

Information technology in a global society

These subject guidelines should be read in conjunction with the “Introduction”, “Outline” and “Details—all essays” sections of this guide.

Overview

Information technology in a global society (ITGS) is concerned with how information technology (IT) systems affect people. All IT systems do affect people—this is why they were devised in the first place. Most IT systems are designed to bring some economic or quality-of-life benefit to people. Most also affect the way that people work. It is also true that IT systems can have deleterious effects on people’s lives—usually, but not always, unintentionally produced. An ITGS extended essay should examine how an IT system or systems has affected people in positive and/or negative ways, with particular reference to the underlying technology.

An extended essay in ITGS offers an opportunity to undertake research into an IT-related topic in an area of personal interest to the student. It gives students a framework to develop research skills, to develop their technical understanding of IT, and to relate an IT system in the real world to its effects on individuals, organizations and society in general.

Choice of topic

The choice of topic may result from a news story, issues brought up in class discussion or a personal interest. The topic must be firmly focused on an issue that has IT at its core. A topic that concentrates on another discipline but which has an IT angle is not suitable for the development of an ITGS extended essay.

Students writing an ITGS extended essay must be capable of demonstrating an in-depth knowledge of some aspect of IT. It is expected that IT terminology is used accurately in order to describe the system or systems under investigation, and that a level of expertise is shown that goes well beyond general knowledge.

IT provides a rich field for the choice of an extended essay because of its extremely rapid development. We are living through an information revolution that is so far-reaching that unprecedented moral and ethical issues are emerging. This gives the ITGS extended essay student much opportunity to be original and innovative in approach—qualities that can enhance and enrich an extended essay in ways that few other subject areas can match.

Much of the evidence quoted will inevitably be obtained from Internet sources, but essays should also include other sources, such as books, newspapers and magazines, as well as primary evidence collected by the student. Students should be aware of the pitfalls in relying on unsubstantiated material, from whatever source, when undertaking their research. The essay should, therefore, include some critical analysis of the evidence.

In choosing their topic, students are strongly advised to concentrate on developing a research question, carrying out relevant research, and applying IT theory, tools and techniques. It is important that the research question is sufficiently focused to allow adequate treatment within the word limit. Topics that depend entirely on summarizing general secondary data should be avoided, as they are likely to lead to an essay that is essentially narrative or descriptive in nature. However, the effective use of relevant secondary data to support primary data in answering the research question will be fully rewarded by the examiner.

Students are encouraged to research a current issue. A successful essay will concentrate on one issue, but the issue should be significant enough to provide a wide variety of suitable evidence.

The following examples of titles for ITGS extended essays are intended as guidance only. The pairings illustrate that focused topics (indicated by the first title) should be encouraged rather than broad topics (indicated by the second title).

- “An investigation into the ways in which IT can assist patients with motor-nerve damage” **is better than** “IT and physical disabilities”.
- “Flight simulators as a means of training pilots to deal with wake turbulence” **is better than** “Virtual reality systems”.
- “Measures that can be taken to protect the transmission of banking information” **is better than** “Hacking”.
- “How the layering of network protocols has contributed to the rapid development of music downloads” **is better than** “Music and the Internet”.
- “Issues in developing natural language interfaces” **is better than** “The uses of robots”.
- “How Open Source software has led to improved corporate networking” **is better than** “Modern operating systems”.

It is essential that the topic has an IT system or IT systems at its core. This means that the system(s) concerned must involve some form of data processing. Essays that focus on technology such as engineering, or on a science topic, are not suitable for ITGS essays. Similarly, an essay that has a social problem as its focus with only tenuous relevance to IT is unlikely to have sufficient depth.

Treatment of the topic

Although an ITGS extended essay is not intended to be an exercise in demonstrating IT skills, it must clearly demonstrate in-depth technical understanding of the chosen area. Students who do not have well-developed IT practical skills are unlikely to show the level of insight that is required for the highest levels of attainment.

Although an ITGS essay should clearly demonstrate technical expertise, the inclusion of program code, markup codes (for example, HTML) or detailed electronics should only ever be supportive and not the main focus of the essay.

It may help if the student defines the topic chosen for study in the form of a research question, followed by a statement of intent that indicates which broad process is going to be used in answering the question. In this way, the approach to the topic chosen may be even further clarified. Some examples of this could be the following.

Topic	The future of natural language interfaces
Research question	To what extent is it likely that natural language interfaces will replace the keyboard in the production of office documents?
Approach	Primary data is collected through interviews with university lecturers and researchers working in the field of natural language interfaces (qualitative research). The algorithms used, difficulties faced and progress to date are discussed. Questionnaires are e-mailed to office managers to determine to what extent there is a need for natural language data input and whether this could improve productivity. Public domain examples of natural language software are downloaded and its effectiveness assessed. Secondary research is collected by accessing Internet-based reports from universities working in the field.
Topic	The effectiveness of e-learning as an enhancement to conventional teaching
Research question	Does the addition of e-learning systems improve the performance of students in mathematics?
Approach	An Internet survey of e-learning systems, highlighting methodologies used by different systems. Quantitative comparisons are made of examination results before and after its adoption from schools that have adopted e-learning methods. Teacher and student opinions are surveyed by issuing questionnaires to teachers who have adopted e-learning and those who have rejected it. Secondary research is carried out by surveying teacher discussion boards.
Topic	The impact of Open Source software
Research question	Has the wide availability of Open Source software resulted in improved security for networks?
Approach	Primary research is carried out by means of circulating questionnaires to network managers. Network managers who make use of Open Source are interviewed. Questionnaires are e-mailed to web site developers. A study is made of an example of an Open Source e-business system. Secondary research is carried out by looking at recent articles in IT trade magazines and surveying "help" web sites for network managers.

