

**2003 HSC Notes from
the Marking Centre
Design and Technology**

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2003 HSC NOTES FROM THE MARKING CENTRE

DESIGN AND TECHNOLOGY

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Design and Technology. It provides comments with regard to responses to the 2003 Higher School Certificate Examination, indicating the quality of candidate responses and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2003 Higher School Certificate Examination, the Marking Guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Design and Technology.

General Comments

In 2003, approximately 4,520 candidates attempted the Design and Technology examination.

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections, should accumulate to a more comprehensive understanding than may be described in each section separately.

Major Design Project

General Comments

Candidates were more successful in demonstrating syllabus outcomes in general and have shown improvement from 2002. Candidates have demonstrated a clearer understanding of the Major Design Project and the marking guidelines, and increased understanding of the outcomes to be achieved and the many means by which it is possible to reach them.

Candidates became more aware of the processes of design development, from needs analysis to final evaluation and including the processes of production.

Projects presented in 2003 represented a broader range and included more ‘wicked problems’: those where the form or nature of the solution is not yet known or fully known or implemented.

Candidates found that when confronted by a ‘wicked problem’ they were more easily able to reach syllabus outcomes in terms of innovation and creativity.

There was a concern with the extent of outsourcing of projects. Some outsourcing done was completely unnecessary. Outsourcing led in some cases to the lowering of quality in the skills achieved by the candidates. It is necessary to point out that Design and Technology is a ‘hands on’ course. Those candidates who tend to outsource the bulk of their project are not demonstrating syllabus outcomes in this regard.

Many of the best projects were innovative and they demonstrated ongoing resolution of design problems in order to achieve a design solution. They also demonstrated extensive and relevant testing to assist them with the final solution. Some candidates struggled to complete relevant tests and research. Candidates need to make more efforts to avoid a range of irrelevant testing, for example folio layout tests.

Candidates do continue to have difficulty communicating their design processes effectively. More appropriate methods of communication are being used, including charts, graphs, photography and other technologies, to express the ideas or development to the visiting HSC markers. Typically, the most successful Major Design Projects show development by models, scale models, hypothetical tests of concepts and design ideas in addition to a strong and applied evaluation of the observed results of this. Candidates improved their presentation and communication marks by providing succinct summaries of their research, and demonstrating application of the results of that research. Those candidates who provided succinct, less detailed portfolios but provided real evidence of how they developed solutions to identify needs in appendices enabled markers to more easily assess that they had demonstrated the subject outcomes.

Candidates were better able to consider the practices of design and development in industrial/commercial settings, and emulate these where appropriate in their own designing.

Candidates and teachers are encouraged to use real evidence of development in model or prototyping form, to use photographic or brief video evidence where appropriate, and to summarise conclusions and place the source material within an appendix.

Component – Project Proposal and Project Management

This component was completed satisfactorily; however, responses in the lower mark ranges tended to discuss what it was that they wanted to make rather than providing a thorough investigation of a problem, situation, want or need. Successful candidates embarked on research early and spent time clearly identifying and exploring the need to be addressed with their project.

The absence of real problems to solve seems to be a challenge for candidates. Many confuse innovation with invention and candidates are overwhelmed by the thought that they have to invent something new. This is not the intention of the Design and Technology course. The person who invented dental floss is an inventor, the person who worked out how to put it into a little box so you could easily cut lengths is a designer.

Assessment Criteria

- Identification and exploration of the need

Most candidates identified a need. However, some candidates tended to simply state what they proposed to make without exploring opportunities for other solutions. More outstanding responses demonstrated the application of critical analysis skills to the investigation of the need and drew conclusions regarding their criteria for evaluation. The flow from need identification to the development of evaluative criteria provided candidates with focus and direction for the Product, System or Environment's (PSE) development.

- Areas of investigation

Many candidates achieved good marks in this area by investigating WHERE they will go to investigate, WHY they plan to investigate and HOW they plan to investigate their listed criteria. These candidates understand that the intent of the Project Proposal is to guide them into the successful completion of a product, system or environment. Better responses included a detailed analysis of the

range of logical and relevant areas that they could possibly research, and the methodologies to be used, to inform the development of the PSE.

- Criteria to evaluate success

Candidates awarded high marks considered the project proposal and the needs that the product, system or environment should meet, in many cases creating an assessment tool for use in the final evaluation of the success or otherwise of the PSE. Better responses linked this work to an analysis of the functional and aesthetic aspects of design. Responses in the lower mark ranges tended to list the criteria without any analysis. It was not always specific to the project requirements.

