ITGS

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0-11	12-24	25-36	37-47	48-58	59-68	69-100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0-10	11-22	23-33	34-45	46-57	58-69	70-100

General comments

The May 2015 examination session saw similar outcomes to previous May sessions. The minor adjustments to Criterion E and Criterion G in the Project to reflect the changing nature of how IT products are developed, which focused more on the appropriateness of the techniques used rather than their complexity, saw a slight increase in candidate performance. There was also a change in the nature of HL Paper 3 which saw a move towards a deeper analysis of the social/ethical considerations associated with information systems, in this case those linked to the use of 'big data' by ASI, rather than an analysis of the introduction of a new IT system. Furthermore, from May 2016, a restructuring of both SL Paper 1 and HL Paper 1 will give candidates longer to develop responses to the questions. Examples of the new format of these papers will be published on the OCC in January 2016. All these minor and subtle changes are reflecting the continual evolution of ITGS to reflect the advances in the information and communication technologies (ICTs) used within and beyond the classroom and the increasing analysis of the social/ethical considerations associated with the use and misuse of these ICTs.

Higher and standard level internal assessment

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 range and suitability of the work submitted

Most projects were submitted as required in Handbook of Procedures 2015 Section B 3.5 and used the templates provided in Forms.zip. Some zipped files were very large. It is important that the student's work adheres to the 750MB limit for the zip file that will be introduced from the November 2015 examination session.

Teachers need to submit a Teacher Marks Justification Form indicating the marks with comments explaining how the marks were awarded for each project in the sample. This information is important both for the moderation process and for providing feedback to the school.

There was considerable diversity in the projects submitted including problems for clients in a school environment, business or organization. Where clients were candidates under the age of 18 years old, an adult co-client was not always involved in the entire process. This is a requirement.

The majority of the products were websites, databases or videos and some desktop published products were developed. There were few basic products (i.e. simple presentations, spreadsheets). Some candidates used online templated sites like Wix and Weeby to develop a website. While these could be a suitable solution, few were sufficiently well developed to generate higher grades (see Guidance on the appropriateness of an information technology solution). Non-basic techniques in these instances are often included in the development of the content within the product.

Several candidates created products based on popular gaming systems such as Minecraft. These were simplistic products with a very poor justification for development. It would be beneficial to provide guidance regarding selection of these types of projects and the extent to which they address the client's problem.

Some schools did not realize that the criteria for assessing the project has changed and continue using the old criteria. This has an impact on the final marks awarded for Criterion E and Criterion G. Criterion E is now 7 marks, not 8 marks, and Criterion G now includes one additional mark for the screencast. This caused differences in the marks awarded.

There is still an absence of the client's signature in Criterion B and Criterion D.

Candidates need to be reminded that the 6 exemplars in the Teacher Support Material are intended to provide some examples and are not to be used as models for the criteria. This is

particularly true for Criterion B and Criterion F. There were instances where information from Exemplar 1: Keith Findlater Photography from the Teacher Support Material seemed to be used as a model to be followed.

Candidate performance against each criterion

Criterion A: Initial investigation and initial consultation with client

Most candidates could identify the client and problem and were able to describe some inadequacies. The major problem is that too little effort is spent on developing well formulated questions for the consultation that provides sufficient information about the problem, solutions or approaches that have been tried and why they have not been fully successful and what the IT solution should achieve.

However, a lesser number of candidates were able to successfully interpret the command term ‘explain’ to reach full marks. Most candidates provide a transcript of the consultation and a few provided audio and video evidence.

Evidence must be cited from the consultation. It does not need to be a direct quote, but the information from the consultation must be accurately represented in Criterion A. This was not always the case.

Criterion B: Analysis

Many candidates struggled to understand the requirements specifications, particularly what was required for Input and output, Processing, Security and especially the Specific Performance Criteria. Hardware and software are often missing some detail or may be inconsistent with Criterion D in some instances.

Many candidates failed to realize that these criteria must be measurable and are used to evaluate the success of the project on the basis of the client’s requirements. Often the Specific Performance Criteria were stated in vague terminology or could not be measured. This is an area where further guidance is needed because other criteria are dependent upon the Specific Performance Criterion (i.e. testing in Criterion D, evaluation in Criterion F).

The justification of the chosen solution was well done in most cases. However, a few candidates simply repeated the explanation of the inadequacies in Criterion A as their justification in Criterion B.

Criterion C: Project Schedule

In most cases the entries were too general and could be applied to any product of a similar nature. Candidates failed to make references to the client and did not always include the specific tasks done. Candidates tended to make general comments like "web page was created", "it was shown to client", "client made comments", or "suggestions were applied”.

