

## ITGS

### Overall grade boundaries

#### Higher Level

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 9	10 - 20	21 - 33	34 - 44	45 - 57	58 - 69	70 - 100

#### Standard Level

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 9	10 - 20	21 - 33	34 - 45	46 - 57	58 - 69	70 - 100

### General comments

The Higher Level (HL) ITGS course is a rigorous pre-university course that provides students with many of the study skills that are required in higher education. The new HL extension material (topics 3.10 and 3.11) requires a significantly more in-depth treatment of the subject matter than was expected with the previous HL course and teachers should be aware of this when delivering these topics. This should also be considered in the preparation of students for HL Paper 3.

Although ITGS may appear on the surface to be a relatively easy subject as the subject matter is not as obviously demanding (“low content”) as that in subjects such as Computer Science, it does involve the considerable use of higher order thinking skills such as application, analysis, synthesis and evaluation (“high context”).

ITGS is as rigorous as other group 3 subjects.

This was the first November examination session for the new ITGS course. All of the components are different from the previous Guide and this report provides an overview of the performance of the candidates and guidance for each of the assessment components for future examination sessions.

The general observations below apply to all assessment components:

- All components are based on the ITGS Triangle.
- Candidates must both practical activities to develop their understanding; this includes hands-on experience in using different software types (digital literacy).

- Knowledge obtained from real situations may be developed from primary research as well as discussions of news articles.
- Candidates must know the terminology that is used in the Guide and where appropriate the HL Case Study. ITGS terminology is defined to be both IT terminology and terminology related to social and ethical considerations.
- Candidates must understand the requirements of all the command terms (pages 71-72 ITGS Guide) as they are used in the assessment of all components.
- Throughout the two years candidates must be given the opportunity to write responses to questions similar to those asked on the various examination components and receive written feedback. It is only through on-going use of the command terms, research, writing responses and receiving feedback that students will improve their knowledge, use of ITGS terminology and organizational skills in their written responses.

## Higher and standard level project

### Component grade boundaries

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 3	4 - 7	8 - 10	11 - 14	15 - 18	19 - 22	23 - 30

### Recommendations for IB procedures, instructions and forms

Schools are no longer required to send a 3/IA form that contains the name of the teacher. Only the 3/CS forms that are sent to the examiner contain the signature of the teacher. Unfortunately in many cases these are illegible. As a result, it is almost impossible for the examiner to provide the name of the teacher on the feedback report. Therefore, it is recommended that below the signature on the 3/CS form, the teacher legibly prints his/her name

Until this last session, schools were not required to submit a screencast with each project. From the May 2013 session onwards, a screencast is mandatory (see the Handbook of procedures for 2013 p. 226-227 and the Guidance on the appropriateness and complexity of an IT solution for the project).

The uploading of projects directly to IB has been postponed until further notice, so it is required that each project is sent to the examiner on an individual CD-ROM/DVD. Teachers should consult the Handbook of Procedures for the most current information. The student and not the teacher is responsible for saving the report documents and the product in the appropriate folders and then burning everything into a CD-ROM or DVD. Some schools have mistakenly sent all the projects in a sample burned on one CD-ROM/DVD.

### The range and suitability of the work submitted

In most cases the clients were appropriately selected and suitable for the ITGS IA.

However, there was not enough evidence of on-going consultation with the client during the development of the project

Moreover, some of the projects were very simple in nature.

The products were mainly websites and a few databases.

### Candidate performance against each criterion

Although the quality of the projects improved in relation to the May 2012 session, there are still many areas for improvement. The weak performance of many candidates in some of these areas is described below:

#### Criterion A

The interview questions were very simple and too broad. Accordingly, the answers were weak.

Few students cited reference to the consultation with the client to present the inadequacies of the present situation.

### **Criterion B**

The initial part of B was in some cases a re-write of what was written in Keith Findlater report (available in the Teacher Support Material). This is not acceptable. Criterion B usually required more technical details.

Generally the justification of the proposed solution was weak. The majority of the students were not able to achieve the highest mark because they did not consider all of the various aspects in sufficient depth.