- Action, time and finance plans and their application

Action plans were always evident. Better candidates used this as an ongoing tool for assessment of progress and found it a management tool to help them achieve success. They frequently referred to it along the process and evaluated it weekly or fortnightly giving self-evaluation of progress.

Some timelines that were presented clearly did not give specific details relevant to the project. Candidates need to add headings and stages which are relevant to their project in order to make it a well-formulated and useful management tool. The time they designate to each set task MUST be appropriate. It is not appropriate to use a generic template that will fit any project. Candidates need to develop their own timeline, specific to their project and themselves.

Better responses had clear project management strategies applied, with quality Action Plans in place from the commencement of the project, and evaluated throughout its development.

Finance plans had improved immensely. Many candidates listed their source of income with a well-justified reason for the amount of money they allocated to their project. Many provided receipts to demonstrate all expenses. Better responses demonstrated a genuine effort to develop a budget based on available financial resources and likely costs and expenses. Poorer responses were simply a collection of receipts after the event. It was clearly a list of expenditure. Little ongoing evaluation was evident with these projects. Hence, few justified financial decisions were made throughout.

Aspects of development and realisation, investigation and experimentation, prototype development, production, implementation and evaluation should be built into the process of planning. Candidates should be advised that it is appropriate to develop a plan of action, provide this and then evaluate this document during the project development to show new directions that may arise. It is essential, however, that the original documentation, written at the commencement of the project, remains as evidence of its early development.

- Selection and use of ideas and resources

Candidates should follow design processes appropriate to their project.

Better projects identified resources that may be available to be used for the project and its development, then evaluated these resources and selected from the range. This selection of resources is part of project management, and was appropriately documented at this point. Many candidates used a table to succinctly communicate in this section. Candidates then used these resources to develop and produce their project, and the experimentation for appropriate use of these resources was described and justified throughout the project.

Candidates were better able to demonstrate their understanding and application of design processes when they communicated the development of their design project in its natural order, rather than artificially structuring it to fit a series of headings.

The ongoing process of resource identification, evaluation, selection, justification and use should continue throughout the project, and does not need to be broken into sections.

Component – Project Development and Realisation

In this section, the development and realisation of the Major Design Project, the folio and product, system or environment, should be clearly evidenced, and explained. Application of the conclusions of research should be evident in the development. This is best shown by models, scale and not to scale, made of a range of materials and, where appropriate, photographic evidence or similar. Long-winded discussion within a portfolio is neither appropriate nor encouraged. The development and the results should be clear in the final PSE. Better projects often presented a 3D folio, where design development was evident by the samples of modeled solutions shown. The use of appendices of the source data is appropriate.

Most candidates followed the design criteria set and demonstrated a sound understanding. Better candidates were able to critically assess existing designs and research relevant areas, which ultimately impact on the success of their final project. They were able to distinguish between relevant and irrelevant research. They engaged themselves in the analysis of their findings and conducted relevant tests and experiments, which ultimately impacted positively on their end result.

Poorer projects demonstrated little design development. The final design was shown immediately without any research and investigation into existing designs. They often included irrelevant testing, which unfortunately rarely had an impact on the final project. Many did not distinguish tools, materials and techniques. Tools were described but very few actually tested. Some candidates listed tests and experiments without evidence of ever carrying them out.

Assessment Criteria

- Evidence of creativity – ideas generation, degree of difference and exploration of existing ideas

This aspect was well understood by candidates. Many demonstrated a thorough understanding of a definition of innovation versus invention, recognising that a degree of difference in the ideas, technology use and/or final product, system or environment was an acceptable indicator of these outcomes.

- Consideration of design factors relevant to the Major Design Project (as defined in the *Design and Technology Stage 6 Syllabus*, p 18)

Though the design factors are explicitly listed in the syllabus, many candidates could not relate these factors directly to their project. Candidates tended to list these factors and write a description of them rather than relate this to the PSE they were developing. Better candidates showed that they considered these factors by actually considering them rather than listing them in isolation.

- Documentation of research, experimentation and testing of design ideas, materials, tools and techniques.

Overall the testing of ‘design solutions’ was handled sporadically. Some candidates continued to test and experiment unnecessarily, resulting in some of their work being irrelevant. They tended to reflect the focus upon portfolio work. Testing became superficial and many candidates could not see its relevance in the development of the whole project. The best responses referred to the use of appropriate testing and created a broad range of model solutions to inform the design development.

