Design and Technology

Stage 6

Support Document

1999

Published by
Board of Studies NSW
GPO Box 5300
Sydney NSW 2001
Australia

Tel: (02) 9367 8111

Internet: http://www.boardofstudies.nsw.edu.au

ISBN 0 7313 4343 3

99521

Contents

1 Introduction

This support document is designed to assist teachers as they plan for the implementation of the *Design and Technology Stage 6 Syllabus*. It provides programming and assessment ideas for selected syllabus content.

Resources related to each unit of work are included. However, it should be noted that a more extensive list of subject specific resources is provided on the Board of Studies website http://www.boardofstudies.nsw.edu.au

2 Information Specific to the Units of Work

Resources
Each unit of work has a variety of resources listed, however, not all resources are referred to in that unit. The intention is that teachers may select from the list which is provided to assist in the delivery of the unit. Whilst every care has been taken to ensure that the websites listed in each unit address the content, there may be other websites that are also appropriate. It is also recognised that websites change and others become available over time.

Resource Referencing
Each resource has been numbered at the beginning of the unit. Resources are referred to by number within the unit and in some cases, page numbers have been included.

Unit Length and Sample Teaching Program
A suggested unit length has been provided, however, teachers may elect to alter this. In some cases, certain aspects of a unit can be integrated or combined. Teachers may also find it appropriate to delete suggested activities depending on the focus of the unit for a particular situation, or to expand certain activities.

3 Programmed Units of Work

3.1 Preliminary Course: Design Dynamics

Suggested Time Allowed: 5 weeks (15 hours)

Rationale
The unit of work is designed to build on, and reinforce, assumed knowledge of design processes used in domestic, community and commercial settings by investigating the work of designers and the design industry.

Students will identify at least one Australian and one international designer of their choice and investigate the design processes that they use. Students will also investigate the factors that influence design and production and develop research skills while undertaking the investigation.

These research skills will be transferable to design projects, and since students are working in areas that are relevant to them and reflect their own interests, a desire to continue learning and working in the diverse area of design and technology may also be fostered.

This unit could also be introduced to prepare students for the development of a seven week design project.

Resources

Books

1. Renew, R, *Making It: Innovation and Success in Australia's Industries* Powerhouse Publishing, Ultimo, 1996, ISBN 1 8631 7153 3
2. Measham, T, *Treasures of the Powerhouse Museum*, Powerhouse Publishing, Ultimo, 1994, ISBN 1 8631 7047 2
3. McDermott, C, *20th Century Design*, Viking, Carlton, VIC, 1997, ISBN 1 8586 8338 6
4. Woodham, J, *Twentieth Century Design*, Oxford University Press, New York, 1997, ISBN 0 1928 4204 8
5. Gill, D et al, *Style and Design: Arts, Advertising, Furnishing and Furniture – The Most Evocative and Significant Creations of the Last 100 Years,* Dempsey Parr Publishing, Bristol, 1998, ISBN 1 8408 4028 5
6. Rochford, J, *Senior Design and Technology*, KJS Publications, Terrigal, NSW, 1995, no ISBN
7. Hauffe, T, *Design: A Concise History*, Laurence King Publishing, London, 1998, ISBN 1 8566 9134 9
8. Bellanca, J & Fogarty, R, *Blueprints for Thinking in the Cooperative Classroom*, Hawker Brownlow Education, Cheltenham, VIC, 1991, ISBN 1 8629 9652 0

Videos

9. Learning Essentials, *Tomorrows World* (video, 20 mins), 1995
10. Classroom Video*, A Design Project* (video, 32 min), 1993

People and Organisations

11. Technology Educators Association, PO Box 102, Hazelbrook, NSW
12. Institute of Technology Education, c/- Mosman High School, Military Rd, Mosman, 2088
13. Local Council, eg engineers
14. Local design businesses, eg fashion designers, cabinet makers, cake decorators, architects, landscape gardeners, engineers, advertising agencies
15. Employment agencies, eg Employment National
16. School careers advisor

Websites

17. The Whitehouse School: http://www.whitehouse-design.edu.au/
18. Powerhouse Museum: http:www.phm.gov.au/schools/
19. University of Technology Sydney: http://www.uts.edu.au/

Magazines, journals, newspapers

20. Sydney Morning Herald, Thursday Edition, 'Domain'

Possible Assessment Strategies:

