine anyone who has ever used a spreadsheet not making extensive use of cell ranges.

(ii) Again, most spreadsheet users must have had experience of absolute addressing, so the fact that many candidates did not know about this was surprising. Candidates could have scored one mark just by noticing the dollar sign.
- c) Candidates must surely have used spreadsheets to make changes in some scenario in order to show the consequences. The term “what-if” is on the syllabus and indeed

widely known. Too many candidates did not show any evidence of ever having used a spreadsheet in this way. The best candidates knew about changing the values of variables and using formulae and functions to produce instant recalculations.

Question Two

- a) The better candidates knew the term protocol, which has been asked before. Many guessed, suggesting that they had not studied this part of the course.
- b) The stem of the question gave plenty of clues. It even said that the HTML code *searches the site*. This should have set the right direction to the answers. Despite this, too many wrote about what the advantages of displaying these advertisements are or made comments about what sort of advertisements might be suitable. The question asked *describe how*. Not *why*. The candidates ought to be used to going through a process like this, step-by-step.
- c) Most scored at least something here, realising that advertising pays. The better ones suggested innovative ways of advertising, providing interesting content to attract more clicks and using meta tags and key words in order to affect the page ranking.

Question Three

- a) The short range requirements of the Oyster card reader was in the main well understood by many candidates, however, a significant minority failed to link to their answers a consequence of having an extended range. A significant minority lost marks by vaguely speculating about interfering with other equipment.
- b) Identifying four tasks for the Oyster software was very well answered by most candidates, most scoring full marks for this question. It was strange that many candidates seemed to have little difficulty with this “step-by-step” question, but were not able to show similar skills elsewhere.
- c) A disappointing set of responses was seen here. Many discussed environmental issues resulting from paper less tickets and lack of trains if the ticketing system failed, ultimately, both responses being off course, having nothing to do with the *extension* of the system. Few discussed the logistical problems of rolling out a scheme across many different transport systems with the attendant issues of incompatibility and varying pricing policies. Most answers were low level and depended on a vague common sense approach which could have been produced by students who had never attended an ITGS class.

Question Four

- a) Most candidates scored at least one mark for this question, a large number scoring two marks. Candidates who failed to score any marks for this criterion tended to assume that a robot device operating in a car assembly plant for example, displayed AI. They failed to understand that AI is in part a quest for learning by doing, as

opposed to the repetitive carrying out of tasks because the human is too lazy, or the task is potentially too dangerous.

- b) Candidates who had studied the Turing test stood out from the rest. They tended to give clear and detailed answers as to what such a test entails, as opposed to many candidates who simply relied on the 'AI' type machine to answer questions using the human language.
- c) This prompted many 'scrappy' responses with few candidates scoring full marks. As with other part c responses candidates only used general terms and did not show a more in-depth understanding that would be expected from a student that had studied ITGS for two years.

Recommendations and guidance for the teaching of future candidates

The widespread weaknesses shown in this year's cohort were largely attributable to obvious gaps in subject knowledge. **All topics in the syllabus will be examined.**

The candidates need to **visit, and if necessary revisit, the practical activities** such as database creation, spreadsheet design etc that will provide a clear understanding of the technical basis upon which topics within the subject is founded. They also need to be tested throughout the duration of the course to ensure this understanding is retained.

All ITGS teachers should provide their students with relevant information from the OCC about product complexities and **all students should have** had experience of:

- setting up and using a complex spreadsheet
- creating and interrogating a relational database of at least three tables
- performing other actions with software that involve the **processing** of data, not simply storing and retrieving it.

Without this solid background knowledge, the candidates cannot discuss social and ethical issues in anything other than a superficial and common sense way.

