M13/3/ITGSX/BP2/ENG/TZ0/XX/M

International Baccalaureate®
Baccalauréat International
Bachillerato Internacional

MARKSCHEME

May 2013

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Higher Level and Standard Level

Paper 2

13 pages

Using assessment criteria for external assessment

For external assessment, a number of assessment criteria have been identified. Each assessment criterion has level descriptors describing specific levels of achievement, together with an appropriate range of marks. The level descriptors concentrate on positive achievement, although for the lower levels failure to achieve may be included in the description.

Examiners must judge the externally assessed work at SL and at HL against the four criteria (A–D) using the level descriptors.

- The same assessment criteria are provided for SL and HL.
- The aim is to find, for each criterion, the descriptor that conveys most accurately the level attained by the candidate, using the best-fit model. A best-fit approach means that compensation should be made when a piece of work matches different aspects of a criterion at different levels. The mark awarded should be one that most fairly reflects the balance of achievement against the criterion. It is not necessary for every single aspect of a level descriptor to be met for that mark to be awarded.
- When assessing a candidate's work, examiners should read the level descriptors for each criterion until they reach a descriptor that most appropriately describes the level of the work being assessed. If a piece of work seems to fall between two descriptors, both descriptors should be read again and the one that more appropriately describes the candidate's work should be chosen.
- Where there are two or more marks available within a level, examiners should award the upper marks if the candidate's work demonstrates the qualities described to a great extent. Examiners should award the lower marks if the candidate's work demonstrates the qualities described to a lesser extent.
- Only whole numbers should be recorded; partial marks, that is fractions and decimals, are not acceptable.
- Examiners should not think in terms of a pass or fail boundary, but should concentrate on identifying the appropriate descriptor for each assessment criterion.
- The highest level descriptors do not imply faultless performance but should be achievable by a candidate. Examiners should not hesitate to use the extremes if they are appropriate descriptions of the work being assessed.
- A candidate who attains a high level of achievement in relation to one criterion will not necessarily attain high levels of achievement in relation to the other criteria. Similarly, a candidate who attains a low level of achievement for one criterion will not necessarily attain low achievement levels for the other criteria. Examiners should not assume that the overall assessment of the candidates will produce any particular distribution of marks.
- The assessment criteria must be made available to candidates prior to sitting the examination.

Theme: Education and training

Criterion A — The issue and stakeholder(s) ***[4 marks]***

1. (a) Describe *one* social/ethical concern related to the IT system in the article.

The issues are about the reliability, security, efficiency and effectiveness of using the cloud provider service for school purposes (the school context must be included in the description of the social/ethical concerns). There are some specific concerns listed below.

Social/ethical concerns may include the following:

- privacy/security of student files – sensitive data could be viewed by people gaining unauthorized access to student files which means the work may be copied or used or even changed
  - privacy is mainly about access to their profiles from a breach of security of the cloud service provider. Some students will confuse this with the privacy concerns associated with social networking sites. Some files may contain private data *eg* photos, email addresses, home address
  - breaches of security where there is unauthorized access to the students files due to weak passwords, not logging off, sharing of passwords
  - security impact – concern with the spread of viruses attached to files that are shared
- digital divide – everyone does not have the same access to the internet or computers, laptops or tablets due finance, access to internet
- reliability of the cloud server – if the server is down students may not be able to access their work and therefore miss a deadline/student work may be lost
- reliability of the internet connection – if the internet connection is not working files may be inaccessible during the lesson, so class time or study time at home is wasted
- efficiency/effectiveness in use – the various stakeholders may not use / have access to the same cloud computing service which will create problems of access for teachers and students
- anonymity – reverse of it, which piece of work belongs to which student, where it is necessary to identify the work of an individual student this may not be possible, *eg* for assessment purposes. Could in effect link to the intellectual property of the student
- lack of policy – concerning misuse of the shared area, *eg* uploading and sharing of inappropriate materials, cyberbullying, plagiarism
- including intellectual property from other sources without referencing (plagiarism) and sharing in the public domain (due to public sharing of folders and files)
- lack of control of sharing due to the sharing options not being set appropriately, *eg* accidental sharing of private data, forwarding of sharing links to others that it was not intended for
- integrity of data – shared files can be altered by others who have access to them, deliberately or accidentally.

