

ITGS

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 22	23 - 35	36 - 46	47 - 58	59 - 69	70 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 9	10 - 21	22 - 32	33 - 44	45 - 57	58 - 69	70 - 100

General comments

The following comments from the May 2012 report still apply. The Higher Level (HL) ITGS course is a rigorous pre-university course that provides candidates with many of the study skills that are required in higher education. The 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 candidates 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.

The three externally assessed components are significantly different to each other. Paper 1 is designed to test candidates’ ability to address scenarios related to the whole course, then to concisely develop arguments in part c of the question. Depth is expected rather than breadth so candidates are advised to develop ideas with a narrow focus rather than try to address a wide range of ideas (superficially).

Papers 2 and 3 require the candidate to plan their response, in both cases up to 15 minutes can be spent on preparing the overall response. This can ensure that the response stays focused, uses appropriate examples and ensures that candidates can reflect before they write.

The general observations below apply to all assessment components:

- All components are based on the ITGS Triangle (ITGS Guide page 15).
- Candidates must undertake practical activities to develop their understanding; this includes hands-on experience in using different types of application (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 (ITGS Guide pages 71-72) 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 candidates will improve their knowledge, use of ITGS terminology and organizational skills in their written responses.

Higher & standard level internal assessment – project

Component grade boundaries

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

General comments

It is highly recommended that the ITGS Project section of the M12 ITGS subject report be read as well as this M13 report.

The requirements for submitting the ITGS Project sample are detailed in the Handbook of Procedures which is updated yearly. IB Coordinators and ITGS teachers must be reminded that the screencast and the 3/CS forms are mandatory components in the submission of ITGS projects. The name of the teacher in the form must be legible.

The screencast is important because it ensures that the moderator can actually see the product, especially in instances where the candidate has created the product with platform-specific applications such as databases made with Microsoft Access or FileMaker Pro. This also provides the candidate with an opportunity to explain his product to the moderator.

All candidates must create a screencast demonstrating that the product is completely functional and highlighting the techniques in Criterion E that were used in creating the product. The screencasts submitted were of varying quality in meeting these two requirements. Some were individual screenshots in a slideshow style movie, where as others were detailed, narrated and annotated and had a huge candidate investment. In general, candidates need further guidance on how to make screencasts with suitable audio and visual evidence from the product.

The form "teacher comments to explain marks awarded" is very helpful to the teacher in understanding how marks were awarded by the teacher. Most schools did provide teacher comments with the sample. This is also helpful in providing meaning feedback to the teacher.

Candidates need to be made aware of the IB Academic Honesty policy. There were reported instances of candidates copying from Exemplar 1: Keith Findlater Photography. Teachers may wish to show candidates the exemplar material as a solution. However, candidates must be carefully supervised so that they develop their own documentation and product.

The range of projects, choice of clients and problems were usually appropriate to ITGS Projects, although the great majority of the projects used websites as the solution for the problems that needed to be solved. There were also a number of videos and databases. Some candidates produced simplistic products and struggled to reach the suitable levels of complexity. This was particularly evident in websites developed in online environments that required little or no user skills and understanding.

Unfortunately, contrary to the spirit of the project, it was clear that in many cases the candidates began the project by choosing the software to be used rather than selecting a client and identifying a problem as the first stage of the process.

Another problem that must be addressed is the lack of candidates close contact with their clients throughout the development process of the product. In most projects there is no clear evidence that this contact was maintained from Criterion A through Criterion F. Some candidates did not include the client's signature in Criterion D and the feedback from the client for Criterion F. It is required. There must be evidence that the client has seen and agreed to the designs as well as being involved in the evaluation of the product.

Candidate performance against each criterion

Criterion A

Usually a client and a problem are identified, but instead of identifying inadequacies of the present system, the candidates only described the problem that needed to be solved. They often neglected to present solutions that have been attempted in the past and why they have been inadequate.

Many candidates failed to cite the interview, which limited their ability to score full marks.

