ITGS

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 20	21 - 33	34 - 44	45 - 57	58 - 68	69 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 9	10 - 20	21 - 32	33 - 44	45 - 57	58 - 69	70 - 100

General comments

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

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

ITGS is as rigorous as other group 3 subjects.

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

The general observations below apply to all assessment components:

- All components are based on the ITGS Triangle.

- Candidates must both practical activities to develop their understanding; this includes hands-on experience in using different software types (digital literacy).

- Knowledge obtained from real situations may be developed from primary research as

well as discussions of news articles.

- Candidates must know the terminology that is used in the Guide and where appropriate the HL Case Study. ITGS terminology is defined to be both IT terminology and terminology related to social and ethical considerations.

- Candidates must understand the requirements of all the command terms (pages 71-72 ITGS Guide) as they are used in the assessment of all components.

- Throughout the two years candidates must be given the opportunity to write responses to questions similar to those asked on the various examination components and receive written feedback. It is only through on-going use of the command terms, research, writing responses and receiving feedback that students will improve their knowledge, use of ITGS terminology and organizational skills in their written responses.

Higher & 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

Candidates selected a range of worthwhile IT solutions to address the needs of their clients. For the most part clients were appropriately selected as an adult member of the school community or someone with whom the candidate had close contact. The client must be involved in the project throughout the process from Criterion A to Criterion F.

Candidates are expected to follow IB guidelines for academic honesty in the ITGS Project. Some students copied information from the Teacher Support Material Exemplar 1 (Keith Findlater Photography). Instances of "suspected malpractice" are taken seriously and were forwarded to IBCA for further action. These situations should have been detected early in the development of the project when each criterion, as it is developed, is submitted to the teacher for feedback as part of an on-going developmental process.

In some instances, the lack of detail in planning from Criterion B through Criterion D or the lack of sufficient time to develop the product lead to projects that did not reach their full potential. The project should evolve over several months in order to allow the candidate to conduct the necessary research and to learn the necessary skills required to develop the product.

Even though there were some commendable projects, many products were too simplistic or lacked the necessary research and commitment to plan and develop a product of the quality expected for an ITGS student. In instances where the client does not have the necessary IT

skills to test the technical aspects of a product, an IT-literate person should also test the product. In some instances clients indicated that the product met their requirements, but there were significant errors or spelling mistakes in the product. In other instances the product did not fully address all of the requirements originally indicated in Criterion A.

This leads to the next important point. All of the criteria are interrelated. For example, the specific performance criteria in Criterion B, leads to the test plan in Criterion D and to the final evaluation in Criterion F. Likewise, the structure and plan in Criterion D must be aligned with the structure of the product in the Product folder and also with the information in Criterion E. Where inconsistencies occur, marks are not awarded.

Screencasts provide an opportunity for candidates to explain the complex techniques in their products and demonstrate their functionality. Screencasts ensure that the moderator actually experiences all of the features that the candidate included in their product. There were some excellent screencasts submitted.

For the May 2013 session onwards there will be two changes:

- The projects selected in the sample will be uploaded to IBIS. ITGS projects will no longer be sent to the moderator.

- Screencasts demonstrating the use of the product and how the advanced techniques in Criterion E were created will be required for all projects.

Additional details for the ITGS Project for May 2013 will be forthcoming in the IB DP Coordinator Notes, in the Handbook of Procedures and on the Online Curriculum Center (OCC).

Candidate performance against each criterion

Criterion A

Some students provided sufficient evidence from the interview with their client to support Criterion A. The interview questions must be specific to the client, the current problem, why previous approaches to address the problem have not been successful, and what the requirements IT solution should address. In some instances claims were made in Criterion A that did not appear in the consultation.

Clients under 18 years of age must have a co-client who is also consulted throughout the development from criterion A through F. The ITGS teacher must not be a client.

Criterion B

Most students provided an appropriate justification for their product. However, this criterion requires more thought and detail in all of the subheadings leading up to the justification, especially in the Specific performance criteria. Specific performance criteria must be measurable and provide a basis for the test plan in Criterion D and can be evaluated in Criterion F. This relationship between the criteria was not recognized.

Some students did not understand the requirements of the subheadings in this criterion and consequently, did not perform well on this criterion.

Criterion C

The Project schedule can be used as a project management tool. The ITGS teacher can follow the on-going progress. Columns 1, 2, 3 and 6 in the Project Schedule need to be completed by the student at the onset of the project. Columns 4 and 5 are completed as the project is developed. Additional rows can be added as needed.

