

The use of CAD

The use of computer-aided design (CAD) benefits the designer in many ways.

- CAD allows the testing of ideas, analysis and development so that ideas are refined and improved.
- It is efficient, often virtual, so no physical components required.
- CAD files are easily saved, modified and can be communicated to users and other specialists.
- CAD files can be converted into CNC or CAM data leading to rapid prototyping.
- CAD simulations can be printed off and used for display purposes.
- CAD files are easily modified to support the presentation of final proposals.

Presenting ideas

Designers use many different methods to communicate design thinking and ideas:

- freehand sketching
- models
- trials / test pieces
- CAD simulations
- rapid prototypes
- orthographic projections
- working drawings
- exploded views.

Recording and explaining design decisions

There is no formal or specific way to document how decisions are made during design and development. Below, however, are some possibilities.

- Sketches can be labelled/annotated.
- 'Break through' moments can be presented using a range of media including sketching, CAD, photographs, physical models, video of user trials, toiles, templates, prototypes etc.
- The iterative process allows the 'think, test, analyse, rethink, test, analyse' cycle to continue endlessly (or until an idea meets all criteria).
- Final design ideas are formally presented using visuals to communicate aesthetics, dimensions and manufacturing information.
- Reports of test results can support design decisions formally.
- Evidence of user tests / user trials can also be helpful in justifying decisions.

Communicating information

Designers communicate using a vast range of methods that include text, sketches, notes, photographs, lists, video clips, physical models, charts and graphs, extended writing, bullet pointed lists, CAD simulations and specialist graphical techniques (Gantt chart, critical path analysis, flowcharts). Designers employ verbal communication as well as electronic, written and printed means.

Anthropometrics – refers to measurements of human beings, the human body's dimensions and sizes, and how physical features and traits are present and can vary.

Importance to the designer: knowing the body sizes, measurements and features allows the designer to ensure the product 'fits' the target market.

Importance to the manufacturer: products can be made accurately and effectively, ensuring the end product will be the correct size for the target market.

Importance to the user: the product will be well received and not rejected. The user must be able to use the product as intended. Positive user opinion is extremely valuable to the popularity of emerging products.

Ergonomics – is about using anthropometric data to ensure that the product 'fits' the user, is comfortable to use, and the user interface is effective.

Importance to the designer: it is almost impossible to design a successful product without reference to the user, and how the user and the product interact. This is a critical part of the iterative design cycle.

Importance to the manufacturer: if there was an issue, production would have to halt until an amendment is made (this is very costly). The success of the product relies on effective design, especially if demand is to increase.

Importance to the user: if the final product fits perfectly, operates effectively, and meets user needs and wants, it will be successful. User interface and function are very important.