Other candidates also demonstrated clear evidence of relevant testing being carried out and predominantly set them out in the form of Scientific Method eg Aim, Method, Results and

Conclusion. The better candidates were able to draw their conclusions explicitly, which ultimately impacted positively on their PSE, with the evidence of the impact being annotated in the PSE. Most candidates were able to include testing in some form, usually of appropriate materials.

Research that could be extracted from external and well respected sources should not be duplicated by candidates. Data that cannot be obtained any other way should be the focus of experimentation and testing. Many candidates heavily relied upon downloads from the internet, without summarising and relating to their PSE.

- Application of conclusions

The development of a Major Design Project involves a long period of practical activity to improve the product, system, or environment. Those candidates who carried out a simple development process did very well in providing evidence of their application of conclusions to their product, system or environment. This generally involved modeling concepts or design ideas.

- Identification and justification of ideas and resources

The justification of the selection of the ideas and resources used remains a concept that is not well understood. This should be linked to the criteria to evaluate success from the project proposal.

- Evidence of the testing of design solutions and application of conclusions

During the development stage of the Major Design Project, many candidates failed to implement a process of model or mock-up development. Processes of development such as this enable candidates to demonstrate both the testing of solutions to design challenges that they meet as they progress, and the testing of whole concepts.

- Use of communication and presentation techniques

A broad range of technologies was used in the presentation of all aspects of product, systems and environment development. From the written word to multimedia presentations, excellent use of the Internet for research and communication person-to-person, candidates showed a growth in the range of techniques they could apply appropriately. This was a most impressive improvement in Design and Technology 2003.

- Evidence and application of practical skills to produce a quality project

Successful candidates continue to produce work at the highest technical level. This was evident in many products, systems and environments, and in a growing range of technologies. The quality of the Product, System or Environment continues to be an essential component of success in Design and Technology. Many of the better responses tended to communicate their construction phase through the use of photographs, which outlined them completing various phases. Explicit instructions followed these photographs along with ongoing evaluations. This enabled the markers to identify that the candidates were clearly solving ongoing problems and making relevant decisions.

Better responses showed little use of outsourcing and the outsourcing they had used was well justified. The bulk of their Products, Systems or Environments was completed by them, demonstrating that they developed many new skills and managed their time management in an effective way. Some candidates had enrolled themselves into a range of courses outside of school hours, to enable them to further develop new skills, to prevent unnecessary outsourcing.

- Consideration of the practices in industrial/commercial settings as they relate to the Major Design Project

Better responses clearly demonstrated an understanding that the 'practices' referred to by the guidelines are the practices of both designing and producing. They discussed the whole process from

needs identification through to production and compared their own practice with that of practicing designers and producers.

Poorer responses generally named an industrial or commercial setting. They did, however, fail to compare and contrast these processes with their own. By evaluating the design, management and production techniques in these settings, the candidate is able to demonstrate a sound knowledge of the industrial and commercial practices along with their own.

Component – Project Evaluation

Ongoing evaluation was much stronger throughout folios. Many candidates demonstrated ongoing problem-solving and decision-making processes by drawing conclusions back to how they would impact on their final Product, System or Environment. Many of these candidates went back to their criteria to evaluate success as a guide to this development.

Candidates generally need to pay more attention to relating their evaluation, both ongoing and final, to their project proposal work.

Final evaluation in relation to functional and aesthetic criteria was generally strong. Many candidates, however, failed to present a photo of the final PSE in its environment; for example, showing the successful operation of it or perhaps modelling it. It is important for candidates to include this as it demonstrates to the marker that the project was successful in its end-use. It also demonstrates that there is a significant link between the final PSE and the Project Proposal that was initially set by the candidate. A good evaluation is only possible if the designed solution is put into practice.

The final evaluation of the PSE's impact on society and the environment continues to provide challenges for candidates. Teachers may like to strengthen the understanding of life cycle assessment/analysis used with candidates and the selection of materials, tools and processes on environmental criteria, in addition to those already used. Social impact of PSE is a major syllabus component, as detailed in outcome H4.3. Candidates should have acquired knowledge of the social impact of design from the preliminary course, ie personal values, cultural beliefs, sustainability, safety and health, community needs, individual needs, and equity, and be able to apply this in their major design project.

Evaluation of impact on society remains an overall, weaker area. Candidates simply do not link back to current trends in design. They do not discuss the uses of their Product, System or Environment, or where it is going. Candidates are advised to consider this throughout the development of the project and refer to social impact of the whole project as well as the PSE, which is the end-point and reason for the project.

