

Markscheme

May 2015

**Information technology
in a global society**

Higher level and standard level

Paper 2

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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: Student cyber-bullying using social networking sites

Criterion A — The issue and stakeholder(s)

[4]

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

The issues are about cyber-bullying and the related concerns which includes anonymity, health/stress problems, privacy and authenticity. There are some specific concerns listed below.

[1]: For identification of the concern, which may not be explicitly named separately or incorrectly named or vaguely named (ie identifying cyber-bullying without describing a related impact/result/consequence/effect/outcome).

[2]: The candidate must describe **the impact/result/consequences/effect/outcome** of the concern to obtain **[2]**. If the description does not support the identified concern, award **[1]**. Detailed description not required as it will come into 2b

*If two **linked/overlapping** concerns are identified, eg reliability and integrity, mark the best response and that concern needs to be explained in (2)(b).*

The description needs to reference the IT system in the article (sometimes candidates will describe the issue and not the concern in context).

*If two **different** concerns are raised, since the question specifies **one** concern hence only mark the first; except if commonly linked eg security and privacy, anonymity and on-going harassment.*

Social/ethical concerns may include the following:

- anonymity – being able to post anonymously on social networking sites giving potential for aggressive behaviour
- on-going harassment – leading to hurt and embarrassment
- privacy (use and sharing of personal information without permission) the unethical use of personal information from a victim with the intent of harassment (if a concern is identified as privacy but described as another concern e.g. anonymity = 1 mark)
- ethics of cyber-bullying (incorrect behaviour on the internet)/digital citizenship in appropriate use of technology – this is regarded as unacceptable and even illegal in some circumstances
- authenticity – public availability of information about the victim which may not be true , defamatory claims.

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

Describe means to include who, what and where but not how and why for full marks.

[1]: *Who – identification of the stakeholder.*

[2]: *Where social networking sites or sms or emails.*

What are they doing with the IT system - to communicate, interacting with others or to post information, images and videos about the victim eg “uploading files” or “posting information” is insufficient, must make a reference to how and where.

Primary stakeholders may include the following:

- victim of cyber-bullying – the person harassed by the personal information posted to a cell phone (ie SMS) or to a social networking site (Facebook, Ask.fm)
- cyber-bully – person using mobile device/desktop computer or cell phone to post hurtful information about a person to a cell phone service or social networking site
- persons viewing the personal information about the victim posted to a social networking site
- developers/companies of the SNS/Websites -Designing the SNS and developing the features that include anonymity used by the victims and bullies.
- parents - they may monitor the SNS/emails/SMS that their children are using to be bullied or to bully with.
- student/users use it to communicate and collaborate, staying in touch with friends, organising personal life, sharing updates, images, media, or messages with their circle of friends (must have some context).

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

[6]

2. (a) Describe, step-by-step, how the IT system works.
IT system: using computer-based technologies and social networks.

The steps are for access and storage/sharing of information - reference to cyberbullying is not required.

Many of the responses will not fit neatly into a mark descriptor, so best fit will need to be applied. There is a large variety of technologies and ways of using them the candidates could include.

Candidates may choose to describe the process for using a cellphone service or a social networking site for accessing and storing/sharing information for cyberbullying – a description of either one is sufficient. This may not be clear to the candidates and some may decide to do both and compare them. If they do so they should not be penalized by a lack of some details in their descriptions. It is not necessary to include about anonymity, as not all information sharing is anonymous but this may be written as one of the developments.

[1]: *The candidate may show some understanding of the process but not in a step-by-step approach – using the information in the article and possibly some steps missing. If storage or sharing (pics, messages, posts, tags) is not mentioned the highest mark is [1].*

[2]: *The student is able to provide a logical step-by-step account of how an IT system is used to access, store/share information – using the information in the article but lacks some details. Best fit if contains information beyond the article but not in step-by-step or does not include both the computer based technology and the social network site.*

[3]: *The candidate is able to provide a more detailed step-by-step account of the storage/sharing of materials (pics, messages, video, posts, tags, etc). AND access using the computer based technology (computer or phone or tablet); AND include some information beyond the article (at least one development).*

[4]: *The candidate is able to provide a detailed step-by-step account how an IT system is used to access and store/share information (at least three developments - at least one for each of storage/sharing of pics, messages, etc. AND access using the computer based technology.*

The candidate does not need to describe a step-by-step process which includes both cellphone services (ie SMS) and social networking services. They may focus on one or the other or a combination of both.

