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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 - 56	57 - 67	68 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 21	22 - 3	34 - 45	46 - 56	57 - 68	69 - 100

General comments

The misuse and lack of use of appropriate IT terminology and terminology relating to social and ethical considerations was a serious concern on all of the internal and external assessment components. If students do not know the terminology that appears in the ITGS Guide and news articles and the terms used to describe the hands-on use of IT systems, they cannot write responses.

Although ITGS is in group 3, it does have some similarities to an experimental science in that there is an expectation that practical work in addition to that required to develop the IT solution should be carried out throughout the duration of the course.

Consequently, many of the examination questions are written with this in mind, so students who have taken part in lessons where they have used different software packages will probably have an advantage over those who have not had this experience. Please note this does not mean spending excessive amounts of time studying any particular application and ignoring issues that arise from the use of IT in contemporary society.

Furthermore, many problems that arise in the Project and externally assessed components can be traced back to this lack of familiarity with software from practical activities. Some common examples are outlined below:

- Using a small bitmap image from the Internet will probably not allow the image to be enlarged and used for the background of a poster. This can be tested by expanding a prototype image to the intended size before going any further.

- Images taken with high resolution camera must be changed to an appropriate format, size and resolution and tested before proceeding thus allowing web pages to load the images rapidly.

- Using an effective testing strategy to test results in a prototype spreadsheet such as comparing results from a formula with known results to ensure it works as expected. This can apply to functions, formulae or other software functionality.

- Creating a prototype relational database of at least three linked tables with queries and form allow it interrogated it in a meaningful way prior to developing the final version.

Finally candidates must understand the difference between a spreadsheet and database. The two terms cannot be used interchangeably.

Students must have the opportunity to analyze scenarios and write responses for the assessment criteria in the Portfolio (replaced in May 2012 with the new Paper 2) and questions on examination papers. 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. A wide range of appropriate resources are available on ITGSopedia.

Higher level internal assessment – portfolio and extension
(In May 2012 this becomes SL/HL Paper 2)

Component grade boundaries

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

General comments

With the new course being introduced with first examinations in May 2012 this task has been modified to become the new Paper 2. The parts that have been carried over are Criteria A, B, C and D and the comments below for this examination session include important advice for preparation for Paper 2.

Students will still need to complete similar tasks to those that they carried out in the development of their portfolio. These should continue to be based on issues in current news items. The articles selected by the teacher will most likely need to be modified to suit the criteria and the subject content more closely (TSM). A good method for choosing a news item is to select a topic or scenario from those studied and find a suitable news item about the issues involved; for example, employee monitoring, computer game addiction, etc. ITGSopedia is an excellent starting point for such information.

Over the course of the two years, the tasks need to cover the six main scenarios in Strand 2 of the new course, some articles will involve more than one scenario. In order to provide students with experience of a broad range of scenarios all the criteria do not need to be completed for all of the news articles analyzed. At times it may be desirable to concentrate on only one or two criteria. However, students need to be given the opportunity to practise all the criteria A-D a significant number of times throughout the course. This could be done in class **or set** as an assignment. Students will need to be given practice responding to a Paper 2 article under test conditions. Unlike the Portfolio, which was researched over a period of weeks, the new Paper 2 will be a timed exam.

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The best method of analysing a news item is using the ITGS Triangle. This will encourage the students to do the same in the Paper 2 examination and will reinforce the use of ITGS terminology and concepts. Also it is essential to teach the students the meaning of the sequence of command terms used in the Paper 2 criteria – description, explanation, analysis and evaluation. This applies especially to the command term progression in Criterion C where the descriptions for the impacts, the analysis and the evaluation **should** be in separate paragraphs. It is strongly recommended that teachers use the booklet in the Specimen Papers to 'train' students in managing their time, organizing and writing appropriate length responses.

Candidate performance against each criterion

Overall there were the same weaknesses as stated in previous subject reports in 2009 and 2010, but there were indications that a significant number of teachers and candidates had addressed them with some success.