Higher and standard level paper two

Component grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 5	6 - 11	12 - 20	21 - 26	27 - 33	34 - 39	40 - 60

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 5	6 - 11	12 - 20	21 - 27	28 - 33	34 - 40	41 - 60

General comments

The **Higher Level Paper Two** examines all areas of impact. In this session Question 2 (Science and Environment) and Question 4 (Arts, Entertainment and Leisure) were common to both the Higher Level and Standard Level papers. Question 1 and Question 3 were specific to Higher Level and examined the remaining four areas of impact. Candidates were required to answer any three questions. Where four questions were answered each question was marked and the best three totalled to give the final score. This helped candidates who were not aware of the paper format, but their marks were generally lower due to the time wasted on the fourth question.

The **Standard Level Paper Two** examines three areas of impact. Section A (business & employment) is required of all candidates. The candidates can select any two out of five Areas of Impact in Section B. In this session Question 5 (Science and Environment) and Question 4 (Arts, Entertainment and Leisure) were common to both the Higher Level and Standard Level papers. Candidates were required to answer two questions from Section B. Where more questions were answered, each question was marked and the best two were considered for Section B. This helped candidates who were not aware of the paper format, but their marks were generally lower due to the time wasted on the additional responses.

The levels of knowledge, understanding and skills demonstrated

- Candidates struggled to use the correct terminology. This was most apparent in HL and SL Question 4c where they talked about linked databases instead of linked tables and used terms such as sectors, lists or categories instead of tables and fields. Many candidates did not have a clear understanding of a flat file so they could not explain the advantages of linked tables. If they mentioned prevention of data redundancy they rarely related this to the file relationship diagram in the question so it was not apparent that they understood the term. Databases can be found in the Guide under Section 2.2.2 'Databases and spreadsheets' where 'flat-file database versus relational database' is one of the subheadings.
- Often responses were vague or lacked depth. Claims that flat file databases are disorganised and suggestions that the Intranet is kept separate from the Internet, without explaining how this could be achieved, were not sufficient to gain marks. Candidates were aware that voice recognition software recognises words but they were expected to give more detail and indicate that the input words are compared with words in its inbuilt dictionary.
- Answers often went 'off course'. This problem was most prevalent in HL Question 1 where candidates were asked to evaluate the use of adaptive technologies for employers and

disabled employees. This question was straightforward and good candidates had no trouble considering positive issues (e.g. increased productivity for employers, greater employment opportunities for disabled employees) and negative issues (e.g. costs for employers, training requirements for employees). Many candidates veered off the topic and wrote about telecommuting issues. If students are given the opportunity to debate extended responses in class this may help them focus more clearly on the question. In this particular debate they should visualise a round table discussion where the employer weighs up considerations and benefits of adaptive technologies and a representative for disabled employees similarly presents their relevant arguments. In HL Question 3 many candidates did not highlight the words 'from the perspective of the government' when they wrote about telelearning in prisons and their answers related to advantages or disadvantages for the prisoners. Similar instances of candidates going off-course and not planning their responses have been cited within the HL and SL comments below.

- Many extended responses only elicited common sense answers which did not indicate that a student had attended an ITGS course. An example of this problem arose in HL Question 3 where candidates were required to evaluate the use of telelearning in prisons. Strong candidates showed evidence of their ITGS studies and discussed costs of hardware, software, network infrastructure and technical support or security issues resulting from prisoners hacking into the system thereby bypassing security measures to communicate with accomplices outside. Weak candidates suggested that criminals are not good people and do not deserve an education.

Extended Responses

The markband below was applied to all extended response questions. In simple terms a descriptive answer falls in the 3-5 markband, an answer involving analysis in the 6-8 markband and an answer with supported opinions in the 9-10 markband.