### **Criterion C**

Many students lost marks in Criterion C because they were not able to cover all of the stages needed in the development of the product or because they did not consider factors such as the stakeholder, software, hardware and networking. The headings were in most cases copied from the Keith Findlater project report. Again candidates are cautioned against this. Moreover, the plan was usually weak, too general and not designed specifically for the client. In many cases, the description could apply to any client for any project.

### **Criterion D**

Most students presented designs of the overall and internal structure, but only a few explained them. In some cases the necessary labelling was missing. The list of resources in most cases was incomplete, some test plans were weak and the client signature was frequently missing.

### **Criterion E**

The overall structure of the product and the advanced techniques were not always provided at the beginning of this criterion. Some candidates only described simple techniques. Contrary to what was stated by many candidates, many techniques indicated as “complex” were actually very simple. Most candidates did not provide the sources used. It is recommended that candidates use arrows and circles to show the techniques used. Each screenshot must be accompanied by an explanation.

### **Criterion F**

In many cases, the feedback questionnaire was very weak and the evaluation did not refer to the specific performance criteria in Criterion B.

### **Criterion G**

Most candidates received full marks on this criterion. For those who did not, it was usually because some links were broken. The great majority of the students used the templates provided by forms.zip and file names were remained unchanged as required. In some instances, the product was not working as expected by the candidate. Candidates must check their CD-ROM/DVD before submitting it.

## Recommendations and guidance for the teaching of future candidates

It is recommended that the development of the project occurs between the beginning of the second semester of Year 1 and the end of the first semester of Year 2.

The process for guiding the candidates work must be into stages, so that as the candidates develop each criterion, the work can be seen and proper feedback can be provided.

The project must meet the need for a real client. Fake projects are unacceptable. Candidates must maintain on-going contact with the client throughout the process.

For additional information regarding the ITGS project, please consult:

- ITGS Guide (pages 56-72)
- Teacher Support Material (information and 6 exemplars)
- Forms.zip
- Guidance on the appropriateness and complexity of an IT solution for the project
- OCC ITGS Project FAQs
- ITGS Subject Report for M12 and N12 sessions

For additional professional development regarding the ITGS Project, please participate:

- ITGS online workshop
- ITGS face-to-face workshop (cat 1 & 2, cat 3)

## Higher and standard level paper one

Higher level Paper 1 and Standard level Paper 1 are separate components. In this session, there were three questions that were common to both papers:

**HL Q1 and SL Q1 – Health and dentistry**

**HL Q2 and SL Q2 – Live-brary**

**HL Q3 and SL Q5 – Voice over internet protocol (VOIP)**

The comments for these questions are included below in HL Paper 1 Section A.

## Higher level paper one

### Component grade boundaries

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 7	8 - 15	16 - 25	26 - 34	35 - 43	44 - 52	53 - 80

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

Strand 3 / HL Extension (IT Systems and Organizations and Artificial Intelligence and Robotics)

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

Strands 3.3 (Networks), 3.5 (Personal and Public Communications), and 3.7 (Databases)

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

### SECTION A

#### HL and SL Q1: Health and dentistry

(a) (i) The tendency was to identify a difference between a local area network (LAN) and a wide area network (WAN). Most frequently the difference in the geographical areas covered by the network was cited. Additional description was provided through an example of each.

(ii) Two characteristics of a client / server relationship were outlined in most responses.

(iii) Most candidates understood the concept of intellectual property, but there were some difficulties in defining what it actually entails.

(b) 'Analyze the impacts of implementing the upgraded IT systems for the dentist' is not a difficult question, but not answered effectively by many candidates. This points to more practice being required to develop a better exam technique and understanding of the requirements of the command terms.

(c) 'To what extent should dentists use simulation software to determine future treatment for their patients' was sometimes not answered well because the candidates did not carefully read the question and understand how the simulation software was used.

#### **HL and SL Q2: Live-brary**

(a) (i) Borrower\_ID was correctly stated as the key field on most scripts.

(ii) Surprisingly, very often the data type for telephone number was incorrectly indicated as numerical.