Generally, the interviews did not have sufficient evidence to substantiate the claims made in Criterion A. More effort needs to be devoted to constructing the questions in the interview that provide a deeper insight into the situation. The interview questions must be specific to the client, investigate the current problem and why previous approaches to address the problem have not been successful, and what the requirements IT solution should address.

Candidates need to be reminded that clients under 18 years of age must have a co-client who is also consulted throughout the development from Criterion A through Criterion F. The ITGS teacher **may not** be a client (see Guide p59).

Criterion B

Candidates tend to make general comments and fail to include a requirements specification that will allow someone else to understand how the product was created. They often forget to mention all of the software and hardware used and details.

Most candidates fail to complete the security section or make it too general.

Input and Output needs are also a point that is not fully understood by some candidates. They fail to mention specifically what inputs they will need (or the product will need) and what outputs the product will provide.

The candidates often struggle with the Specific Performance criteria. These were often simplistic and generalized. The Specific Performance criteria should address the requirements for functionality and the content in the Product. The candidates need support in developing these criteria as they need to be "SMART GOALS": Specific, Measurable, Attainable, Realistic and Time-bound.

The Specific Performance criteria are also linked to the testing in Criterion D, the product in Criterion E and the Evaluation in Criterion F.

Justification of the chosen solution was in general well done.

Criterion C

This has improved from previous years. More detail has been included in every date, and some very good explanations of steps have been included. There were some weak ones where they failed to mention every stage Criterion A through F (eg missed the testing or implementation).

However, this was one area where the material from the exemplars on the OCC was copied and pasted and then slightly modified instead of being planned for the specific client, problem and product.

Criterion D

Usually, the product design form had significant omissions and in some cases it was not consistent with the final product. Candidates were not always aware of the correct way to show the overall design and internal design for a database, movie or website.

The resources section was often limited to comments like "pictures and data from the client" few if any candidates used a recognised citation format for this.

The testing components were poorly executed, few candidates provided a detailed testing plan, and fewer still provided a detailed response to the test they outlined. Sufficient content and test data must be included in the product in order for all of the features of the product to be tested.

The signature from the client in this section was either typed in a different font (usually a scripting font) or scanned. There was no way of seeing that this actually was provided by the client. The same signature scan was often used in the evaluation. While in theory there is on-going consultation with the client, this was always apparent.

Criterion E

All of the marks for Criterion E are based on the documentation, not on the screencast. The screencast demonstrates that the product is fully functional and highlights the technique and shows where it is used in the product.

For most of the projects, the techniques that were described were not enough to make the product a complex one. Furthermore, the screenshots must be legible and there should be some indication on the screenshot what the text is referring to. More care needs to be taken in considering the audience of this documentation.

In order to achieve higher marks the complex techniques must meet the requirements of the command term "justify".

Appropriate equipment and methods must be used in collecting content (i.e. video, photographs). Candidates need access to a tripod and external microphone for video content. Weak audio tracks, distorted photos, pixilated images and wiggling video clips are unacceptable in ITGS products. Candidates should be encouraged to investigate guidelines and examples of successful products of the type that they are making.

Criterion F

Many candidates failed to use the specific performance criteria from Criterion B in collecting feedback from the clients. They often presented information that was not evident in the interview, or the interview was a simple yes/no sheet with one sentence feedback apparently from the client. Again not enough thought was given to the questions asked. Essentially there are two aspects that need to be addressed: an evaluation of the product based on the specific performance criteria identified in Criterion B and recommendations for future modifications and improvements.

The question of authenticity of the feedback is evident in the use of the same scanned signatures from Criterion D. Some candidates presented video or audio recording of the interview, these were very useful. Supporting information from the teacher could alleviate some of these issues.

In instances where clients were relatives or acquaintances, they indicated that the product met their needs and it was doubtful if this could be the case. This illustrates the need for on-going supervision in the development of the ITGS candidates' products.