Some candidates did not use the required form, and as a result some or much of the required information was missing. In other cases the number of entries was often limited to 10-12 entries each covering a very broad range of dates.

Criterion D: Product Design

This work submitted for this criterion is disappointing. Even some of the better candidates do not know what are appropriate methods for representing the external and/or internal structure for the kinds of products that they are developing. Some use screenshots of the finished product to show what the finished product looks like which is unacceptable; this is reverse engineering. The designs need to be annotated and demonstrate the specific IT solution.

Few candidates included colours, fonts, alignment, and other such relevant design details. The candidates also struggled to address behaviours and actions within the product. This was particularly evident in web design where candidates would mention JavaScript, but not identify the rationale for its inclusion.

Resources needs to include all of the specific sources of the content and all of the resources used in creating the product. Details of the source must be included.

The techniques are also explained in a very general way, and not specifically related to the product being developed, for example: the use of Fireworks, "to edit images" instead of saying "to edit the photographs provided by the client so that they have a smaller file size".

Testing was poorly done, and often did not include the measurable items stated in the Specific Performance Criteria in Criterion B

Criterion E: Product Development

The reasons for the selection and use of three appropriate techniques was well done by better candidates. This included a concise explanation for the technique, relevant screenshot(s) and the citing of sources. Screenshots in some instances had additional annotation and the screenshot was also explained in the text. Weaker candidates only included a screenshot and identified the technique used resulting in low marks.

Most candidates included the list of techniques at the top of this criterion. However, many candidates neglected to include the structure of the final product immediately after this listing.

Some candidates attempted to use CSS code or HTML code, but did not show the changes that they made or provide a screenshot of the outcome of that code.

Many candidates failed to acknowledge sources. For example, web templates (downloaded from the web or inherent in their editor) were frequently used, but were not acknowledged. Candidates also tended to use the template in a simple way.

Few candidates who developed web-based solutions were able to perform simple tasks such as modify the head of the page or acknowledge sources within the source code.

Criterion F: Product evaluation and future product development

A major weakness is the interview with the client which should evaluate both the process used for consultation and development of the product and an evaluation of the product itself. The evaluation must include references to the Specific Performance Criterion. Ideally, there are also questions related to recommendations for the future development of the product.

Candidates tend to evaluate the Specific Performance Criteria from Criterion B superficially. They say "objective met" or "partially met" without any further development in the evaluation. Some candidates are able to suggest detailed and insightful recommendations for future development, but many only stay at the needed changes of aspects that were not finished or had errors. Some typical recommendations mentioned by the candidates are: fix images so they download faster, or add more picture, or make email link work. Few mention aspects for future improvement like "make the changes needed for it to load in any device, including mobile devices"

Criterion G: Required elements

Screencasts were included as required showing the functionality of the product and highlighting the appropriate non-basic techniques that were used. Most screencasts were logically presented and demonstrated all of the requirements. They were of better quality and for the most part within the 5 minute limitation.

In too many instances, candidates have changed the names of files or folders on the Forms.zip resulting in a loss of marks. Most cover pages work. Some products do not contain sufficient detail to be considered fully functional.

No Product folder should be submitted empty. Even if a website was created using an online service that does not allow exports, the Product folder must include evidence from the making of the product such as images before and after manipulation.

The Product must be submitted in the original file format and also an alternative file format wherever possible. This is particularly important for desktop publishing and video products.

Recommendations for the teaching of future candidates

The Project must be guided criterion-by-criterion. Candidates should have an opportunity to discuss the expectations for each Criterion A through Criterion G. They should submit each criterion as it is finished and receive feedback. Feedback for each criterion can only be provided once for each criterion.

The files in Forms.zip should be changed from rtf format to a format used by the candidates i.e. docx format. The files need to be changed to pdf files before they are submitted for final marking.

Candidates should do all of their work inside of the student folder that contains the Documentation and Product folder. The student folder should be periodically backed up.

Show candidates a sample project, but without letting them keep a copy or without allowing them to have permanent access to it.

Provide the candidates with a copy of the updated assessment criteria.

The teacher must be certain that the ITGS Project sample works as required and has been created following the instructions in the Handbook of Procedures for 2015.

Further comments

For additional information regarding the ITGS project, ITGS teachers should consult:

- *ITGS Guide* (pages 56-72, except Criterion E and Criterion G which have been replaced by updated internal assessment criteria—SL and HL (updated for May 2015)
- *Teacher Support Material* (TSM). The exemplars have not been updated using the new criteria. The maximum mark for criterion E is 7 marks. Criterion E marks will not change.
- forms.zip templates (link included in TSM)
- guidance on the appropriateness of an information technology solution for the project (updated for May 2015)
- past ITGS Subject Reports from M12 onwards
- submission of the ITGS Project in the Handbook for Procedures for the Diploma Programme 2015 (Section B3.5). The Handbook is updated yearly.
- IB Coordinator Notes for ITGS update notices.