The details in the Project schedule need to be specific to the product being developed. It is also expected that the student would be consulting with the client throughout the development Criterion A through Criterion F and references to this consultation would be recorded in the Project schedule.

Criterion D

The time spent in planning is saved in the time spent on development and results in a better product. Students need to spend more time investigating how to create a good design for their product. It is expected that students will learn new skills through the ITGS Project. Where new skills need to be learned, students need to take the time to learn these skills.

Criterion D is developed before the product is created. Therefore, there no screenshots from the product should appear in Criterion D. The design of the product can be hand-drawn or created with graphics tools.

All resources required for making the product (i.e. templates, widgets, code, special effects, etc.) and for the content in the product (i.e. images, text, audio, video, animation, etc.) must be provided with details of the source. Content material that comes from the client or created by the student needs to be cited. If any of this material comes from another source, the original source must be indicated.

The client's signature is required to show that they approved the product design before the candidate proceeded to develop the product.

Criterion E

From May 2013 onwards screencasts will be required for all products. Some students provided screencasts where the student explained how to use the product, how the complex techniques were made and how they are used. Screencasts should have an audio explanation in order for the student to best present their project.

The overall structure of the product and the advanced techniques must be provided at the beginning of Criterion E. There should ideally be at least three advanced techniques included in the project. Each advanced technique is justified by using screenshots from the making of the product, and explanation of how it was made and justification for its use. Screenshots need to be legible.

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Students must use appropriate equipment in collecting content and also appropriate methods for displaying content. Students need access to a tripod and external microphone for video content. Distorted photos and pixilated images are unacceptable in ITGS products. The fonts selected for the project must be legible and appropriate to the product begin developed.

Sufficient test data must be included in the product so that all of the features of the product can be tested. This includes both databases and spreadsheets where test data must be entered that demonstrate that the product functions properly.

Criterion F

The feedback from the client needs to address the requirements for the product in criterion A which were then transformed into Specific performance criteria in Criterion B. Additional questions regarding the specific product and future development should also be included in the feedback from the client.

The Feedback questionnaire is separate from Criterion F; Product evaluation and future product development.

The client's signature must appear at the bottom of the Feedback.

In instances where the client is not competent with using IT, it is recommended that additional technical testing of the product be carried out by someone who is knowledgeable about the development of these kinds of products. Too often clients were relatives or acquaintances who indicated that the product met their needs and there were serious mistakes within the product.
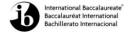
Criterion G

Many candidates received full marks on this criterion. Most products functioned according to the requirements indicated in criteria A, B, D and F. In some instances there was not enough content to evaluate the effectiveness. This was most often the case in databases and spreadsheets.

Products used the templates provided in Forms.zip (download from the OCC) and the cover page functioned as required. Directions for using Forms.zip are included in the Teacher Support Material. File names and folder names were not changed.

Recommendations for the teaching of future candidates

- Provide students with copies of all of the relevant ITGS documents and exemplars: ITGS Guide, the Teacher Support Material (zip file), Guide on the appropriateness and complexity of an IT solution, the project zip file for submitting the Project, a copy of this section of the May 12 subject report and the 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, analysis, stages in the

Project schedule, Product design, Product development and questions for the Feedback and evaluation.

- The client needs to understand the requirements of the ITGS Project and agree to work with the student 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.

- Allow time 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 students and the teacher should use the checklists provided in the TSM and Criterion C Project schedule 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 student's CD-ROM/DVD, not from files on a server or memory stick. The teacher and moderator need to assess exactly the same product. From May 2013 onwards, the candidates' projects will be uploaded to IBIS; however, this will still require checking the internal links in the Project folder on a range of computers to ensure they are relative.

- Teachers need to consult the following resources (available on the OCC) for the ITGS project:

    (a) ITGS Guide (pages 56-70 for the project, pages 71-72 command terms)

    (b) Teacher Support Material

    (c) Guidance on the appropriateness and complexity of an IT solution

    (d) ITGS FAQs for the Project

    (e) IB Coordinator Notes (quarterly updates on IB subjects)

Higher level and standard level paper one

Although higher level Paper 1 and standard level Paper 1 are separate components, 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 – Implementation of a school database

HL Q2 and SL Q3 - Telemedicine

HL Q3 and SL Q5 – Improving Lima's transport system

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 - 8	9 - 16	17 - 26	27 - 35	36 - 43	44 - 52	53 - 80

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

In Section A candidates choose 2 out of 3 questions that are common to HL and SL. In Section B and Section C candidates choose 1 out of 2 questions from each of the two additional topics 3.10 IT systems in organizations and 3.11 Robotics, artificial intelligence and expert systems. In general, it seemed that the candidates were equally prepared for the different areas of the ITGS programme and the choices of each candidate were more a result of individual preferences than of better preparation for one area over the other. There was not a clear preference for one question being selected over the alternative choice(s).