Criterion G

This should be an 'easy' 3 marks, but it is not. Reduced marks occurred because:

- The product is "empty" or has very little content. Many spreadsheets or databases had the structure, but insufficient content. This is not a real solution. Data needs to be included to show that the product has been created as a solution to a real problem. Similarly some websites were incomplete or text-only.
- Content is missing in the product folder. Even if websites cannot be exported. Evidence from the making of the product must be included in the Product folder. No product folder can be empty.
- Cover pages need to be throughout tested. Most worked and this has been a great improvement. However, there were cover pages where some of the links did not work. One way to demonstrate that the cover page is completely functional could be addressed through the screencast with additional information on the 3/CS form.
- The file names and/or folder names were changed from those in Forms.zip which means the cover page as it has been setup does not function properly. The default settings for the links on the cover page are for pdf files.

Recommendations for the teaching of future candidates

- Candidates could have the opportunity of doing the design of more than one example of a product before working on their real product. By imagining a solution and putting ideas on paper - before creating the product - is a good exercise for Criterion D.
- Some very good products, which were created using appropriate techniques and solved a real problem, did not gain marks because the documents (mainly for criteria B, C, D, and E) were not completed adequately. In these cases some of the marks awarded by the teachers were high because they were thinking of the work the candidate had done to create the product, but it is the documentation that is considered for marks. This is why it is extremely important to discuss the requirements of all of the criteria before the candidates begin working on their projects.
- When in doubt - ask. Teachers should use the OCC and read the forums or post questions on the forums if there is something that is not clear to them about the content of a particular criterion or about the level of "complexity" of certain techniques. Candidates will benefit from this.
- The Project exemplars provided in the OCC must not be copied by the candidates as a "recipe".
- It is recommended that the following sources of information regarding the requirements for the ITGS Project be consulted and made available to candidates:
 - 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, N12 and M13 sessions
 - For additional professional development regarding the ITGS Project, please participate in: ITGS online workshop or ITGS face-to-face workshop (cat 1 & cat2) and ITGS face-to-face workshop (cat 3)
 - IB Academic Honesty document
- There are 6 exemplars of Projects in the Teacher Support Material. Neither the documentation nor products may be copied from these exemplars. Candidates are expected to formulate their own questions for consultation with the client before the development of the product and as part of their evaluation

- The client needs to fully understand the requirements of the ITGS Project and agree to work with the candidate throughout the stages of development.
- The process for guiding candidates is best achieved by having candidates complete each criterion and submit it for feedback before moving on to the next stage of development.
- Ensure sufficient time is allocated for the project. Candidates may run into unexpected difficulties that take time to resolve. They must take the time to work closely with their client throughout Criterion A through Criterion F.
- The candidates and the teacher should use the checklists provided in the TSM to help manage the project process.
- The candidate should have tested their CD-ROM/DVD on different computers to make certain that it functions properly. When the teacher receives the final version to mark, the marks must be awarded on the contents of the candidate's CD-ROM/DVD, not from files on a server or memory stick. The teacher and moderator need to assess exactly the same product.

Higher level and standard level paper one

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 Q3 – Libraries and e-book loans

HL Q2 and SL Q4 – E-waste – recycling and carbon footprint

HL Q3 and SL Q2 – Patient Monitoring

The comments for these questions are included within the HL Paper 1, Section A information.

Higher level paper one

Component grade boundaries

Higher and standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 7	8 - 15	16 - 26	27 - 34	35 - 43	44 - 51	52 - 80

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

From the Paper 1 exam, it was clear that most candidates had some gaps in their knowledge and understanding of ITGS concepts. Many of them clearly did not know why some e-book readers use a proprietary file format or why relational databases are used [in this case as the basis of lending systems]. Other areas that where significant gaps in knowledge were the responsibilities of an Information Systems Manager, how to convert speech into text, and expert systems.

Sometimes, it was not a topic that was difficult, but the correct interpretation of the command term or what was being asked in the question, for example, when a question was about what the government could do in a specified situation but candidates went off course and wrote about what companies could do, or when a candidate described rather than identified (meaning that more time was spent on the early part of a question at the expense of the extended responses in part c).