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

- in the ITGS OCC discussion forum
- in ITGS online workshops or ITGS face-to-face workshops.

Higher level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0-10	11-20	21-31	32-38	39-44	45-51	52-80

Standard level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0-6	7-12	13-19	20-26	27-32	33-39	40-60

Higher level and standard level paper one

General comments

Higher level Paper 1 and Standard Level Paper 1 are separate components. However, many of the comments that apply to one component apply to the other.

In this session, there were three questions that were common to both papers. They were as follows:

HL Q1 and SL Q1 – BodyGuardian

HL Q2 and SL Q2 – 3D printing

HL Q3 and SL Q3 – Small town bookshop moves to computer-based records

The comments for these common questions are included within the HL paper one Section A information.

Higher level paper one

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

Overall, there were five key problems.

First, many candidates wanted to regurgitate what they memorized about topics and often didn't think about the questions which asked for **conceptual** understanding. For example, in 1(b), candidates often listed discrete ideas they had learned about passwords but struggled with applying them to the specific scenario described in the question. Likewise, many candidates attempted to turn question 4(b) into a comparison between AGILE and Waterfall, but the question really asked candidates to apply the main characteristics of the AGILE method to the scenario. They could list characteristics but could not apply them *to the scenario*.

A second variation of the above problem applies to the social and ethical issues. Some candidates have tried to systematically apply the social/ethical issues in part (c) and sometimes part (b) with disastrous results as they force issues into these boxes without addressing the question.

Third, many candidates do not seem to have studied the HL extensions since a number of answers were clearly just guesses. Changing to three questions and giving candidates more time to answer them will eliminate the problem of running out of time, but could create problems if candidates are unable to respond adequately to the part (b) and (c) questions.

Fourth, many candidates could not go beyond creating lists in part (c) responses and struggled to include analysis and evaluation which are explained and supported with examples.

Finally, many candidates did not focus on the stakeholders specified in the question, so they often veered seriously off-course in their answers.

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

Most candidates were able to structure their answers to parts (b) and (c).

Candidates were able to answer step-by-step questions reasonably well.

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

Section A

Common question: HL question 1 and SL question 1 – BodyGuardian

(a) Most candidates were able to:

- correctly identify two health indicators that could be measured by the device. It was recognized that few candidates would be familiar with the specific device referred to by the scenario. As the wording of the question suggested, the range of accepted answers included health indicators that *could* feasibly be measured by such a device rather than only those that actually are (HL 1ai, SL 1ai).
- identify at least three steps taken by the software. The question asked for four steps. Some candidates suggested steps that were not taken *by the software*.

(b) Many candidates managed to explain some implications of password strength or of changing a password every 40 days. Far fewer were able to take both factors and structure them into a coherent and analytical answer that addressed the two specific options presented in the question. Many candidates mentioned “doctors” but made little attempt to frame their overall response in the context of the scenario, relying on what were essentially generic “boilerplate” points. A surprising number of candidates assumed that the phrase “does not need to be changed” was synonymous with “cannot be changed”, which led to some unwarranted assertions. A significant minority of candidates interpreted the question as meaning that the doctor set passwords for each of his/her patients, which tended to rather de-rail the rest of the response. (HL 1b, SL 1b)

(c) There were two possible interpretations of the question:

- implications for doctors and patients involved in the clinical trial itself
- implications for doctors and patients as a result of the device having been trialled.

Either or both interpretations were accepted.

A common weakness in the responses stemmed from not focusing on the stakeholders specified in the question. Many answers were merely a list of things that a clinical trial might seek to establish with little or no attempt to discuss implications for doctors and patients. Some responses discussed the manufacturers of the device with little or no reference to doctors and patients.

Far too many candidates wrote responses along the lines of “the device will be unreliable / wrong readings will result / patients will die”, failing to spot that one obvious purpose of a clinical trial would be to establish the reliability of a device, which renders the above chain of events unlikely.

The answers in general ranged from basic to adequate. Few candidates achieved the depth of discussion and the clarity of implications for the stakeholders required for the competent or proficient markbands.

Common question: HL question 2 and SL question 2 – 3D printing

(a) Very few candidates gave the correct responses "import", "insert" or "open". A few managed to gain a mark by talking about format conversion. (HL 2ai, SL 2ai)

Even candidates who knew little about 3D printers managed to get a reasonable mark as the steps are largely generic. Most candidates started off with "taking pictures from various angles" – which is in the stem and could not be credited. (HL 2aii, SL 2aii)

(b) Many candidates had at least some superficial knowledge of the differences between open source and proprietary software but far fewer were able to apply that knowledge to the context of the scenario and merely re-iterated standard "boilerplate" points. Some confused "proprietary" with "bespoke" and talked about development times etc. There were some rather vague claims of virus/malware/security/privacy (etc.) risks with open-source software, many of which were either not supported by the reality of the two types of software or only exist under specific circumstances (e.g. downloading open-source software from unofficial/untrusted hosts), which were rarely acknowledged in the responses.