(iii) Many candidates could not give a feasible reason why a drop-down list would be used instead of an alternative method.

(iv) Two features of the database query were provided in many instances demonstrating a good knowledge of databases.

(b) This question was either answered very well or very poorly.

(c) Candidate evaluated two methods of reading free digital content either online or downloading a file to be read offline. There were too many common sense responses lacking depth. This is also a typical instance where students having some familiarity with e-books would have been beneficial to their understanding.

#### **HL Q3 and SL Q5: Voice over internet protocol (VOIP)**

(a) (i-iii) Candidates were able to identify two characteristics of VOIP, to some extent define the term protocol and state two stages where a Skype call can be blocked.

(b) Analyzing the decision of some countries to ban services such as Skype was not addressed as well as would be expected. Through considering the stakeholders, a balance of impacts could have been analyzed.

(c) Candidates experienced some difficulty in providing a well-planned response to the decision of a business to use of VOIP services instead of conventional phone system. The question is difficult, but requires detail and balance in the response.

**SECTION B****HL Q4 – Online marking****HL Q5 – Software development**

Candidates should answer one of these two questions. The great majority of the candidates responded to Q4 – Online marking. A much smaller percentage of candidates responded to Q5 – Software development.

**HL Q4 – Online marking**

(a) (i) The tendency was for the correct identification of two stakeholders; usually examiners and the scanning centre. Many students incorrectly pointed out a third stakeholder as the students. This was not accepted as a valid answer as it was assumed that for most students taking the exam this would be their first time they had done this and so they would not be able to comment on the old system (besides the fact that marking is an action that does not involve students).

(ii) Questionnaires and interviews were common responses. Many other students also pointed the observation of current processes.

(b) Explaining what must be included in a feasibility study was not a particularly difficult question, but it was usually not treated effectively by the majority of the candidates. Most candidates only identified the need to examine the hardware, the software and the costs, and completely ignored other important components of a feasibility study such as time frame, risk analysis, and alternatives.

(c) Very few candidates understood what was being asked in this question. Rather than answering to what extent the requirement specification determines the success of IT projects, some candidates described what goes into a requirements specifications and the great majority went off course.

**HL Q5 – Software development**

(a) (i) Customer database and offers were correctly stated as the answers for this question in the majority of the scripts.

(ii) Most candidates answered this question correctly. The majority stated input customer details and produce personalized mailing as their preferred answers.

(iii) Most candidates correctly stated customer as the entity that is planned in this project.

(iv) Also an easy question, whose answer was data entry clerk, but worryingly many candidates did not respond to it correctly.

(b) This question was not difficult, but most candidates were unable to thorough examine it with a detailed knowledge. The answers provided were usually a



description or partial examination with limited knowledge.

(c) It was disappointing to find out that most candidates were unable to provide at least a competent response to this question. Some students described some characteristics of the agile methodology, usually generic responses written from memory, but not in the context of the question. Most students demonstrated minimal knowledge or went completely off course.

## **SECTION C**

### **HL Q6 – Artificial intelligence (AI) / pattern matching**

### **HL Q7 – Artificial intelligence (AI) / expert systems**

Candidates should answer one of these two questions. Most candidates responded to Q6 – Artificial intelligence (AI) / pattern matching. A significantly lower number of candidates responded to Q7 – Artificial intelligence (AI) / expert systems.

### **HL Q6 – Artificial intelligence (AI) / pattern matching**

(a) (i) This question was not correctly answered by most of the students. The candidates who earned 1 mark usually stated classifying images or object recognition as one practical use of edge detection.

(ii) This question was not difficult, but very few candidates were able to identify at least three correct steps that Google Goggles™ could use to establish the location of an image in a photograph; however, many candidates achieved 1 or 2 marks by stating that a picture was taken and compared in an image recognition database.

(b) Most candidates were able to provide a partial examination of why the image recognition system is better at recognizing locations than at recognizing people and some candidates were able to provide a thorough examination with detailed knowledge. The most common reasons which were cited were that faces are similar and change along with time, while locations are static and are already part of the database of image recognition systems.