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

Again, the candidates seemed to be well prepared to answer questions about certain topics. They were in general well prepared to identify the steps necessary to log in to libraries and borrow e-books and what type of information is recorded in libraries databases. They were this year better prepared to deal with spreadsheet formulae and graphs than in previous sessions. They had a pretty good idea of the effects of irresponsible disposal of e-waste and the problems that may arise when departments are given freedom to develop independent IT systems. They could name vital signs that are monitored by IT systems in the area of health and they showed understanding about the differences between online training and face-to-face training.

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

Common question: HL question 1 and SL question 3

- (a) Most candidates were able to achieve full marks in both parts (I and ii) of this question. Very few candidates failed to achieve marks here.
- (b) Roughly 50% of the candidates demonstrated a correct understanding of why a relational database is chosen as the basis of a lending system. The other 50% showed poor knowledge of the topic.
- (c) Most candidates were able to present acceptable impacts on candidates with the introduction of the loan of e-books. Some candidates went off course and discussed the impact on the library.

Common question: HL question 2 and SL question 4

- (a) (i) Most candidates demonstrated proper knowledge of the formula requested in this question, but a great number of candidates failed to use the equals sign or used an x instead of an *
- (ii) Most candidates demonstrated proper knowledge of the formula requested in this question.
- (iii) Most candidates were able to achieve full marks in the response submitted for this question.
- (b) Most candidates had no problem with answering this question and were able to achieve at least 4 marks out of 6.
- (c) This seemed to be an easy question, but many candidates did not focus on what a government could do, as asked in the question, and ended up going off course by addressing what companies and the population could do. Also, most candidates did not explore the question in the depth required.

Common question: HL question 3 and SL question 2

- (a) Not only most of the candidates provided correct answers for the part I of this question, as the great majority answered the question with the words heart rate and blood pressure. Part ii was also correctly answered by the majority of the candidates.
- (b) Many candidates addressed the impact of the new patient monitoring equipment rather than the implications of the equipment for doctors. Those that analysed implications failed to provide balanced and detailed analysis.
- (c) The problem with answering this question was that while the question was asking to justify the decision of using a combination of online training and hands-on training, most candidates limited their answers to contrasting the two methods.

Section B**HL question 4**

- (a) Clearly, most candidates had no idea of what the responsibilities of a typical information systems manager are and also did not know the job titles of the specialist staff who typically report to an information systems manager.
- (b) Most candidates demonstrated a good understanding about the consequences of giving freedom to the departments to develop independent IT systems.
- (c) It seems most candidates had no idea of what advantages there would be by having an information systems manager as part of the senior management team.

HL question 5

- (a) The definition of prototype was well known by most candidates and most of them were also able to describe two essential components of a project plan.
- (b) This question did not represent a major challenge for the candidates as it seems all they needed to demonstrate were good observation skills. The best prepared students were also able to point out not so obvious differences in the usability of the two interfaces.
- (c) An easy question that was not well answered by most students. The great majority of candidates talked about consultation as one of the first steps of the project of a new IT system or after the project had already been implemented, but failed to present adequate reasons for consultation throughout the project.

Section C**HL question 6**

- (a) The question asked for six steps. Most candidates were not able to correctly provide more than two steps.

- (b) Most candidates provided a reasonable explanation that demonstrated some knowledge and were able to earn 3-4 marks for this question.
- (c) Most candidates were not able to present reasonable arguments in their answers for this question. Also, most of the candidates focused on speech recognition rather than on speech to text.

HL question 7

- (a) Both parts I and ii had a very high number of correct answers, so it was not hard for the candidates to achieve full marks in both of them.
- (b) Most candidates had only a slight and superficial idea of the capabilities of an expert system, so they had no idea on how to correctly answer this question.
- (c) Most candidates were able to provide good reasons for the future of robotics to be more about single purpose devices than humanoid/android robots, but the answers usually lacked depth.