There was a stronger use of professional evaluations, but many candidates failed to link such evaluations to how their project impacted on society as a whole. Many candidates tended to include these evaluations without realising their significance or reflecting upon it.

In relation to evaluating environmental considerations, candidates consistently discuss recycling issues without a detailed analysis. They struggle to clearly state what impact their design has on the environment in terms of resource usage. It is essential that candidates realise that they need to analyse the 'internal' environment as well. For example, 'does the product suit the existing décor in my lounge room?' 'Is my garment suitable for the formal occasion?'

Assessment Criteria

- Recording and application of evaluation procedures throughout the design project
As with other parts of the marking guidelines, many candidates used this as a heading for a section of their portfolio. This is unnecessary. A more appropriate response is to record evaluative comments and procedures as they occur. Candidates with better projects used incidental pages or notes throughout their folio or attached to their models of design development to emphasise their efforts at evaluation. The presentation of developing models and prototypes communicates clearly to markers that ongoing evaluation has occurred.

- Analysis and evaluation of functional and aesthetic aspects of design
Candidates whose projects scored highly commenced this analysis in the early stages of development. They analysed functional and aesthetic criteria while developing their criteria to evaluate success. They then drew upon this in a final evaluation of their solution using functional and aesthetic criteria.

- Final evaluation with respect to the project proposal and the project's impact on society and the environment

Societal impact still proves to be an area of evaluation that is difficult for many candidates. Some work in the case study about societal impacts of designs, and design and production, may assist candidates in this area. Environmental issues are better addressed, but rarely extend to life cycle assessments of materials or of environmental impact of processes used. Successful candidates in this section related their criteria to evaluate success directly to their final evaluation.

- Relationship of the final product, system or environment to the project proposal
This aspect was well done by most candidates, many providing a brief personal reflection relating back to the criteria to evaluate success.

Overall, teachers and students should be encouraged by their success in Design and Technology Major Design Projects 2003.

Written Examination

Section I

| Question | Correct Response |
|----------|------------------|
| 1 | D |
| 2 | D |
| 3 | C |
| 4 | D |
| 5 | A |
| 6 | B |
| 7 | B |
| 8 | C |
| 9 | D |
| 10 | C |

Section II

Question 11

(a) Most candidates had no difficulties identifying two design opportunities from the stimulus material. They suggested ideas such as mechanised processes to reduce damaged fruit, improved ladders, a range of safety procedures, and new bags that would distribute weight more effectively.

(b) (i) Most candidates could successfully identify one of their design ideas from part (a), and identify and justify factors to consider in the development of this idea.

Some candidates identified suitable factors, but simply developed the meaning of these rather than showing their importance in the design idea.

(b) (ii) Candidates demonstrated sound knowledge about the methods they would use to identify target markets for their designs, and were able to articulate strong links between the target market and the method of analysing their needs. For example, a candidate who identified a new bag identified the pickers as the target market, and suggested analysing their needs by observing their use of bags, interviewing them, and asking them to analyse the appropriate features of other bags.

(b) (iii) Candidates had varying abilities in explaining the marketing process, ie the process of meeting market needs throughout the development of the project. Better responses included an explanation of a process including conducting ongoing evaluation, testing and refining ideas by referring back to the target market and initial criteria, developing prototypes and testing them with focus groups.

(c) Many candidates were able to explain two research methods that were appropriate for use in development of their idea, tailoring the methodology to the nature of the idea being developed. Some candidates even clarified primary and secondary methodologies, and examples included experimentation of possible solutions, interviewing, testing, analysing existing ideas, prototype development and testing.

(d) This part of the question was where candidates encountered the most difficulty. Whilst some candidates were easily able to explain the role of two appropriate agencies, and use appropriate examples to enhance their explanations, some responses indicated little knowledge of either of these agencies or their role in supporting design development. Many of these candidates showed, by their diverse examples, that their studies of design and the work of designers was comprehensive and in depth. Unfortunately, some responses indicated much less knowledge of the role of agencies in facilitating design, and listed resource providers (such as hardware stores and fabric shops) as examples, or Workcover, which has a different role in production rather than design development.

Good responses showed high-level understanding and knowledge of the role of a range of agencies, and could identify their role in the proposed design development.

Section III

Candidates are required to attempt ONE question from this section. They should read each question, spend more time critically analysing what is required in the question, and carefully choose the one they feel they can best answer. Better responses showed evidence of doing this. An overwhelming number of candidates chose to answer Question 14, whilst equal numbers of candidates attempted Questions 12 and 13.