Answers provided in the article include the following:

Access using the computer based technologies

- examples of SNS in article include Facebook and Ask.fm (line 3, 8)
- from a cell phone (mobile phone) or laptop to another account holder (line 10)
- 24/4 access using cell phone apps to post directly to SNS (line 17)
- via cell phone services (line 23)
- apps are specialized programs downloaded onto mobile devices, that can run on the internet on a computer or on a cell/mobile phone or other electronic device (footnote)

Storage and sharing

- the site allows an account holder to send anonymous questions (line 9)
- once a post is received the exchange of messages is posted publicly for anyone to read (line 11)
- receiving a stream of nasty messages (line 11)
- anonymous posting in school (line 15)
- posts can include a range of personal information including photos, videos (line 18, 19)

Answers with additional information to that in the article may include the following:

Access using the computer based technologies

- setting up the account and the personal information needed to do this
- downloading of the app or logging into the SNS URL
- additional social networking websites (ie Twitter, internet polling site, interactive gaming site, blogs)
- using public wifi/hot spots to avoid IP tracking
- creating fake accounts (not using personal details or other email accounts)

Storage and sharing

- users receives an alert(in the form of email/sms/?) that information has been posted to their cell phone or social networking site
- anonymity is allowed on Ask.fm, but may not be possible on other sites
- personal information may include photos and videos that were taken without the user's knowledge
- the information posted may be seen by far more people than the account holders realise
- user may leave identifying information (ie coordinates on photos, what kind of device took the images, background details in the photo) (users may take photos with geo-tagging enabled device and post it)
- search for friends on the SNS to connect with/Use the Search Bar
- use the chat (voice or message) feature in SNS or email
- tagging of photos or videos

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

*Explaining the **link between the concern and specific parts, or whole, of the IT system** means the candidate must include **how and why** the concern has arisen from the use of the IT system. The naming of the concern identified in Criterion A may be implicit.*

*Question 2.(b) clearly asks for a link to question 1.(a), but the link only needs to be generic – eg for a specific concern described in question 1.(a), then in question 2.(b) the candidate can explain further without reference to the specific concern in question 1.(a). If the concern addressed in question 2.(a) is **completely** different from that in question 1.(a), a link cannot be made and hence **[0]**. If identified as privacy in 1(a) and described as anonymity in 1(a) and 2(b) explains anonymity then 2 marks - no double jeopardy penalty.*

[1]: *If the candidate identifies the relationship between the concern and the IT system. This may be a repeat, or rewording, of the response to 1.(a).*

[2]: *For concerns regarding a technical aspect of the IT system, candidates would be expected to demonstrate an understanding and use of ITGS terminology for one of the IT systems. Not a general reference, eg “cyber-bully is invisible” for anonymity.*

Some answers may give adequate explanation with limited technical detail due to the nature of the concern, eg lack of policy, involving the whole system or many aspects of the system.

Answers may include the following:

This is not an exhaustive list.

- Anonymity is a concern:
 - the social networking site does not have a way of knowing who is cyber-bullying
 - being able to post anonymously on social networking sites or using an fake account (how); not very strong authentication measures or SNS policies, often only a valid but fake email address needed(why).
- On-going harassment is a concern:
 - the victim is receiving constant alerts every time information is posted (how). Account settings for SNS/email have been set up to receive alerts every time someone makes a post or are automatic (why)
 - it is possible for multiple persons to be posting information to a common account (how), due to the privacy settings of a user's account - this may be set to friends or public and the number of 'friends' of the account holder (why)
 - the victim is feeling hurt/embarrassed/harassed due to the nature and frequency of the postings to the cell phone service(s) and/or social networking site (how), the ease of being able to spread posts ensures that embarrassing posts can spread quickly and into the hands of others using mobile technologies (why)
 - there is no way of reporting to the social networking site information that specific posts should be deleted (how); there are inadequate built in features to report misuse of SNS. (why).
- Privacy is a concern:
 - IT system allows the postings to be publicly accessible (how); the spread of pics/post without the person not being asked permission to be tagged. The tagging spreads it quickly without permission being given (why)
- Ethics of cyber-bullying is a concern:
 - cyber-bullying - the sharing of personal information with the intent of harming or embarrassing another through posts, tagged pictures/videos often taken/shared without their permission (how); a bully does not have to ask permission to post a picture or send an email with attachments; they may not realise that it is a form of bullying and that it is just 'fun', public SNS are not fully monitored (why)
 - has legal consequences in some circumstances - victims can sue the bully, by gathering evidence of the bullying or tarnished reputation and take them to court (how); bullies can leave a digital footprint e.g. IP address used, log activities of school networks; emails/SNS posts can be printed as evidence (why)

- Authenticity of person posting information (also connected to anonymity) is a concern:
 - bullies can easily create fake accounts and hide their true identity when creating accounts which they make the bullying posts/messages from (how); as very little authentication is required to set up an account to prove that you are who you say you are (verification is often through email accounts which can easily be made)(why).
 - bullies logging on under other accounts (e.g. friends log on) to share information/bullying posts (how); lack of security of friends accounts by sharing passwords or log on details (why)
- Authenticity of information is a concern:
 - bullies can post information about others even if it is not true (how); lack of approval processes on the site to check the accuracy of the content before published (why).