- Group Case Study – Designers and their Work:
  - identify and describe the work of an Australian and international designer and the design industry in which they work
  - describe the designer's styles and the inspiration reflected in their work
  - compare and contrast factors affecting designing and producing. This includes appropriateness, needs, function, aesthetics, short and long term consequences of cost, ergonomics, use of the design, sustainability, energy, recyclability, safety, quality, durability, obsolescence and life cycle analysis

- Peer evaluation of computer presentation

- Class test or exam (eg half yearly exam)

- A response to a hypothetical design situation – eg designing a new MacDonald's toy:
  - identify the factors that will affect the design and production of a new MacDonald's toy
  - identify and justify suitable research methods that will be employed by the designer during the design and production process
  - include thumbnail sketches of initial design ideas
  - provide detailed and labelled drawings of the chosen design
  - evaluate the chosen design in term of the factors affecting design and production identified in the question

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• design processes – design processes used in domestic, community, industrial and commercial settings from initial contact with clients to final presentation. • factors affecting designing and producing including: – appropriateness of the design solution – needs – function – aesthetics – short and long term consequences of cost – ergonomics – use of the design – sustainability – energy – recyclability – safety – quality – durability – obsolescence – life cycle analysis	• describe and analyse the processes undertaken when designing • identify factors affecting design • appraise the aesthetic and functional qualities of a variety of design products, systems and environments	Teacher introduces topic - *designers and their work* Students: • revise the design process through the use of a hands-on problem-solving activity, eg design a new McDonalds toy, or solve an unusual design problem, eg design and make a device which suspends a brick above a table using only one piece of A4 paper and 5cm of sticky tape • discuss the processes used to develop ideas and a successful design (other suitable design/lateral thinking problems are described in resource 6) Students: • discuss the processes used to develop ideas and a successful design • view resource 10 and record details about the design processes used by a number of design teams in response to a design brief based on a caravan • complete a “jigsaw” cooperative learning activity based on the video investigation (resource 8 pp 170 and 260)

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• design theory and practice – Australian and international designers and their work	• investigate at least one designer and the nature of their work	Students: • research, with a partner, two designers – choose one international and one Australian designer – identify styles used and sources of inspiration – compare and contrast factors affecting designing and producing of their design products – present work using PowerPoint, Hyperstudio or similar presentation software – student resources could include web searches, resources 1, 3 and 9, local designers, newspaper and journal articles Teacher introduces research methods (and examples) including primary and secondary research Students: • complete a group matching activity (the name, description, uses and examples of each research method are to be matched) • record information from the matched cards in their books

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
P5.3 uses a variety of research methods to inform the development and modification of design ideas	• research methods – qualitative and quantitative research – questionnaires – surveys – interviews – observation – tests and experiments – statistical analysis – information research including print and electronic sources • interpreting and presenting data • ethics in research	• select and use a variety of research methods to inform the generation, modification and development of design ideas • analyse, interpret and apply research data to the development of design projects	Students: • select and justify the research methods used to complete a group research task • complete a questionnaire, survey or list of interview questions to be used for the group research task • collate and interpret the results • draw conclusions
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• design theory and practice – range of professions – nature and variety of work of a range of design professions – interaction and overlap of design professions – Australian and international designers and their work	• investigate at least one designer and the nature of their work • identify a range of career opportunities in design and production	Students: • complete a questionnaire, survey or list of interview questions to be used for the group research task • enter information into a database and add to the previous designer investigation • visit a design exhibition or local designer and complete the research questions • listen to a guest speaker (from a design school or local design business), discuss career opportunities in the design profession, the nature of designers work, how design teams operate and the interaction of designers in the work place

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects			• investigate a career in the design industry and orally report back to the class – nature of the work – type of training/further education required – possible location of training/education, eg TAFE, University – method of income, eg wage or salary earned – resources 13, 14, 15 and 16, UAC books and the internet

3.2 Preliminary Course: The Great Australian Dream

Suggested Time Allowed: 12 weeks (36 hours)

Rationale
In this unit, students are required to work in cooperative teams in the development and realisation of a design project. The unit aims to develop prospective business, industry and community leaders who understand the nature of design and technology.

Students will investigate the many organisations associated with the housing/building industry and they will gain insight into the roles of the employees in these organisations. Through the completion of a folio and a design project, students will develop a range of communication, production, management and evaluation skills. Students will be encouraged to foster and promote innovation in their designs. They will also investigate historical and cultural influences on design and creatively integrate the latest trends in technology into their designs.

