

OM 201

Design of Product
(Additional Slides)

February 2020

Reason for Product Design

- Be competitive
- Increase business growth & profits
- Improve product quality
- Achieve cost reductions in labor or materials

Trends in Product Design

- Differentiation
- Differentiation + Response
- Low Cost
- Low Cost + Response
- Response

What is design?

- **Carnegie Mellon's School of Design**

Design is the process of taking something from its existing state and moving it to a preferred state".

- **ICSID, (International Council of Societies of Industrial Design)**

"Design is **a creative activity** whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life-cycles. Therefore, design is the central factor of innovative humanization of technologies and the crucial factor of cultural and economic exchange".

What is good design?

- **Useful**

It works well and functions as promised. It does what it is expected to and satisfies a minimum or appropriate level of performance. **(Need to have)**

- **Usable**

It has appropriate ergonomics and user interface, considering how, where, how often and who, it will be used. **(Need to have)**

What is good design?

- **Desirable**

It looks good –

What looks good will be dependent upon the nature of the market, the lifestyle, culture, age, gender, education, occupation and place of use.

What looks good is also dependent upon other competitive and complementary products.

In general, it is important for the product aesthetics to be appropriate for the market, users and usage environment. A good test is if customers are prepared to pay a premium because they desire it. **(Nice to have)**

What is good design?

- **Producible/Manufacturable**

It must be capable of **economical volume** manufacture using **appropriate production methods**, considering the impact on the organization of new components, assemblies and processes. Producible products combine **optimization of assembly and manufacture** with modularity and platform strategies

- **Profitable**

It must result in sufficient business rewards, measured in terms of market share, gross margin, break even, turnover or sales volume. Financial rewards may also be supplemented by other business benefits.

What is good design?

- **Differentiated**

The benefits of good design are seen in products which are clearly differentiated. Differentiation can be gained through satisfying core user benefits in new ways,

1. by delivering excellence in one of the product's physical attributes or
2. by providing leading support services around the physical goods.

Apple and product design

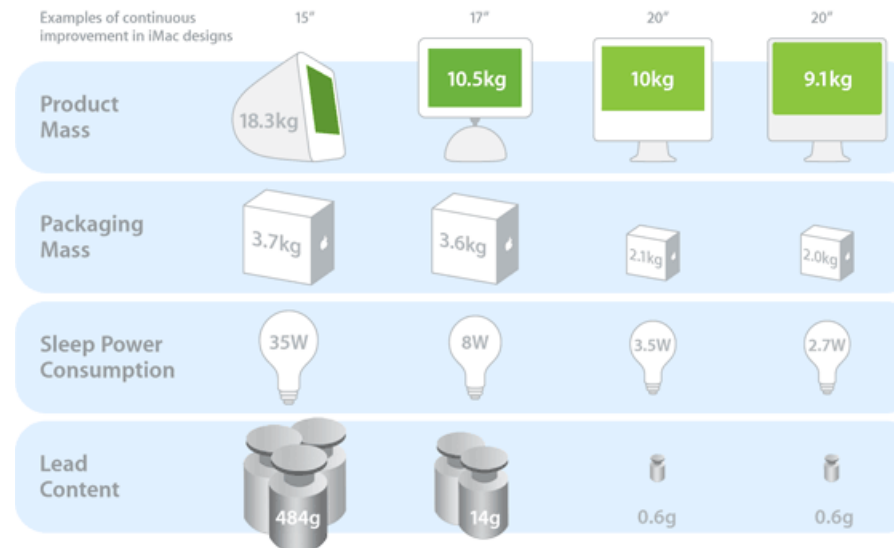
- Reducing the environmental impact of our products starts with the product design phase. Design dictates the quantity of raw materials, type and recyclability of materials, energy consumption required for manufacturing and use, and the ease of recycling. For example, our decision to eliminate Cathode Ray Tube (CRT) displays makes our product line much more environmentally friendly. Our flat-panel displays eliminate more than two pounds of lead, consume up to 80% less energy in sleep mode, and weigh half as much as their CRT counterparts.
- Apple continually [refines its product design](#) to maximize efficiency while minimizing waste, following the requirements of programs such as ENERGY STAR® as well as our own high standards



- From designing for energy efficiency to using recyclable materials, Apple's design philosophy focuses on the future of our products and the future of our planet.

Apple: Less is more

- Our designs also help to **reduce energy** consumption, **minimize the use of environmentally damaging substances**, and **optimize the useful life of our products** — all of which lead to a smaller environmental footprint. Lower energy consumption reduces electricity demand and alleviates the detrimental effects of power generation. Using recyclable materials cuts the amount of waste going into landfill. And restricting environmentally damaging substances makes products safer for consumers and businesses during their useful life and beyond.



