Ergonomics

The interaction between the human body and products, systems and environments.

Psychology

- How a product communicates to us.
- So we know exactly how to use, we know where the functions are by just looking at it
- Thinking about colours, textures, mood.
- How a product affects our senses (aesthetics).

Lighting

The correct level of illumination can be a very ergonomic factor. Visual displays need to be bright enough to be seen in full day light and adjusted at night time.

Many car dashboards have lighting that adjusts at night.

Does a sign, warning light or a button become less important in low visibility? No!

Ergonomics affects the following:

- Size – ensuring a chair is the correct size
- Shape and form – round shape for a mouse to fit comfortably into the hand
- Comfort – this might mean selecting soften materials for a seat
- Colour – The colour of a wet floor sign is yellow with black text

Colour

Power switches, warning lights on cars, function keys on your mobile phone...

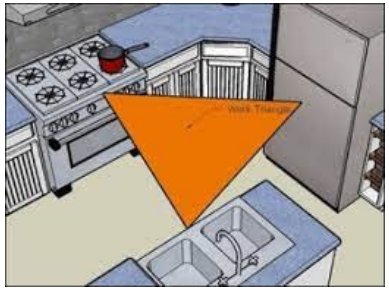
The type of colour used and how that colour performs in different levels of light are important factors that a designer must consider.

Sound

Audible instructions and warnings are common in aircraft controls, lifts, SATNAVS, in car safety systems and self-service checkouts.

The sound level and clarity of the instruction in different circumstances, such as engine noise etc. are also important factors to consider.

On the other hand, high levels of noise can be uncomfortable and cause health and safety issues.



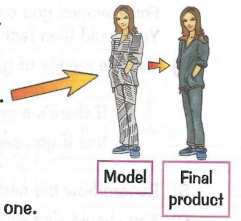
Prototyping

Professional designers make 3D prototypes early in the design process. It's quite crude in the beginning: a cardboard model. Cheap and pliable, cardboard or foam allows the engineers to model basic functions, quickly.
They then move on to Computer Aided Design (CAD). This allows engineers to test calculations and airflow dynamics as well as send the CAD parts to a 3D-printer.
The 3D printed parts can be assembled with motors and electronics into fully functioning machines.

1) Once you've got your detailed sketches and maths done, it's a good idea to make a prototype (a model) of your design. The prototype you make depends on your product and what you want to test. For example, your prototype could be:
   - A scaled-down version of your design.
   - A full-size version of your design but made using cheap materials.
   - A one-off version of your design made using the right materials or ingredients before the product is mass produced (see page 18).

The ratio 1:10 is the easiest scale to use when making a scale model. (You just move the decimal point on your measurements by one place).

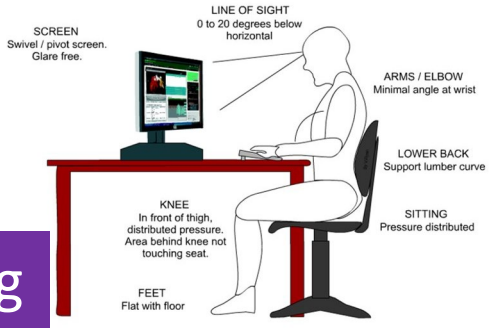
2) 3D models are a great way of finding out whether your design will work.
3) A prototype can allow you to see the final design in 3D without wasting money on lots of materials or ingredients. E.g. you can make up a clothes pattern using newspaper to check that all the pieces fit together.
4) Producing a prototype can help you find out which shapes, colours and materials will suit your design best.
5) Making prototypes also helps show up any problems — see next page.
6) It is common in industry for lots of prototypes to be made, not just the one.



'Good' ergonomics are found through using anthropometric data...

Anthropometrics

The use of human measurement data in order to improve ergonomics.



Ergonomics and Prototyping