This unit of work could be taught in either term one or two of the Preliminary course. All students should be encouraged to produce ideas and samples of work at all stages of the design process.

Resources

Books

1. Lucas, B et al, *Contemporary Technical Graphics*, McGraw Hill, Sydney, 1989, ISBN 0 0745 2126 8
2. Braggs, J & S, *The Healthy House*, Harper Collins, Sydney, 1996, ISBN 0 7322 5753 0
3. Greenland, J & Szokolay, S, *Passive Solar Design in Australia*, Royal Australian Institute of Architects Education, Red Hill, 1985, ISBN 0 9097 2464 4
4. Hawkes, N, *New Technology, Structures and Buildings*, Gloucester Press, London, 1999, ISBN 0 7496 1704 7
5. Hughes, S, *The Visual Dictionary of Buildings*, Readers Digest Press, Sydney, 1992, ISBN 0 8643 8312 6
6. Nicholson, J, *A Home Among the Gum Trees*, Allen & Unwin, St Leonards, 1997, ISBN 1 8644 8106 4
7. Bellanca, J & Fogarty, R, *Blueprints for Thinking in the Cooperative Classroom*, Hawker Brownlow, Cheltenham, VIC, 1991, ISBN 1 8629 9652 0
8. New South Wales Department of School Education, *Teaching Literacy in TAS,* New South Wales Department of School Education, 1997, ISBN 1 8631 8017 6
9. Ward-Harvey, K, *Fundamental Building Materials,* Royal Australian Institute of Architects, Red Hill, 1989, ISBN 0 9097 2455 5
10. Judd, B, *Designed for Urban Living*, RAIA, Red Hill, 1993, ISBN 1 8631 8020 6
11. Vulker, J, *Housing in Australia*, Jacaranda, Milton, QLD, 1986, ISBN 0 7016 2042 0
12. Taylor, J, *Australian Architecture from 1960*, Royal Australian Institute of Architects, Red Hill, 1986, ISBN 0 4552 0351 2
13. Vulker, J et al, *The Sourcebook*, Royal Australian Institute of Architects, Red Hill, 1990, ISBN 0 9097 2479 2

Magazines/Journals

14. *Project Kit Homes*, Australian Home Journal, Autumn/Winter, AHJ Project Homes Magazine, Box 7029, Sydney, 1993

Videos

15. Classroom Video, *Designing a Toy* (video, 36 min), 1996
16. Video Education Australia, *The one that didn't get away* (video, 28 min), 1997

Kits

17. The Home Show-Teaching Resource Kit, Famous Artists International Pty Ltd., Royal Australian Institute of Architecture, ISBN 1 8631 8017 6

Websites

18. Board of Studies: www.boardofstudies.nsw.edu.au
19. National Archives of Australia www.aa.gov.au/AA_WWW/AA_Home_Page.html
20. University of New South Wales http://www.erdic.unsw.edu.au/
21. SOLARCH (University of New South Wales), http:www.fbe.unsw.edu.au/events/sustliving/
22. Royal Australian Institute of Architects: www.raia.com.au/home.htm

CD-ROMS

23. Powerhouse Museum, *Know-How*, (CD-ROM, Macintosh Windows), Powerhouse Museum Publications, Sydney, 1996, ISBN 1 8631 7053 7

Possible Assessment Strategies

Assessment will be based on the skills and knowledge demonstrated throughout the folio, product/system/environment and the assignment.

Preliminary Outcomes A Student:	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• design process – design processes used in domestic, community, industrial and commercial settings from initial contact with clients to final presentation	• describe and analyse the processes undertaken when designing • apply a design process when developing design projects	Teacher introduces a *design process* to students: • planning Ideas • research/investigation • project development • evaluation Students: • view video resource 16 and complete a brainstorming activity (concept map cognitive organiser) identifying each stage in the design process • incorporate the gathered information into a scaffold to assist in writing an information report on this process (resource 9)
P3.1 investigates and experiments with techniques in creative and collaborative approaches in designing and producing	• creative approaches including: – cognitive organisers – strategies for problem solving and solution creating – cooperative structures – ideas generation	• select and apply a variety of cognitive organisers • apply problem-solving techniques to identified problems • recognise the advantages of cooperative structures compared to individualistic and competitive approaches	As part of this unit, the teacher will provide opportunities for students to develop creative approaches in the design and production of their project. The activities listed will be integrated throughout the unit. Students select a cognitive organiser best suited to brainstorming (refer to beginning of unit) and evaluating (refer to end of unit). Refer to resource 8, pp 89–90

