



inclusive design education resource

**sensory devices:
communication in domestic appliances to aid use by older people**



Bryn Griffiths

Research Associate:

Bryn Griffiths / RCA Industrial Design Engineering

Research partner:

Dyson Research

Year of completion: 2000

introduction

A design study that explores more effective ways to communicate how domestic appliances work to an ageing population, using the Dyson Dual Cyclone vacuum cleaner as the main case study. Can the appliance be designed to instinctively inform the user of its functions, or do people have to read complicated instruction manuals?

next: challenge >>

inclusive design education resource

sensory devices: communication in domestic appliances to aid use by older people

challenge

Given their relative simplicity, domestic appliances such as vacuum cleaners, kettles, dishwashers and washing machines tend to be more difficult to use and understand than controls on more complex products from other industries - such as the automotive and computing sectors.

For older consumers in particular, with a range of physical impairments, this problem has been compounded by domestic appliance producers ignoring the needs of an ageing population and relying on complex instruction manuals (usually in small print) rather than the intrinsic design of the product to communicate function.

The challenge is to explore ways in which product designers in the domestic appliance industry can use aspects such as form, colour, orientation, consistency and commonality of signs and symbols on the product user interface to encourage intuitive use of the various functions. Is there room for this within the product design process, or is the only answer a complicated instruction manual?

next: research partner >>



Many domestic appliances such as vacuum cleaners have product function that are confusing to older users





the helen hamlyn
research centre



inclusive design education resource

sensory devices:

communication in domestic appliances to aid use by older people

research partner

Dyson Research, the research and development arm of Dyson Appliances, is part of a company that is renowned worldwide for innovation in the area of domestic products. Dyson, inventor and manufacturer of the Dyson Dual Cyclone vacuum cleaner, launched its first product - the DC01 - in 1993. Dyson cleaners are now the best sellers in the UK and are sold in 18 countries around the world. Since then, the company has added a long list of ground-breaking products, including the world's first contra-rotating washing machine.

The Dyson logo, consisting of the word "dyson" in a bold, lowercase, sans-serif font.

More than a quarter of Dyson's customers are aged 55 and over, which explains the company's interest in the behaviour and needs of older users. This project was important in generating a set of inclusive design guidelines to direct Dyson future product development aimed at the widest range of age and ability.

next: methodology >>

inclusive design education resource

sensory devices: communication in domestic appliances to aid use by older people

methodology

The Research Associate conducted an audit of all Dyson product communication (on and off the product), listened in on the Dyson service helpline and studied marketing data to collate a list of key issues. These were mapped against a parallel investigation of interface issues in automotive interiors - an industry with an advanced understanding of an intuitive user interface.

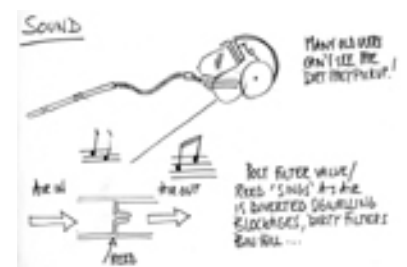
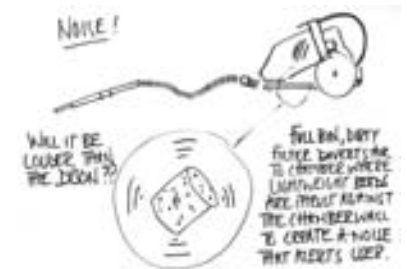
Key ethnographic research was then carried out with 12 older users aged between 55-85 years, a group accounting for over 25% of Dyson customers. The Research Associate visited all of the users in their homes, completed a short informal interview to cover background information and lifestyle, and then asked them to carry out four distinct tasks: assembly of a Dyson vacuum cleaner, cleaning the kitchen, cleaning the stairs and emptying the cleaner at the end. At each stage of the process, the users were asked for verbal and written feedback, and each visit was documented using video and photographs.