Standard level paper one

Component grade boundaries

Higher and standard level

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

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

Even though there seemed to be an overall awareness of ITGS knowledge and concepts, candidates demonstrated in their responses:

- Lack of understanding of command terms
- Not carefully reading the questions. Therefore, responses are at times 'off-course'.
- Memorized generic responses and knowledge was not actually applied to the specific questions asked.
- Lack of evidence and examples to support arguments. The question arises what notes and material have the candidates collected to review before the examinations.
- ITGS terminology and concepts not included in responses. This includes both IT terminology and terminology relating to social and ethical considerations (see the markbands on markschemes)
- Lack of depth and balance in extended responses.
- Lack of planning before beginning to write responses.

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

Three questions on SL P1 were most frequently selected:

SL Q1 Bank offers online services to customers

SL Q2 Patient monitoring

SL Q5 Blogs and social networking tools

Candidates seemed less well prepared on Q3 Libraries and e-book loans and Q4 E-waste – recycling and carbon footprint.

It seems that candidates have studied all of the ITGS topics to some extent and have a good understanding of the ITGS Triangle, but the shortcomings cited above prevent many from achieving higher marks.

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 under HL Paper 1. These questions include:

HL Q1 and SL Q3 – Libraries and e-book loans

HL Q2 and SL Q4 – E-waste – recycling and carbon footprint

HL Q3 and SL Q2 – Patient Monitoring

SL question 1

- (a) (i) This type of question has appeared in past examinations. However, there were still a significant number of responses that could not identify the protocol or domain name in the URL.
- (ii) Candidates seemed familiar with statements that could be included in a bank's "Privacy Policy".
- (b) Very few candidates were able to reach the upper range of marks on this question. They seemed to be able to describe two possible additional security measures, but not analyse them. This demonstrates that candidates are not addressing the command terms in the questions.
- (c) Candidates did not always read questions carefully and strayed from the focus of the question. This question requires implications for the bank of the implementation of new online services. Too many candidates discussed implications for the customer.

SL question 5

- (a) (i) Many candidates were able to achieve 2 marks for defining a *blog*.
- (ii) Again most candidates were able to identify two other types of social networking tools. There was a wide range of acceptable answers.
- (iii) The responses to this question were somewhat disappointing because many candidates did not refer to a specific social networking site or did not provide sufficient description of how family members living in different countries could share their daily experiences with one another.
- (b) Some candidates went off-course in this question because they did not focus on the scenario of many employers now checking job applicants by viewing the information that applicants post on social networking sites. The benefits and risks needed to

relate to the first sentence in the question.

- (c) There were many different situations presented to show how governments attempt to control internet and social networking sites. The major shortcoming is that candidates did not organize their responses. There were some relevant examples provided, but most often the responses did not provide a balanced argument to answer the question “to what extent is this claim acceptable?”

Recommendations for the teaching of future candidates for higher level paper 1 and standard level paper 1

- The teaching of ITGS has to be balanced in the different areas of the syllabus in order to properly cover the ITGS Triangle - there cannot be an emphasis in just one area. All areas must be covered and candidates must learn to develop their answers in depth with well-supported arguments.
- Teaching command terms is essential for success - far too many candidates respond to the questions with very superficial answers. Opportunities must be provided throughout the two years for candidates to write responses and receive teacher feedback. If candidates are given the opportunity to practice timed responses with mock tests, are given proper feedback about how well their response addresses the command terms, their possibility of success will greatly increase.
- Candidates must learn to organize and develop their answers with well-supported arguments. They need to practice structuring an extended response before they begin to write.
- All of the terminology that appears in the ITGS Guide must be taught so that candidates can naturally include the appropriate words in their writing. Candidates may use any additional terminology in their responses that they have encountered through the use of specific applications from Strand 3, from the study of topics in Strand 2 and from class discussions of news articles and other ITGS-related material.
- Candidates need to have an organized approach to studying ITGS so that they have sufficient material to review before taking the ITGS examinations.

Higher and standard level paper two

Component grade boundaries

Higher and standard level

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

Paper 2 is based on an unseen article which contains a scenario about the use of information and communication technologies. The focus of the scenario for this examination session was the technology of cloud computing and its use in schools for the purpose of storing, accessing and sharing files by candidates and teachers. Many schools already use products such as Moodle for their learning management systems, and the scenario presented an opportunity for candidates to evaluate the positive and negative impacts of two free cloud computing services, Google Docs and Dropbox which were not specifically designed for educational purposes.