(c) An entire range of answers was provided for this question. While some students were able to provide responses with detailed knowledge, others went off course and described social and ethical concerns, for example. The majority of the students provided descriptive responses with limited knowledge.

### **HL Q7 – Artificial intelligence (AI) / expert systems**

(a) (i) This question was not correctly answered by most of the students. Most candidates earned only 1 mark usually by stating somewhere in the answer that an expert system is software.

(ii) Most students went completely off course and were unable to identify even one feature of an expert system shell.

(iii) Similarly to 7 a (ii), most students went completely off course and were unable to state even one rule for chaining when solving a problem.

(b) Q7 as stated before was not chosen by the majority of the candidates, probably due to the difficulty in answering 7 a (i-iii). However, the great majority of those candidates who opted for question 7 were able to earn 6 marks for this question. Very few candidates were unable to correctly construct the requested decision tree.

(c) Many students were able to provide competent responses to explain to what extent it is appropriate to use an expert system to advise a student, but usually not in the desired depth of knowledge and understanding. Most answers were descriptive and unbalanced in their analysis.

## Standard level paper one

### Component grade boundaries

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 6	7 - 13	14 - 20	21 - 27	28 - 33	34 - 40	41 - 60

### General comments

Almost all candidates responded to Q1 – Health and dentistry. There were noticeably fewer candidates who responded to Q4 – 3D in the classroom. The other three questions were approximately equal, and between these two extremes.

### The areas of the programme and examination which appeared difficult for the candidates

Areas of concern that were noted in the May 2012 subject report continue to be problematic:

- Requirements of the command terms are not understood.
- Responses do not specifically address the question asked or do not focus on the specific scenario. Generic responses are written from memory. Learning is not applied to the particular scenario.
- Lack of evidence and examples to support arguments.
- ITGS terminology and concepts not included in responses. This includes both IT terminology relating to the IT system specified and terminology relating to social and ethical considerations.
- Lack of depth and/or balance in extended responses. Teachers and candidates must be aware to achieve high marks in part b and part c questions, it is not sufficient to simply address a range of issues superficially (ie breadth rather than depth).

Additionally, part (c) extended responses tended to lack planning and organization. The arguments were not fully developed. Judgments should not only appear in the conclusion, but should appear wherever relevant throughout the development of the argument.

References to these shortcomings will be cited below in specific questions.

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

Most candidates seemed better prepared for part (a) requiring knowledge of IT systems and using low-level command terms such as 'identify', 'state' or 'define'.

However, part (b) questions involving 'explain' or 'analyze' a particular IT systems in a social or ethical context was only partially effective. Full marks were rarely awarded because the depth of response required by the command term was not evident.

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

For an explanation of common questions on HL Paper 1 and SL Paper 1, see explanations in HL Paper 1. These questions include:

### **HL Q1 and SL Q1 – Health and dentistry**

### **HL Q2 and SL Q2 – Live-brary**

### **HL Q3 and SL Q5 – Voice over internet protocol (VOIP)**

SL only questions

### **SL Q3 Running your home from your touch-screen tablet**

(a) (i-iii) Most students could define WiFi and USB. However, most students could not identify two tasks carried out by a router. This further demonstrates that that students must understand the terminology used in the ITGS Guide.

(b) (i) Although explaining why the use of computers would be an efficient way to control your home seems to be an easy question. Most candidates did not achieve full marks because they did not provide the depth required by 'explain'.

(ii) The difference between access to a Wi-Fi network and to a 3G network was addressed well.

(c) Disappointing responses to what would seem to be a straightforward question: justify the option (permanent login, require a username and password to be entered each time) that you would choose when using a computer to access a website from home. The general concept was understood, but was often not justified with sufficient depth .

### **SL Q4 3D in the classroom**

(a) (i-iii) Defining storage area network and stating an advantage and disadvantage of using fibre optic cable were addressed well.

(iv) The concept of a concurrent license was not well understood.

(b) Many acceptable IT training methods were cited. However, using a help desk was not accepted as a training method.