Question 12

The most successful candidates were able to elaborate on the creative design process, using a wide range of examples of both design products and the work of designers to enhance their responses. Many candidates highlighted aspects of creative processes from their case study, as well as other examples they had analysed in their studies, demonstrating depth of knowledge and the ability to synthesise concepts.

(a) Candidates presented a range of examples, identifying motivational stimuli and describing how characteristics are adapted into successful design solutions. Examples included:

- environmental problems requiring a solution, leading to waste management programs, or the development of regenerative drive systems which store unused energy for further use and reduce pollutant emissions
- burrs sticking to clothing after a bush walk, with analysis of the characteristics of the burr leading to the development of Velcro.

Some candidates had difficulty outlining application of the inspiration, or could identify the link between stimulus and solution, without outlining the characteristics of the stimulus.

(b) In this part of the question, many candidates who successfully explained how examples of creativity (usually stimulated by research) occurred at various stages throughout the design process, further developed their example used in part (a).

Other candidates outlined a creative design process, but failed to elaborate on the creative strategies which might be used at various stages of the process. They identified design decisions made, but did not describe the creative methodologies that had led to those decisions at each stage. Some responses indicated little knowledge of how and when creativity can or does occur. Candidates seemed to find this the most difficult part of the question.

(c) Candidates demonstrated significant knowledge of the importance of evaluation in creative design by explaining the constant ideation-research-evaluation-ideation-research-evaluation that occurs in successful creative design, and used examples to demonstrate where this had occurred. They referred to creative evaluation strategies such as creative team discussions, critique situations, focus groups, on-line evaluation and PMIs (Positive/plus, Minus/negative, Interesting) Some candidates continued to use their same example, and highlight appropriate points throughout the process.

Other candidates analysed examples of evaluation at isolated stages throughout the design process, but did not explain the link between ongoing evaluation and creative design processes.

Some candidates outlined the role of evaluation, but did not account for research driving creativity at various stages and the evaluation of that research against identified functional and aesthetic criteria or the design brief.

Question 13

(a) Many candidates identified a number of sources of sustainable energy, drawn both from the stimulus material and their studies of design and technology. Examples given included: geothermal power, wind power, wave power, solar power, nuclear power, biomass, hydrogen cell and regenerative braking. Impacts included no release of CO² into the atmosphere, no greenhouse effect, no waste product, reduced amount machinery and infrastructure less unsightly power plants that burn coal and increase greenhouse gas emissions, reduced costs to consumer after installation, replaces fossil fuels and consequently less depletion of natural resources.

(b) Candidates found it easy to answer this part of the question from the stimulus material, and most candidates chose the fleecy top and the recyclable chair. Many candidates used a life-cycle analysis process, or design process flow chart, to organise their responses. This resulted in quality responses with key intervention points identified and discussed.

Whilst many candidates could describe a range of intervention points, not all of them ordered their responses in a logical sequence. Consequently, they discussed only a few intervention points and not all the key points at which environmental decisions might be made.

(c) Candidates who successfully responded to this part of the question showed a high level of understanding of both ethical and environmental implications of sustainable product design, and were able to use relevant examples to demonstrate their depth of knowledge. They were able to make articulate judgements about environmental choices, ethics, and impact on design products.

Responses included: reduced use of natural resources; reduction of energy usage, and using sustainable sources; new industries from return and recycle of products; less need for landfill sites; changing nature of design criteria with emphasis on reduction of materials, ease of recycling, less weight.

Many candidates were able to make judgements about short-term cost/long-term benefits of sustainable product design, and discussed in detail ethical issues such as loss of jobs and industry in the short term, but how this could be addressed and disadvantages/costs overcome.

Some candidates used techniques like mind maps to present a range of issues relating to sustainable product design, then went on to present well-structured critical analyses with good supporting examples.

Other candidates generally had difficulty identifying and critically analysing ethical implications of sustainable product design, but had a lot to say about environmental implications. Many candidates found it difficult to go that last step and make a judgement about the implications, or else could articulate a careful critical analysis but not provide examples to illustrate concepts discussed.

Question 14

This question was overwhelmingly the most popular question. Candidates were obviously familiar with the range of communication technologies and games exemplified in the stimulus material, and could draw on both these and other examples from their study in their responses. They articulated a range of ways that teenage social habits had changed, were able to demonstrate a high level understanding of ethical issues, and critically analysed the impact of emerging communication technologies on the way people interact.