Since it is the third session for this Paper 2 format a good number of the responses displayed a familiarity with the format and the expectations required of the responses, but many clearly did not. The overall spread of the grades was similar to previous sessions and there were fewer poor and mediocre responses. The number of very good to excellent responses was similar; hopefully in the next session there will be more if the candidates follow the suggested response structures below so they can give themselves the best chance to obtain the higher grades.

The length of the article was long due to the inclusion of diagrams to ensure that candidates who had not used one or both of the services would not be disadvantaged, even though it was expected that candidates would have used these, or similar services such as a wiki.

Some candidates produced good responses for criteria C and D but not for A and B. It is recommended that candidates return to criteria A and B at the end of the paper and improve them. They should be able to do so since by that stage they will have more ideas. Also candidates need to use all the space in criteria C and D, especially by including a well-argued conclusion.

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

Criterion A

Part A:

Many candidates were able to identify a social/ethical concern and describe it. A concern or issue means a negative impact/outcome/result/consequence/effect and

this impact needed to be firstly identified and then described. Too often a generic concern, such as hacking, was identified and the impact description did not reference the article.

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 use of the IT system, specifically the 'what' and 'where'. Some candidates described impacts of the IT system on the stakeholder instead.

Criterion B

Criterion B is designed to examine the technical knowledge of the candidate 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. Candidates could choose to describe one or both of Google Docs and Dropbox, but some did not distinguish between them effectively. To assist candidates the major components of the IT systems to be described were identified at the start of the article and the question. The article provided the main input and output, and some information about the components. Candidates needed to include other missing components and the steps required to process and use the data/information. Some candidates did not format their response in a step format based on input-process-output. It is also recommended that candidates use extra paper to include as much detail as possible. This response depended on the candidates being familiar with ICT hardware and software terminology for computers, web-access, Internet-based services and networks.

Part B:

The description of the relationship between the concern from Question 1, Part A, and the IT system was somewhat better than in previous sessions but too often responses did not include specific details of the IT system. Candidates are required to analyse the IT system and explain 'how' and 'why' the concern is facilitated by one or more of the hardware and software components and their use. Descriptions of impacts are not required, which happened too often.

Criterion C

This question required a structured response that included descriptions of impacts, analyses and evaluations of both positive and negative impacts for more than one stakeholder with a justified conclusion.

Some deficiencies were:

- candidates only identified one stakeholder
- concentrated on the negative impacts or positive impacts exclusively, or had an unbalanced list
- candidates identified a list of issues but did not provide details of the actual harm or benefit
- impacts were described in a general way without direct reference to the stakeholders in the context of the article
- responses repeated the issues from the article without adding further details
- responses only continued with the concern from Criterion A when a range of issues and impacts provided more opportunities for analysis and evaluation
- general impacts due to issues such as hacking were also common
- the few conclusions that were presented usually were not justified, but summarised the previous list of impacts, or contained the candidates opinion
- very often there was no attempt at a conclusion
- no attempt at analysis or evaluations, a purely descriptive response - candidates need to be taught to specifically include analytical and evaluative comments
- impacts NOT grouped as positive/negative or by various stakeholders
- a structure based on issues listed in the ITGS guide was usually not successful and were often artificially forced onto the article

Candidates need to be taught to use a structured analytical response that allows for direct comparisons between impacts. Also they need to learn to include analytical and evaluative comments, using such words as: *furthermore, additionally, however, but, conversely, likewise, in addition, on the other hand, whereas, compared to, contrast with, implies, as a consequence.*

The better responses were often based on a detailed description of a balanced number of impacts grouped into negatives and positives (usually more than three of each type); and within each group there was a range of stakeholders with comparisons and links between their impacts and further implications noted. Also there should two mini-conclusions comparing the impacts, e.g. 'the best/worst impact is because' and finishing with an overall conclusion. For example: 'Overall the impact of the use of Google Docs/Dropbox at Shannon Academy is/is not good because; and the major problem needs to be addressed to enhance the benefits', which leads into Criterion D. The conclusion must be justified with explicit references to the described impacts or else it is only an opinion or summary.