(c) Very few responses reached the top range of marks in discussing whether schools should invest in this 3D technology for their classrooms. Although achieving balance

between the various considerations in the decision was straightforward to develop (i.e. cost and installation considerations, relevance to the students' learning, teacher training), the responses lacked depth and organization.

## Recommendations and guidance for the teaching of future candidates (HL & SL paper one)

All ITGS scripts are scanned and marked on a computer screen. Candidates must be taught to use good examination techniques in order for their responses to be read:

- write with legible handwriting
- use a black or dark blue pen
- label responses as they appear in the examination paper with the number of the question and the part of the question
- Begin the response to each question on a new page.

The teaching of ITGS has to be balanced across all areas of the Guide in order to properly address the ITGS Triangle - there cannot be an emphasis in just one area, such as IT systems. Often the involvement of the stakeholder(s) is necessary in responding to part (b) and part (c) questions. Candidates should also be aware of the general structure of all of the questions on Paper 1.

Candidates must develop responses with well-supported arguments. All of the terminology that appears in the ITGS Guide must be taught. Additional ITGS-related terminology can emerge from the terminology that appears:

- in specific applications from Strand 3
- specific topics in Strand 2
- news articles and
- Other ITGS-related material.

Correct spelling of IT terminology and vocabulary relating to social and ethical considerations from the ITGS Guide is expected. Also candidates tend to repeatedly confuse some terminology (i.e. 'insecure' for 'not secure', 'memory' for 'hard disk space', 'reliability' and 'integrity'). Descriptors such as 'easier', 'quicker', 'cheaper' and other similar words require additional explanation beyond the sentence in which they appear. On their own, they provide insufficient detail.

Effective methods need to be used to record notes and findings throughout the course so that candidates have sufficient material to review prior to the examination.

Candidates must have frequent opportunities to structure responses according to the requirements of the command terms. The use of assignments and other class activities requiring written responses and receiving feedback from the ITGS teacher are recommended.

ITGS teachers need to gain more familiarity with the expectations of HL paper 1 and SL paper 1 by:

- Reviewing the specimen material on the OCC
- Reviewing past papers and markschemes (available through the IB store)
- Participating in special discussions on the OCC relating to HL paper 1 and SL paper 1
- Attending a face-to-face ITGS workshop (cat 1, cat 2 or cat 3) and/or participating in ITGS online workshop (cat 1) where sample scripts are marked and discussed

## Higher and standard level paper two

### Component grade boundaries

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 2	3 - 4	5 - 8	9 - 11	12 - 15	16 - 18	19 - 26

### General comments

Paper 2 is based on an unseen article which contains a scenario that addresses issues linked to the relationship between human beings and the use of information and communication technologies. Candidates are expected to apply the knowledge and skills obtained from their study of Strand 1 (Social and Ethical significance) and Strand 3 (IT systems) to it. The scenario is based on a real article that has been modified to suit the purposes of the examination and is similar to one that candidates would have encountered in their studies of Strand 2 (Application to Specified Scenarios) throughout the course.

The focus of this scenario was the technology of geotagging, integrated with two other IT systems (mobile phones and social networking sites) to make a complete IT system. A significant minority of responses focused parts of their responses on one or two of the three IT systems. In particular some students focused on the use of the GPS system or erroneously considered that the geotagging of photos enables the real-time tracking of mobile phone users, or discussed the benefits and problems of social-networking sites.

The questions for this paper are the same for each examination session and students need to be given the opportunity to practice responses to these questions using a variety of articles, either genuine or modified. Now that two Paper 2 examinations have been held candidates need to be given sample scripts to aid their understandings of the requirements of the questions; how to improve an ineffective response and to learn from the good ones. The OCC may be a good forum to hold such discussions.

ITGS is a subject that is about the application and impact of ICT in a fast moving and complex technologically based world, and so covers a wide range of technologies and scenarios. Hence the subject focuses on developing the ability of the students to be able to analyse and evaluate the uses and impacts of ICT using interlocking themes (the three Strands). The IT Systems Strand provides the technological basis for the other two but should not be separated out, as it is best studied when tied to the context of a scenario or impact (see ITGS Triangle in the Subject Guide). The information and communication technologies can be studied from a technology skill and knowledge perspective but this is only one of the three main strands of ITGS.