Preliminary Outcomes **A Student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P3.1 investigates and experiments with techniques in creative and collaborative approaches in designing and producing	• collaborative approaches – design teams: roles and tasks of members – communication between and within design teams – team responsibilities	• identify the factors that contribute to successful work and collaboration • collaborate and participate in design teams • work cooperatively	As part of this unit, students will work in teams to develop collaborative approaches in the design and production of their project. Prior to the introduction of the situation, students will be organised into design teams. As the teacher guides students through the range of activities, reference will be made to the roles and tasks of members, communication and responsibilities of each member (resource 8)
P4.1 uses the design processes in the development and production of design solutions to meet identified needs and opportunities	• project analysis – design briefs	• formulate and analyse design briefs	Teacher introduces the *design situation* to students via a worksheet 'The Great Aussie Dream' Students: • formulate a design brief based on the situation • analyse the design brief • analyse available technological and print resources on housing design and record ideas • brainstorm for ideas and interesting concepts for the 'dream home'

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P4.1 uses the design processes in the development and production of design solutions to meet identified needs and opportunities	– project analysis – appropriateness of design solutions • project analysis – criteria for evaluation and factors to consider	• identify the parameters of design	Students: • list parameters of the design brief • identify limitations for the project including site size, elevation, council regulations, family needs and wants, time for completion of project, acquired skills, innovative ideas • discuss expectations of the quality of work • identify and record the criteria for evaluating the success of the project analyse the marking scale for the design project
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• factors affecting designing and producing including: – appropriateness of the design solution – needs – function – aesthetics – short & long term consequences of cost – ergonomics – use of the design – sustainability – energy – recyclability – safety – quality – durability	• identify factors affecting design – analyse design products – compare and contrast the factors to be considered in the design and production of design projects – appraise the aesthetic and functional qualities of a variety of design products, systems and/or environment	Teacher introduces the concept of *planning* Students: • attend an excursion to examine housing in local and surrounding areas, then visit a housing display village (students could write to housing companies) • collect interesting design plans and discuss them with the expert on site in relation to the factors that affect designing and producing • evaluate the plans collected in relation to a hypothetical family's needs

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	– obsolescence – life cycle analysis		• identify and list the factors affecting a dream home – family needs, wants, style, number of rooms, council regulations, designs: interior and exterior, use of energy, lighting, ventilation, garden settings (resource 17) • view home show video and complete worksheets • create an ideas/inspiration page of best/suitable housing designs for folio • justify the choice of each design by making notes around the illustration • view resource 23
P5.3 uses a variety of research methods to inform the development and modification of design ideas	• research methods – surveys – information research including print and electronic sources – tests and experiments – statistical analysis	• select and use a variety of research methods to inform the generation, modification and development of design ideas	Teacher introduces concept of *research/investigation* Students: • use an appropriate research tool to ascertain a hypothetical family's needs • analyse the data to prioritize the families wants in the 'dream home' • consider the functional and aesthetic aspects of a number of different styles of houses • test and experiment with ideas based on the results • conduct a field trip to a possible site

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P5.3 uses a variety of research methods to inform the development and modification of design ideas			• select and discuss a site, measure the perimeter and graph the elevation of the land • investigate the role of the surveyor by interviewing the career advisor and using the internet • listen to a guest speaker from the local council discuss council regulations and aspects relating to zoning, environmental impact studies and the impact of the dwelling on surrounding areas • apply this information to their planned dwelling on the surrounding areas • apply this information to their planned dwelling on their proposed site in a written report
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects	• design theory and practice – range of design professions – nature and variety of work of a range of design professions – interaction and overlap of design professions – Australian and international designers and their work	• investigate at least one designer and the nature of their work	Students: • listen to a guest speaker such as an architect/draftsperson/engineer • compare and contrast the work roles of each guest speaker and present this information in data base format

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P1.1 examines design theory and practice, and considers the factors affecting designing and producing in design projects			• Assignment: '*The Designer Generation*': – using print and electronic media, investigate one national and one international designer who designs the interior and/or exterior of buildings – include information on the following: a brief biography, present work address/website, training and experience, work samples, major achievements, elements admired in the designers work and brief detail about how a part of the designers work could be incorporated into their own project work – present the information in written and pictorial form, utilising available technologies
P6.1 investigates a range of manufacturing and production processes and relates these to aspects of design projects	• manufacturing and production – selection of processes appropriate to a need	• account for practices undertaken in industrial and commercial settings	Teacher introduces the concept of *project development* Students: • use information already gathered and compare the procedure of designing and building ones own home with that of using a kit home