Criterion A: Presentation of the issue

Candidates often spend too much of this criterion describing or explaining the positive impacts, some facts from the news item or other research in the first part of criterion A, and only in the last paragraph outlined or identified the issue for the main stakeholders. Candidates often did not refer to the IT system involved or the major effects on the stakeholders in sufficient detail, and hence did not adequately explain the connection between the issue, the stakeholders and the IT system (the Triangle). These comments need to be heeded when attempting the similar criterion in the new Paper 2. It is important that the student can concisely describe the issue and the stakeholders. The number of lines on the paper will give an indication of the length of the response expected.

Criterion B: The IT background of the issue

Often Criterion B was very generic, focused on the input and the output only and did not use correct IT terminology. A general guide to the level of IT required is an explanation which contains material about IT beyond that expected from a reasonably well informed average person. This will often mean that teachers, as well as the students, will need to research the IT system. A suggested method for practising Paper 2 Criterion B is to present the students with the input and output for the IT system and then to ask the students to investigate the often hidden processing, software, hardware, storage and networking components. The students would then be asked to explain how the IT system contributed to the concern in Criterion A. The detailed description of the step-by-step process may be in bullet points. It is the evidence of logical thinking that is credited. This criterion is technology based, so the use of correct technical vocabulary is expected.

Criteria C and D should be seen as linked. The solution evaluated in criterion D must be explicitly linked to the problem identified in criterion C. Failure to make this link will lead to significant problems for the candidate.

Criterion C: The impact of the issue

The main problem is that analysis and evaluation were very often not even attempted, and the criterion was often too short and sometimes one long paragraph! The voice of the candidate is needed for the higher marks. The candidate needs to demonstrate higher order thinking skills – to compare/examine the impacts and to then evaluate the overall impact.

Most candidates clearly did not see this as the main purpose of the criterion. When practising for Paper 2 the answer should be in three sections: a number of impacts about the scenario in the article should be described in detail, compared in more than one way, and an overall conclusion evaluating the extent of the impact. The candidate must also explicitly state a problem that can be used for the basis of the solution required in criterion D.

Criterion D: A solution to a problem arising from the issue

Some candidates were still including more than one solution and often there was a lack of evaluation of the solution for the higher marks. This is one of the easiest criteria to obtain full marks in but candidates often let themselves down with only a general description of the solution. When practicing for Paper 2 the single solution should address the one major problem, but may also address some minor problems. The answer should be divided into a number of sections as indicated in the assessment criteria: the solution described in detail, how the solution solves the problem, strengths and weaknesses, and future concerns/developments.

Comments regarding Criterion E through criterion R are consistent with those in previous ITGS subject reports (see May 2010 and May 2009).

Special Events will be held during September 2011 to help prepare teachers for these changes.

Standard level internal assessment - project

(In May 2012 this becomes SL/HL Project)

Component grade boundaries

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

General comments

The transition to the new assessment criteria is a natural progression from the current project criteria. All of the comments in this report will be focused on providing feedback from the May 2011 session with a view towards providing recommendations for the May 2012 session.

Candidate performance against each criterion

Criterion G: Identifying the problem within a social context

Some students provided evidence of interviewing their client to support criterion G. For May 2012, the interview questions need to be carefully formulated so that they support <u>new Criterion A</u> and <u>new Criterion F</u>. Time spent on writing, testing and revising the questions is time well spent. The client must be closely involved throughout all stages of the process (<u>new criteria A-F</u>).

Criterion H: Analysis and feasibility study

In spite of attempts to explain Criterion H, this criterion is not addressed well.

Criterion I: Planning the chosen IT solution

The design of the products was not detailed nor described well (new Criterion D). The design of a product consists of both the overall structure of the product (i.e. storyboard for videos and podcasts, sitemaps for websites). In addition to the specific detail from scenes in a video (i.e. lighting, position of actors, sound) or web pages (i.e. design of the various pages on the website. design of logos and buttons, choice of fonts).