(b) Describe the relationship of *one* primary stakeholder to the IT system in the article.

Primary stakeholders may include the following:

- students – who store their files/work/data in the cloud / who use cloud computing /*Google*/*Dropbox* services to store/share files/work/data
- the cloud computing provider (*ie Google/Dropbox*) which provides storage and is responsible for the security of data
- teachers – who need to use the services *eg* marking, sharing of files; and to be aware of the advantages and disadvantages of cloud computing and advise students accordingly
- school administration – setting policies for the use of the services
- the network manager and support staff – involvement with the cloud provider on behalf of the school, and helping students/teachers use the service in school, and helping with registration for the service
- staff associated with the cloud service if linked to the article.

Marks	Level descriptor
0	The response does not reach a standard described by the descriptors below.
1	Either an appropriate social/ethical concern **or** the relationship of **one** primary stakeholder to the IT system in the article is identified.
2	Either an appropriate social/ethical concern **or** the relationship of **one** primary stakeholder to the IT system in the article is described **or** both are identified.
3	Either an appropriate social/ethical concern **or** the relationship of **one** primary stakeholder to the IT system in the article is described; the other is identified.
4	Both an appropriate social/ethical concern **and** the relationship of **one** primary stakeholder to the IT system in the article are described.

Criterion B — The IT concepts and processes ***[4+2 = 6 marks]***

2. (a) Describe, step by step how the IT system works.
IT system: using cloud computing services, manual sharing or automatic synchronisation of information between portable systems, desktop systems, servers and web-based services.

Answers provided in the article include the following:
Storing and sharing using Google Docs:
- log on to *Google Docs* / log on to *Google* and choose Documents
- open/select the file and choose Share
- enter the email address of the person who will share the file
- choose to notify recipients by email
- add a message for the recipient
- choose to send a copy of the email to yourself.

Answers provided in the article include the following:
Storing, sharing, synchronizing with Dropbox:
- download the *Dropbox* application/client onto a desktop computer/mobile device
- the *Dropbox* folder is set up on the desktop computer/mobile device
- drag the required files/folders into the *Dropbox* folder
- files/folders are synchronized between the storage location in the cloud and any other devices set up with *Dropbox*
- changes to files are synchronized across all devices
- folders are selected for sharing and recipients are invited by entering their email addresses.

*Answers with **additional information** to that in the article may include the following:*
- set up an account with *Google*/*Dropbox*
- choose a username and password
- mobile devices need to be connected to the internet by Wi-Fi or 3/4G connection
- use of web-browser
- protocols
- cloud servers in general, or specific *Google*/*Dropbox* servers
- other components (hardware or software) that are clearly part of the steps.

Storing and sharing using Google Docs:
- create a new *Google Doc*/file for example document, presentation, spreadsheet
- save the file under a meaningful name to the *Google* servers
- ensure permissions for sharing are set to Edit if the recipient needs to add information
- request email notifications when comments are made on the document.

Storing, sharing, synchronizing with Dropbox:
- the *Dropbox* executable file is downloaded and run
- the *Dropbox* executable file links the device (desktop/laptop/mobile phone) to the *Dropbox* server

- files/folders copied to the *Dropbox* folder on the student's device are uploaded to the student's account area on the *Dropbox* server by the *Dropbox* software
- files/folders are automatically downloaded from the *Dropbox* server to all other *Dropbox* enabled devices set up by the student and put into the folder on their device.

(b) Explain the relationship between the IT system and the social/ethical concern described in *Criterion A*.

Answers may include the following:
*This **not an exhaustive list** – please see page 4 for all possible concerns. The most important consideration is that the concern in 1.(a) is explained here in 2.(b).*

Privacy would be a concern if data is not properly secured for example:
- if the permissions are not set properly others may be able to gain access to them
- if the ID and password of a sharer are known then access may be gained by others
- if the cloud server is not protected hackers could gain access to the student files which may contain private/sensitive information (a rare event for *Google* and *Dropbox*)
- if data is not encrypted during transmission hackers could gain access to student files during the synchronization process (a rare event as students are not often targeted).