Transferable analytical and evaluation skills are in great demand in the workplace albeit in a science, business, and government environment, especially as information and communication technologies are constantly evolving with no reason to think this process will become slower. As more issues, often significant ones such as the changing of behavioural and ethical norms for many people, are constantly arising, sometimes unintentionally, from

these developments. Paper 2, especially in Criteria C and D, has emphasises higher order thinking skills which is significantly different from other more content based ICT subjects.

## The areas of the programme and examination which appeared difficult for the candidates

It is recommended that candidates use the first 15 minutes of the examination to plan the structure of their responses, this would allow them to write in a logical and concise manner. The 750 words mentioned in the exam paper rubric indicate that answers that are both logical and concise can achieve high marks.

In this article (and for every examination session) the technology that is examined is clearly identified, not only at the beginning of the paper, but also in Criterion B, where students are expected to explicitly identify more details about how it functions. The scenario also includes clues about some of the impacts associated with the technology, requiring candidates to extend them further in Criterion C. Unfortunately too often students did not develop these two areas further.

The meanings of the command terms used in the assessment markbands; identify, describe, explain, analyse, and evaluate, need to be clearly understood by candidates to ensure they respond appropriately, both in terms of structure and depth. Unfortunately, the responses of many candidates indicated that too many did not understand the meaning of these terms, nor the way the markbands are used, nor how to structure a response.

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

### Criterion A (Question 1)

Criterion A is designed to enable the candidates to start the examination in a relatively easy manner and is basically a comprehension question about the article.

#### Part A

Most candidates were able to identify a social/ethical concern. Most candidates were able to describe why it was a concern. A concern or issue means a negative impact and this impact needed to be firstly identified and then described.

#### Part B

Most candidates correctly identified a stakeholder but not all were able to describe the relationship of the stakeholders with the IT system. The relationship must connect the stakeholder with the IT system.

### Criterion B



Criterion B is designed to examine the technical knowledge of the student and to analyse the link between the IT system and the concern.

### **Part A**

Candidates who scored well gave a clear description, BEYOND the details in the article, of the step-by-step process of how the IT system works, including all three major components of the system. To assist candidates these were identified at the top of the exam booklet and the question. Some candidates did not include all three major components of the system. Some provided extra details for only one or two. The article provided the main input and output of the IT system, and some information about the components. Candidates needed to identify these and other missing components and the steps required to process and use the data/information.

The steps involved in the processing of data/information are data gathering (human/machine), data input (human/machine), data validation/authentication, communications (via network or other means), processing/manipulation, storage (local and network), retrieval (local and network), output to the user, disposal/archiving of data/information. Candidates need to practice identifying and describing the components and the processing steps for the IT systems they encounter in the course, that are parts of scenarios or studied separately.

### **Part B**

The description of the relationship between the concern from Question 1, Part A, and the IT system was not done well as too often responses did not include specific details of the IT system. Candidates are required to analyse the IT system and explain how the concern is facilitated by one or more of the hardware and software components. If the student provides extra details in this part about the IT system they can be credited towards the mark for Part A.

### **Criterion C**

This was a question that candidates answered poorly as they did not write a structured response that included descriptions, analyses and evaluations of both positive and negative impacts for more than one stakeholder. Sometimes candidates only identified one stakeholder or concentrated on the negative impacts. Too often candidates identified an impact but did not provide details of the actual harm or benefit. They were left out or treated in a generalised comment. Also responses sometimes repeated the material from the article without adding further details.

A list of impacts could only achieve 2 marks. In order to move into the 3-5 markband candidates needed to provide some analysis and evaluation. Analytical and evaluative comments could include grouping of impacts (e.g. positives and then negatives, or for various stakeholders), linking of impacts between stakeholders, (e.g. positive for one and negative for another), providing additional consequences of an impact, combining impacts, or comments about the size and extent of the impact by itself or in comparison to another impact.