Criterion D

Most candidates were able to identify a solution to one or more problems identified in Criterion C but only a few evaluated the solution fully. Some responses contained more than one solution that were not marked. The solution needs to explicitly include the technical requirements of the solution and how it would work; the hardware, software and the actions of the stakeholders involved. Some solutions were described but not applied to the article, e.g. encryption and authentication technologies (e.g. passwords, biometrics) were described but details of how they would work in the context of the school situation were not included. The middle markband requires the application of the solution to the problem in context. It is important to note that the solution need not be technology based, e.g. describing policies for using the services by candidates and teachers.

The first positive evaluation of the solution is how the solution solves the problem. Further strengths and benefits are needed for the higher mark bands. The negative evaluations need to include how the solution did not completely solve the problem, and could include further weaknesses and/or a different or modified solution. A final overall conclusion that argued the solution was a good or bad one needed to explicitly compare the strengths and weaknesses of the solution.

Recommendations and guidance for the teaching of future candidates

- The questions in the paper are the same for each examination session and candidates need to be given the opportunity to practice responses to them using a variety of articles, either genuine or modified. Now that three Paper 2 examinations have been held candidates need to be given sample scripts to aid their understandings of the requirements of the questions, and to practice improving ineffective responses. Candidates should also mark scripts using the markbands and the markschemes. The previous ITGS subject reports need to be discussed with the candidates.
- Teachers need to be constantly on the lookout for news articles that can be turned into practice Paper 2s. Some are shared on the ITGSopedia wiki along with other resources. Issues related to the teaching of the paper can be discussed on the OCC, and contact made with other ITGS teachers to share resources and ideas as well. Collaboration on setting practice papers will help to clarify ideas and enhance best practice.
- Candidates should go into the examination with a clear structure for the response to each question, and should spend the first 15 minutes using the structures in their planning. Even short answer questions like 1a, 1b and 2b need planning. Also in the first 15 minutes candidates need to use a highlighter to mark the issues and benefits raised in the article; and in another colour the technology mentioned in the article. This will ensure that the response will focus on the article rather than what the candidate thinks the article is about.
- 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 they were used to distinguish scripts in the various markbands.

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 8	9 - 13	14 - 16	17 - 19	20 - 22	23 - 30

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

One of the difficulties candidates had was in developing the extended responses for Question 3 and/or Question 4 that went beyond common sense issues or what had already outlined within the case study itself.

As with previous case studies, candidates still have difficulty in linking in independent research. The research must be additional to the information provided in the case study. Without this independent research, candidates cannot reach the top tier of the grading rubric for Question 4.

Being a Higher Level component of the subject, candidates are expected to demonstrate higher order skills, such as analysis and evaluation. Many candidates could identify and describe, but not take the response to the required level. Some of the extended responses could have benefited from taking a little time to plan the response before beginning writing it. This, linked with understanding the specific requirements of the command terms, will allow a focussed and structured response to be developed.

The levels of knowledge, understanding and skills demonstrated

The Red Dragon Case Study was successful as the content and topic was a real life situation that candidates could do real research and investigations. The technology was accessible to all candidates. There was a large range of research available on the Internet that could have supported primary data gathered by candidates.

Candidates were able to demonstrate technical understanding in Question 2 although the depth to which candidates developed this knowledge ranged across the full range of marks.

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

Question 1

- (a) Most candidates were successful with this question. However, even though it is an identify question, some clarity was needed for some responses as they were too vague or used misleading terminology. An example was the use of the single word "radio". That does not imply the two way communication using two-way radio. It is

ambiguous and could mean the normal radio which is 1 way. The two way communication was needed for full marks.

Some candidates also wasted time by over analysing the answer and providing too much information; in some cases negating their answer with incorrect information. I think this comes from a lack of understanding about requirements of the command terms.

