

---

# 'Beholder's Share' And The Wooden Spoon, Or What Young Engineering And Technology Designers Need To Know About Domestic Technology and Older People

**Rachel Batchelor**

School of Engineering and Digital  
Arts/Kent Law School  
University of Kent  
Canterbury, Kent CT2 7NT  
United Kingdom  
Rb392@kent.ac.uk

**Ania Bobrowicz**

School of Engineering and Digital  
Arts  
University of Kent  
Canterbury, Kent CT2 7NT  
United Kingdom  
A.Bobrowicz@kent.ac.uk

**Abstract**

A generation which relies on constant communication and digital information has a different view point and language use to older generation for whom modes of communication are less constant. How do we convey intangible qualities such as empathy, creativity and ethics to a young technologically literate generation who are comfortable with its use, but who may lack understanding of life experiences of other users? We examine findings from a study into the ways older people (60+) use technology, and how learning about social history of technology may help bridge the gap between generations and lead to a more empathic design.

**Author Keywords**

Beholder's share, technology, designers, empathic design, users, interdisciplinarity.

**ACM Classification Keywords**

H.5.2. User interfaces (Evaluation/methodology, user-centred design)

---

Copyright is held by the author/owner(s).

CHI'13, April 27 – May 2, 2013, Paris, France.

ACM 978-1-XXXX-XXXX-X/XX/XX.

## **General Terms**

Design.

### **Introduction**

The need for design engineers to be able to examine viewpoints of the users of digital technology is paramount for successful design to succeed. For educators this presents particular pedagogical challenges of how to convey intangible qualities such as empathy, creativity and ethics to a young generation of designers who are technologically literate and very comfortable with its everyday use, but who may lack understanding of the diverse life experiences of other, for example, older users and especially of digitally dis-engaged non-users. Findings from our recently completed project indicate that older users (60+) are much more comfortable with domestic technology, while finding digital technologies generally obscure, confusing and baffling. Older people did not recognize digital technologies as tools for everyday use and had no need for most of them. In this context we pose two questions: What can be learnt from the use of domestic technology? How can the learning help promote empathic and ethical design in the education of young technologists and engineers, particularly, in a field in which the rapidity of change is a commercial and patent driver, but does not always allow for in depth consideration of all potential user groups?

### **Empathy and ethical design**

Empathy and ethical design are, we argue, core features of good human-computer interaction (HCI) design, i.e. design which is ultimately successful for a diverse range of user groups. Though concepts which may promote empathic design [1], through reflexive consideration of one's own perspectives and that of others, such as theories relating to 'beholder's share' [2], the 'period eye' [3] and 'ways of seeing' [4] are familiar to those with design training through art and design schools, they are not necessarily included in the engineering and technology curriculum. These and

similar theories help to analyse social constructs and intellectual frameworks which inform art and design history and critical studies modules. The reflective self-analytical aspects of these broad theories encourage students to question the familiar and to consider their own and others responses to material and visual cultures. Intuitive and emotional responses are part of the process of qualitative research. Likewise, undergraduate design students at art colleges are not likely to have experience of quantitative design process.

Intuitive use of tools and technology cannot be assumed. A simple domestic tool such as a wooden spoon has a basic design, which can be easily understood across many cultures. The use to which it is put may however be less clear – as a device for stirring, scooping, measuring, dipping. It might be used at different stages in a process, for cooking with, serving with or eating with. The same domestic tool can be a tool for preparing non food stuffs, and has a symbolic, iconic value, especially in the context of food preparation, café signs, recipe books and similar. The shape of this simple tool allows for other uses. In contrast, the functions of a mobile phone may be multiple, but they are not always obvious, especially to a new user.

It is the teaching to understand the importance of viewers and, in a technology context, users' qualitative viewpoints, their needs, feelings, experiences and barriers to use of technology to technology designers which we are considering in this paper. Work carried out by the Royal College of Arts at the Helen Hamlyn centre as well as Cambridge Engineering Design Centre demonstrates diversity in process and problem solving, and may serve as a useful reference point here [5].

### **Education system**

Commentators such as Ken Robinson note that mass systems of public education were developed primarily to meet the needs of the Industrial Revolution, and, in many ways, they mirror the principles of industrial production. They emphasise linearity, conformity and standardization. One of the reasons they are not working now is that 'real life is organic, adaptable and diverse' [6]. Conversely, engineering and technology training traditionally has a greater reliance on linear quantitative methodologies and commercial approaches, which are not necessarily embedded in empathic modes of research [7]. However,

"For something to be designed well, it needs to have been designed in consideration of more than mathematical integrity, cognitive models of 'users,' or usability it needs to have been designed in consideration of contexts, environments, inter-relations, markets, emotions, aesthetics, visual forms, semiotic references and a whole host of considerations that are part of the assumed nature of successful designs. It needs to be construed as part of a dialogue between product, anti-product (i.e. reclaiming old things as new), and lifestyle and notions of ecology and futures." [8]

Education systems in the United Kingdom have traditionally divided science and arts subjects early in the student's education (by the age of 16), which means students entering university have a specialist, not generalist education background. This early specialisation commonly falls between the sciences/maths strands and arts/humanities strands. The early emphasis on subject selection at school level, which promotes rapid specialism rather than broad conceptual basis would bias against a student taking STEM (science/ technology/engineering/maths) subjects as well as ethics/philosophy/reflective subjects (or humanities subjects plus maths). We will argue from experience, that this early split results in methodological and epistemological differences, which

can be barriers to good design and can also hinder interdisciplinary working and research. Authors' own experience of working on this paper uncovered different 'ways of seeing', from a task-oriented and solution-based approach of the sciences to the posing of probing questions practiced in the arts and humanities. A pertinent question emerges of how to integrate these disparate approaches in the education and training of engineers and technologists and prepare them for the world, which is increasingly interdisciplinary?