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 the 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]

3. Evaluate the impact of the social/ethical issues on the relevant stakeholders. The list below is not exhaustive. If in doubt contact your team leader.

Impact = result/consequence/effect/outcome

There are a large number of impacts that can be compared and critically analyzed. Given the time constraints not all are needed.

*At least **two** stakeholders are required for entrance into the top markband.*

[1]: One or two impacts described.

[2]: More than two impacts described of either type.

[3]: Analysis by structure – organizing a response in a consistent manner (eg positive/negatives issues and/or various stakeholders).

*[4–5]: Must include **linking** analytical connections (between positive/negatives, various stakeholders, various issues) and/or **added** evaluative comments about extent of implications on stakeholders. Candidates who have supplied a good conclusion apply best fit here. Only **one** stakeholder, maximum of **[4]** if includes analysis and evaluations, eg the impacts on the person who has been cyber-bullied only.*

Notes for markers that you would expect to see in this markband:

- if NO analytical links and only evaluative comments then maximum of 4 (candidates may be providing many evaluations from their own experience).
- candidates providing a descriptive sequence of impacts is not considered analytical links (and ... and ... and....)
- an analytical example may be when there is a discussion of the impact where the negative is for the victim and positive for the bully (credit for highlighting the relationship between the two)
- a link between impacts such as bullying to health issues to poor grades is another example of analysis.
- an extensive list of benefits of SNS not relevant to the cyberbullying focus of article should not be awarded significant marks without a link to other relevant ideas. Possibly count as one positive impact, especially in the 1-2 mark range
- a wider discussion about the benefits of social networking that builds on the issues linked to cyber bullying could be implicit or explicitly linked e.g., “ although cyberbullying is bad, it may make the person consider the amount of time they spend on social networking sites Overall” could be the approach of a level 5 answer because there are analytical connections and evaluations made.
- 4 or more analytical links/evaluations could still be unbalanced and not warrant 6 marks.

[6]: At least two negative per stakeholder; and two positive impacts overall for any stakeholder/s linked explicitly to cyberbullying. At least two stakeholders need to be addressed relatively equally. Number of analyses, links and evaluations, is the most important consideration as well to reach this level. Must be at least FOUR.

*[7–8]: A conclusion **backed** by direct reference to the impacts described is needed. The overall evaluation should focus on the significance of the impacts on the various primary stakeholders. The evaluation may include secondary stakeholders as well. A good conclusion would balance the benefits of SNS with the problems arising from the possibility of cyberbullying. Another conclusion could focus on the evaluation of a range of negatives for various stakeholders (with little reference to positive impacts).*

Answers may include the following:

Impact on victim

Positive

- character building - victims, learn to stand up for themselves
- learning how hurtful cyber-bullying can be and it may discourage the victim from cyber-bullying others.
- the ability to conduct in anonymous postings allows freedom of expression, possibly for shy introverted students, or people living in a oppressive environment
- cyberbullying is in writing - this means that it is easy to show proof of it happening as posts/messages can be printed

Negative

- sense of being victimized, tormented, hurt, threatened, harassed, embarrassed and/or humiliated
- 24/7 – constant alerts whenever information is posted
- health issues (ie stress-related disorders, fear, anxiety, depression, helplessness)
- need to change schools or club affiliations to avoid personal contact with cyber-bullies
- reluctant to tell an adult (ie teacher or parent) that they are being cyber-bullied drop in grades - due to emotional distraction of being bullied

Impacts on the person cyber-bullying

Positive

- sense of power over the victim
- personal recognition from peers involved in the cyber-bullying
- less adult supervision online than face-to-face
- bullying can be done from the safety of their own homes, which is convenient and feels safe from not being caught
- being able to find private information is a positive for the bully
- increased awareness of the implications of his/her actions which may lead to their own more responsible use of technology

Negative

- if caught can be punished by the school or face legal battles with the victim and parents

Impacts on persons viewing the postings

Positive

- increased awareness and lookout for signs of depression in friends.. help prevent many fatalities
- forces users to be careful and selective of online friends and have increased security settings.
- may include the feeling of power in learning personal information (real or not) about the victim and making judgments about the victim.