- (b) A very successful question as most candidates scored full or close to full marks. Many candidates were able to link their answers with common sense responses from the case study.

Question 2

This was a good question with a good range of marks across the candidates. Majority of candidates successfully identified up to 3 valid uses for how the data could be used to enhance the business.

The majority also supported the identify component with some discussion and explanation of how the data could be used. Many candidates were short, clear and to the point. Some also structured their response making it easy and clear to see the 3 points.

There were only a few who delved past the basic case study information though, those were the candidates who also tended to be more successful with Q4 through the independent research.

There was a range to the depth of the explanation and discussion for each of the 3 uses of the data.

Those candidates who were not successful tended to be the candidates with the responses that only identified. For many candidates, they could easily see how the data could be used to enhance.

Some candidates however focussed too much on live data and not the historical data to enhance the business. While live data is valid, the intent of the question was to use all the data that had been collected to analyse.

Question 3

Q3 was the least successful question for candidates. A large majority of candidates focussed more on the criteria to test a system and not the criteria that could be used to rate/judge a provider. Within those who focussed on the system requirements, much of it was simply repeating what was in the case study with little new information or developing the topic further. Those candidates who successfully looked at provider criteria tended to look at key criteria that would link in with the SDLC and logical criteria.

Question 4

For this question the whole range of marks were awarded. However, there were not many 10-12 answers as many candidates did not provide evidence of independent research. This is a comment that is made every year and I believe that it comes from a lack of Case Study preparation. Those that do mention independent research show valid, relevant and appropriate comments that enhance and support their response.

Many candidates were sidetracked and moved away from the drivers as the focus. Some candidates were also very opinionated with respects to drivers and their ethics; giving a biased view of the social and ethical concerns.

Recommendations and guidance for the teaching of future candidates

- Understanding the command terms – There needs to be a time spent during the course on how to interpret and understand the requirements of the command terms (Guide p71 – 72). Candidates are missing out on valuable marks as they are not reaching the level that the command term requires (or going beyond what is expected). The OCC has a number of examples and resources on this topic.
- Learning how to develop a coherent and structured evaluation – For the higher order thinking tasks that require an evaluation, candidates need to see examples as well as practice developing these extended responses within a classroom environment. Teachers should use a framework for evaluation, such as advantages, disadvantages and an overall opinion to help guide their students.
- Practicing developing extended responses – Candidates need to practice, under time constraints, an extended response to ensure that they know how to develop a balanced and evaluated response. Time spent planning the response would pay dividends here.
- Carrying out independent research - Provide candidates with many opportunities to gather independent research that can be used in the extended response questions. Educate candidates on how to undertake such research and then appropriately incorporate it (synthesis) into their responses.
- Understanding the Mark Bands - Understand the nature and structure of the mark bands for Question 3 and Question 4 and how marks are allocated using best-fit.
- Formulating an appropriate response to the command term used - Have candidates understand how to interpret the requirements of the question by breaking down the stem of the question. This will avoid candidates going 'off course'. Also practice re-reading the question to validate if the response corresponds to the question asked. Peer review could take place in this exercise. Time spent planning the response would also pay dividends here.

Overall recommendations for the teaching of ITGS and for assessment

The following teaching strategies should be used to help candidates on all of the assessment components:

- Use the Triangle as a basis for planning and teaching the course.
- Emphasize ITGS terminology at all times (in class discussions, during hands-on sessions with IT tools, in exams).
- Provide practical exercises to provide candidates with first-hand experience of IT tools.
- Encourage class discussions of news articles and research so candidates can support their explanations with real life examples.
- Use varied techniques (i.e. visits, hands-on activities, analyzing news articles) and visual material (i.e. videos, diagrams, photographs) to support the candidates' understanding.
- Use an effective method for recording the information that is collected, discussed and analyzed throughout the course so that candidates have the material consolidated to review before the examinations (i.e. wiki, CMS or other methods)
- Use past IB exam papers for class tests and mock exams.