Some parts of questions rather than areas appeared more difficult for the candidates. Examples include the role of an information system manager (Q4), features included in a software requirements specification (Q5), and steps that washing machine software uses to adjust the length of the washing cycle (Q6).

Many candidates did not understand what was required by certain command terms, even though these are an essential part of the ITGS programme. That was especially the case with the command term "contrast", which appeared in Q1 (b) (ii) and Q6 (b). Most candidates described advantages and disadvantages of the alternatives provided in the questions and may have implicitly contrasted them, but did not provide an explicit contrast that referred to each alternative throughout.

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

Candidates were well prepared for parts of questions rather than entire questions. That was the case of the database question Q1 (a). Also, many concepts were well known by the

candidates, such as real-time communication (Q2) and social networking (Q3). Fuzzy logic was a concept that was correctly understood by most candidates in Q6. Many students did not have much difficulty to develop long and well-argued answers for the questions dealing with videoconferencing (Q2) and social networking (Q3).

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

Common question: HL and SL question 1

(a) Most candidates were able to correctly answer at least 4 of the 6 parts of the database question. Most candidates incorrectly answered Q1 (a) (vi) by stating the field type "number" for Telephone Number.

(b) Not many candidates could present a reasonable explanation of why teachers would export data from a database to a spreadsheet. For part (ii), the majority of candidates were able to present advantages and disadvantages of online and face-to-face training, but failed to contrast the two options.

(c) Most candidates appeared to have no idea of how a VPN works and had the misconception that allowing teachers remote access to the school server would allow access to the entire database.

HL question 2 and SL question 3

(a) Most candidates correctly defined the term 'real-time communication'.

Many candidates failed to convert kilobytes into kilobits and a lot of them sadly showed they lack basic arithmetic skills.

Most candidates knew exactly how to resolve the problem of how to send large images to a hospital.

(b) Most candidates had no problem with real-time data transfer. Candidates are also aware that many computers and mobile devices will store data (for example an e-mail in the Outbox when a network is not available) until it can be forwarded on (when the network can be accessed and it is sent), but were unable to apply this knowledge to the scenario in the question.

(c) This seemed to be one of the easiest part (c) questions in the entire exam. Yet, most candidates did not take advantage of it to explore it to the depth required.

HL question 3 and SL question 5

(a) Many candidates received full marks for describing "social networking" and describing two appropriate types of files that could be uploaded to a social networking website.

(b) Most candidates seem to be frequent users of social networks, so this question did not present any special difficulty. However, many candidates failed to explore the question in the depth required and provided only superficial reasons to explain why companies will use social networking websites to develop new business opportunities.

(c) The answers for parts (b) and (c) could make use of many of the same arguments to provide the required explanations. The comparison between a social networking website and a company website seemed to be well known by most students. Most candidates that explored in depth the part (b) of the question also followed through in part (c). Likewise, most candidates who provided superficial answers to part (b) did the same for part (c).

HL question 4

(a) The problem was that many students provided answers that were merely copied from the stem of the question. These responses were not accepted.

(b) The same problem described above occurred in part (b) where the most cited three criteria were "the department", "the nature of incident" and "the number of users affected" – not by coincidence these appear in the stem of the question. In order to get full marks, the candidates had to provide explanations for using these criteria and that made a clear distinction between candidates that knew what they were talking about and candidates who knew how to copy.

(c) The candidates found this question difficult to provide reasonable arguments for the extent to which the Information services department should be responsible for supporting an alternative network operating system. It seems most candidates had no idea of how to approach the question.

HL question 5

(a) In part (i), the same problem that occurred with question 4(a) occurred again. Many candidates attempted to answer this question by copying the answer from the stem. In part (ii) candidates experienced difficulties in responding to four features that might be part of a software requirements specification. Most answers were vague and/or completely off course.

(b) Most candidates provided a reasonable explanation that demonstrated some knowledge of prototypes and were able to earn 3-4 marks for this question.