Interpreting the assessment criteria

Criterion A: research question

The research question must be clearly and concisely stated in the introduction and the abstract. It can be defined in the form of a question or as a statement or a proposition for discussion. The IT system chosen as the focus of the essay should be sufficiently limited so that specific results of research can be demonstrated and linked to the social consequences. It is important to avoid vague generalizations and sweeping statements.

Criterion B: introduction

This should explain, succinctly, the context of the research question, the significance of the topic and why it is worthy of investigation, and provide an overview of the impact of the issue. While it is important in the introduction to consider the theoretical context for the essay, it is not the place for a full review or explanation of that theory.

Criterion C: investigation

There must be clear evidence of a well-planned investigation. Students are expected to use a wide range of both primary and secondary sources. Wherever possible, the secondary research can be followed by and further supported by primary research. Primary research can include carefully considered interviews, surveys and investigations. All of these techniques must be concisely explained and critically assessed in the essay, along with the analysis of the results.

The precise details from the data collection must be included in the appendices according to accepted standards for recording data using these techniques.

Criterion D: knowledge and understanding of the topic studied

The essay must demonstrate a substantial and secure understanding of the IT issues being investigated. To this end, the level of IT knowledge must be clearly greater than general knowledge and show some professional insight and specialized study. The essay must not be a sociological study with some simple IT references—it should ideally address an IT-aware audience, not the general public.

Criterion E: reasoned argument

The argument should always relate to the research question and the evidence provided. The essay should show a logical development of the argument throughout, providing a clear sense of direction.

Criterion F: application of analytical and evaluative skills appropriate to the subject

Sufficient data should be collected so that there is scope for it to be summarized and presented in new ways to support the arguments being developed in the essay. Graphs and tables may be considered as methods for presenting some of the analysis. Materials collected in the research for the essay should be used selectively to make the desired points. Effective analysis occurs if the information provided is used to create a sound, reasoned and logical argument.

Effective evaluation occurs if the possible social and ethical impacts of the IT developments are considered, where possible, from both local and global perspectives. Students should also show critical awareness of the validity of their information and the possible limitations of their argument. Very importantly, the essay should clearly note any assumptions that the student has made in setting out the argument and reaching the conclusions.

Criterion G: use of language appropriate to the subject

Extensive and accurate usage of IT terminology should feature throughout the essay. It may be appropriate for students to include limited amounts of program, HTML or other code to illustrate an argument, or it may be helpful for them to quote various system specifications or configurations.

A lack of IT terminology would suggest that the original topic is not suitable for an extended essay in ITGS.

Definitions should be clear and precise.

Criterion H: conclusion

The conclusion must develop from the argument and be consistent with it. New or extraneous content must not be introduced at this point. Material from the introduction should not be reintroduced or repeated here, but there should be a new synthesis in light of the discussion. Any unresolved questions/issues should be included in the conclusion.

Criterion I: formal presentation

This criterion refers to the extent to which the essay conforms to academic standards about the way in which research papers should be presented. The presentation of essays that omit a bibliography or that do not give references for quotations is deemed unacceptable (level 0). Essays that omit one of the required elements—title page, table of contents, page numbers—are deemed no better than satisfactory (maximum level 2), while essays that omit two of them are deemed poor at best (maximum level 1).

Any material included in the essay that is based on secondary sources should be referenced in the body of the essay. A full bibliography must also be provided. Extracts of interviews, correspondence and copies of relevant e-mails should be provided in an appendix.

Criterion J: abstract

The abstract is judged on the clarity with which it states the research question, explains how the investigation was carried out and summarizes the conclusion. However, the quality of the research question or the conclusion is not judged in this criterion.

Criterion K: holistic judgment

Qualities that are rewarded under this criterion include the following.

- **Intellectual initiative:** Ways of demonstrating this in ITGS essays include a choice of topic that shows originality or a new viewpoint on a well-known issue. Some IT issues are well known and regularly debated. Better essays may identify an issue that has not previously been extensively debated in the public domain.
- **Insight and depth of understanding:** An ITGS essay should show signs of in-depth IT knowledge. Linkage of the technology to the effects on people should be clear and convincing rather than speculative.
- **Creativity:** A good ITGS essay should deal with an issue of some contention. The suggestion of creative and technically feasible solutions to problems can demonstrate a higher level of achievement in this criterion.