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P6.1 investigates a range of manufacturing and production processes and relates these to aspects of design projects	– development of appropriate skills and techniques		• visit a building site and listen to a builder speak on the role of the builder, the process of building ones own home and the role of the Australian Building Industry • use the Yellow Pages to list companies available in the local area to assist in all internal and external aspects of house design
P5.2 communicates ideas and solutions using a range of techniques	• communication – forms of communication, including verbal, written, graphical, visual and audio – communicating information through a variety of media – visualising solutions	• uses appropriate design and technology terminology • experiment with a range of techniques and forms to visualize and communicate ideas and solutions • communicate design ideas and solutions effectively using a range of technologies • use appropriate standards and conventions for drawing and diagrams • justify the selection and use of communication techniques	Teacher introduces *design realisation* Students: • select and use an appropriate form of communication (which could include computer aided design software) to produce a range of sketches showing idea development • produce rough sketch of garden plan on graph paper • produce a technical garden plan using appropriate communication techniques

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P6.1 investigate a range of manufacturing and production processes and relate these to aspects of design projects	• manufacturing and production – selection of processes appropriate to a need – development of appropriate skills and techniques	• account for practises undertaken in industrial and commercial settings	Students: • visit nursery sites/landscaping company to discuss the role of landscape designers and possible career opportunities • develop landscape ideas for the site based on the nursery visit compile information on housing interiors, exteriors, the use of energy, lighting and ventilation
P5.2 communicates ideas and solutions using a range of techniques	• communication • the purpose of prototypes and/or models • presentation techniques suited to the needs of design clients and design projects • the realisation of ideas	• communicate design ideas and solutions effectively	Student groups select from one of the following options: OPTION ONE • research model building • build a model of the dream home OR
P4.2 uses resources effectively and safely in the development and production of design solutions	through manipulation of materials, tools and techniques and other resources	• develop and demonstrate proficiency in using an appropriate rage of materials, tools, techniques and other resources	OPTION TWO • Room Design (students choice) – produce a diorama and manufacture an article for use in this room. For example: soft or hard furnishing, water saving device for the bathroom, special needs device for a disabled person

Preliminary Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, Activities and Related Resources**
P4.3 evaluates the processes and outcomes of designing and producing	• evaluation – developing and refining ideas – criteria for evaluation – methods of evaluation	• conduct continual evaluation throughout design and production	*whole class evaluation* Students: • evaluate the home in terms meeting the families needs and wants (PMI cognitive organiser) • informally write and ask if council staff would evaluate plans • request builder/project home specialist analyse home design and suggest improvements • complete unit evaluation sheet, assessing own work prior to teacher evaluation. (refer to criteria established earlier in class)

3.3 HSC Course: Innovation and Emerging Technologies

Suggested Time Allowed: 6 weeks (18 hours)

Rationale

This unit of work is based on innovation and emerging technologies and is taught through a variety of teaching and learning activities as well as the case study of an innovation.

Students will be introduced to the role and importance of innovation and be encouraged to investigate both independently and cooperatively, the issues surrounding the development of innovation and emerging technologies.
As a result of completing the case study, students are encouraged, where appropriate, to apply the processes utilised in the development of the innovation to the exploration and development of their own major design project.

