

# DOT POINT

HSC DESIGN AND TECHNOLOGY

• Monique Dallì •



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# Innovation and Emerging Technologies

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# DOT POINT

Innovation and Emerging Technologies



## 1. Factors affecting design.

### 1.1 Factors affecting designing and producing.

**1.1.1** Which of the following best describes the aesthetic features of a product?

- (A) Styling.
- (B) Suitability.
- (C) Ergonomics.
- (D) Visual appeal.

**Extension:** Define aesthetics.

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**1.1.2** The durability of a product refers to its:

- (A) Value.
- (B) Quality.
- (C) Function.
- (D) Strength.

**Extension:** Define quality.

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**1.1.3** When designing a new chair, which of the following factors has the most importance?

- (A) Aesthetics.
- (B) Styling of shape.
- (C) Cost of manufacture.
- (D) Interaction with the user.

**Extension:** Explain your choice.

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**1.1.4** Which of the following would be considered as an economic factor?

- (A) Quality.
- (B) Recyclability.
- (C) Material choice.
- (D) Short-term cost.

**Extension:** Explain your choice.

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**1.1.5** Outline the impact of designed obsolescence on the following.

(a) Consumers.

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(b) Environment.

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**1.1.6** Explain the importance of a designer conducting research into possible manufacturing processes prior to a product’s final development.

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**1.1.7**

(a) Compare the life cycle of the two types of shopping bags shown below.



Plastic disposable bag



Re-usable bag

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Designing and Producing





## 7. Identification and exploration of the need.

### 7.1 Needs analysis.

7.1.1 A need is driven by:

- (A) Market needs.
- (B) Changing human needs.
- (C) Technological advancements.
- (D) All the above.

**Extension:** Explain your answer.

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7.1.2 Criteria for success are best defined as:

- (A) System requirements.
- (B) Benchmarks for success.
- (C) Criteria for cost and function.
- (D) All the above.

**Extension:** Why are criteria for success essential?

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7.1.3 Market success of a product is fundamentally determined by its:

- (A) Ease of use.
- (B) Futuristic styling.
- (C) Ability to suit intended use.
- (D) Cost effectiveness in comparison to competitors.

**Extension:** What are other factors that impact a design's success?

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**7.1.4** Design solutions start with a problem. Discuss this statement in relation to your major design project concept.

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**7.1.5** What methods could designers use to test the validity of a market opportunity?

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**7.1.6** Outline disadvantages of having a set concept prior to conducting the research stage of the design process.

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**7.1.7** What elements are essential to include in a design proposal?

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**7.1.8** Explain the concept of ‘point of difference’.

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**7.1.9** What is the purpose of having criteria to evaluate success?

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**7.1.10** Explain why modifying or deviating from the original design proposal should not be considered as bad practice.

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**7.1.11** How can a designer practically test and develop a ‘bright idea’ ?

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**7.1.12** How are areas for investigation identified as part of the research and development of your major design project?

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## Answers



## 1. Factors affecting design.

- 1.1.1** D Aesthetics is the personal perception of an item's beauty and visual appeal.
- 1.1.2** B Durability is the length of time a product, system or environment can reasonably function; it is directly linked to the quality.
- 1.1.3** D The ability of a chair to provide comfort and interact with its user in terms of ergonomics is directly linked to a chair's prime function.
- 1.1.4** D Short-term cost involves the manufacturing of an item, and includes wages, production costs and cost of raw materials.
- 1.1.5** (a) Consumers are affected by the ongoing need for buying new products as the old products break down or are superseded by upgraded models.
- (b) Premature disposal of working items due to superseded models adds to waste, as well as the waste of resources employed to create replacements.
- 1.1.6** Research into possible manufacturing processes is important to not only work out in advance if a particular process is viable, but also to check cost effectiveness of production. Increasingly, sustainability and life cycle assessments are carried out to help minimise the impact of production on the environment. Production and industrial processes can have as much impact on the environment as end use and disposal.
- 1.1.7** (a) Plastic bag: Singular or limited use design; its disposal depends on consumer, commonly not recycled, and therefore added to landfill.
- Re-usable bag: Designed for extended durability and repurposing, lessening the likelihood of disposal.
- (b) Short-term: Both bags are produced/manufactured using resources and energy. Plastic bags are commonly made from petroleum, a non-renewable resource. Re-usable bags are commonly made from recycled/reclaimed materials.
- Long-term: The consumption of finite raw materials such as petroleum is not sustainable. The disposal of the plastic bag is adding to waste, due to the quality and nature of their design they are not intended for multi-use and are not durable like the re-usable shopping bags. Re-usable shopping bags have a longer life, and over time and re-use do not involve the constant consumption and disposal of plastic bags.
- 1.1.8** Function is the purpose or core need that a product, system or environment is designed for. For some designed items to accomplish this there may be less importance placed on aesthetics so as to fully achieve its function. Inversely, in a competitive marketplace, aesthetics could be a determining factor between options and models when core function is the same.
- 1.1.9** Safety: Park area must comply with safety standards and allow safe play for appropriate use.
- Aesthetics: Due to the audience being young, the colour and structure must be aesthetically pleasing as well as suited to the environmental surrounds.
- Sustainability/obsolescence: The manufacture, installation and life span of the play area must be durable and sustainable in maintenance.
- 1.1.10** Costs occurring the design stage are costs associated with testing and experimentation. During the manufacturing stage resources are bought and used for production. Distribution costs are from advertising, transportation and delivery. Costs during use could be from resources such as power. Finally there are costs to dispose of the product when recycling or deconstructing occurs.