Students need to collect appropriate information for the content of their products as well as researching best practice for product design.

All screenshots must be legible and reference must be made to them from the text. Wherever necessary arrows and circles must be used to show relevant area of the screenshots (new Criterion E).

Criterion J: Testing and evaluating the solution

Testing was generally well done. The testing process in the new criteria is simplified. However, students need to realize that the references to testing in the new criteria B, D and F are closely aligned (ie the same set of tests run through the documentation).

Criterion K: Assessing the social significance of the product

Very few candidates could explain both an observed and projected impact for their product. This may be evident in the new criterion F. (This relates to Criterion F because the observed and projected impact actually come at the end of the process when the product is "handed-over" to the client).

Criterion L: The Product

Products that do not have the required complexity lose marks. In May 2012 the lack of complexity could result in lower marks on several criteria (new criteria B, D, and E). The document "Guidance on the appropriateness and complexity of the IT solution for the project" should be used to ensure the students select appropriate techniques.

In all projects the content material originates from the client or the student must collect the information (i.e. take photographs, make a movie, create a sound track). Wherever copyrighted material must be used, it must be cited in the resources of the report and be clearly indicated in the product in a matter appropriate for the kind of product. (see *IB Academic Honesty*).

Criterion M: The Log Book

Logbooks were not well maintained. The new Criterion C actually is a planning page and also in some respects replaces the logbook. The first three columns are created in the planning stage and the remaining columns are filled-in as the tasks are completed. Revisions to the plan may be necessary during the process. In some respects as students are working on their product, they can be placing screenshots on the new Criterion E page. This eliminates the duplication that was occurring between the logbook and the report.

Recommendations for the teaching of future candidates

- Provide students with copies of all of the relevant ITGS documents and exemplars: ITGS Guide, checklists and exemplars from the Teacher Support Material, Guide on the appropriateness and complexity of an IT solution for the project, the project zip file for submitting the Project and a copy of this subject report.

- Use IT terminology in the project documentation. This includes the IT terminology that is used in applications, tools and online services.

- Allow time for the project. Students may run into unexpected difficulties that take time to resolve. They must build in time to work closely with their client throughout Criterion A through Criterion F.

- The six examples in the TSM are excellent models to follow for the documentation. The TSM can be downloaded as a zip file so that the students can become familiar with the exemplars.

- The students and the teacher should use the checklists provided in the TSM to help manage the project process.

- The process for guiding the students with the new criteria will be much the same as in the past by, for example, completing one criterion and submitting it for feedback before moving on to the next stage.

- The student should test 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.

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Higher and standard level paper one

Component grade boundaries

Higher and standard level

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

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

Question 1

Many candidates seemed not to have ever used a spreadsheet. Even those who showed some awareness of what formula should be used often failed to express it as it would have been done on a spreadsheet. Most were able to spot that the data in column C was expressed as a percentage. Most gained some credit for describing how the grades were allocated, but few were precise in identifying the locations of the required data or the processes need to access it. Many candidates confused macros with graph plotting. Perhaps, surprisingly, they had never actually recorded a macro.

Question 2

Most candidates made suitable comments about the use of drop down boxes. Saving space was not credited because such a box takes no less space that a suitable text box. Most were able to see that invalid data or no data was entered in the on screen form. Fewer were able to describe the steps taken to discover these errors. Most candidates were aware of the need for training. Fewer also mentioned that the staff concerned needed to have their computer systems checked out as well. The better candidates mentioned the need for a help team to be ready but few realised that the system should have been developed with input from the users so that it was usable and helpful and not just an additional burden. The possibility that the users might not want to use the system was an important consideration missed by most candidates.