	0	<i>No knowledge or understanding of IT issues and concepts or use of ITGS terminology</i>
	1-2 marks	<i>A brief and generalized response with very little knowledge and understanding of IT issues and concepts with very little use of ITGS terminology.</i>
Description	3-5 marks	<p><i>A response that may include opinions, conclusions and/or judgments that are no more than unsubstantiated statements.</i></p> <p><i>The response will largely take the form of a description with a limited use of ITGS terminology and some knowledge and/or understanding of IT issues and/or concepts.</i></p> <p><i>If no reference is made to the information in the stimulus material, award up to [3 marks].</i></p> <p><i>At the top end of this band the description is sustained.</i></p> <p><i>At the bottom of the band a tendency towards fragmentary, common sense points with very little use of ITGS terminology.</i></p>
Analysis	6-8 marks	<p><i>A response that demonstrates opinions, conclusions and/or judgments that have limited support.</i></p> <p><i>The response is a competent analysis that uses ITGS terminology appropriately. If there is no reference to ITGS terminology the candidate cannot access this markband.</i></p> <p><i>There is evidence that the response is linked to the information in the stimulus material.</i></p> <p><i>At the top end of the band the response is balanced, the response is explicitly linked to the information in the stimulus material and there may be an attempt to evaluate it in the form of largely unsubstantiated comments. There is also evidence of clear and coherent connections between the IT issues.</i></p> <p><i>At the lower end of the band the response may lack depth, be unbalanced or tend to be descriptive. There may be also implicit links to the information in the stimulus.</i></p>
4 Opinion discuss, evaluate, justify, recommend and to what extent	9-10 marks	<p><i>A detailed and balanced (at least one argument in favour and one against) response that demonstrates opinions, conclusions and/or judgments that are well supported and a clear understanding of the way IT facts and ideas are related.</i></p> <p><i>Thorough knowledge and understanding of IT issues and concepts.</i></p> <p><i>Appropriate use of ITGS terminology and application to specific situations throughout the response. If there is no reference to ITGS terminology candidates cannot access this markband.</i></p> <p><i>The response is explicitly linked to the information in the stimulus material</i></p> <p><i>At the bottom end of the band opinions, conclusions and/or judgment may be tentative.</i></p>

ITGS terminology refers to both the IT technical terminology and to the terminology related to social and ethical impacts.

In extended responses for HL Questions 1, 3, and the common question HL Question 2 / SL Question 5, students were able to access the higher markbands if there was more emphasis on the terminology related to social and ethical impacts and less on IT technical terminology.

In the common question HL and SL Question 4 and SL Questions 1, 2, 3, and 6, in order to access the higher markbands, examiners were expecting a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

The areas of the programme and examination that appeared difficult for the candidates

As mentioned earlier the main concern was the lack of knowledge of IT concepts and terminology. This was particularly apparent in parts a, b and c of each question. In extended responses candidates could frequently describe issues and often analyse impacts, but well substantiated, balanced opinions were rare. Some extended responses were very generic, especially in HL and SL Question 4d) where candidates wrote about privacy and security concerns and provided solutions without relating their answers to the scenario.

The levels of knowledge, understanding and skills demonstrated

At Higher Level and Standard Level, most candidates displayed, at least, a basic understanding of their three chosen questions. Adaptive technologies had obviously been studied for HL Question 1.

It also seemed that candidates were aware of the requirements when asked to describe step-by-step processes in HL Questions 1 and 2, the common HL and SL Question 4 and SL Question 5. However, some of the description would have been clearer if the candidates had actually numbered the steps in their processes.

The strengths and weaknesses of the candidates in the treatment of individual questions

Common questions

HL Question Two and SL Question Five

- a) (i) and (ii) This question was well answered and students defined a terabyte usually in terms of bytes or gigabytes. The term GPS was understood.
- b) Answers varied here. A wide range of answers was possible and students who described capturing and storage generally scored marks. Some misread the question and talked about the use of Google Earth.

- c) There was not a good knowledge of GPS and how it works with mapping software. Again some students only gave part answers and did not explain how the destination is found.
- d) It was clear most students had used Google Earth and they were able to discuss impacts of privacy and security. Some did not focus on the question which asked if blurring images on users' requests was acceptable. Others simply indicated that privacy is a concern and people should be able to request that their home is blurred. To gain further marks they needed to consider the implications for this suggestion. Many students thought Google Earth was operating in real-time and discussed tracking of individuals. Some misread the question and wrote about Google Maps.