Apple: Reducing packaging

- Packaging for the current generation 20-inch iMac uses 66% less plastic and 42% less paper than the 20-inch iMac G4 flat panel, while taking up 41% less space.
- The 15.4-inch MacBook Pro packaging is 45% lighter and uses 45% less volume than the 15-inch PowerBook G4.
- The packaging of iPod classic consumes 35% less weight and 82% less volume than the first generation iPod.



iPod classic packaging consumes 82% less volume than the first generation iPod.

Apple: Recycle

In 2006, Apple recycled 13 million pounds of e-waste, the equivalent of 9.5 percent of the weight of all products sold seven years earlier. We expect this percentage to grow to 13 percent in 2007, and to 20 percent in 2008. By 2010, we forecast recycling 19 million pounds of e-waste per year — nearly 30 percent of the product weight we sold seven years earlier

Apple maintains a variety of recycling programs, which add to recycling totals every day:

- For customers in the United States, Apple offers a free recycling program of old computers and displays with the purchase of a new Mac.

- A free iPod recycling program, conducted through Apple's retail stores, offers environmentally friendly disposal and a 10 percent discount on the purchase of a new iPod.

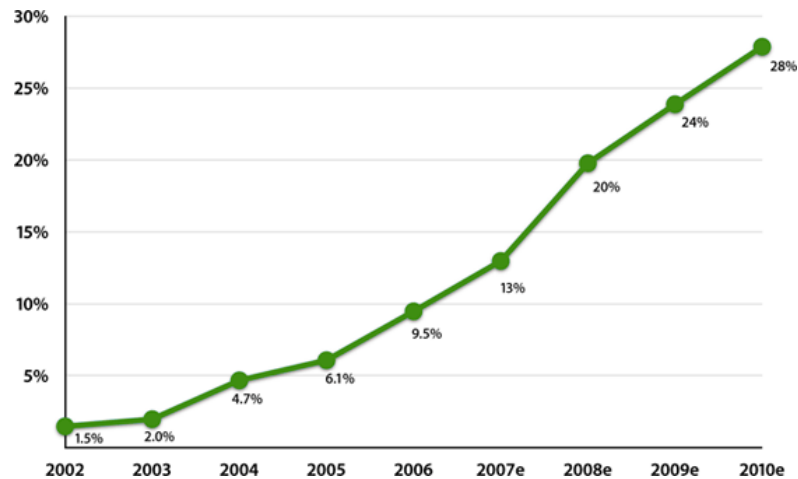
- Apple's [free recycling program](#) will take back your iPod or any cell phone regardless of manufacturer or model.

- A trade-in program for educational and business customers in the United States has already diverted more than 270 tons of electronic waste from landfills since August 2005.

- Apple's recycling partnership with the city of Cupertino, California, has recycled more than 340 tons of electronics. All electronics products are accepted free of charge, regardless of manufacturer.

Responsible recycling

No waste from Apple's U.S. recycling program is shipped outside North America. All recovered materials are processed domestically, with the exception of some commodity materials that can be recycled for future use.



Apple design

- **Recyclable materials**

Apple uses highly recyclable materials such as aluminum for iMac, MacBook Pro, Mac Pro, MacBook Air and Cinema Display enclosures, polycarbonate for MacBook enclosures, and glass for iMac display covers. The use of these high-value materials encourages recycling, which helps to minimize waste at the end of the product's life.

- **Dematerialization**

Apple's ultra-compact product and packaging designs lead the industry in material efficiency — reducing waste and energy consumption and maximizing shipping efficiency.

- **Fewer Cables**

Apple spearheaded the widespread adoption of wireless technologies such as AirPort and Bluetooth. Wirelessly connected MacBooks help entire school networks reduce their need for miles of PVC-containing cables.

- **Responsible Manufacturing**

Apple's record of restricting harmful substances goes back well over a decade. [Learn more](#) about substances currently restricted or banned in Apple's products, packaging, and manufacturing processes.