(c) The responses to this part were weak in many cases. A significant number of candidates concentrated on describing the "bad things" that could be done with 3D printers or 3D printer software with only a passing reference to *regulation*; the intended focus of the question. Some candidates launched into a polemic about freedom and the evils of regulation with little mention of 3D printer software. Far fewer were able to strike the balance needed to discuss regulation in the context of the scenario. Those who did scored reasonably well.

Common question: HL question 3 and SL question 3 – Small town bookshop moves to computer-based records

(a) Well answered by many candidates.

The first part was answered correctly by most. (HL 3ai, SL 3ai)

Some candidates did not spot that the question stated *all* the books and truncated the formula at row 13. The correct range was from row 2 up to row 401. Some candidates suggested formulae without a preceding = sign. This is always required in questions that ask for a spreadsheet formula. (HL 3aii, SL 3aii)

Some candidates had very little understanding of the potential advantages of a database over a spreadsheet in the context of the scenario given. A significant proportion of problems appeared to stem from a lack of knowledge of the capabilities of a spreadsheet rather than a lack of awareness of databases, although there was a distinct paucity of technical terminology and precision about both in many responses. (HL 3aiii, SL 3aiii)

(b) "Faster" was a very common response. This was explicitly given in the scenario and merely repeating it in the response attracted no credit. Far too many candidates made appeals to vague impacts such as "more comfortable", "easier", or "more efficient" with no attempt to clarify what, why or for whom. Once again, many candidates trotted-out standard responses such as "staff will lose their jobs as all the work will be done by the computer

system", or talked about "the IT department", without taking the context of the scenario into account (a local bookshop in a small Argentinian village).

(c) Many candidates spotted the obvious impacts of the initiative (more potential customers in the shop versus more need to maintain/staff the system). Far fewer responses went further than that and many did not relate suggested impacts to the effect they may have on *Daniela as shop manager*.

As with all part (c) responses, it is vital that candidates focus their responses on:

- the specified stakeholders
- in any roles stated by the question
- in the context of the scenario.

Section B

HL Question 4 - Penrose Airport (UK) automated baggage system

Overall the responses to this question were disappointing.

(a) A large number of candidates did not know the definition of a prototype (HL 4aii).

(b) Many candidates attempted a comparison between AGILE and Waterfall while others wrote generalized answers that had little to no reference to the AGILE method. Deep knowledge was not required, but candidates should have been able to apply some of the main characteristics of the AGILE system to the specific situation given.

(c) Most candidates missed the phrase "...throughout the development process" and so could not develop their answers.

HL Question 5 - Zunica Chocolates

Fewer candidates answered this question but it was a good option for those who chose it.

(a) Most candidates had no problem with identifying requirements for a website to be user-friendly, suggesting that many had experience of creating webpages (HL 5ai). However, most did not know what belonged in a feasibility study beyond cost (HL 5aii). This term shows up in the subject guide under both 3.9 (preparation for the project) and 3.10 (which takes the process further and applies it to organizations).

(b) Candidates had difficulty distinguishing clearly between alpha and beta testing. Many could only manage generalities.

(c) Those candidates who knew the basics of GANTT charts were able to develop responses with relevant ideas.

Section C

HL Question 6 - Telepresence robots

Overall most candidates were able to produce reasonable answers but had difficulty with the difference between a description and an analysis (HL 6b). Some candidates did not realize that the robot can only communicate and does not perform physical tasks. This sent them off course in part (c). Others missed the statement that workers are only telecommuting part of the time and tried to turn the question into one about telecommuting rather than the use of the robot by Larsson Laboratories (HL 6c).

HL Question 7 - Art and expert systems

Very few candidates responded to this question.

(a) Many candidates seem to know almost nothing about fuzzy logic (HL 7aii) and machine learning (HL 7aiii).

(b) All got full marks for constructing a decision tree (HL bi), but few could see that a decision tree limits Aaron's choices (HL bii). This is another example of not being able to apply the concepts to a concrete situation.

(c) Candidates often had some good insights but seemed to run out of time to develop them.

Recommendations and guidance for the teaching of future candidates

Concepts should be taught in specific contexts so candidates can see how the concepts relate to real world conditions. Then, candidates should be presented with a new scenario (context) and asked to apply what they have learned to that new situation. This can be done by using current news articles from reliable sources and creating activities that require candidates to provide supported arguments and to evaluate the impacts of information technology on specific stakeholders.