Question 3

Most candidates knew what resolution is. There was some loss of marks where pixel numbers were mentioned rather than pixel density or numbers per unit distance such as dpi. The loss of data when the image files were converted was often mentioned in various ways. Few also realised that the loss could be permanent or that it might impose processing overheads when displaying the images. Any technique which described some form of compression gained credit when describing how the images could be converted and most scored some marks here. Just saying that you would use image processing software was far to vague to gain credit. Most candidates were aware of storage limitations on web sites, hence the restrictions on file sizes. Too many candidates talked about "memory" which wrongly implied RAM rather than disk storage space. The better candidates were also able to talk about slowing the site down and bandwidth issues.

Question 4

Most candidates did well in describing the features of a strong password. The steps involved in a brute force attack often provided opportunities for gaining marks although many of the answers did not indicate the systematic way in which attempts would be made in order to crack a password. Few candidates answered the keylogging question well, often straying away from the central theme that it was in fact about logging keystrokes. Too many talked about general security issues, with plenty of predictable comments about firewalls and viruses. The better candidates came up with solutions such as on screen keyboards and biometric identification that would not generate any keystrokes to be logged.

This paper will be not be in the new course, but elements of it will be merged with the current SL Paper 2 and HL Paper 2 to form the new SL Paper 1 and HL Paper 1. Recommendations for future sessions are included with the recommendations at the end of the section on HL and SL Paper 2.

Higher and standard level paper two

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

Candidates often showed a lack of understanding of the underlying IT concepts and the basic terminology. They had limited knowledge of databases and spreadsheets and used database and spreadsheet terminology interchangeably. This affected short answer questions and also made it difficult to follow their lines of reasoning in extended responses. Hands-on experience with applications is essential and their answers indicated that this was not a part of their classroom experience. Similarly the terminology relating to ITGS social and ethical impacts (eg *integrity* and *reliability)* was frequently misused. Some students just included long lists of terms without applying them to the scenario, presumably hoping to cover all eventualities.

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

Candidates showed a better understanding of a step by step process (HL Q2b). Extended responses were more structured and many attempted to analyse the issues. Conclusions were often included, but frequently were only summaries.

Candidates were more confident writing extended responses about familiar topics. Many seemed to have personal experience of exercise watches (HL Q2d) and they could often cite examples from their own education when considering laptops in schools (HL Q4d).

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Applying their knowledge to new situations such as Kiva (HL Q1; SL Q1) and the bureau of meteorology (HL Q3; SL Q5) was more challenging for them.

Teachers should focus very clearly on the need to examine general ITGS issues (such as privacy, security etc.) in the specific context of the question. This is a key ITGS skill and one that ties in very well with the principles of the IB learner profile. The uncritical use of generic ITGS phrases such as: "Hackers may gain access to the database and steal your private information, resulting in identity theft. This can be prevented by installing a firewall" will rarely score well. Furthermore it does it develop the candidates' ability to apply existing knowledge and understanding to specific situations.

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

Common question: HL & SL question 1 - Business and employment

Even though similar questions have been asked in previous examinations the answers to Q1 were disappointing. Few students could identify a data type for phone number. There was some confusion about database queries and many answers merely restated the question. Data redundancy was generally not well understood. Q1(a), Q1(b) and Q1(c) should have been straightforward if students had set up and queried relational databases in class. The extended response asked about 'online services' and many students either did not read the question carefully or did not know the definition of an online service.

HL question 2 - Arts, entertainment and leisure / health

Answers to Q2(a), Q2(b) and Q2(c) were generally well done but Q2(d) responses were mostly weak. Candidates tended to describe the features rather than evaluate the technology.

Common question: HL question 3 & SL question 5 - Science and environment

This appeared to be the most difficult question for candidates. They continually confused database and spreadsheet terminology. In Q3/Q5 (b) validation was confused with verification. In Q3/Q5 (c) they could often described the two ways but rarely compared them. Answers to part d) reflected very poor knowledge of policies. In many cases no policies were mentioned and candidates did not even consider routine IT policies such as back up regimes and implementation of security measures.

