

A2 LEVEL Section C

FACT FILES

Technology & Design

For first teaching from September 2011

For first award in Summer 2013

Design for Use



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design



Learning Outcomes

Students should be able to:

- Design for maintenance and repair;
- Design to be inclusive for all society;
- Re-design for a changing length in life cycle.



Course Content

Design for maintenance

Most modern products require some form of maintenance to keep them working properly, it could be changing batteries, replacing a bulb or a filter, or replacing a part which has become worn. Some of these products can be maintained by the user, but some may require skilled/specialist labour to perform any maintenance.

Designers work closely with the engineers who will manufacture the product so that it can be manufactured in a way that allows be easily maintained by the user. This may involve making the product with parts which can be easily removed or exchanged e.g. changing ink cartridges in a printer or removing a filter from a dishwasher for cleaning. It might also mean ensuring the safety of the consumer by making some parts of the product inaccessible using security screws for example on electrical products, like a hairdryer, to prevent electrocution.

Designers and engineers will also improve designs by reducing moving parts and overly complex designs/systems not only to improve reliability and reduce costs but make it easier to service and maintain a product.

Some products will have parts that are more reliable than others, where some of the components are designed to last and some of the parts are designed to fail requiring the user to replace them. For example a light socket is not designed to be replaced regularly whereas the bulb is designed to be replaced by the user.

Manufacturers need to be seen to produce products in a more environmentally way and building products to last or be maintained easily by the consumer is one such way. However designing more reliable products can have an effect on manufacturer profits. However, by providing additional services and selling replacement parts to maintain a products life span manufacturers can recoup some of these losses. For example replacing printer cartridges can cost nearly as much as the printer itself.

Maintenance and repair during the design of a product are addressed by a designer in the following ways:

- Improving reliability by reducing it's complexity, especially if it utilises systems;
- Reduce costs by reducing and minimising parts;
- Make use of standard components therefore reducing replacement parts costs, and making it easier to repair and maintain; and
- Labeling and instructions included with products to educate the user in any maintenance procedures.

Inclusive Design

Inclusive design means a designer/manufacturer producing a product, which users of differing ages and abilities, can use easily. Not all products are designed with every type of user in mind and there will always be products which will need to be specifically developed for users who have specific requirements. The designer has to consider that their product might be used by everyone and anyone and that for it to be successful, it should improve their quality of life in some way.



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For example, this electric toothbrush has several features which would assist people with poor eyesight, weak grip and strength clean their teeth more easily. Can you identify some of these features?

It is important for manufacturers to design products which are inclusive because:

- People are living for longer, so products need to be easily understood and easily used by older users as much as they do by young and healthy users; and
- There is an increasing need to integrate people with disabilities into society.

Designers can achieve this by ensuring products have some or all of the following features:

- Flexible design: the product can be personalised by the user allowing some form of customisation, e.g. size adjustment for better fit, visible and audible warnings/signals, suit existing ability by simplifying processes.
- Easy to understand, with simple control whatever the users ability, especially the use of senses e.g. sight, hearing etc.
- Reduce fatigue during use and require the user to exert the minimum effort for a required output.

Re-design for a changing length in life cycle

As a product enters the *maturity phase* of a life cycle the manufacturer has a choice, either abandon the product and allow it to enter the *decline phase* or re-design the existing product to increase it's time in the marketplace.

Below is a chart depicting a products life cycle with extension, instead of decline in the fifth phase new options allow it to increase sales again.



A manufacturer may consider the following options when re-designing a product:

- Develop alternative versions of the existing product, by introducing newer technologies in the existing product, software updates, different colour options.
- Reduce the price of the product.
- Bundle the product with other products and other promotions.
- Selling the product in new countries, allows the company to increase it's marketshare.
- Repackaging the product to make it more visible in the marketplace.



Revision questions

1. Give **two** reasons why manufacturers should consider inclusive design when producing new products. [2]
2. Briefly explain how a manufacturer might prevent their product from entering the decline phase of it's product's life cycle. [2]
3. Designers are working more and more towards inclusive design, state **three** ways a designer can achieve inclusive design in an everyday product. [3]
4. It is important that manufacturers produce products which can be easily maintained. Describe **two** ways manufacturers might.