

The following article was written for the NewDesign magazine (September/October 2001). The "3D printer" concept was designed to highlight the points made. The input devices shown, including the table, is part of an ongoing research project at Touch Interactive. All Copyright restrictions apply.

Rapid prototype technologies could turn the whole idea of industrial design on it's head. But when it comes to interfaces, says Christian Mark Rødland, we need to forget about mice and think about magic markers.

Touch and go

Industrial Design, if my rather blurred memory of design history does not deceive me, came about as a bridge between the industrial revolution and the arts and crafts movement. Now the digital revolution is here and the rules that govern industrial design begin to sound more and more out of touch. The economies of scale of mass production, which has been with us since the dawn of the industrial revolution, and the costs associated with this has meant that many product visions have been left in permafrost, or finally realised by large corporations with more money than sense. Well it looks like all this is about to change and our idea of industrial design is finally about to be turned on its head.

100's of labs throughout the industrialised world are developing rapid prototype technologies or "3D Printers" which will allow you and me to produce tangible objects from digital designs from our own living rooms. It is estimated that within 10 to 20 years we'll have touch interactive 3D printers producing objects in multiple materials with working mechanisms and even built in electronics. These miniature factories will probably start at \$10,000 and could end up costing as little as your average desktop printer.

This certainly suggests the future will be more like the past than the present, like it was before the industrial revolution, but with more of us producing customised products with significant technical complexity for clients as individuals. The future seems a lot more interesting when you also consider the advances in 3D scanning, hologram projection, electronic ink, etc. There are opportunities therefore to completely revolutionise the industrial design creative process.

Up until now the digital revolution for us has involved the introduction of CAID to help facilitate our needs but so far this revolution has remained far too conservative. Although software has advanced at a furious rate concrete interfaces and general HCI (Human Computer Interaction) has remained disappointing. If the technology which has evolved in the last 20 years suddenly all arrived at once from the beginning then it is inconceivable that the input devices we use to develop our products would involve the keyboard, mouse or even a graphics tablet. It is more likely we would have been inspired by pencils, magic markers, hot wires and band saws. The reasons for what we have now are many but mainly point towards the inadequacies of the past and the typewriter approach to computing which has been with us from the beginning. In other words we started with a single unified approach to Human Computer Interaction and this has remained. This begs the question whether we, as designers, should be the makers of our own tools.

As for rapid prototyping this has mainly remained in the high precision CAD and engineering camp, distinct from CAID and the concept development stage. As a result many designers often get pigeon holed into doing only what they do best, or what they can do. The computer, at least in part, can be blamed for this.

A key argument for a greater emphasis on the tangible world lies in my conviction that the superior physical capabilities of the human has been undervalued almost to the point of sacrilege. Our ability to create things comes from our ability to manipulate physical objects to create works of art. This has taken millions of years of physical and mental evolution. Without our hands our artistic history would be non existent. Indeed one could argue that our hands are the reason why we got so far in the first place since our ability to continuously touch and manipulate things could have been the reason for our brains evolving as they have. Why stop this now?

At Touch Interactive we specialise in Industrial Design for Tangible and Virtual Interfaces. Primarily this involves



computer related industrial design in areas such as HCI, electronic enclosures and the design and brand integration between tangible and virtual interfaces. The following concepts illustrate our vision for rapid prototyping which follows our design philosophy:

- 1) When it comes to computers there are more opportunities in the real world.
- 2) The Human Interface is King.

The concept shown here is designed to fulfil the product development environment from concept to production. The table has a paper like surface for natural sketching to help gather 3D thoughts which can then be managed and placed digitally on the screen above the table. This screen acts as a digital research and development surface, where the user can manage and share thoughts throughout the design process.

The table surface is the main working 'monitor' which uses pressure sensitive touch screen technology and intelligent software which is controlled by the user's hands and initialised by the tools which 'sit around' the table. The tools themselves consists of pen based tools for sketching and creating derivative 2D shapes, to hand held haptic input devices for editing and manipulating 3D virtual models as they are built.

The '3D printer' concept is designed as an integral part of the whole concept solution. The concept uses intelligent '3D ink' tubes which the user can place around the surface of the printer to allow the production of objects with various colours and material properties.

It is difficult to imagine that a single, unified approach to human computer interaction will hold sway much longer and in some way this concept helps to fulfil this. In this way the concept shown here could be part of whole new digital Industrial Design workshop, where all the stages of Industrial Design are catered for so that the designer gets involved in each stage.