(c) This was a very good question to separate students who understood the waterfall method of systems development from those who had just memorized concepts. Many of the latter were even unable to notice there was no testing phase in the chart.

HL question 6

(a) Part (i) referring to two data items was correctly answered by most candidates, but

the same was not true with part (ii) where four steps in the washing machine software were required.

(b) Most candidates provided a reasonable explanation that demonstrated some knowledge of fuzzy logic and were able to earn 3-4 marks for this question.

(c) Most candidates were able to present reasonable arguments in their answers for considering to what extent it is sensible for an investor to trust systems that use fuzzy logic to predict market trends.

HL question 7

(a) Many students chose to answer this question and were able to successfully answer part (i) about sensors, but usually did not do well on part (ii) requiring algorithmic thinking. Although the question had a technical feel to it, the intention was to require candidates to identify that if a critical value is exceeded (for example, too much pressure on the accelerator), this will trigger an action in the ECU (for example, the traction control activated).

(b) Well-developed answers here were rare. It seemed that many candidates have a misconception of what expert systems are and how they are used – apparently they imagine an expert system as a science fiction robot that knows and does everything without human assistance. Most students had only a superficial idea of the capabilities of an expert system.

(c) The same problems noted in part (b) were also faced here where candidates were required to discuss the impacts on motorists and car repair shops of diagnostic expert systems for cars.

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

Five areas are causes for concern:

• Requirements of the command terms are not understood.

- Responses do not specifically address the question asked or do not focus on the specific scenario. Generic responses are written from memory.

- Lack of evidence and examples to support arguments.

- ITGS terminology and concepts not included in responses. This includes both IT terminology and terminology relating to social and ethical considerations.

- Lack of depth and balance in extended responses.

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

There was no noticeable difference between the candidates' selection of questions 1 through 5. Students seem to perform better on Q2 Home networks and Q5 Improving Lima's transport system relating to the use of social networks. This can be partially attributed to their familiarity with these systems.

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 Q1 – Implementation of a school database

HL Q2 and SL Q3 - Telemedicine

HL Q3 and SL Q5 – Improving Lima's transport system

SL question 2

(a) Four advantages of using a LAN in part (i) were answered well by many candidates. Likewise, most candidates could describe the role of the ISP in part (ii).

(b) Most candidates provided explanations why the Perez family would install a mixed network. In many cases it seemed that candidates had experience with using a mixed network from school and/or home.

(c) Candidates who understood P2P networks were able to evaluate the decision of switching a home network from P2P to a client-server network. Unfortunately, too many candidates do not reach the upper range of the mark band on part (c).

SL question 4

(a) Some candidates in part (i) did not read the question carefully and mistakenly defined *SMS* instead of focusing on *SMS alerts*. Most candidates to identify two ways traffic information could be captured electronically in part (ii), but could not outline two ways

how this information could be transferred to a central location in part (iii).

(b) The question specifically asks candidates to analyse the decision to use models from the scenario for traffic flow. Two problems emerged here. Some students did not understand what a model is and how it could be used to manage traffic flow. Other students went off-course by not reading the question carefully and ignored "used to manage traffic flow".

(c) The impact of having the traffic information from traffic control systems available for the police again did not result in well-considered responses and did not reach the upper mark band.

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 across all areas of the syllabus in order to properly cover the ITGS Triangle - there cannot be an emphasis in just one area.

- Students must learn to develop their answers in depth with well-supported arguments. All of the terminology that appears in the ITGS Guide must be taught. Additional terminology that candidates may use in responses can emerge from the use of specific applications from Strand 3, from the study of specific themes and topics in Strand 2 and from class discussions of news articles and other ITGS-related material.

- Teaching command terms is essential for success - too many candidates responded to the questions with very superficial answers. If students are given a chance to practice writing responses on assignments and mock tests and are given proper feedback about their response to the command terms, their possibility of success will greatly increase.

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 - 4	5 - 8	9 - 11	12 - 15	16 - 18	19 - 26

General comments

Paper 2 is based on an unseen article and candidates are required to write a response using assessment criteria provided in the Guide. Although the scenario was unfamiliar, the social and ethical impacts and the underlying technology related to Strand 1 and Strand 3 in the

Guide. Candidates were able to apply knowledge gained in the ITGS classroom to this new situation.

The technology described provided sufficient insight into the IT system, yet allowed candidates to draw on their own knowledge to further describe the step-by-step process of how the IT system worked. Although candidates often failed to fully analyse and evaluate their arguments, they were obviously familiar with the process of analysing a news article and applying the Paper 2 criteria.