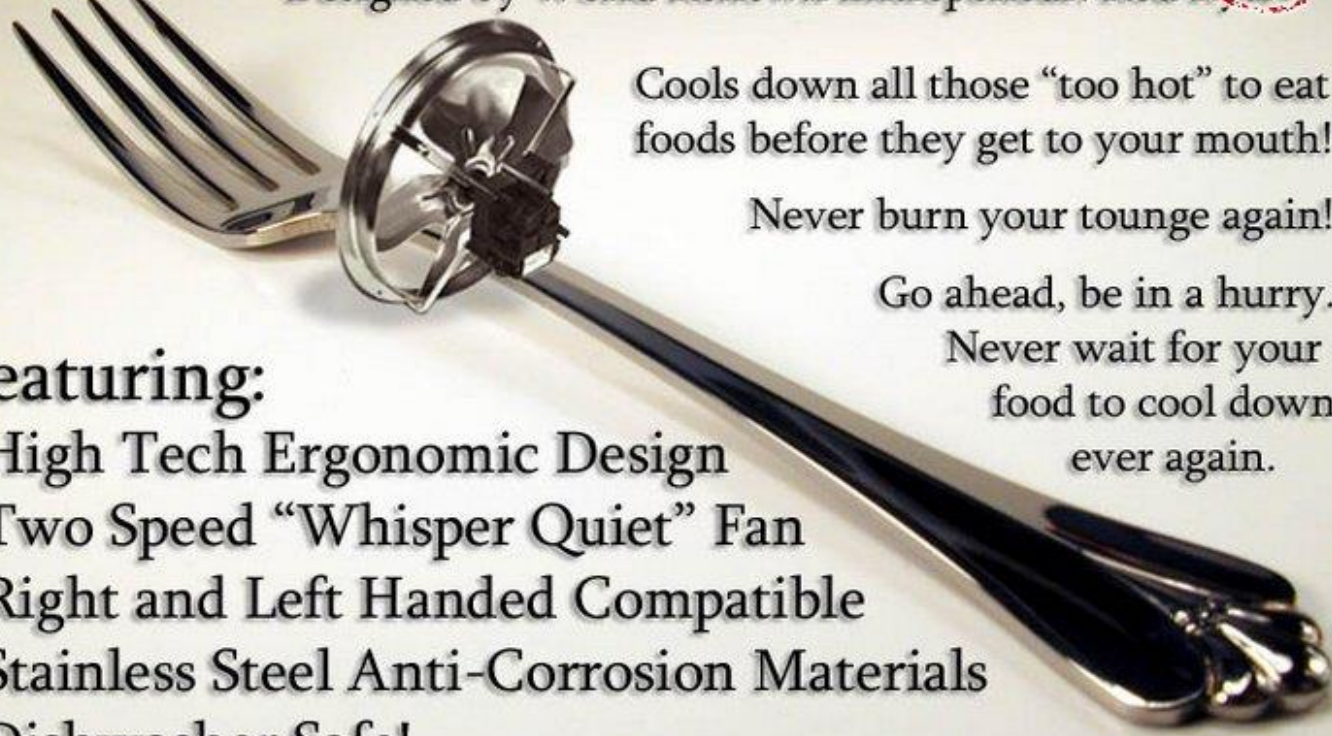
- **Environmental Specifications**

The [Apple Product Environmental Specifications](#) page details the environmental attributes of our computers, monitors, and servers.

Good or Bad Design?



Good or Bad Design?



The Exciting New F² ("Fork Fan")
Designed by World Renown Entrepreneur: Rod Rye

Cools down all those "too hot" to eat foods before they get to your mouth!
Never burn your tounge again!
Go ahead, be in a hurry.
Never wait for your food to cool down ever again.

Featuring:

- * High Tech Ergonomic Design
- * Two Speed "Whisper Quiet" Fan
- * Right and Left Handed Compatible
- * Stainless Steel Anti-Corrosion Materials
- * Dishwasher Safe!

"This is the BEST new kitchen innovation I have ever seen! Ideal for prison food!" Martha Stewart

modome3d2@earthlink.net

CE NSF SP UPC Good Housekeeping UL US 945 FM

Good or Bad Design?



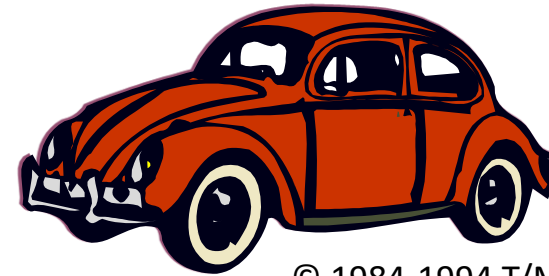
Humor in Product Design

As the customer wanted it.



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As Marketing interpreted it.



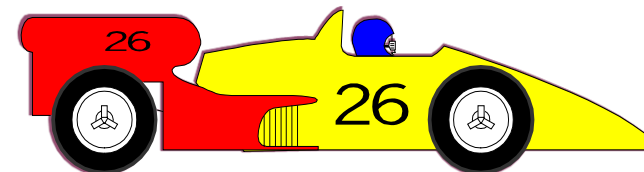
© 1984-1994 T/Maker Co.

As Operations made it.



© 1984-1994 T/Maker Co.

As Engineering designed it.



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Cross-Functional Product Design



Misalignment : product designed
by engineering
cannot be made by operation

What should I do?

Concurrent approach

