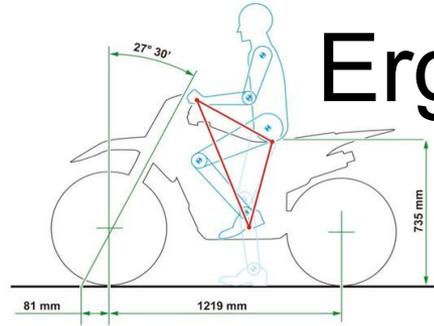


DESIGN FACTORS 'FEEPAM'



Function



Ergonomics

Environment



Performance

Aesthetics



Market

FUNCTION

ERGONOMICS

ENVIRONMENT

PERFORMANCE

AESTHETICS

MARKET

DESIGN FACTORS

FUNCTION

Primary

Primary function is what a product is designed to do:

Kettle

Mobile phone

Tin opener



Boil water

Phone calls

Open Tins

Secondary

Secondary function is anything else a product can do other than what it is directly design for.

What do they products below have as secondary functions??



ERGONOMICS

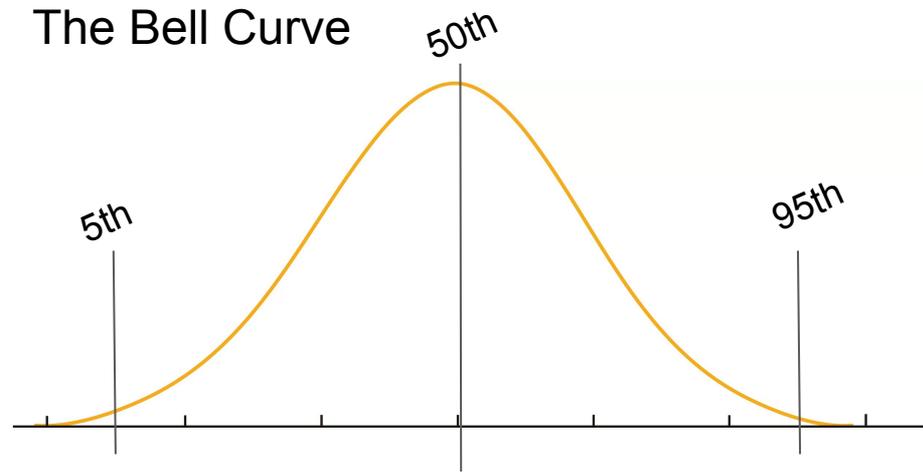
Anthropometrics

Anthropometrics is the study of human measurements. It is key to designing products which are the right size for us to use.

There are sizes for all sizes of humans from children to adults, males to females and also for all different parts of the body from fingers sizes to height.



Data has been collected to ensure it is relevant to the products we use all the time.



The bell curve shows the percentiles from 0-100 with the commonly used percentiles within design being the 5th, 50th and 95th percentile.

Designers often leave the top 5% or bottom 5% of people due to the cost implications of designing for such extremes of size.

ERGONOMICS

Psychology

Psychology is the study of interaction with products through the mind. This is normally achieved using sound and light to convey a message.

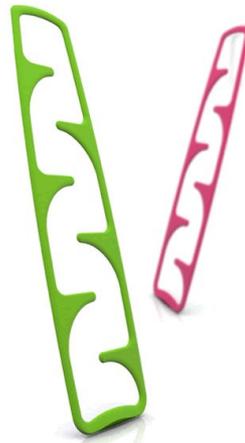


So.... you get in from school and sit down on the couch, switch the tv on, the tv is still black but you put the remote down. How do you know the tv is on????

Have you ever heard someone saying:
‘CLICK ON THE KETTLE’

This has become a saying due to the fact the button on the kettle actually does click when you are pressing it.

There is also an LED on the button of the kettles which will light up when the kettle is on.



Psychology can also impact upon a product's look, for example the colour of a piece of fruit or how stable/strong a ladder looks.