Reliability would be a concern:
- if the cloud server is down, students are prevented access to personal files due to a hardware failure (candidates must give an example of the hardware and its failure)
- if the student's own device is down, they have difficulties accessing and sharing files
- if the internet connection is interrupted preventing synchronization between the *Dropbox* folders on the devices and the *Dropbox* cloud server, access to these files via the internet is not possible.

Candidates are expected to make reference to relevant stakeholders, information technologies, data and processes. Candidates will be expected to refer to "how the IT system works" using appropriate IT terminology.

Marks	Level descriptor
0	The response does not reach a standard described by the descriptors below.
1–2	There is little or no understanding of the step-by-step process of how the IT system works and does not go beyond the information in the article. The major components of the IT system are identified using minimal technical IT terminology.
3–4	There is a description of the step-by-step process of how the IT system works that goes beyond the information in the article. Most of the major components of the IT system are identified using some technical IT terminology. The relationship between the IT system referred to in the article and the concern presented in Criterion A is identified, with some use of ITGS terminology.
5–6	There is a detailed description of the step-by-step process that shows a clear understanding of how the IT system works that goes beyond the information in the article. The major components of the IT system are identified using appropriate technical IT terminology. The relationship between the IT system referred to in the article and the concern presented in Criterion A is explained using appropriate ITGS terminology.

Criterion C — The impact of the social/ethical issue(s) on stakeholders ***[8 marks]***

3. Evaluate the impact of the social/ethical issues on the relevant stakeholders.

Idea	Issues – Negative Impact	Positives – Benefits
Accessibility	• access to data is provided by the cloud company and could potentially be denied if there are problems with the student's account – IMPACT hinder learning *eg* not complete homework on time • digital divide – IMPACT lack of access to benefits.	• files can be accessed from anywhere with internet access – IMPACT a student can work on files at home, upload to the cloud, then access them next day from a school computer.
Synchronization		• files are automatically synchronized across computers and mobile devices – IMPACT same version in different places updated automatically (Data Integrity), ease of access on different devices/locations.
Convenience		• no need for students to transport files using USB drives – IMPACT less likely to lose or forget homework.
Backup	• how long are deleted files still kept on the cloud server? Is it possible to permanently delete files? – IMPACT may not be able to retrieve deleted files – accidental or deliberate; • automatic synchronization may spread corrupted file and viruses.	• data stored in the cloud acts as a backup if the original files are lost or become corrupted – IMPACT less resources needed by school and student, less worries, if a file/device is damaged backup available; file available on non-synced device/location.
Responsibility	• data is managed by someone else / responsibility for the data is handed to them / ownership of the data may not be clear – IMPACT loss of control of own data and may be used for other purposes *eg* advertising.	• responsibility for maintenance/ backup is given to the company – IMPACT savings for the school in staff, time, equipment.
Cost	• IMPACT some companies offer free access for the first few GB but then charge fees – the user may become reliant on the service and incur high costs; and may increase prices • IMPACT may promote digital divide • continuity of service – IMPACT time/effort are invested by the student in the setup and some services may be discontinued.	• some services provide several GB of free storage: – IMPACT this saves the school the cost of purchasing backup drives – IMPACT the school will save money on wages as fewer highly qualified technical staff will be needed to install software, backup student files – IMPACT the school will save money on software purchase and software upgrades for example

		Google Docs is a free online application.
Sharing		• files of all types can be shared with colleagues/teachers : – IMPACT instead of clogging up inboxes with large attachments the recipient receives a link to view a file/folder – IMPACT less versions of documents – IMPACT collaborative learning/ projects via file sharing – students can work on the same file during a collaborative project.
Ease of use	• need for training of teachers and students – IMPACT not all teachers and students will adopt and gain the benefits – leads to inequality and lack of effectiveness.	• the software is easy to use and online training videos are provided IMPACT high adoption rates of technology – impacts on efficiency and effectiveness of teaching and learning.
Security	• large cloud service providers are targets for hackers – IMPACT could copy/delete personal data unless security measures are in place • sharing of passwords (deliberate or stolen) IMPACT access to your work – change/delete files.	• a company has resources (staff/hardware) to ensure security of data on servers – IMPACT – less chance of losing data and data breaches (hacking).
Privacy	• hackers could view personal data IMPACT take action against the student	
Reliability	• issues could arise if the internet connection fails or the cloud server is experiencing hardware problems – IMPACT users may not have access to their files • if a problem occurs (for example access is denied) - IMPACT the service may take time to respond / fix the problem	• a company has resources (staff/hardware) to ensure backup routines / access to powerful servers – IMPACT – less chance of losing data
Advertising content	• does the free storage come with advertisements and could the content be seen as offensive? IMPACT annoying advertising, inappropriate adverts.	
School responsibility	• if the school promotes the use of cloud computing – IMPACT responsibility for educating students on its use • need for policies – IMPACT no	