Candidates should keep a record of what is learned in class including copies/links to news articles discussed, notes on concepts which have been taught, copies of formative assessments and so. The format does not matter as long as the candidates have an organized body of material to review before the exam.

Teachers should participate in any Special Events on the OCC in order to deepen their knowledge about assessment.

Teach candidates how to read questions carefully so that they do not miss key elements or misinterpret the question entirely. Strategies that may help candidates include underlining or circling key words, looking at the stem of the question carefully to identify key stakeholders and IT concepts and to be sure they understand how the technology is functioning in this particular scenario.

Candidates need to be thoroughly familiar with the markbands and the command terms. This can be done by using them for formative assessments by having candidates use them to evaluate their own work and/or the work of other candidates, and by applying them to samples such as those available on the OCC.

Standard level paper one

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

As highlighted in the higher level paper comments, the most glaring difficulty appeared to be concerned with formulating responses within the context of the scenario of the question. For part (b) and part (c) responses, candidates will not get beyond the lower mark range unless they target their answers to the specified stakeholders and roles, with explicit reference to the context of the scenario.

Digital Citizenship policies. Few candidates seemed to be aware of the difference between digital citizenship policies and technical policies limiting access etc.

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

Three questions on SL Paper 1 were most frequently selected:

- Q1: BodyGuardian.
- Q3: Small town bookshop moves to computer-based records.
- Q5: Professional photography for family events.

This selection also mirrored the main areas in which the candidates appeared well prepared.

There was a reasonable awareness of the IT systems behind mobile devices and the ways in which devices can transmit data to each other.

More candidates than in previous sessions appeared to be aware of the underlying structure of databases. There was greater and more accurate use of vocabulary such as table, query, relationships etc.

Many candidates were at least aware of the IT systems underpinning different security measures (eg passwords, firewalls, encryption) although the technical precision in the responses varied widely.

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 the explanations under HL Paper 1 Section A.

These questions include:

- HL Q1 and SL Q1 – BodyGuardian
- HL Q2 and SL Q2 – 3D printing
- HL Q3 and SL Q3 – Small town bookshop moves to computer-based records.

SL question 4 – Digital citizenship

(a) Most candidates were able to identify a difference between streaming and downloading videos and many provided enough detail to gain the second mark for an outline (SL 4ai). The majority of candidates had at least a superficial understanding of the term “bandwidth” and many responded with the clarity and accuracy required to score both marks (SL 4aii). For the calculation question, the majority of candidates gained a mark for converting gigabytes (GB) into megabytes (MB). Significantly fewer were able to arrive at the correct final answer, mainly due to neglecting to convert the file size from Bytes to bits before calculating the download time. Some candidates lost marks by not specifying units in their responses. Appropriate units (e.g. MB, seconds etc.) are always required for calculation questions (SL 4aiii).

(b) Despite the clear differentiation in the scenario between downloading and streaming, many candidates did not take into account that restricting the ability to download videos did not impact the possibility of streaming them. As a result, many responses talked about removing distractions from students, which was not an inevitable consequence of the decision.

Some responses argued that more bandwidth would be available, some less. In reality the effect on available bandwidth would be dependent on many factors and although some of the suggestions made had merit, few candidates recognized the complexity of the issue and made brief assertions with little supporting analysis. Similarly, many responses asserted that students would not be able to use video resources in a lesson. Again, this may be true in some cases but is not a simple, inevitable consequence of the scenario given by the question.

Although many candidates were able to list some plausible consequences of the Principal’s request, far fewer *analysed the impact* on teachers and students effectively. Those who did tended to score reasonably well.

(c) Many candidates misinterpreted this part and responses were rarely more than adequate. Few had any clear understanding of the nature of a “digital citizenship policy”. A majority of candidates interpreted this as a technical policy denying/filtering access to websites, downloading etc., even though the information given in the scenario states clearly that the concept of digital citizenship “goes beyond limiting access to some resources”.

Even where the nature of the policy was correctly understood, many largely ignored the specific context of the question (ensuring the responsible use of technology *with respect to*

sharing the available bandwidth) or the command term used in the question (to what extent...).

SL question 5 – Professional photography for family events

(a) Most candidates were able to gain at least four marks on this part. Many scored the full six marks. Candidates should be aware that "USB" on its own is not a storage device. A wide range of vocabulary was accepted (e.g. drive/flash drive/memory stick/disk/device etc.) but just "a USB" is like saying "an optical" and expecting marks for it (SL 5aiii)

(b) Most candidates at least identified some valid ways that Claudia could secure the information she held and many explained them adequately, although the explanations were occasionally too brief and vague for the extra mark. Some basic technical precision was expected here. Not necessarily great technical depth, but at least a response that aligned with reality.