ERGONOMICS

Physiology

Products need to consider the limits and capabilities of the human body with lifting, twisting, turning, pushing, pulling and various other movements.

Everyone has different strengths and sizes of hands but we all need to be able to use items such as a tin opener, therefore different tin openers have been designed to achieve this.



Cheap tin opener for mass market



Expensive tin opener for targeted market maybe older buyers with less strength



Electric tin opener for gadget or technology market



This tool makes it easier to open jars using a lever, not just relying on grip strength alone



ENVIRONMENT

Sustainability

Sustainability within products is where products are designed to be made and used having minimal impact on the environment.

Designers are being increasingly conscious of their products impact on the environment and the need to protect the earth from damage and pollution.



The diagram shows the life cycle of a product from sourcing the materials, manufacturing and assembling the product, product use and then finally product disposal (hopefully with most parts and materials being recyclable)

ENVIRONMENT

Recycling

Recycling has become a huge factor within the products we design. Using recycled materials to make the product. Ensuring a products can be recycled once its life cycle has ended. Recycling has become a huge industry in itself.



ENVIRONMENT

Transport

Transport is an area that most people forget however it is present in all areas of manufacturing between different factories, from factory to retailer and then from retailer to place of use. Transport has a huge role to play in the reduction of a product carbon footprint.



Ikea looked at transport a different way, instead of green fuels or more efficient vehicles they have produced their watering can so that it can be stacked. Therefore allowing many more to be transported in each lorry load. Cutting down on the amount of transport needed.



ENVIRONMENT

Packaging Reduction

Companies now are looking for alternative ways to package products to reduce the materials being used.

The reduced packaging uses less of the raw materials as well as having a lower carbon footprint whilst being manufactured.



'Ever noticed the caps on bottles of juice getting smaller as well as the bottle itself getting thinner'

ENVIRONMENT

Manufacturing

During the manufacture process of any product it is important to reduce the waste during production and also the amount of energy use during production.

Some are very obvious but production waste what do you think these products are made from?



Denim offcuts, as slippers



Flooring offcuts, as folders



Old circuit boards, jewellery



Flip flop offcuts, it's a stool

PERFORMANCE

Ease of Use

Products should be designed to make life easier, they should aid completion of the task they are designed for. Products will be easy to use if designers have carefully considered:

- Function
- Instructions for use
- Ergonomics
- Ease of use
- Ease of assembly



All baby and toddler car seats by law have to have warnings and instructions on them about how they should be used correctly.

PERFORMANCE

Fitness for Purpose

When any product is made the first impression users have is whether or not it does the job it is designed to do.... Products will either be described as:

'Fit for Purpose'

'Not Fit for Purpose'

This will depend on the situation that the product is in.. For example...

'I have designed a toaster for using within the catering industry making breakfast for 100 people+'



OR



'Not Fit for Purpose'

'Fit for Purpose'

PERFORMANCE

Maintenance

Products which are easy to maintain allow consumers to replace worn or broken parts.

If a product has parts which will be worn down with use then they should be easy to change or replace, examples of these are:

- Bike tyres, brakes and chains
- Car bulbs in indicators/headlights
- Spare blades/wire for lawnmowers and strimmers

Extending a product life cycle in this way mean it is regarded as being better **'value for money'**

Bikes are one of the most important product to be able to maintain, almost every piece is exposed to the elements and need to be constantly checked to keep the product running smoothly.

Bikes are manufactured to allow each part to be removed and therefor can be checked and repaired easily. Changing a tyre when it has a



puncture for example, a wheel comes off simply by loosening two nut and sliding it out of the brakes

PERFORMANCE

Durability

There is an old saying 'you get what you pay for' this encapsulates durability.

The durability of a product can be affected by a number of different factors:

- Materials used.
- Manufacturing techniques used.
- Wear and tear in use.
- Elements that product is subjected to.
- Quality checks on finished product.