HL and SL Question Four

- a) Most correct answers indicated that a smart card includes an embedded microchip. Some candidates thought smart cards had a magnetic strip.
- b) Many students appeared to have studied IT processes and could describe several, if not four processes needed to authenticate the cyclist. Some answers were too brief and did not fully describe the steps. Some candidates did not focus on authenticating the cyclist when collecting a bike and they wrote about the initial sign up process or how the rental is completed at the end of the day.
- c) This question was poorly answered due to a lack of understanding of flat files and relational databases. The question required an explanation that referred to the diagram on the exam paper.
- d) Privacy and security issues had obviously been studied but answers were often generic and did not always relate back to the scenario.

HL Question One

- a) For 2 marks candidates were required to make two statements about VPN. Most knew the meaning of the term and some were able to score a second mark by making an additional comment, such as the use of encryption to secure data from unauthorised access.
- b) Most students could describe several steps in the process when voice recognition software converts speech to text. Sometimes steps were not sufficiently precise to gain marks.
- c) There was a good understanding of adaptive technologies. Some students chose to explain separate hardware and software and others chose one technology and described how the hardware and software worked together. Descriptions of regular hardware such as speakers did not gain marks.
- d) This was a straightforward question. Good answers provided balanced viewpoints and stayed focused on the question.

HL Question Three

- a) This question was generally well answered although some candidates identified output instead of input devices.
- b) This was a straightforward question. Most students lost marks only due to lack of depth in their descriptions of the way these technologies could be used in telelearning. Specific examples of learning activities would have secured a second mark.
- c) There was a very poor understanding of an Intranet and how it could be used to give prisoners access to resources. To gain full marks it was necessary to explain how an Intranet could isolate prisoners from the outside world. Answers often described filtered Internet access which did not answer the question.
- d) This question was straightforward and marks were generally lost when candidates did not focus on the key phrase 'from the perspective of the government.'

SL Question One (Business & Employment)

- a) Most candidates answered the question correctly. However, some candidates did read the entire question and neglected to provide components of the thin client computer that are in fact needed to enable it to be part of a network.
- b) A wide range of appropriate features were identified. However, candidates must be familiar with the command term 'describe' and provide adequate detail. Simply stating a feature of a client/server network is insufficient for full marks.
- c) Very few candidates achieved four marks because they did not provide clear, detailed and precise description of the benefits of a thin client approach for the call centre with clear reasons of why it is better than any other system or why it is beneficial. Students need to be aware that part (c) questions use markbands and also the command term 'explain' requires description and reasons.
- d) Very few candidates addressed the question asked and did not describe specific methods of monitoring employees and the information collected or evaluate the usefulness of the information to assess employee productivity. Future candidates need to investigate a range of methods used for employee monitoring and their effectiveness.

SL Question Two (Education)

- a) The two most frequent ways data collected could be entered into the computer were by typing the data directly into the computer and by transferring the data from data logging devices and cameras using USB cables. Other appropriate ways were also accepted.
- b) Most candidates could identify two ways (i.e. create tables to show results using appropriate formats for text and numbers, using functions for calculations,

representing data in graphs), but did not continue to describe how the way could be used to analyze the results.

- c) Candidates often did not answer the question asked. The question specifically refers to the students reporting back to their class. Consequently, responses need to focus on how the word processor and presentation software is used to report the work done during the field trip to the class and the one advantage for each.

Many students neglected to describe the methods for reporting and immediately proceeded to describe the advantages of each.

- d) It was quite surprising that any candidates neglected to organize their responses. Consequently, there was often repetition and lack of depth in the answers. There was a wide range of responses possible for both concerns for the school and teachers and educational advantages for the students. However, the response rarely reached the upper markband requiring the students to use ITGS terminology (both terminology for IT systems and terminology for social and ethical impacts).