In order to move into the 6-8 markband the candidate needed to provide a structured and balanced response with a final evaluation which is not a general comment but a justified conclusion referring back to the impacts that had been described (e.g. 'Overall/on balance the impact of geotagging is good' needs to be justified with explicit comparisons of the extent of the positive and negative impacts). Some responses lacked explicit references to the article (e.g. general comments about privacy and security in the context of social networking and GPS location technology). There were some unexplained references to hacking and weaker responses often included real-time tracking.

### **Criterion D**

Most candidates were able to identify a solution to one or more problems identified in Criterion C; and some provided more than one which was not marked. But only a few could evaluate the solution fully.

The solution needs to be described in detail, explicitly including the technical requirements of the solution and how it would work; that is, the hardware, software and the actions required of the stakeholders involved. The strengths of the solution need to include how the solution solved the problem, but should include further strengths and benefits, e.g. the inclusion of a warning when a user is about to upload a photo with geotags solves the problem of uploading private data and also gives the user the choice to do so when wanting to provide the location to friends.

The weaknesses need to include how the solution did not completely solve the problem, and should include further weaknesses and/or a different or modified solution, e.g. the warning may not work as users may ignore it or not understand its meaning, which will require an educational explanation/campaign to ensure the maximum benefit is achieved from the warning. In addition if the geotags are uploaded the SNS should default to only allowing friends to view the data as a safety measure.

A final overall conclusion that argued the solution was a good or bad one, or a bit of each, needed to explicitly compare the strengths and weaknesses addressed in the analysis. A multi-part solution is allowed if it covers interlinked parts of a single problem, e.g. various ways of ensuring security.

## **Recommendations and guidance for the teaching of future candidates**

All DP Group 3 subjects have an emphasis on these higher order thinking skills as can be seen in the Grade Descriptors. However in ITGS the content of the course is largely centered on recent and living examples of the impact of the application of ICT, and teachers need to spend time and effort to continually keep up to date with developments in hardware, software, issues and impacts, and to use them in the classroom.

The subject that has many similarities with ITGS in being based on real-life examples and the use of higher order thinking skills is Theory of Knowledge (TOK). TOK focuses on the reliability of and the problems of knowledge studied in the Areas of Knowledge and personal

Ways of Knowing. In their TOK essays students are required to use real-life examples of knowledge claims and to analyse and evaluate the extent to which the knowledge claims are true. The better essays have examples from within the context of their own studies and their personal knowledge. This is similar to the way news articles are used by ITGS, and the emphasis on the study of the use of ICT in the students own lives and the lives of people around them. ITGS requires the students to analyse and evaluate the positive and negative impact assertions, both social and ethical, about ICT made from various perspectives in the same way as TOK does for knowledge claims.

All Diploma subjects are required to include TOK in their teaching and there are clear similarities between TOK and ITGS. The TOK essay is structured around issues, real-life examples, analysis and evaluation like the extended response questions in ITGS. And the assessment of the extent of the impacts of ICT, including the comparison and evaluation of positive and negative impacts for and from various stakeholders, is similar to the evaluation of the claims and counter-claims made by various perspectives about knowledge. A recent example is the claim that [first person shooter video games](#) promote violence, especially in teenage boys, and contributed to shootings in schools and other places in recent years. Another is the claim that the data recorded about our Internet activities can be as a basis for data mining and the unethical use of personal data. Such claims need a careful assessment using the skills and knowledge developed in ITGS and TOK, with proposed solutions being fully evaluated.

ITGS teachers are recommended to discuss with TOK teachers the ways in which the higher order thinking skills are taught, used and assessed, as well as discussing with their students the questions in the TOK section of the ITGS subject guide.

## Higher level paper three

### Component grade boundaries

<b>Grade:</b>	1	2	3	4	5	6	7
<b>Mark range:</b>	0 - 3	4 - 7	8 - 11	12 - 14	15 - 18	19 - 21	22 - 30

### The levels of knowledge, understanding and skill demonstrated

The majority of students were familiar with the contents of the Case Study but the level of knowledge in many cases was mediocre.

The knowledge of technical concepts required should go beyond basic recall of the key terms of the case study. This was evident in Question 3 where the answers were common sense points with only a superficial discussion of the technologies involved.