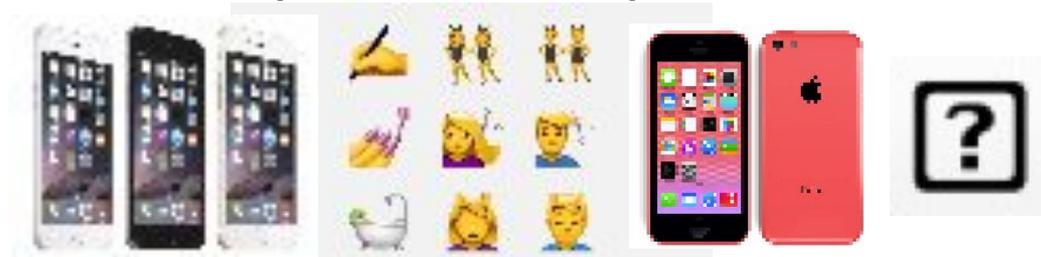
PERFORMANCE

Planned Obsolescence

Planned obsolescence is where a product is designed with a planned expiry. It is interesting as designers **do** design products to have a limited life span, there can be many reasons for this however.

- Cost of producing the longer life product
- Technology overtaking the product
- Software updates that the product will not handle

Take mobile phones for example:



On this iPhone the new emoji's look like this

On the older model the new emoji's look like this



One use products are also said to have planned obsolescence, the terramundi pots above and the various products below are a perfect examples.



PERFORMANCE

Material Selection

Materials have a bearing on the performance of a product as well as the appearance. Having rubber on the corner of portable products can make them more durable if dropped.



There are also other considerations such as moisture and water which affect material performance. For example MDF just expands when wet so is useless in a bathroom environment.



Size

The performance of a product is impacted by size. Products had a race to be smaller with the technology advancing, this is called miniaturisation.



Mobile phones have now went the opposite way due to users watching movies and searching internet on them.

PERFORMANCE

Manufacturing Processes

A major impact in the performance of the product is how it's made. The actual manufacturing process can cause the object to have different properties. You will learn more about mass manufacturing processes later in the year.



Production Processes For Woods:

- Laminating
- Bag Press
- Steam Bending
- CNC Lathe
- Laser Cutter

Production Processes For Metals:

- Press-forming
- Sand Casting
- Die Casting
- Drop Forging
- CNC Lathe
- Laser Cutter

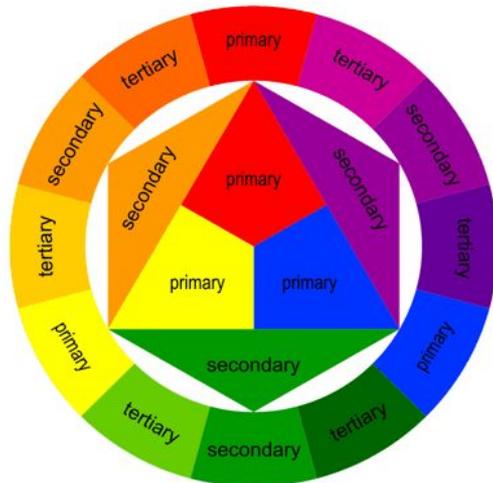
Production Processes For Plastics:

- Injection Moulding
- Rotational Moulding
- Blow Moulding
- Vacuum Forming
- Extrusion
- CNC Lathe
- Laser Cutter

AESTHETICS

Colour

Colour is usually the first detail the eye notices. Colour can be used to target specific markets i.e. bright colours and primary colors would be used for children's toys while more sophisticated colours such as white and black would be used for high class products and so on.



Material

All materials have unique characteristics of colour, texture, pattern, form and quality.

For example, in a professional kitchen you are looking for a material which is hard wearing and hygienic. In this case stainless steel would be a good choice of material. It is hardwearing, has a sterile look and a smooth texture for easy cleaning.