(a) The majority of candidates successfully responded to this part of the question by effectively describing two ways in which electronic games had changed the social habits of teenagers, and linked these to examples, including:

- role models in games promoting negative behaviours, eg violence, or inappropriate responses to conflict situations
- increased competitiveness, bullying and marginalising those without the technology
- less social interaction, and increasing isolation from peers, because of less outdoor or team games played, less tendency to join groups like Scouts or joining a club
- decreased communication skills, resulting from social isolation and solitary play, and not participating in conversations with parents, mates, girlfriends or team mates.

Many candidates were able to describe influences on the growing use of computer games, such as football being sponsored by an electronic games producer, and cricket being sponsored by a phone company whose phone had a cricket game function, as being a contributory factor in the growing popularity of electronic games and subsequent changes in teenage social habits.

Some candidates were confused between social and health issues, using examples such as growing obesity and heightened fine motor skills and decreased gross motor skills. Others identified social habits, but did not give examples from either the stimulus material or their own design experiences; or only outlined one change but did not link it to an example.

(b) Candidates had to discuss at least one ethical issue relevant to two electronic communication technologies identified. This discussion required candidates to identify the issues, and elaborate points both for and against. Good responses included:

- privacy issues, spam messages and inappropriate text messages. Bullying via text messages is difficult for the target to avoid, especially if the sender's number is blocked.
- taking photos (without knowledge of subject of photo) on 3rd generation mobiles, using inappropriately or selling
- text messaging takes priority over social interaction
- pornography, with misleading website addresses
- discriminatory websites and chat rooms, inappropriate comments about some groups
- plagiarism
- misrepresentation of self as relationships are developed over the internet, and resulting changing values in society
- privacy/security issues with using credit card/personal details.

Many candidates also raised issues of discrimination for those who are excluded from the use of electronic communication technologies because of restricted finances, age, or low technological literacy. Some candidates outlined one or two ethical issues, but either neglected to relate them to two electronic communication technologies, or simply identified the ethical issues but did not elaborate on them.

(c) Better responses identified and explained in detail how at least two emerging communication technologies impacted on people and how people interact with each other. They discussed both positive and negative impacts, and could then explain the consequences of this impact. Examples used were explored in depth and indicated candidates' ability to synthesise design concepts and demonstrate depth of knowledge. Examples given, and positive and negative impacts critically analysed by some of the better responses, included:

- The automated house, fridge with automated internet ordering – positive in that it facilitates ease of shopping for busy people, or those who are housebound, people who feel more secure when at home find this process useful, but negative in that it reduces human contact and interaction.
- Video phones, sending photos via mobile – leads to increased effectiveness of communication, builds positive relationships, eg when family members are overseas, communication is instant and emotions can be shared; or sending a photo with a text message can lead to increased effectiveness of communication as the message can be interpreted more positively, whereas just a written message in text abbreviated style can lead to misinterpretation and have a negative effect on communication.
- Email: less expensive than telephone, and photos can be attached. This strengthens relationships when families or friends are separated. Communication is faster, cheaper, and more regular and more things in common, relationships stronger. Email can relieve the problems of isolation. People living alone, or in hospital, can communicate with a wider

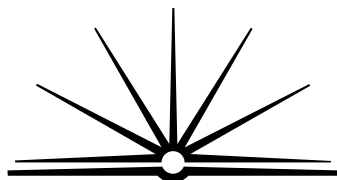
network of people when they have access to emerging communication technologies. The world is getting smaller, and our networks of people with whom we communicate regularly are expanding. This results in stronger support networks.

Other candidates were able to explain the impact on the way people interact, but showed less depth of knowledge by not extrapolating the consequences of this impact. Some candidates described the impact, but limited their description to only negative impact, indicating less understanding of this concept and limited ability to analyse a design issue. Weaker responses only identified two emerging communication technologies, or briefly mentioned a possible impact. Some candidates misunderstood the question, and described at length the impacts of communication technologies, rather than their impact on the way people interact.