	policies could reduce effectiveness and create problems *eg* inappropriate material, cyberbullying.	
Compatibility issues	• there are a number of providers of these services and the teachers and students may not be using the same ones – IMPACT this will have impacts on collaborating/sharing as need to manage many types of services and accounts.	

Marks	Level descriptor
0	The response does not reach a standard described by the descriptors below.
1–2	The impact of the social/ethical issues on stakeholders is described but not evaluated. Material is either copied directly from the article or implicit references are made to it.
3–5	The impact of the social/ethical issues on stakeholders is partially analysed, with some evaluative comment. Explicit references to the information in the article are partially developed in the response. There is some use of appropriate ITGS terminology.
6–8	The impact of the social/ethical issues on stakeholders is fully analysed and evaluated. Explicit, well-developed references to information in the article are made appropriately throughout the response. There is use of appropriate ITGS terminology.

Criterion D — A solution to a problem arising from the article ***[8 marks]***

4. Evaluate *one* possible solution that addresses at least *one* problem identified in *Criterion C*.

Problem should be specified but if not it must be one identified in Criterion C.

Answers may include the following:
Solutions to the problem of privacy/security of student files:

- authentication of the user via username and password (and possibly a third item) *Accept other identification methods such as biometric access to devices if it can be/is **applied** to the problem in an **appropriate** way.*
- setting permissions on files – for example *Google Docs* can be published on a web page for public viewing, viewed by anyone who has the URL or set to private where viewers are invited to view the document. Permission can be granted to view or edit the document
- cloud providers ensure that data is encrypted for storage on the server / during transfer between remote devices and the cloud server using SSL encryption
- a firewall is installed to protect the cloud server from unauthorized access by hackers (this is part of the cloud service providers now but needs to be explained that there have been occasions when these large security systems have not worked)
- a detailed policy from the school about the safeguarding of username (and email addresses) and passwords.

Solutions to the problem of reliability of the cloud server:

- redundancy is built in to the system – a backup server is in place in case the main server crashes (this is part of the cloud service providers now but needs to be explained that there have been occasions when these large backup systems have not worked)
- a backup internet website if the main one is crashed or suffers a DOS attack or some other problem
- school policies – students are advised to employ their own methods for backup
- school policies – include procedures / alternative upload schedule to address technical problems
- school policies – to handle unforeseen problems for example students who have not made backups or cannot hand in work due to technical problems.

Solutions to the problem of the reliability of the student's own devices and internet access:

- availability of other devices to access the internet
- other ways of accessing the internet (Wi-Fi hotspots, smartphones and mobile computer access)
- having backups on USB memory devices or portable hard drives
- school policies – students are advised to employ their own methods for backup
- school policies – include procedures / alternative upload schedule to address technical problems
- school policies – to handle unforeseen problems for example students who have not made backups or cannot hand in work due to technical problems.

Solutions to the problem of incompatible services:

- specific service/s need to be specified by the school so that a limited number of services are used by staff and students
- specific instructions/policies developed by the school that will allow the use of the various services to be successful.

Marks	Level descriptor
0	The response does not reach a standard described by the descriptors below.
1–2	**One** feasible solution to at least **one** problem is proposed and described. No evaluative comment is offered. Material is either copied directly from the article or implicit references are made to it.
3–5	**One** appropriate solution to at least **one** problem is proposed and partially evaluated. The response contains explicit references to information in the article that are partially developed. There is some use of appropriate ITGS terminology.
6–8	**One** appropriate solution to at least **one** problem is proposed and fully evaluated, addressing both its strengths and potential weaknesses. Areas for future development may also be identified. Explicit, fully developed references to the information in the article are made appropriately throughout the response. There is use of appropriate ITGS terminology.