AESTHETICS

Texture

The texture of a product describes the surface qualities of a material. Different textures can make designs look more stylish or interesting. Effects such as glass, concrete, wood grain, hard, soft, glossy (shine), matt (flat dull colour) and so on.

Our preference to texture is a personal choice for example, some people prefer a fabric sofa while others prefer a leather.



Fashion/Popular Culture

Like fashion, trends in design are forever changing with new materials and consumer demand. For example the 80's was a decade filled with bold shapes and colours and this was reflected in the design of this era.



Today there is more of a minimal approach to design leading to a growing trend in using raw materials such as copper and concrete.

AESTHETICS

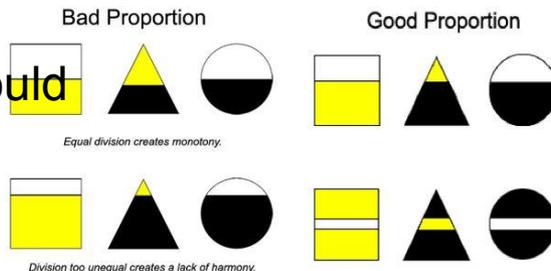
Size and Proportion

Proportion is the relationship of two or more elements in a design and how they compare with one another. Good proportion adds harmony, symmetry, or balance among the parts of a design.

When elements are out of proportion, they tend to look awkward or unbalanced. If a person had a head larger than their entire body, we would say that they were out of proportion.



Proportion



Shape and Form

The shape of a product must be attractive to the eye yet functional. You wouldn't make a rolling pin square...

Designers will use geometric shapes such as squares, triangles, circles and so on or organic shapes which are free flowing and natural. Usually a design will stick to geometric or organic, however it is not unusual to use a mix of these shapes and forms.



MARKET

Target Market



The target market that a product is aimed at can be a specific or it can be a wide reaching market. The target market can depend on many different things, gender, age, wealth, location, interests or anything else which separates buyers.

Take these two bikes, the mountain bike (top) will be used by riders of all abilities, whereas the bike (below) will be used by pro athletes. Completely different target markets and also price ranges



Market Segments

Market segments are the different areas of the target market that designers may choose to aim their products at:

- Babies
- Toddlers
- Children
- Teenagers
- Young Adults
- Adults
- Middle Aged
- Retired
- Elderly

Designers can combine these segments or even split them. Into Male or Female for example.....



MARKET

Niche Market

Niche marketing is where a designer chooses a particular part of the market to aim a product at to make it successful.

The niche market can be decided upon price ranges, technology and features or even quality of the product



The opposite approach is when a designer decides its market is to be mainstream and aims the products to meet the needs of most people.

Consumer Demand

Consumer demand for a product drives the whole market, if a product is designed that consumers don't want or need it simply will fail to sell.



There are also products which consumers need constantly for example, hair gel or hairspray, soap, toothpaste and bottles of water. Many of these essential products are continuously manufactured.

MARKET

Branding

Branding is a company or a product's identity. Branding can be achieved in many different ways, using colour as shown in the iPod adverts or even symbols with a brand's logo.

Branding helps people to build a relationship with their products and it can encourage consumers to be fiercely loyal.



Technology Push

Technology push is exactly as it says: new products being pushed onto the market due to new technology, manufacturing methods or even new materials.



Products are evolving at super speed these days and every company is trying to develop technologies that will set them apart from the competition.



MARKET

Market Pull

Market pull is where a gap appears in the market and is pulls designers and companies to manufacture a product which fills that specific gap. A good example of this is slow cookers.



Where buyers with busy lifestyles can prepare their meals in the morning and leave it to cook slowly all day and have a meal which is ready when they come home.

Market Research

Research, research, research!! Market research is the continual process that designers and companies undertake (surveys, questionnaires, product testing, user trials, consumer reviews and product comparisons) to ensure they are making products which suit the needs of a complex marketplace.

Did you know? Through the use of store cards which give us discounts, big companies are tracking all our purchases and selling that data as market research.



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