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

Criterion A

Most candidates were able to identify a social/ethical concern from the list under Strand 1 (Guide page 12). Some gave vague descriptions of the concern and tended to describe the technology rather than the social/ethical concern. For example if privacy is identified as a concern this could be expanded to describe a situation where the handheld device is found by an unauthorised person who accesses a car owner's criminal records with intention of blackmail. Alternatively a situation could arise where a police officer used his position to perform an unauthorised search on his neighbour and shared sensitive information (e.g. criminal records) with other people in the neighbourhood.

Part b) was well answered and candidates described the relationship of stakeholders such as police officers, car owners and the police department.

Criterion B

Candidates who scored well gave a clear description of the step-by-step process to show how the IT system works. To assist students the main components of the IT system were identified at the top of the exam booklet. A basic outline was provided in the article and candidates who only summarised the article scored 2 marks. To gain further marks they needed to describe the major components (from input, processing and output) and use their knowledge of similar IT systems to describe steps not mentioned in the article. Good answers provided further details of the technology used in the steps such as use of a stylus or touch screen, the possibility of authentication (e.g. password/biometrics), a description of the way the handheld computer could connect to the central database, the use of a query and key field matching.

To access the 3-4 mark band candidates needed to identify the relationship between the IT system in the article and the concern presented in Criterion A. Candidates who were not able to describe a concern in Criterion A struggled with the second part of Criterion B. Following the examples given above, privacy would be a concern if an unauthorised person gained access to the handheld device where the policeman had not logged off and the IT system was not password protected. In the second case privacy would be a concern if the police officer used his ID and password to access the database and perform a query using his neighbour's car registration number in order to retrieve his neighbour's record and hence details of any criminal offences. This criterion requires an explicit link to the IT system.

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Criterion C

Successful candidates planned their responses to Criterion C. Those who provided lists of impacts, often not fully described, were rarely awarded more than 2 marks. In order to reach the 3-5 mark band they were expected to consider more than one stakeholder and clearly link the response to the scenario. Quotes and reference to line numbers were not expected, but the description and analysis had to apply to the scenario in the article. Analytical and evaluative comments enabled students to reach the 3-5 mark band.

Candidates found it harder to reach the 6-8 mark band where a structured consideration of both positive and negative impacts for more than one stakeholder was expected. Often candidates wrote a summary at the end and this did not add any value to their arguments. Marks were awarded for partial evaluation, but a full evaluation needed a justified conclusion/opinion/judgment about the overall impacts. Candidates who gained full marks wrote a final evaluative paragraph.

Criterion D

This was probably the most disappointing criterion. Candidates should have identified the problem chosen from Criterion C. In some cases it was not clear which problem they intended to solve. Criterion D asks for one solution and the first appropriate solution was marked. In many cases candidates provided a solution of many parts which worked together to solve one problem. This was accepted as a multi-part solution. For example the solution to protect a database could include the use of a firewall, VPN and secure physical location. Unfortunately, with a multi-part solution, the parts were rarely well described and often only listed. Lists and descriptions scored marks in the 1-2 range.

If the solution was not fully described, yet evaluated marks were awarded according to a best-fit approach. Using best-fit the examiner or moderator reads the candidate's response and determines which of the levels within the mark band is most appropriate. This does not mean that the candidate has to reach every statement within that level. Sometimes a response does not fully satisfy one level but has strong elements of the higher level.

The second reason for frequently low marks in Criterion D was poor evaluation of the solution. An acceptable solution to the problem of security of the central database was the use of biometrics, such as fingerprint scanning, to authenticate the police officer. Most students did no more than suggest that this solution was a good one as it would make the database more secure, make the police happy and give the citizens more trust in the police. This answer does not evaluate the strength of biometrics. Answers scoring marks in the 6-8 range evaluated both strengths and potential weaknesses of the solution Successful candidates considered the strength of the security due to the unique properties of fingerprints and they addressed weaknesses such as the cost to implement the system and the need to set up a finger print database for the police officers. Candidates who wrote a final paragraph that provided a judgment of the points raised gained full marks.

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 3	4 - 6	7 - 10	11 - 13	14 - 17	18 - 20	21 - 30

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

The performance of the candidates on this paper was low. They did not always understand the command terms. The main problem was that analysis and evaluation were generally not even attempted. The students need to demonstrate, especially in the extended responses questions, higher order thinking skills.