SL Question Three (Health)

- a) The two most common hardware features of a PDA that were identified were a keyboard and screen. However, a range of other IT hardware features were accepted (i.e. infrared port for wireless communications, digital photo camera, stylus to use on the touch screen, memory cards and other appropriate hardware).
- b) Better responses correctly described in detail two ways that the hospital wireless system could be protected from intrusion. Candidates seemed to have a good understanding of login/password access, firewalls and encryption of files and emails, and virus checking software.
- c) "Explain" requires an identification of a reason, then an explanation of it for one advantage and one disadvantage. Often the advantage or the disadvantage lacked detail in the explanation. Future candidates must understand the depth of the response expected by the command term "explain" in part (c) questions.
- d) It is unclear why a few candidates referred to other hospitals when the scenario refers to the use of the Blackberry or similar devices on all hospital areas in one hospital. Again it was apparent that candidates do carefully read the questions and neglect to plan their responses before beginning to write. Consequently, answers do not have the required depth, examples with explanation, balance or use of ITGS terminology. Better responses developed a range of responses relating to the various stakeholders. These included that communication would be possible with all hospital staff regardless of where they would be located, staff may feel that their work is affected if they are expected to answer every message, implications for the need for greater security to prevent access to hospital information systems.

SL Question Six (Politics & Government)

- a) Most candidates could identify two features of optical character recognition (OCR).
- b) Although the question requires the candidate to reflect situations where wireless link between the camera and network would not function, many candidates experienced difficulty in describing obvious responses such as: places where there is interference from other equipment, instances of power shortage or places where there is a risk of hackers obtaining access to the results of the surveillance.
- c) Candidates did not always describe the "unusual" situation and then explain how the new expanded system would be able to detect this. Candidates are expected to apply their knowledge from IT systems that they have studied in class to new situations.
- d) The question requires a "weighing-up" of citizens concerns about the expanded system to the benefits of providing continuous information to the police department. Specific examples should be cited and analysis is required. Very few candidates provided detailed responses and balance in their arguments. Both aspects of ITGS terminology was also lacking.

Recommendations and guidance for the teaching of future candidates

- Ask students to prepare a glossary of IT terminology – this will improve their answers to early parts of each question
- Ensure students understand ITGS issues – many candidates wrote about *reliability* when asked about *privacy* and *security* in Question 4
- Explain the requirements of the command terms – a few candidates wrote more for *define* than *evaluate*
- Guide students on the depth expected for parts a-d
- Teach students how to analyse impacts and provide well supported opinions – this will improve extended responses
- Help students to differentiate between the terms describe and explain – often candidates did not provide a reason for an *explain* question
- Guide students in planning answers to extended responses - this creates a more structured response, avoids repetition and usually avoids answers that go off course
- Show students how markbands are used for extended responses – always use markbands for class tests
- Use past exam questions for class tests - provide feedback according to the markbands

- Advise students to carefully read the stem of the question and underline keywords – this should prevent them going ‘off course’ in their answers
- Suggest students use opening sentences such as ‘From the perspective of the government - this should keep answers focussed
- Run class debates on extended response questions where students represent stakeholders and opposing views – this should assist with planning extended responses
- Share current news items in class and ask students to explain the technology, identify the stakeholders and discuss the impacts – this is good practice for extended responses
- Encourage students to start each question on a new page and separate issues with line spaces – marking can be very difficult when writing is illegible and it is unclear where the next issue starts
- Share this Subject Report with your students

Advice to teachers

- Visit the OCC where you can share resources and join the very active ITGS forum
- Check the IBO events calendar on the OCC for details of workshops in your region

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 8	9 - 11	12 - 15	16 - 18	19 - 22	23 - 30

The areas of the programme and examination that appeared difficult for the candidates

The performance on this paper was similar to last year. As is often the case, technical knowledge proved to be an area of weakness for the less well prepared candidates. This was surprising, given that a list of additional technical terms was provided in the case study. The best candidates had clearly researched these terms and provided accurate definitions and descriptions.

Most students were able to identify some security measures for wireless networks but failed to score top marks because they did not make detailed references to how wireless networks are configured

Students very rarely made any reference to independent research and so many were excluded from the top mark band in question 3. It is expected that answers to question 3, in particular, are enhanced by referring to real-world examples of situations that are similar to those in the Case Study. Names of companies investigated and descriptions of how they solve similar problems are good ways of approaching this.