Resources

Books

1. Renew, R, *Making It*, Powerhouse Publishing, Ultimo, 1996, ISBN 1 8631 7153 3
2. Measham, T, *Treasures of the Powerhouse Museum*, Powerhouse Publishing, Ultimo, 1994, ISBN 1 8631 7047 2
3. Board of Studies*, Design and Technology Stage 6, Draft Support Document Volume 2*, 1996, ISBN 0 7310 6339 2
4. Gill, D et al, *Style and Design: Arts, advertising, furnishing and furniture – The most evocative and significant creations of the last 100 years*, Dempsey Parr Publishing, Bristol, 1998, ISBN 1 8408 4028 5
5. Trott, P, *Innovation Management and New Product Development*, Financial Times Pitman Publishing, London, 1998, ISBN 0 2736 3111 X
6. Australia Design Council, *Australia's Best*, T Wilson Publishing, Melbourne, 1988, ISBN 0 8582 8012 4
7. McKeough, J & Stewart, A, *Intellectual Property in Australia*, Butterworths, Sydney, 1997, ISBN 0 4093 0677 0
8. MacInnes, P, *Applied Studies in Science, Mathematics and Technology*, Longman Cheshire, Melbourne, 1993*,* ISBN 0 5829 1044 7
9. Cronk, T, *Operations Management*, ITP Thomas Nelson, South Melbourne, 1994, ISBN 0 1700 8946 0
10. Vallence, K & Wallace, L, *Quality Concepts,* ITP Thomas Nelson, South Melbourne, 1993, ISBN 0 1700 8799 9
11. Chapman, C & Peace, M, *Design and Realisation*, Collins Educational, London, 1992, ISBN 0 0032 2060 5
12. Warner, N et al, *Studies in Senior Design and Technology*, Jacaranda Press, Milton, QLD, 1995, ISBN 0 7016 3281 X
13. Rochford, J, *Senior Design and Technology*, KJS Publications, Terrigal, NSW, 1995, no ISBN
14. Constantinidis, S et al, *Legal Studies 3 Unit Course*, Heinemann, Port Melbourne, 1995, ISBN 0 8585 9837 X
15. Hayward, H & Lembach, M, *Business in Australia*, University Press, Melbourne, 1992, ISBN 0 1955 3225 2

16. Sykes, D et al, *3 Unit Business Studies*, Longman, Melbourne, 1994, ISBN 0 5829 1347 0
17. Miles, S, *Business Management: Case Studies in Small Business, Communications, Marketing, Public Relations*, Edward Arnold, Melbourne, 1993, ISBN 0 3405 8138 7

Video;

18. Video Classroom, *Rip Curl I and II*, (video, 30 min), 1996
19. Classroom design and marketing of a new product: case study of a new model – the Toyota Camry, (Video, 22min), 1994
20. Video Education Australia, *Good Enough To Eat*, (video, 38 min), 1999

CD-ROM

21. ICAC, *Ethics in Design and Technology*, Jacaranda Press, 1995, ISBN 0 7016 3281 X

Organisations

22. Australian Industrial Property Organisation, IP Australia (Patent, Trade Marks & Design Offices) Level 1, 45 Clarence St, Sydney tel 1300 651 010

Websites

23. Chiat Day Advertising Agency: http://www.chiatday.com/
24. University of Technology Sydney: http://www.uts.edu.au/
25. SRI International: http://www.sri.com/
    This website is based on innovation and is organised around key fields embracing the sciences, key technologies and applications.
26. CSIRO Library: http://www.cis.csiro.au/

Possible Assessment Strategies

The case study on innovation addresses knowledge of innovation and skills in researching and communicating. Other assessment tools could include reports and oral presentations, however, it is important that this unit also be used as a tool to improve or assist a student's development of their major design project and following a process that is consistent with successful practice in designing.

HSC Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H2.2 evaluates the impact of design and innovation on society and the environment	• ethical and environmental issues – ethical and environmental considerations for designers and society – sustainable technologies – protection of intellectual property including patents, copyright and plagiarism – rights and responsibilities of the designer	• critically analyse ethical issues in relation to innovation	Teacher introduces the Case Study which is integrated into the teaching and learning activities of this unit. Students are provided with the topics (refer p 9 syllabus) that they need to cover in their case study and work independently to complete the task. Note that the topics are italicized throughout this unit to assist with the case study Students: *(case study reference: the impact on Australian society)* • locate and record a definition of the term *innovation* using a variety of sources (resource 2, p 56) • discuss in groups examples of current innovations and how they have improved an aspect of our everyday lives Students: *(case study reference: ethical and environmental issues)* • in groups discuss, define and record definitions of environmental factors that impact on design and innovation on: • socio-cultural; demographic patterns, lifestyles, ethnicity and social attitudes

HSC Outcomes A student:	Students learn about:	Students learn to:	Strategies, activities and related resources
H2.2 evaluates the impact of design and innovation on society and the environment		• discuss ethical and environmental considerations for designers and society in general	• economic; level of unemployment, national debt, interest rates and inflation • legal/political; environmental protection laws, stability of government, industrial law and tax corporate law • technology; automation, robotics and computer literacy (levels of diffusion into society) • natural; pollution, greenhouse and non-reusable resources Students: • investigate and review resource 23 and record notes about the ethical issues in relation to innovation. Teacher references resources 4, 5, 6 (p 3), 7 (p 160–1) • discuss and list points for good design (teacher reference resource 6, p 8), eg: • utility and safety • maintenance • cost • sales appeal • appearance • environmental issues and product life cycle changes due to changes in government regulations for the environment

Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H2.2 evaluates the impact of design and innovation on society and the environment		• identify the factors which contribute to the efficiency and sustainability of technologies	Students: • participate in a role play 'future scenario' to anticipate new technological developments and the resulting human design needs • investigate changing lifestyles and how this has influenced the ergonomics of design
H3.1 analyses the factors that influence innovation and the success of innovation	• factors that impact on success of innovation including: – timing, available and emerging technologies, cultural, political, economic and legal factors, marketing strategy including size, demand and product promotion • agencies including the patents office and small business council • entrepreneurial activity – nature of entrepreneurial activity – role in design and technological activity – agencies which affect entrepreneurial activity eg gov'ment, commercial and industrial – management and entrepreneurial activity	• differentiate between factors which have contributed to the success or failure of innovations • describe the role of a variety of agencies that influence the development, implementation and acceptance of innovation	Students: (*case study reference: factors which may impact on successful innovation*) • identify opportunities (problems worthy of a solution) and the role of advertising and marketing in innovation eg Chiat Day Mojo (resource 23) • record notes on the factors that have contributed to the success or failure of innovations – success: computer socks – failure: Leyland P76 • identify and record – management of innovation (resource 1) – ownership of innovation (patents) – research and innovation (resource 25) – customers (Cochlear Implant) – market opportunities (computer socks)

HSC Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H3.1 analyses the factors that influence innovation and the success of innovation		• discuss the influence of entrepreneurial activity on successful design and innovation • discuss the legal and ethical issues related to entrepreneurial activities	*(case study reference:entrepreneurial activity)* • recognise that a products success is enhanced when it is functional and 'trend-right' • discuss and list the elements of innovation (resource 1 p 9) • view video (resource 19) and answer included worksheet questions • investigate issues related to legal, industrial and consumer safety issues • identify the diversity of technologies available to companies to assist them in conveying the intended image (eg computer design visualisation, product materials to exact requirements, miniaturisation) • recognise that new designs to meet recyclability legislation, often yield unexpected benefits – resource 2 (p40 – Mount Batten Brailler), 2 (41 – Bionic Ear) and resource 6 (p26 – no screw assembly)

HSC Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H1.2 relates the practices and processes of designers and producers to the major design project	• the work of designers – design practice – processes used by designers	• emulate, where appropriate, the practices and processes used by designers to assist in the development of the major design project	Students: *(case study reference: designs and design practise)* • investigate, report and define what design practices are by recalling the steps of the design process (resources 8, 10 and 11) • relate these findings, where appropriate, to the development of the MDP • explain and record the impact of economic global factors (resource 7, pp 24–42) • identify a trend in design and technological activity and identify the issues arising from its development • identify and record the role of computers, the nature of work and employment and how it has impacted on the adoption of new technologies by Australian businesses
H2.1 explains the influence of trends in society on design and production	• trends in designing and producing, including those which are influenced by social, global, political, economic and environmental issues • historical and cultural influences on designing and producing, including: – changing social trends – cultural diversity	• discuss the issues arising from trends in design and technological activity	

HSC Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H2.1 explains the influence of trends in society on design and production	– the changing nature of work – technological change	• identify and acknowledge historical and cultural influences on design and technological development	Students: *(case study reference: historical and cultural influences)* • select an item and identify the historical and cultural influences on the design and technological development of the product, eg – gratuitous gadgets – high tech products (digital colour, artificial muscles) – low tech products (pens, pencils, toothbrushes) – domestic products – transportation – communication • present an oral presentation to the class and distribute a summary sheet of the main historical and cultural influences on the design and technological development
H3.2 uses creative and innovative approaches in designing and producing	• creativity and innovative design practise – processes undertaken to develop innovations – success of innovation – adaptation and development of ideas	• demonstrate creativity in the development of the major design project	Students: *(case study reference: creativity)* • experiment with the concept of brainstorming relating to the development of initial ideas and sources of inspiration for innovation