Candidates must be aware that when questions ask for independent research they will not be able to reach the higher marks if they did not show evidence from their research. A recurring problem was that many candidates lost marks by not quoting specific examples that they had investigated and researched.

As is often the case, IT technical knowledge proved to be an area of weakness for the less-prepared candidates. However, there were gratifying examples where some candidates had clearly researched the IT systems related to the case study.

The levels of knowledge, understanding and skills demonstrated

Better candidates showed a good understanding of the case study and the issues relevant to the use of information technology. They were also able to quote examples derived from their research. In other cases it was apparent that they had not undertaken any independent investigation.

In these responses technical knowledge was often superficial. This was evident in Question 4 were the answers were common sense points with the occasional inclusion of IT terms without any development beyond a superficial discussion of the information technologies involved.

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

Question 1

(a) Most students could not define a "cookie". Many candidates confused cookies with browser history or indicated that they are "active devices" or a program that could 'manage' other applications or plug-ins. This is terminology that the candidates should know because "cookie" is included in the subject guide.

(b) Students performed better on this question than question 1(a). It seemed that they knew the purpose of the cookie more than what it actually was. This probably was because they applied knowledge from their own experiences on the Internet. Some candidates fail to link their response to the PTC website. A response must be always focused on the context of the question.

Question 2

Few students demonstrated a clear understanding of the ACID rules and followed it up with a clear example. In some cases it was clearly only guesswork. There did not seem to be any particular ACID rule that was popular and there was a relatively equal balance between all the 4 different rules. In many cases the rules were defined and explained. However, reference to the stimulus was missing. Only better candidates performed well on this question.

Question 3

Most candidates were able to score at least some marks on the mark band. There were too many students who simply recited or repeated case study issues without any sort of expansion of the issue. The command term of this question was "discuss" which required an in-depth treatment, rather than a listing, of the features, of how and why they were important in creating a quality experience for the user. The lack of use of ITGS terminology was common in this question.

Question 4

This was a difficult question for a majority of candidates and the extent to which it was answered was varied. Some candidates focused solely on the website components and responded as if it were an extension on Q3. Others were extremely general and only listed the steps with very little development or discussion. The command term Formulate requires candidates to outline and then justify the development strategy proposed. Many students produced a Gantt chart, but generally there was lack of meaningful references to the proposed development strategy or independent research to justify the use of it. Some candidates were unable to link SDLC and Project Management with the development plan. Better students understood how to link the Case Study with their independent research. They had structured a logical flow of discussion about what needs to be done. They chose a development strategy such as waterfall or agile method and constantly showed a timeline-based process.

Recommendations and guidance for the teaching of future candidates

- An additional 15 minutes are available for this component. This time should be used to plan the responses rather than to write additional material.

- Advise students to carefully read the question. This should prevent them going "off course" in their answers.

- It is essential that the students carry out an extensive investigation about the situation presented in the Case Study. When it is required by the question, they must refer to this research, quoting organizations and systems that they have researched. Candidates will never achieve the highest marks without mentioning specific details and names.

- Teachers need to develop candidates' analytical skills. The analysis of the information underpins any conclusions that can be made.

- Understand how mark bands are used for extended responses - this can be achieved by using them in class tests and throughout the course.

- Many candidates need to be taught how to interpret the command terms when reading the question and link this to the depth of response required. If the command term is higher order, the candidate must also spend time organizing their answer for the extended response.

- Teachers should review the terminology in the Case Study with the students at length. In this way, the students should appreciate exactly how the hardware, software and concepts mentioned relate to the Case Study and also to real-world applications.

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 students 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 students" understanding.

- Use an effective method for recording the information that is collected, discussed and analyzed throughout the course so that students 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.

- Encourage students to plan their extended responses by considering stakeholders and their involvement with the issues.

- Show students how to apply critical thinking skills so they can move beyond a basic description toward in-depth analysis. Show them how to organize a well supported response with conclusion.

- Share relevant parts of this Subject Report with your students

- Use specimen paper questions and adapt questions from past papers to provide students with experience throughout the course in responding to ITGS questions. Provide feedback to students using the mark band for extended responses.

Teachers can receive additional support by through:

- ITGS face-to-face workshops at http://www.ibo.org/events/index.cfm and online workshops at http://onlineworkshops.ibo.org/workshop_search

- ITGS discussions and special events on the Online Curriculum Center (OCC) on a regular basis. Any questions about this subject report or any aspect of ITGS can be posted in the ITGS discussion forum.