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Design & Technology
Eduqas GCSE

Using design strategies

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don’t spend too much time on one question

Good luck!

Q1. What is the correct order of the four stages of the Double Diamond?

A Define, Discover, Deliver, Develop

B Discover, Define, Develop, Deliver

C Develop, Discover, Define, Deliver

Q2. What is meant by design fixation?

A Getting stuck on the first idea, or copying an existing product

B Fixing faults found when testing a prototype

C Agreeing the final design with the client

Q3. In systems thinking, a product is often shown as:

A A mood board

B A rendered 3D drawing

C An input, process, output (block) diagram

Q4. Which stage of user-centred design identifies what the users need, which then becomes the specification?

A Contexts

B Requirements

C Evaluate

Q5. Looking at nature for design inspiration is called:

A Biomimicry

B Iteration

C Collaboration

Q6. Which of these is a disadvantage of collaboration?

A It brings diverse ideas and skillsets

B It gives faster problem-solving with multiple minds

C It can result in conflict and slower decision-making

Q7. A designer is developing a new LED head torch. Explain why a user-centred design approach is so important for the successful design of the head torch. **(2 marks)**

Q8. The Apple iPod is said to be an example of systems thinking. Explain the design approach of systems thinking. **(2 marks)**

Q9. Explain what is meant by avoiding design fixation. Give examples to support your answer. **(4 marks)**

Q10. Vacuum cleaners have been improved through many different models over the years. Analyse and evaluate how iterative design may have been used to improve vacuum cleaners. **(4 marks)**

Q11. Designers often collaborate. Discuss the importance of collaboration in creating effective design solutions. Give examples to support your answer. **(6 marks)**

Q12. Explain how a user-centred design approach can ensure that products are fit for purpose. Give examples in your answer. **(6 marks)**

Q13. A film company is considering launching a range of musical jewellery boxes based on its animated characters. Discuss the different design strategies the company could use to generate initial ideas and to avoid design fixation. **(6 marks)**

Q14. The Design Council encourages designers to 'Discover, Define, Develop and Deliver'. Evaluate how this is reflected in the iterative design process. **(10 marks)**

Answers

Q1. B
Q2. A
Q3. C
Q4. B
Q5. A
Q6. C

Q7.

1 mark for a correct understanding of a user-centred design approach and 1 mark for relating it to the head torch. For example:

- A user-centred design approach makes sure end users are consulted throughout the design and development of the product (1)
- This would make sure the head torch is easy to operate without having to look at the switch (1)

Credit any other appropriate response.

Q8.

Up to 2 marks for an explanation. For example:

- Systems thinking is when a product is not seen as just a product, it is seen as part of a system (1) that works with a number of other products, often to provide a service (1)
- Or: Apple provide a music download service (1) that works alongside the iPod, earphones and computers, which all work together (1)

Systems thinking means understanding a product or component as part of a larger system of other products, and considering all the parts and components in one system or sub-system.

Q9. (4 marks)

Marks	Descriptor
3 to 4	A detailed explanation of avoiding design fixation, with relevant example(s) to support the answer.
1 to 2	A basic explanation of avoiding design fixation and/or a relevant example.
0	No response or nothing worthy of credit.

The question is about avoiding design fixation, not just defining it.

- Basic: avoiding design fixation is where a designer looks at more than one design
- Detailed: the designer looks at more than one design; a greater range of ideas should lead to better products that meet the client's needs and wants; this is done by considering other possible concepts, e.g. folding smart phones

Examples of products or techniques:

- Mobile phones were expected to have keys; the first smartphone broke from tradition with a touch screen
- Dyson moved away from the bagged vacuum cleaner to a collecting drum
- Mary Quant's creative and imaginative use of geometry in 1960s fashion
- Collaboration: designers with different skill sets working together
- Focus groups: specific input of the client's needs and wants

Q10. (4 marks)

Marks	Descriptor
3 to 4	Clear analysis and evaluation of how iterative design could be used to improve the vacuum cleaners.
1 to 2	Brief or simple statement(s) about iterative design, with limited evaluation of how it is used to improve vacuum cleaners.
0	No response or nothing worthy of credit.

Iterative design is:

- Prototyping, testing and then evaluating a product
- Each cycle leads to small, step by step refinements in the product (feedback)
- Evaluating by finding out the views and opinions of clients, potential customers or end users
- Taking small steps with a design and responding to feedback

It improves vacuum cleaners because:

- Each iteration aims to improve both the quality and the function of the product, e.g. removing the dust collection chamber

- It should find and remove problems and quality issues before commercial production, e.g. the speed of cable retraction
- It avoids the expense of stopping production or withdrawing a product, as flaws should have been removed during development and prototyping

Q11. (6 marks)

Marks	Descriptor
5 to 6	A thorough, detailed explanation with clear, relevant discussion of collaborative design and its importance in helping designers create effective solutions. Clear example(s) support the answer.
3 to 4	A good explanation with relevant discussion of collaborative design and some consideration of its importance. Simple example(s) support the answer.
1 to 2	A basic explanation of collaborative design with little or no reference to its importance. Examples do not support the answer.
0	Nothing worthy of credit.

Examples can be products designed through collaboration and/or collaboration in designing itself.