HL question 4 - Politics and government

This was a popular question about a familiar scenario. The role of the firewall was understood, but there was some confusion about the exact purpose of the UPS. Answers to Q3/Q5 (c) were often vague. Candidates were able to raise many issues in Q3/Q5 (d), but did not thoroughly analyse the advantages and disadvantages in order to reach a conclusion.

SL question 2 - Education

a) Most candidates could identify two file formats that can be used for podcasts or vidcasts on PDAs.

b) Candidates are still having difficulties with IT concepts and describing the steps for processes (i.e. steps for producing a podcast).

c) Candidates did not read the question accurately and often provided responses relating to lecture material.

d) There seems to be an unawareness of the requirements of the markbands. Several students did not identify the stakeholders, using the generic term "stakeholders" throughout the answer, which inevitably lacked depth and focus as a result. Many wrote at length about uses that were aimed specifically at students enrolled in the courses.

SL question 3 - Arts, entertainment and leisure

a) Generally well answered. Candidates were able to identify two reasons why a social networking website would provide free online social games through its website.

b) There was great variation in levels of understanding of cookies. Many candidates confused cookies with browser history and confused ideas further with indications that cookies are 'active devices' that can track users' browsing history, or cookies can track everything users do on their computers.

c) This question attracted a range of poor responses relating to bandwidth and data transfer speed. Many candidates did recognise the effects of multiple users accessing the game server although this was often expressed poorly.

d) "Long-lasting" was often ignored often transitory effects suggested with no attempt to identify longer term consequences – the prime area for this being "addiction" which was often merely presented as a consequence in itself rather than considering the "long-lasting" effects.

SL question 4 - Health

a) Few students could define pixel.

b) A large number of candidates misunderstood the question and/or included long tracts about privacy, security and hackers. Some candidates confused the stages with providing responses about taking digital pictures then downloading them from a 'camera'.

c) Most candidates had some knowledge of JPEG images. Many of the more technically oriented candidates erroneously claimed that JPEG was a lossless compression technique.

d) Frequently only a repetition of the information in the stimulus material with little additional insight.

SL question 6 - Politics and government

a) The question attracted the usual claims to being "more comfortable" and suggestions that global warming would be eliminated by people not driving to the post office. Many candidates went off-course by indicating that the whole process was currently carried out manually by Post Office employees that would face unemployment as a result of the online vehicle tax service.

b) Responses rarely contained anything more insightful than an ability to state that the "S" in HTTPS stood for 'secure'.

c) Some candidates had a basic understanding of encryption, but very few understood the use of private key/public key encryption. Often candidates focused on the security of data in storage (with the inevitable passages about hackers and identity theft) rather than during transmission.

d) Many candidates wrote at length about unauthorised access to the databases themselves and made no mention at all of data matching across databases carried out by the government which was the focus of the question.

Information for the new Paper 1, first examinations May 2012

The new SL Paper 1 and HL Paper 1 will follow a similar format to the current SL Paper 2 and HL Paper 2. However, there will be some significant changes:

- The new papers will give less time per question, a decrease from 40 minutes to 30 minutes, which will require the following adjustments:

    - The management of time will be more important particularly on HL Paper 1

    - The extended responses will need to be more concise, approximately 400 words, to ensure that the candidates complete the paper in the time allotted. **One suggestion is to ask students to write an extended response in 10 minutes, this will give a clear indication of the length of the response.**

    - There are additional command terms. Teachers must ensure their students are familiar with them

Special Events will be held in March 2012 to help prepare teachers for these changes.

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 standard was generally very low. The IT Systems knowledge of candidates was sporadic and in some cases severely lacking from whole groups of students. Specifically this was apparent with Q2(a) where knowledge of DBMS really needed the student to have corrected IT Terminology e.g. transactions (rollback, timeout) access privileges etc. This led to students writing very vague answers to this and other questions.

Candidates did not always understand the commands verbs. Analysis and evaluation were in general not attempted as most candidates only described issues in a basic narrative way without offering any more penetrating insight

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

Question 1

Part of the students mainly focused on the free aspect of the software confusing it with public domain software and attributing it some of the problems of the later. Some students also knew that it can be edited. Little was known about the role of communities in developing such resources as Linux or Ubuntu. It was rarely mentioned that open source software is often extremely reliable because of the collective efforts made to improve it.