### The areas of the programme and examination which appeared difficult for the candidates

The main concern is the lack of use of appropriate ITGS terminology. This indicated that the student had not studied all the topics in the Case Study to the required depth.

Databases continue to be a subject which is poorly understood. Technical knowledge was lacking in many cases; this knowledge did not often go beyond what can be regarded as common sense points.

Extended responses require a balanced analysis, use of supported opinions, conclusions and judgments. Some students seem to use the long answer format as an opportunity to write everything they know about the subject whether related to the question or not. Students should be advised to plan their answers briefly before putting 'pen to paper' so that they are better structured and less prone to be incoherent. This is why the examination was extended by 15 minutes from the previous course.

Some candidates did not always understand that the response must be focused in the context of the question. As a consequence they explain interviews and examples that are not applicable to the situation described.

This paper is an examination of the candidates higher order skills, such as analysis, synthesis and evaluation. This can only be achieved by developing the ideas fully rather than a superficial outlining of everything you have studied. It is better for candidates to spend 15 minutes planning and 60 minutes writing in a concise and focused manner, rather than spending 75 minutes writing everything they know.

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

**Question 1a**

Most responses focused on a lack of client side software. A surprising number of students ignored the obvious evidence (i.e. the title on the window which indicates which program is running) and advised the installation of Flash. A few mentioned compatibility issues with the version that may have been installed on the client's machine. Most mentioned plug-ins as a reason.

**Question 1b**

Most responses focused on upgrading the currently installed version of the plug-in or correcting the server video file. Few took that too much further. None chose the obvious solution of refreshing the page, which they would probably do immediately in real life.

**Question 2**

Very few students showed good technical knowledge of databases and the differences between flatfile and, relational databases, data structures, normalization, data types etc. Most seemed to be focusing only on the quantity of data and the different formats. Few candidates developed ideas further than the information that was already presented in the Case Study. There were some good responses that mentioned repetition of data or issues of compatibility of the different databases or the many different concerns of manual data entry, but they were quite rare. Many responses just mentioned the issues without looking at implications of them.

**Question 3**

This was the question that was most poorly done. Students were unsure about what the word "functionality" meant and therefore the idea of how this could be a conflict with multiple languages didn't emerge clearly except in a few good scripts.

In general the responses focused on the website including languages rather than the implications of this inclusion in the functionality of a website. Very few mentioned Unicode or layout changes. There were a number of responses that talked about videos and animations being difficult on websites due to language. Some mentioned subtitles as a solution, others mentioned redoing the videos (which in some cases may not be feasible or practical) or the website would be 'non-functional' for those other languages.

**Question 4**

Most students picked up marks by immediately mentioning the time, cost and relative flexibility of both approaches. Students often then repeated these points several times, instead of looking deeper into the implications of each approach (i.e. breadth vs. depth). Few students compared the merits of each approach and related that to their independent research. In some cases the students related the interviews that they did as a research instead of focusing in answering the question. There was in

general a lack of structure in this extended response question and a lack of knowledge of the necessity to show a critical thinking skill.

## Recommendations and guidance for the teaching of future candidates

- Many candidates need to be taught how to interpret the command term when reading the question and link this to the depth of response required. If the command term is higher order, the candidate must also spend time developing a structure for the extended response.
- Teach candidates how to evaluate. Give them examples of a balanced answer (advantages/disadvantages) and then make them provide opinions/appraisals/judgments.
- Understand the requirement of the different command terms
- Understand how marks are allocated for extended responses and how the markband is applied.
- Advise students to carefully read the stem of the question, this should prevent them going “off course” in their answers.

### Spanish report only \*

In some cases the students carried out an extensive investigation, but they did not know how to link this research to the specific question. In these cases the student merely provided a narrative of the interview and what the interviewee said without linking this to the question, for example, they may have described the website at a local theatre without making the connection with the CTP. Therefore even though they wrote 2 or 3 pages they do not answer the question and were only awarded very low marks. It is essential that the teachers instruct the students how to integrate the research carried out to the questions on the examination paper.