(c) Most candidates had some awareness of the advantages and disadvantages of websites versus social networking sites in general. Fewer were able to discuss those issues in the context of "showing her work to potential clients". A few candidates misread the question and provided responses that detailed ways *other than* a website or an account on a social networking site.

Recommendations and guidance for the teaching of future candidates

Candidates must be taught to explicitly frame their responses *in the context of the scenario* for all part (b) and part (c) responses. At the same time, candidates need to be reminded that they do not get credit for merely repeating information given in the scenario. They have to USE the context and the information given to inform and structure their responses. Generic, "boilerplate" answers attract few marks. Irrelevant, pre-learned examples simply tacked-in to a response also attract few marks, especially when there is no attempt to relate those examples to the scenario of the question.

Candidates must be taught to read the question carefully and respond to the exact question asked. Often candidates do not relate their answers to the specified stakeholder(s). Some questions also explicitly mention a role, e.g. "Daniela *as shop manager*" (HL 3c, SL 3c) or a particular focus, e.g. "…as a way of *showing her work to potential clients*" (SL 5c). Responses will only gain credit beyond the basic levels where they explicitly address the question *exactly as asked*.

Candidates should be taught to organise and structure their answers clearly, especially for part (c) responses. The use of paragraphs is a great help to both candidate and examiner - it allows both to see where and how an argument or point has been developed or not developed. Answers that simply run-on without the use of a line break to indicate a new point or concept tend to run a far greater risk of ending-up being convoluted and vague, at times bordering on incoherent.

Candidates should be taught that although bullet-point lists may be appropriate for some part (a) responses, they are *not* an appropriate structure for part (b) or (c) responses. Bullet-point lists encourage candidates to make brief, unsupported assertions rather than analyse, explain, discuss, evaluate or consider "to what extent...". Teachers and candidates should be aware that the bullet-point lists used in the published markschemes are a set of *brief marking notes for examiners* to indicate possible directions an answer might take. They are NOT an indication of the way a candidate's response should be structured, argued or presented.

Teachers are encouraged to make full use of **role play** with their classes. Playing the roles of various stakeholders can be a very effective way of helping a candidate understand the impacts and implications of ITGS issues in the context of a particular scenario. It also encourages candidates to adopt what might be termed the "so what?" approach. Repeatedly challenging what the implications are for the stakeholder and why the stakeholder should care about those implications helps candidates develop their ability to understand the impact of novel scenarios beyond the obvious and often superficial initial stages.

Candidates should be reminded to give units (e.g. MB, seconds, pixels/cm) for all quantities.

For part (a) step-by-step questions, candidates should be reminded that there is no risk in identifying more than the specified number of steps if they are unsure of any. For example, if a question asks a candidate to identify 4 steps and they offer 5 or 6 steps, the first 4 correct steps found will be credited. Incorrect steps will be ignored.

Higher and standard level paper two

Component grade boundaries

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

General comments

The article on using social networking sites and other technologies to cyberbully was short but contained sufficient material about the potential concerns to enable the candidates to get started on their responses. Given the familiarity of the scenario it would be expected that the quality of the responses would increase but they remained the same for a variety of reasons. This was the first paper which was presented with a negative issue at the heart of the article and the article included a significant number of negative impacts. This meant that the candidates were expected to provide examples of the positive impacts associated with cyberbullying. Most candidates did not have major problems with this; and also the markscheme was adjusted to take account of the change of emphasis from providing negative impacts, especially for Criterion C, to providing positive impacts. Overall there was a small improvement in the middle and lower end but the number of candidates obtaining the higher grades did not increase.

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

Most candidates grasped the different nature of this examination which was an IT system with the focus on a negative issue i.e. cyberbullying. This presented an issue to a few candidates who were unable to provide a balanced analysis of the impacts for various stakeholder; and instead included generic answers about the positive benefits of social networking services and did not link them to the scenario of the case study. Overall the candidates displayed an insightful understanding of the application of ITGS concepts in their analysis of the positive impacts of cyberbullying.

However the use and understanding of information and communication technologies in Criterion B and in some cases for Criterion D was not as good as previous sessions; possibly due to the complexity of the technology used in social networking sites.

Again it was a major disappointment to see that many students did not attempt to provide conclusions to Criterion C and Criterion D, even after providing a balanced set of impacts. Often the conclusions that were provided were just a summary of the impacts in Criterion C and the positive and negative evaluations of the solution in Criterion D. In Criterion C the conclusion needs to be a justified comment coming down on one side or the other concerning the overall effect of the impact of the major issue in Criterion C. For Criterion D an overall

evaluation of the effectiveness of the solution being a good solution or not is required, comparing the negative and positive analyses.