Negative

- information is posted about the victim to a wide spread audience
- may have little/no awareness if the information is true or not
- may choose to take no action for fear of being cyber-bullied themselves

Impacts on school personnel

Positive

- schools have implemented policies and security systems that help prevent cyber-bullying during school hours.
- some schools have developed social education programs that address cyber-bullying
- Schools can monitor public postings of their students and use this to be proactive in dealing with issues
- cyberbullying is in writing - this means that it is easier to support the students who can build a case against the bully.

Negative

- teachers may not be aware of their role and responsibility in cyber-bullying cases
- schools may not have a social education program in place that addresses cyber-bullying case
- security systems for monitoring or tracing cyberbullying can be expensive and time consuming to extract the needed information.
- additional pressure on staff to respond to bullying which happens outside of school
- schools with a cyberbullying problem may have a poor reputation

Impacts on parents

Positive

- parents have learned from other instances to keep aware of the apps and online services that their child is using
- increase parent awareness of possible remedial actions
- parents can monitor their children's accounts and so protect them from afar.

Negative

- parents may not know how to deal with the situation when their child is being cyber-bullied
- parents may need to enroll their child in another schools in order to stop the cyber-bullying
- in some countries, parents are ultimately responsible for the actions of their child who is a minor and a bully and may be sued.

Impacts on Social networking sites such as Facebook and Ask.fm

Positive

- update policies to address cyber-bullying - this may encourage more students to choose their SNS as it may appear 'safer'
- increased number of users (parents) who will join the SNS in order to monitor or keep in contact with their children.

Negative

- implementation of reporting system for cyber-bullying may need to be created which will require time for developers to write and cost the company money to employ the developers and test out the new features.
- prevent anonymous posting - this may discourage certain users who joined because of that specific feature.
- reputation of the website will go down as a result of repeated cyber-bullying happening in a particular website – result in fewer users – result in less money made by the website.

If the evaluation does not provide any additional information to that in the article, the candidate will be awarded a maximum of [2].

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]

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

Problem must be specified here, but if this is not done here, it must be one of the impacts/problems identified in Criterion C.

[1]: Solution is identified. If not, the response is usually not well structured.

[2]: Solution is described (what, who, where)

A solution may have more than one part/aspect, e.g. developments for the SNS - monitoring and reporting features, policy has different parts and stakeholders. The solution may be briefly described early and then expanded subsequently when discussing its application - combine descriptions for the 2 marks and other marks for the first positive application and further evaluations.

[3]: **The solution is applied to the problem** directly and not generally – how and why it solves the problem (first positive evaluation). The solution must be **feasible** and can be **applied** to the problem, even if not good “quality”. **A description may also include the application to the problem.**

[4–5]: Further positive evaluations and at least one negative evaluation is required for 5 marks. Best fit if description is limited.

[6]: Fully evaluated strengths and weaknesses requires at least two positive and negative evaluations.

[7–8]: Concluding paragraph directly referencing the evaluations. Candidates may propose future developments as part of the conclusion instead of discussion of evaluations – best fit applies. Likewise if a candidate has not fully described the solution or provided the minimum four evaluation best fit applies.

Answers may include the following:

Solutions to social networking sites allowing anonymous posting

- social networking sites must store identifying information so that anonymous cyber-bullies can be reported
- instances of cyber-bullying requires a simple method for reporting and prompt action
- policies need to clearly state the penalties for cyber-bullying
- social networking sites should not allow anonymity.

Solution to educating parents about actions to take against cyber-bullying

- install web filters on home computers to filter social websites
- keep track of all evidence of cyber-bullying to share with school officials and the police
- solicit advice and help from online organizations that specialize in cyber-bullying.

Solutions to schools offering education programs to prevent cyber-bullying

- schools setup safety teams to investigate reported cases of bullying
- implement an anti-bullying program in the school for students
- develop school policies relating to cyber-bullying.

Solutions to schools implementing security systems to prevent cyber-bullying

- schools use networking software to block common websites used for cyber-bullying (ie Facebook, Ask.fm).

Solutions to governments providing laws to address cyber-bullying

- laws may set the conditions for schools to monitor and report cyber-bullying to police authorities
- training police authorities about reported instances that can be regarded as cyber-bullying and what actions are required.

Solution to Cyberbullying

- cancel the SNS account so as not to be part of any cyberbullying communications and so that the bully has less access to the victim.

Do not accept a solution to cyber-bullying in general.

If the evaluation does not provide any additional information to that in the article, the candidate will be awarded a maximum of [2].

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.