Products

- Mobile phones: many different parts needing people with different skills to design them
- Packaging: the package and secondary packaging may be designed by different companies with different skills, equipment and expertise
- Motor vehicles and public transport: complex products needing teams with engineering, ergonomic and interior design skills to meet technical, legal and user needs
- Medical equipment: needs medical knowledge, technical and manufacturing expertise and human factors

Designing

- Getting specialist expertise, e.g. electronic engineers working with product designers, architects with structural engineers
- Companies buying in outside design ideas, e.g. products marketed as “Porsche design”, IKEA working with outside designers such as Tom Dixon, fashion stores commissioning outside designers

- Designers working together feed off each other's ideas and experience, and inspire innovative and creative solutions
- Designs by one person can become stale; solutions made in isolation may be lower quality and miss some needs of the client or user
- Increases the range and quality of solutions, e.g. teams of designers in competition
- Companies can be slow to react to changing market demands; collaboration can help "future proof" against this
- Shorter design timescale, as designers can work at the same time

Q12. (6 marks)

Marks	Descriptor
5 to 6	A thorough and detailed explanation with clear, relevant discussion of a user-centred design approach. Excellent understanding of how it makes sure products are fit for purpose. Clear example(s) support the answer.
3 to 4	A good explanation with relevant discussion of user-centred design. Some understanding of how it makes sure products are fit for purpose. There may be example(s).
1 to 2	Basic discussion with general points about user-centred design and what it is. Little or no use of examples.
0	No response or nothing worthy of credit.

A maximum of 4 marks if detailed points are made but no examples are given. Examples may be real products or methods used in user-centred design.

- Constant contact, feedback and discussion with the end user or client group, e.g. questionnaires, surveys
- Designing with thought about how specific people will use the product and what they will do with it
- Focusing on a specific identified problem, e.g. opening bottles and jars, storing mountain bike equipment
- A client-based approach, e.g. GCSE projects where students identify an end user
- Responding to customer feedback on existing products, e.g. virtual reality headsets and games
- Focused on the needs and wants of the client or end user so the product meets their specific requirements, e.g. a suit or wedding dress

- Focused on the needs and wants of the user at each phase of design and development
- Uses primary and secondary research, e.g. interviews, focus groups, user interactions
- Focus group testing makes sure the product works safely and correctly with its intended users, and may flag up changes for a future iteration, e.g. battery life, camera or screen size on a mobile phone

Q13. (6 marks)

Marks	Descriptor
5 to 6	Takes the information apart with sustained connections and logical chains of reasoning. A well-balanced appraisal with judgements showing a thorough awareness of how the strategies link together.
3 to 4	Takes the information apart with some connections and logical chains of reasoning. A balanced appraisal with judgements showing an awareness of how the strategies link together.
1 to 2	Attempts to take the information apart, but the connections and chains of reasoning are flawed. An unbalanced appraisal with limited awareness of how the strategies link together.
0	No rewardable content.

Indicative content:

- Collaboration: different people look at problems from different viewpoints, such as technical, manufacturing, materials and users' needs and wants
- Collaboration lets people and teams bounce ideas off each other, sparking imagination; teams may be in different countries and work together online or by video conference
- User-centred design puts the needs and wants of others at the centre of all decisions, and considers users' views at every stage of the design process
- In user-centred design, feedback is taken very seriously, so users' needs and opinions are gathered and acted on
- Systems thinking looks at the whole problem and breaks it down into individual parts or blocks, and how the parts fit, work and interact with each other

- Systems thinking considers where any energy or power will come from and what inputs, control and outputs are needed
- Evaluating and analysing existing products, designers and movements
- Using outside stimulus or triggers, e.g. biomimicry
- Iteration is used to fine tune and develop ideas in response to consumer feedback

Q14. (10 marks)

Answers that evaluate how the iterative design process can be seen as discovering problems, defining specifics, developing and refining solutions, and presenting a final outcome to solve the problem can be awarded up to 10 marks. Quality of written communication (QWC) is also assessed.

Guidance:

- Discover: seen in the iterative process when designers look for problems and possible design tasks within contexts; exploring the user's needs and wants helps designers discover the essential parts of the problem
- Define: fixing a design brief for an identified problem; also includes the design specification, a list of success criteria that the design will be measured against
- Develop: generating a wide range of initial ideas, which are then modelled, tested and evaluated to find areas for improvement; as the iterative cycle continues, the solution improves and becomes refined
- Deliver: making the prototype and presenting it to the users; testing and evaluating the final prototype with users shows how well the solution answers the problem

Marks	Descriptor
9 to 10	A highly clear and fully detailed evaluation of how Discover, Define, Develop, Deliver relates to the iterative design process, with specific reference to the stages and activities of the process and how they fulfil the 4 Ds. Excellent QWC: wholly appropriate, coherent and logical, with no spelling, punctuation or grammar errors.
7 to 8	A fully clear and very detailed evaluation, with reference to the stages of the iterative process and how they fulfil the 4 Ds. Very good QWC: wholly appropriate, coherent and logical, with hardly any errors.
5 to 6	A clear and detailed evaluation of how the 4 Ds relate to the iterative design process. Good QWC: mainly appropriate and coherent, with few errors.
3 to 4	Some detail, with some evaluation of how the 4 Ds relate to the iterative design process. Good QWC: mainly appropriate and coherent, with few errors.
1 to 2	A brief description with very little evaluation of how the 4 Ds relate to the iterative design process. Basic QWC: occasionally appropriate, with some coherence and some errors.
0	No answer, or no relevant information.