Question 2

a) This was the worst answered question. Knowledge of databases was practically non-existent. There were some low grade responses about password and levels of access but most candidates had no idea about how a DBMS connects the underlying data to the databases applications at the top level. A large number of candidates rephrased the stimulus material and referred to internet security options what do not accredited them any points.

b) Only the better candidates could justify the key word examine with relation to the two payment methods. Many candidates were able to compare in a limited manner the security issues that arise due to the use of either a gateway payment service or/and a manual credit card service or/and a direct payment. It was only the better candidates that were able to detail the advantages and disadvantage of each method in a detailed manner using appropriate ITGS terminology.

Question 3

There was a wide range of responses on this question. Many candidates were able to identify at least some features of STA and SEO. Although many did not go into the technical of STA such as browser version, operating system or browser type and how Carmen should ensure her website is compatible with everyone. Many only looked at when traffic was the most, and what products were most popular or not, some even looked at where the hits were from. For the SEO the better candidates were able to mention algorithms, and meta tags, black hat techniques of improving page ranking without mentioning its ethical component. Real examples of companies that use or supply the methods were rarely provided.

Recommendations and guidance for the teaching of future candidates

Students should:

- remember specific details of relevant companies/organizations and the mechanism relevant to the scenario in question. Vague accounts score very few marks.

- understand the technical issues involved in the Case Study. They go beyond the requirements of the rest of the course.

- be taught both secondary and primary research techniques to support investigations for the case study. An effective method for recording, analyzing and presenting findings needs to be used so that candidates can review these before the Paper 3 examination.

- practice how to structure their answer to show their knowledge.

Overall recommendations for the teaching of ITGS and for assessment

The following teaching strategies are approaches that should be used to help candidates develop the necessary knowledge and skills for all of the assessment components:

Pedagogy

- Use the Triangle as a foundation for planning and teaching the course.

- Promote the correct use of ITGS terminology at all times (in class discussions, during hands-on sessions with IT tools, in exams). Encourage the compilation of a glossary to define and describe the terms.

- Ensure students engage in practical exercises to provide firsthand experience of IT tools.

- Encourage class discussions and wide research so students can support their arguments with real life examples.

- Use a range of real experiences (i.e. visits, hands-on activities, analyzing news articles) and visual material (i.e videos, diagrams, photographs) to support the students' understanding.

- Once a topic has been taught give students the opportunity to apply this knowledge to new situations.

- Use an effective method for recording information that is collected, discussed and analyzed throughout the course so that students have the material consolidated to review before the examinations.

- Use past IB exam papers for class tests and mock exams. Encourage students to plan their extended responses by listing the stakeholders and issues.

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

- Visit the OCC where you can share resources and join the very active ITGS forum.

- Check the IBO events calendar on the OCC for details of workshops in your region

- Share this Subject Report with your students

Assessment

- Use command terms in assignments and tests and teach the students structured writing.

- Use specimen paper questions and adapt questions from past papers to provide students with experience in responding to ITGS questions for class tests and mock exams. Provide feedback to students using the markband for extended responses.

Balanced, well supported arguments with opinions and conclusions were rare. Many extended responses could have been written by anyone with a home computer and internet access. It was not obvious that some students had been in an ITGS classroom.

Teachers can receive additional support by:

- Attending ITGS workshops. Search for 'ITGS' and 'Information Technology in a Global Society' in the workshop databases at http://www.ibo.org/events/index.cfm (face-to-face workshops) and http://onlineworkshops.ibo.org/workshop_search (online workshops)

- Following the ITGS discussions and special events on the Online Curriculum Center (OCC) on a weekly basis. Any questions about this subject report or any aspect of ITGS can be posted in the discussion forum. Several special events are planned for September onwards (Announcements on the OCC).