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

It was pleasing to see more structured responses in criteria B, C and D with many students being able to write in a step-by-step manner about using IT terminology. Students were able to engage with the topic of cyberbullying and frequently give first hand examples to support the impacts. However the use of a standard structure did not lead to an increase in the display of higher order thinking skills needed for the higher marks in Criterion C and Criterion D. It was also good to see many students being able to describe a feasible solution with less students offering a generic solution that was not applied to the problem. However there were still a small number of candidates who included more than one solution in Criterion D. A minor change to the paper structure will be introduced in May 2016. The amended paper structure will be posted on the OCC in January 2016.

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

Question 1 - Criterion A

Part A

Most students were able to identify a concern from the impact of cyberbullying and use the correct terminology to indicate the impact of this concern. Some students were confused about certain key terms and would label one concern and go on to describe another; e.g. identify security and go on to describe a privacy issue; or sometimes confusingly including security from hacking when the data is publically available. This was caused by a lack of understanding of how invasion of privacy issues may be linked to personal information being automatically open to the public on social networking services.

Part B

Most candidates answered this question well – specifying who the stakeholder was, the part of the IT system they were using or associated with (this requires the use of specific IT terms), and what they were doing with the IT.

Question 2 - Criterion B

Part A

For this question candidates were required to describe step-by-step how the IT system works and were required to include the use of the computer based technologies to access the social network AND how the social network was used. Many candidates described the logging on process to the IT system but did not elaborate on the storing and sharing of data via the social networking site. Many students did not start with the information given in the article and then

use this as a base to develop their answers on. However, more students were structuring their answers in a step by step manner which was pleasing to see.

Part B

Candidates needed to explain the link between two items, how the concern could come about and why it could happen due to a weakness in the IT system and its use. The lack of IT knowledge was apparent here as the IT weakness was identified but often specific IT details were not provided. For example, candidates described how a student can write an anonymous post but failed to explain why the IT system allowed them to be anonymous up with regard to the way the various social networking sites allowed them to register and use the site.

Question 3 - Criterion C

It was clear that most candidates knew that a structure was required for the response and provided one based on the various stakeholders or the various issues. The most successful were those based on the stakeholders as it enabled them to provide a balanced set of positive and negative impacts which is required for the higher marks. This was even more apparent this year, with the emphasis of the article being the negative impacts of the cyberbullying victims. But candidates who used a structure based on issues and ITGS concepts had difficulty linking them to the scenario; which also occurred in previous sessions.

Also there were too many candidates who provided lists of impacts in a comparative structure but did not make analytical links between any of these, or make evaluative comments about the implications of the impacts in terms of size, the future, possible other effects, impacts on other stakeholder, duration, extent, etc.

Question 4 - Criterion D

Most candidates were able to identify a solution to one of the problems found in question C but often the problem was not specified in sufficient detail to be of help when providing a conclusion to the evaluation of the solution. The problem needs to be framed with reference to specific stakeholders and addressed in the conclusion. Again there was not enough detailed description presented about the solution, especially technical details or details of actual policies that need to be implemented. And the solution needs to be effectively linked to and applied to solve the specific problem. Also to evaluate this solution candidates need to provide a balanced set of at least two positive and two negative evaluations of the effectiveness of the solution in solving the problem, and a conclusion that argued that the solution overall was effective, or not effective, in solving the problem.

Recommendations and guidance for the teaching of future candidates

Teachers should guide candidates to write answers that are specific to the scenario of the article and the IT system that the article is focusing on as a number of candidates included material that was not directly related to or even relevant to the article. Also there is little evidence of candidates going back to Criterion A and Criterion B and revising their responses. Considering the significant number of incomplete and unfocused responses for these criteria the candidates need to review them and most seemed to have time to do so.

Planning prior to answering Criterion C would allow candidates to identify the positive and negative impacts on a range of stakeholders (not about a range of issues) and see where the links between them are before writing. This ensures a structured and well-presented answer which can then be evaluated in a conclusion. Time should be allowed to write a concluding statement that does more than summarize the impacts and comments previously made. Candidates should instead discuss the extent of the impacts and draw conclusions and form judgements that look at the impact of the issue as a whole.

Candidates need to ensure that one solution is described and evaluated as only one solution is marked. When a solution has more than one part it would be considered one solution if both parts are linked. For example schools blocking social networking sites and monitoring Internet activity could be one solution, whereas the schools blocking social networking sites and the social networking site monitoring activities on the site would be considered two solutions.

For Criterion B, and also for Criterion A and Criterion C, candidates need to be instructed to include technical terms that demonstrate they have significant IT knowledge. The simple rule is to include technical IT terms beyond those used in the article.