Design and Technology

2003 HSC Examination Mapping Grid

| Question | Marks | Content | Syllabus outcomes |
|--------------|-------|---|-------------------|
| 1 | 1 | Factors affecting design – life cycle analysis | H1.1 |
| 2 | 1 | Design factors | H1.1 |
| 3 | 1 | Entrepreneurial activity | H3.1 |
| 4 | 1 | Success of innovation | H3.1 |
| 5 | 1 | Factors affecting design | H1.1 |
| 6 | 1 | Collaborative design | H6.1 |
| 7 | 1 | Creative and innovative approaches Emerging technologies | H6.2, H3.2 |
| 8 | 1 | Emerging technologies | H6.2 |
| 9 | 1 | Design and production processes | H6.1 |
| 10 | 1 | Factors affecting successful innovation | H3.1 |
| 11 (a) | 2 | Design opportunities | H4.1 |
| 11 (b) (i) | 2 | Factors affecting design | H1.1 |
| 11 (b) (ii) | 1 | Market research needs | H4.1 |
| 11 (b) (iii) | 2 | Market research needs | H4.1 |
| 11 (c) | 3 | Research methods | H4.1 |
| 11 (d) | 5 | Factors that influence innovation – agencies | H3.1 |
| 12 (a) | 3 | Creative and innovative design practice | H3.2, H4.1, H4.3 |
| 12 (b) | 4 | Creative and innovative design practice | H3.2, H4.3, H5.1 |
| 12 (c) | 8 | Creative and innovative design practice, project evaluation | H3.2, H4.3 |
| 13 (a) | 3 | Environmental issues | H2.2 |
| 13 (b) | 4 | Processes used by designers | H1.2, H4.2 |
| 13 (c) | 8 | Ethical and environmental issues | H2.2 |
| 14 (a) | 3 | Influence of trends in designing, producing | H2.1 |
| 14 (b) | 4 | Ethical implications | H6.2 |
| 14 (c) | 8 | Communication, implications of use of emerging technologies | H2.1, H2.2, H6.2 |



B O A R D O F S T U D I E S
NEW SOUTH WALES

2003 HSC Design and Technology Marking Guidelines

Question 11 (a)

Outcomes assessed: H4.1

MARKING GUIDELINES

| Criteria | Marks |
|---|--------------|
| • Outlines two appropriate opportunities from the stimulus material | 2 |
| • Outlines one appropriate opportunity from the stimulus material OR | 1 |
| • Identifies two appropriate opportunities from the stimulus material | |

**Question 11 (b) (i)***Outcomes assessed: H1.1***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">Two factors and justification of both (justification must relate to issues in the articles) | 2 |
| <ul style="list-style-type: none">One factor and justification of this (justification must relate to issues in the articles) OR <ul style="list-style-type: none">TWO factors with no justification | 1 |

Question 11 (b) (ii)*Outcomes assessed: H4.1***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">Identification of target market and statement of method for analysing needs | 1 |

Question 11 (b) (iii)*Outcomes assessed: H4.1***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">Explanation of marketing process (process of meeting/responding to market needs) throughout the design process. | 2 |
| <ul style="list-style-type: none">Description of marketing process (process of meeting/responding to market needs) outlining most elements of this process | 1 |
| <ul style="list-style-type: none">Note — if repeat of part (ii) only | 0 |

**Question 11 (c)***Outcomes assessed: H4.1***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">Explains two appropriate research methods | 3 |
| <ul style="list-style-type: none">Explains one appropriate research method and outline one research method | 2 |
| <ul style="list-style-type: none">Outlines two research methods OR | 1 |
| <ul style="list-style-type: none">Explains one appropriate research method | |

Question 11 (d)*Outcomes assessed: H3.1***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">Sound explanation of two agencies/support programs, related to the idea developed in preceding parts of question. The form of relationship must be described and justified, and with a strong link to own designing. Example of use of agencies in other people's design activities | 4-5 |
| <ul style="list-style-type: none">Explanation of two agencies/support programs, linked to this designing, relevant example of use in other design (less depth knowledge shown) | 3 |
| <ul style="list-style-type: none">Explanation of two agencies/support programs OR explanation of ONE agency and a relevant example | 2 |
| <ul style="list-style-type: none">Two agencies/support programs identified OR | 1 |
| <ul style="list-style-type: none">Describes one agency/support program | |

**Question 12 (a)***Outcomes assessed: H3.2, H4.1, H4.3***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| • Describes how two characteristics of stimuli are reflected in design, using different examples to demonstrate application of inspiration | 3 |
| • Outlines how a characteristic of the stimulus is reflected in the design, with an example demonstrating application of the inspiration | 2 |
| • Identifies one motivational stimuli, show some link to a design idea | 1 |

Question 12 (b)*Outcomes assessed: H3.2, H4.3, H5.1***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| • Explanation of the implementation of a design process, creativity interrelates at each stage (can vary in details but must be a true creative design process) with clear, relevant examples | 4 |
| • Description of a creative design process or examples of creativity at isolated stages | 3 |
| • Outline of creative design process with an attempt to describe how it would occur | 2 |
| • One application/example of creativity, but not at initial idea stage | 1 |