### 1.1.11

Item	Function	Aesthetics	Ergonomics
Mobile phone	Primary function: To make phone calls. Secondary functions: Access internet, SMS, email and video call.	Specific to item: May include reference to style/colour, texture.	In relation to distance between ear/mouth, hand and fingers for buttons.
Sports bottle	Primary function: Hold drink. Secondary function: Advertise brands/logos for marketing.		In relation to hand/grip and mouth. Speed of dispensing liquid.
Car steering wheel	Primary function: Control direction of car. Secondary function: Radio controls, acceleration, and cruise control buttons.		In relation to hand/turning capabilities.
Writing pen	Primary function: Ink marks on page. Secondary function: Advertise brands/logos for marketing.		In relation to hand, position of fingers and grip.

**1.1.12** Answers will vary, but should include factors (note plural) specific to major design project (MDP) such as: function, aesthetics, finance, ergonomics, workplace health and safety (WHS), quality. For each factor, the characteristics and features must be provided, as well as each factor linked to an appropriate example to prove relevance. For example: Ergonomics is an important design factor to consider when designing a product, as it is concerned with a human's interaction with a design, and for a design to be successful it should take this into account. When designing my MDP I researched physiological factors and anthropometric data to get a better understanding of how ergonomics could impact the design outcome, and better improve the function of the design.

**1.1.13** Answers will vary but should include: planning and production of practical work; meeting safety requirements; competency in equipment use; access to equipment and manufacturing methods; application of safe work methods as outlined by teacher and WHS standards; use and management of personal protective equipment (PPE). Also restrictions on tool and machine use that may not be suitable for students' age/level of experience. For example, sample response could read: WHS specifically impacted the practical work during practical processes of the MDP in the following instances. Before using any equipment I had to seek permission from my teacher after they had checked relevant safety requirement. Then, if possible I was able to use the equipment, but only after adequate safety instruction, testing and demonstration of competence. Whilst using practical equipment, I had to wear the correct PPE and continually abide by relevant WHS safe practices to maintain a safe environment for myself and others. In one instance, I was not able to use machinery on my own; this was due to a higher level of risk identified with the piece of equipment and the level of experience required to operate it. I sought a professional to assist with this practical process, and it was documented in my folio.

**1.1.14** When designing and producing, financial issues affect both a designer and a student. A designer may have access to a larger amount of funds from a business, or larger budget, whereas a student has limits on finances. Both a designer and student are constrained by a budget in the design process, as well as in the production of a design, and in both cases it should be so that the final design could be manufactured and be profitable once sold.

**1.1.15** It is important to understand the link between the factors that affect design and successful designing. Design is a creative process, however, to make money it must be done for a purpose/need. Factors such as function, quality, short/long-term costs constrain a designer from creating items that are not purposeful and appropriate for marketing and general consumption/use. A designer should understand the factors that affect design because they can determine the success or failure of a project.

**1.1.16** It is a designer's core purpose to solve problems and fulfil the needs of society with successful product, system or environments (PSEs). Design is everywhere in society, e.g. architecture, graphics/advertising, multimedia, fashion and furniture. Products, systems and environments are essentially created to either fulfil an existing need, or because a designer saw an opportunity. Designers do solve problems, by thinking creatively and designing a solution that can be implemented for a profit.

**1.1.17** The final judge of a design's suitability is the user. Even though a designer may have fulfilled a need with an appropriate solution, it is the end user that decides if it solves the initial problem. The consumer will only pay for a design if they think it is appropriate and has perceived benefit. If after use, it does not fulfil the need, then the designer has not been successful. In this regard, it is up to the designer when designing to create PSEs that are suitable to the mass market (so that the majority can be satisfied, and there will then be a higher return on profit).