Candidates did not always understand the way to respond to the commands verbs. In order to gain the second point in a “describe” question, some information must be added. “Evaluate” questions were poorly done as most candidates only described issues in a basic narrative way without offering any more penetrating insight.

The areas of the programme and examination in which candidates appeared well prepared

The majority of students understood the contents of the Case Study. The better ones related the issues in the N&Q Investment Company to similar issues that they had researched in other organizations. They also showed detailed knowledge of the technicalities of mobile communications and the setting up and securing of home networks.

Most candidates were able to describe strategies required to reduce the compatibility problems. The best candidates provided considerable detail and showed knowledge of innovative and up to date solutions to the problem, such as the use of cloud computing. It is gratifying to see evidence that the students are prepared to show such initiative and look beyond the confines of the syllabus.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question One

- a) This was generally well done. Some scored only one mark as they failed to give additional information to receive the second point.
- b) Many candidates defined the acronym for http instead of https. In some cases they identify the “s” as secure but were not able to provide any detail about how the security is achieved.

Question Two

- a) (i) This was one of the most poorly answered. A great number did not know what SSID is, even though it was given in the glossary of the stimulus material. Some wrongly identified it with a number given to each computer in the network.

(ii) A large number of students stated that a router connects to the Internet but failed to state any other feature or purpose of a router hence only scoring one mark. The principal function of a router is to select the optimum route for the data packets and this was rarely mentioned by the candidates. Some even confused it with a modem.

(iii) Most students failed to score any marks and were completely unaware of what a network switch is. Many took the simplistic view that a switch is simply a circuit breaking device.

- b) Students often provided generic answers involving simplistic accounts of virus software, hackers and firewalls. Even when the answers were thus limited, many were unable to describe any detail about how these measures operate. The best candidates focused their answers on the technical aspects of ensuring security in a wireless network rather than providing vague comments about security in any situation. Only the better candidates identified hiding the SSID and explaining WEP/WAP2 methods in detail.

A good number of students did not appear to understand that this question was worth more marks and as a consequence it requires a more in-depth treatment of the issue.

To get into the top mark band, candidates were expected to demonstrate the understanding that this was referring to a home network and it is not possible to employ the same procedures that a big company does. They have to use correct subject terminology, relate the answer to the Case Study. The most successful candidates had clearly experienced setting up their own home networks.

Question Three

A large number of students correctly identified the strategies required to reduce the problems with sharing and editing documents. The examples given were often limited, with common answers focusing on incompatibilities between .docx and .doc, and Mac and Windows platforms. Answers were often very generic and were lacking in the use of appropriate IT terminology. It was unfortunate that few candidates showed knowledge of new technologies like cloud computing or online applications which would presumably be an integral part of their ITGS courses.

A near universal problem was that most students completely failed to mention anything that demonstrated that they had carried out any independent research. This prevented them from accessing the top mark band. What is needed in this question is **specific** mentioning of companies, individuals or systems that they have encountered, either by making visits, listening to external speakers or even simply carrying out secondary web-based enquiries. These experiences should then be incorporated into their answers in support of their suggestions for the organizations and individuals in the Case Study

Only a minority of candidates reflected on their suggestions and provided any analysis and evaluation.

Recommendations and guidance for the teaching of future candidates

- The Case Study provides a list of terminology additional to the syllabus in order to keep the material up to date and relevant to the scenario. **Questions on these terms will always be set.** Teachers should review the terminology in the Case Study with the students at length. In this way, the students should appreciate exactly how the hardware, software and concepts mentioned relate to the Case Study and also to real-world applications.
- It is essential for students to carry out independent research to provide support for their answers. They should investigate companies, organizations or individuals that have encountered and solved problems similar to those in the Case Study. Ideally, candidates will quote names of organizations and systems that they have researched.
- Teachers have to instruct candidates that if a question asks specifically for two methods or two strategies, treatment of more than this number will be ignored by the examiners possibly leading to lost marks.

In summary, students must:

- understand the technical issues involved in the Case Study
- research deeply into all aspects of the Case Study
- understand the command terms
- practice how to structure their answers to show their knowledge.