HSC Outcomes A student:	Students learn about:	Students learn to:	Strategies, activities and related resources
H3.2 uses creative and innovative approaches in designing and producing	– responding to motivational stimuli – creative thinking	• critically analyse successful innovation	• research related fields of technology to determine possible sources of application to the MDP • identify and analyse the reasons behind the success of the development of the Toyota car. Resource 19 • apply, where appropriate, these processes to the development of the MDP • investigate entrepreneurial strategic planning by one company(eg Hoover – 3 different products for niche markets) and describe the approach used
		• discuss concepts of quality, innovation and creativity	Students: • define and record a definition for quality (resource 13 and 14) • investigate the image of quality and the process of Total Quality Management in relation to how well a product meets an end-use and consumer lifestyle. Resource 13 (eg a thematic approach could be taken based on recreation, consumer electronics, kitchen appliances and transportation) • recognise that legal factors have reduced the gap in manufacturing quality

HSC Outcomes **A student:**	**Students learn about:**	**Students learn to:**	**Strategies, activities and related resources**
H6.2 critically assesses the emergence and impact of new technologies, and the factors affecting their development	• emerging technologies – factors affecting their development – criteria for evaluation – impact on society and the environment • impact on innovation	• appraise the ecological, economic, social, ethical, and legal implications of new and emerging technologies • analyse the impact of emerging technologies on innovation	Students: *(case study reference: the impact of emerging technologies)* • investigate how some countries separate laws from convention in relation to consumer items eg brand name shirts in Bali markets • explain the role and application of copyright in relation to catering for technological improvements ie world wide web Students: • discuss and record notes on the impact of emerging technologies on innovation – remote sensing-speech recognition; – systems development-information and communication – human-computer – health care-drugs • recognise that consumer responses drive innovation, eg mobile phone.

4 Preliminary Assessment Scheme

4.1 Example

Assessment Components	Syllabus Weightings	Task 1 Design Project 1	Task 2 Research Task	Task 3 Oral Presentation	Task 4 Yearly Exam	Task 5 Design Project 2
		Due Date T1 W9	Due Date T2 W6	Due Date T2 W2	Due Date T3 W5	Due Date T3 W10
Knowledge and skills in: **Designing and Producing**	100	15	15	20	20	30
Course Outcomes		1.1, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.1, 5.2, 6.2	1.1, 5.3	2.1, 5.2, 6.1, 6.2	1.1, 2.1, 2.2, 3.1, 4.2, 4.3, 5.1, 5.3,	1.1, 3.1, 4.1, 4..2, 4.3, 5.2, 5.3, 6.1,
Marks	100	15	15	20	20	30

4.2 Task Outlines

- Task 1 - design project I: students work independently to design and make a system in response to an environmental need
- Task 2 – research task: using a range of methodologies, students conduct market research to establish a need and draw conclusions based on the results
- Task 3 – oral presentation: students present a 3 minute presentation on the comparison between the technologies and processes used in the realisation of a project to the activities of design and production in industrial and commercial settings
- Task 4 – yearly exam: written paper
- Task 5 – design project 2: students work in cooperative groups to either design and make a scaled model of a dream home or design and make a diorama of a room design and manufacture an article for use in this room

5 HSC Assessment Scheme

5.1 Example

	Assessment Components	Syllabus Weightings	Task 1 Oral Presentation based on MDP	Task 2 Case Study of Innovation	Task 3 Written Report	Task 4 Management Plan for Advertising Campaign	Task 5 Trial HSC
			Due Date T4 W7	Due Date T1 W6	Due Date T2 W4	Due Date T3 W3	Due Date T3 W8
	Knowledge and skills in: **Innovation and Emerging Technologies**	40		20			20
	Designing and Producing	60	20		20	20	
Course Outcomes			4.1, 4.2, 4.3, 5.1, 5.2	2.2, 3.1, 3.2, 6.2	5.2, 6.1	5.1, 5.2	1.1, 1.2, 2.1, 2.2, 3.1, 6.2
	Marks	100	20	20	20	20	20

5.2 Task Outlines

- Task 1 – oral presentation: students present their ideas and direction for the Major Design Project in a three minute presentation
- Task 2 – case study on an innovation: using the criteria from the syllabus (p 9) students complete a written report based on one innovation
- Task 3 – written report: students account for the processes carried out in industrial and commercial settings in relation to those used in their major design project
- Task 4 – management plan: using a range of presentation media, students prepare a management plan for an advertising campaign based on their major design project
- Task 5 – trial HSC: written paper