For Criterion C and Criterion D many candidates had been well prepared to use a structure for presenting the impacts but need to heed the advice above.

For the next examination session candidates need to be instructed how to write their own analysis and evaluation of the impacts and solutions, and how to develop justified conclusions. Specifically they need to make connections and comparisons and examiners will be looking for the use of such words as furthermore, additionally, however, but, conversely, likewise, in addition, on the other hand.

Higher level paper three

Component grade boundaries

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

General comments

Candidates generally performed more consistently than in recent years. Candidates were well prepared for the Case Study as students had plenty to say about the theme and were competent in being able to stick to the topic and answer the questions.

Candidates should spend some time in practicing some of the high order questions to ensure that their level of analysis is appropriate for the question.

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

As per previous years, candidates still struggle to incorporate any ITGS terminology into their analysis or their responses. There are many keywords, technical words as well as appropriate terminology that would support the Case Study. During the Case Study preparations, they should develop a list of appropriate terminology that would be able to support any response.

In terms of general feedback, candidates have shown a better response to the Case Study than in previous years, however there are still some students who struggle with time management and are not able to show a well thought out and crafted response for Question 4. This is something students should be practicing prior to the examination.

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

In general, students appear to have been exposed to, and done research on, the issues underpinning the May 2015 Case Study.

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

Question 1

(a) Many candidates confused the physical functions of the data warehouse and not what characteristics it has.

(b) The vast majority of candidates were aware of the function of the ETL process and how it is both important and required when transferring data. However some of the terminology and language used meant candidates were given a BOD (benefit of doubt) for their response as what was written did explain things.

Question 2

(a) This question was a good discriminator for candidates as they needed to be very specific with their response here. Again some candidates lacked appropriate terminology to be able to differentiate between data mining and data querying. Some candidates confused mining and querying the data or had combinations of both characteristics for both responses; even though they generally know about both.

(b) This question had some candidates confused. Many talked generally about protecting data and failed to actually discuss the specific access control for either staff or customer. Those that did would sometimes repeat the same access control. In other cases there were some candidates who developed clear and well thought out responses.

Question 3

This question showed that most candidates had thought through data analysis and big data for the use of stores. Candidates used their terminology best here. However many tended to be very “black and white” and either said “yes” or “no” to store managers using the data. However there were some candidates who took the situation into a real life situation and said that a store is a 'living' being and needs to be flexible enough to adapt to changes in customer or environment events and that the analysis of the store data should be used to support a manager's decision as well as a guide for the manager to make decisions, but it should not be the only source of decision making.

Some candidates failed to look at impacts of decisions of changing staff schedules without through or consultation with the staff involved.

There were some candidates who took the use of the data too far and discussed issues of surveillance of staff as well as it being seen as monitoring staff. Also many candidates took ASI's analysis of data from ALL stores and did not take into account the location, size and effects of individual stores. They were making statements from whole company data and not individual store information.

It was good to see that some candidates looked at the reliability of the analysis from ASI and whether reliable decisions are able to be made using only this data.

Question 4

As with what happens sometimes with Question 4, some candidates spend much of their response explaining the items. In this case, some explained loyalty cards or targeted marketing more than the issues behind loyalty cards or marketing in this way.

Generally candidates were fully aware of data privacy issues however many could not develop clear articulated analysis of the pros and cons of this in a balanced and clear way. However some only focused on the negative aspects or the positives of getting discounts or products targeted to you specifically.

For the independent research, some candidates were accessing and reporting on areas outside of a shopping centre. While this could be ok if the candidate sticks to the core issues, many times it was just used to talk about a generic loyalty card system without any real connection to ASI or the issues involved.

Compared to previous years, candidates for the May 2015 session did attempt responses for Question 4 with much more thought out responses. There was clarity, cohesion of ideas and the information generally stuck to the specific focus of the case study.

Recommendations and guidance for the teaching of future candidates

For the Case Study, students as well as teachers, should link in with available sites that will assist students' preparations for the paper. There is the OCC which is a great forum site for ITGS teachers, the ITGSopedia site which uses a number of techniques to collect appropriate ITGS resources, as well as the Facebook Case Study group.

While there was more evidence of independent research, some of it was off topic and not relevant. Teachers should be exposing students to real life situations that link in with the core issues of the Case Study. Also teachers should take opportunities throughout the year to have students writing practice responses that particularly look at how to incorporate independent research. There has been an improvement on this from past years, however there is more work to be done.

As mentioned earlier, students should develop a list of appropriate terminology linked to the Case Study that could be incorporated into their responses so that they are able to demonstrate some higher order thinking.

Students should also be practicing the analysis of different situations. Many candidates stopped at the descriptive phase of responses and therefore did not and could not reach the high mark bands.