Question 12 (c)*Outcomes assessed: H3.2, H4.3***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">• Demonstrates comprehensive knowledge of evaluation and its role in creative design throughout the design process• Detailed examples should be used, indicating how evaluation occurs and how it might influence creativity and further development at each stage of the design process, including further research whenever decision making occurs | 6–8 |
| <ul style="list-style-type: none">• Ongoing evaluation against criteria while constantly exploring new possibilities and making modifications• Demonstrates knowledge of evaluation in creative design, using examples to demonstrate links between design experiences and creative design processes | 3–5 |
| <ul style="list-style-type: none">• Outlines the role of evaluation in creative design, using at least one example to show the link to a design experience | 2 |
| <ul style="list-style-type: none">• Briefly outlines the role of evaluation in design throughout design process | 1 |

Question 13 (a)*Outcomes assessed: H2.2***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">• Describes impact of two sources | 3 |
| <ul style="list-style-type: none">• Outlines impact of two sources OR <ul style="list-style-type: none">• Describes impact of one source and identify impact of another source | 2 |
| <ul style="list-style-type: none">• Identifies two sources of sustainable energy OR <ul style="list-style-type: none">• Outlines the impact of one source | 1 |

Question 13 (b)*Outcomes assessed: H1.2, H4.2***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">• Explains, clearly and logically, the process the designer would use (eg life-cycle analysis); identify key points at which environmental choices could be made/explored | 4 |
| <ul style="list-style-type: none">• Description of process with most key points of environmental choices addressed | 3 |
| <ul style="list-style-type: none">• Outline of process, limited examples at which environmental choices might occur | 2 |
| <ul style="list-style-type: none">• Identifies product, and brief outline of environmental consideration | 1 |

**Question 13 (c)***Outcomes assessed: H2.2***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">Identifies and explains in detail, at least one of each of the ethical and environmental implications of sustainable product design, using relevant examples to show depth of knowledge and understanding, and making judgement about environmental choices and impact on design product | 6–8 |
| <ul style="list-style-type: none">Discusses at least TWO of the ethical and/or environmental implications of sustainable product design, showing some link by use of example(s) and demonstrating knowledge and understanding of implications | 4–5 |
| <ul style="list-style-type: none">Describes at least one implication of either the ethical or environmental implications of sustainable product design | 2–3 |
| <ul style="list-style-type: none">Outlines/identifies one aspect of either | 1 |

Question 14 (a)*Outcomes assessed: H2.1***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">Describes two ways, with examples from stimulus or other | 3 |
| <ul style="list-style-type: none">Outlines two ways or describes one way and identifies one way, one example | 2 |
| <ul style="list-style-type: none">Identifies two ways or outlines one way, vague link to example | 1 |

Question 14 (b)*Outcomes assessed: H6.2***MARKING GUIDELINES**

| Criteria | Marks |
|--|--------------|
| <ul style="list-style-type: none">For each of the TWO electronic communication technologies identified, discuss at least ONE ethical issue in detail, with an example to elaborate the issue | 4 |
| <ul style="list-style-type: none">Identify TWO electronic communication technologies and discuss ONE ethical issue in detail, with an example to elaborate the issue | 3 |
| <ul style="list-style-type: none">Identify TWO electronic communication technologies, and outline ONE ethical issue, with an example | 2 |
| <ul style="list-style-type: none">Identify TWO electronic communication technologies and list at least TWO ethical issues, with a vague example or no example | 1 |

Question 14 (c)*Outcomes assessed: H2.1, H2.2, H6.2***MARKING GUIDELINES**

| Criteria | Marks |
|---|--------------|
| <ul style="list-style-type: none">Identifies and explains in detail how at least TWO emerging communication technologies impact on people and how people interact with each other. Discussion about positive and negative impact and consequences of this impact, should be articulated. (The examples used should be explored in a depth suitable to indicate a high level of understanding of impact) | 6–8 |
| <ul style="list-style-type: none">Discussion of at least TWO emerging communication technologies, with explanation of their impact on how people interact. Some exploration or a description of consequences of this impact. (Examples used should demonstrate sound knowledge and understanding of emerging technologies, with some understanding of related social issues) | 4–5 |
| <ul style="list-style-type: none">Outlines at least TWO emerging communication technologies and describes how they impact positively and/or negatively on the way people interact | 2–3 |
| <ul style="list-style-type: none">Identifies at least two emerging communication technologies | 1 |