Close observation of every task the users performed was essential as the Research Associate observed important information that users left out in subsequent interviews e.g. one user always turning the cleaner on with his feet rather than hands. From this, a list of critical areas where the users misunderstood the product function was drawn up.

next: results >>



A participant is observed studying the bin on a Dyson vacuum cleaner



User feedback informed sensory concepts integral to the product

inclusive design education resource

sensory devices: communication in domestic appliances to aid use by older people

results

A set of guidelines resulted from the study, illustrated by a series of proposals for sensory devices integral to the product itself. The guidelines centred on the following user interface areas: form; colour; orientation, consistency and commonality of features, signs and symbols. The conceptual proposals looked at providing reassurance through other senses such as sound and touch.

Form has a huge impact on the consumer as 'busy' looking products can be viewed as too complicated to use; in user tests, nodule-like features were often mistaken for buttons. Colour is another area of importance as a visual contrast between buttons and the main body of the product is helpful to older people. Colour can also communicate the state of the appliance, such as a thermopolymer changing colour when the product becomes too hot to touch. Use of sound reeds in a vacuum cleaner, which respond to diverted air and alert the user by sound signal when the bin is full, is another sensory concept.

Bad orientation or positioning of the controls can confuse users who might not know where to start or might not be strong or dextrous enough to operate the button in its position. Consistency and commonality of features across a product range can reduce the amount of learning a person has to do to operate any single product. Signs/symbols is a massive area in itself, but product designers should not rely on signs to guide users as to the function of any particular button. More direction can be gained by reassurance through sound and touch - a 'click' says that the button has been pressed and a more tactile material such as rubber can indicate a button to be pressed.

next: issues >>



Changing colour can alert users, as in the use of a thermopolymer on this hair dryer which changes colour when the appliance gets too hot



Form and materials influence product function



inclusive design education resource

sensory devices: communication in domestic appliances to aid use by older people

issues

The results showed that designing domestic appliances requires careful consideration of form in relation to function and that the domestic appliance industry is behind other sectors when it comes to interface design. A vehicle is an extremely complex product yet most drivers can step from one vehicle to another and operate the same basic functions (such as steering, gear changing, braking) without the need for a manual. Most domestic appliances, however, require a mandatory read of the manual - totally against the nature of most consumers who ignore the manual and try to operate the appliance using a mixture of intuition and guesswork.

By designing interfaces for intuitive operation and looking at consistency of operational features, with special attention paid to the extreme needs and capabilities of an ageing population, high-tech products within the home can be used to their full capability and users will feel more enabled and confident when using complicated appliances.

Colour, form, sound, touch and signs all influence the way in which we interact with products. Can we use this to design easy-to-use appliances, and will this mark the end of the over-complicated instruction manual?

next: projects >>



Buttons and features that encourage intuitive operation will give older consumers more confidence in using domestic appliances

inclusive design education resource

sensory devices: communication in domestic appliances to aid use by older people

projects

brief 1

- 1/ Look at one domestic appliance that you find difficult to operate.
- 2/ Go through the process of operation and identify where the stumbling block is (use the instruction manual if necessary).
- 3/ Redesign that part of the appliance to allow the following people to operate it: a) you b) your parents c) a visually impaired person d) a 10 year old e) a 75 year old.

brief 2

- 1/ Document different operation icons/pictograms that can be found on appliances and compare them with each other in terms of clarity. Get various people's reactions (younger, older, men, women, British and non-British).
- 2/ Choose three of those icons, and compare how the design differs from each other on five different makes of the same type of appliance.
- 3/ Analysing the above, come up with the ultimate solution/icon/pictogram for those three type of operation.

brief 3

- 1/ Pick one type of domestic appliance (e.g. kettle, fridge, cooker, hair dryer etc) and document the different functions for five different brands.
- 2/ Select three functions and rate each brand for usability (scale of one to five) if the appliance is to be used by the following: a) you b) your mother c) your father d) a visually impaired person e) a 10 year old f) a 75 year old.
- 3/ Pick one function and design a solution that can be used by all of these users.

brief 4

- 1/ Investigate the effect of ageing on sense of touch, sight and hearing.
- 2/ Pick one type of domestic appliance (e.g. kettle, fridge, cooker, hair dryer etc) and document its different functions.
- 3/ Redesign five functions so they can be used by a 75 year old without needing the manual.