In this paper we are seeking to probe how dialogues across generations and academic disciplines can successfully happen, to share qualitative and nuanced data of the 'lived experience', explore creative processes and still meet the requirements of an industry which relies on quantitative (linear, conformed, standardized) rather than qualitative (organic, adaptable, diverse) data.

### **SEEDS: An Approach to Participatory Design**

In order to inform our view, we are considering the data from the SEEDS project funded by the Engineering and Physical Sciences Research Council (EPSRC), UK. A collaborative venture between the School of Engineering and Digital Arts at the University of Kent, School of Computing at the University of Dundee and School of Mechanical Engineering at Leeds University, SEEDS was an 18-month long feasibility study, which collected data from older people relating to their use of technology. The central theme of the project, 'what would you like to be able to do which you currently cannot, and will technology help?' effectively resulted in the collection of contextually rich social stories. Over a period of several months we gathered 29 social stories recounting older people's experiences with technology. The stories were made available to trial groups of students on the undergraduate multimedia technology and design degree at Kent and a postgraduate engineering design degree at the University of Leeds. Our aim through the SEEDS project was to find out whether or not access to such social stories would

enhance the understanding of older people's needs among young designers and result in better design solutions. In other words, will understanding of the context of use help inform better, more user-friendly design solutions?

As a result of our study we gathered a rich archive of social stories. We recorded 29 interviews with older people (60+) from diverse socio-demographic groups (professionals, housewives, military, public and private sector). The interviews were taken in different geographical locations (Scotland, Kent, the Midlands). We video recorded response sessions to social stories from undergraduate and postgraduate students in engineering, HCI, and technology and design. Our archive is an exciting repository of socially rich material, which we analysed using data coding and followed with a careful interdisciplinary contextual analysis of written record and video footage.

## **Results**

The results of our analysis are, on the one hand, unexpected in terms of the outcome of the coding process, and, on the other, revealing in terms of how differences in life experiences between generations impact upon the engagement and understanding of technology.

The data coding from the three research teams shows some marked differences in student response. Often two centres correlate but seldom all three. When re-analysing the SEEDS data, we re-framed the approach to consider possible variables across sites and groups. As a result, subtle variations emerged on close scrutiny despite initial similarities as a controlled study. Contextual aspects derived from interviews with older people, and the subsequent video recordings of students (responding to the interviews) pinpointed the following areas: gender, age, location and spatial arrangements in each room, team dynamics, institutional pedagogical variables and learner understandings, language usage and data presentation.

This large number of variables involved make it hard to pinpoint specific aspects which may have caused differences in results over those predicted. Although these are possible contributing factors to different outcomes, it is difficult to determine what the underpinning cause of these differences may be. This could reflect differences on a regional or at least, location basis. The universities involved are in distinctly different geographical locations, which include rural and urban settings. The differing socio-economic backgrounds of the centres may be a factor, particularly in the responses by interviewees and students to financial aspects of digital technology. It is possible that wider social factors such as technology in the workplace and the prime economic drivers for each location may have an impact. However, it seems most likely that the data coding differences simply reflect the differences in course structures and pedagogical models at each centre, which could impact on the likely responses to the video and paper-based evidence. Use of discourse analysis may be useful in unpicking the student responses, the interview conversational data and the wording of the brief.

## **'Beholder's share' and domestic technology**

As a result of undertaking the study, we learnt that differences in life experiences between young designers and older users bear upon the uptake, use and understanding of digital technology. Each group and the individuals within them bring with them their own 'beholder's share' to their view both of technology and the visual culture in which they are submerged. For example, when an older person was asked where she would go for information, she responded that she would ask friends/family, or use the library. Young people would answer - 'Google it'. Interviewees were more familiar with domestic technology. They frequently referred to domestic technology which they find less problematic in usage. For instance, garden equipment and domestic appliances have a clear function, and though can sometimes be used for other purposes, there is a general principle that the function is singular

and limited. The use of such technology is often mechanical and physical in user engagement rather than electronic and largely passive.

In our study older participants talk about written letters, which are tactile reminders of the person as well as written communication in preference to e-mail. Letters were indicated as particularly valuable by several respondents. For a generation of young designers used to constant uploads this is an illustrative point. Rapidity of communication is not the key issue, reliability (post boxes and post offices don't lose signal or battery) is more important, as is the quality of information and the concomitant sense of personal contact. Respondents were not on the whole, technophobes. Two of the video interviewees had previously held technologically sophisticated jobs (dentist, and RAF air traffic). These respondents were more assured in talking about technology than other interviewees. Though there was a clear understanding of the potential use of digital technology (e-mail and research), neither seemed to have a particularly enthusiastic response to the domestic use of digital technology; the concerns of the broader group about use and necessity seem to be shared.

E-mail was recognised by one interviewee (Kent male) as being quicker and useful for formal communication. This again may reflect a 'beholder's share' which indicates that technological aspects of communication are essentially business and formal in use. Landline telephones used to occupy the same niche. They were initially limited to those who needed them for work or who were wealthy. The use was limited and delineated by need, and not constant drive for communication and 'being connected'. Landline telephones are available – again a single use device and seem preferred to mobile phones which have multiple applications. The key advantage of a mobile phone is that it is mobile and not restricted to place, however interviewees often used phrases relating to 'intrusion' in relation to mobiles. This seems to reflect concerns about usage rather than

the technology itself -again possibly pointing to functionality and perceived usefulness. We would suggest that further in-depth information on generational differences in telephone use may be helpful here. De-regulation of the UK telecommunications industry in the 1980's had an impact on providers and tariffs and it may be useful to look at this context and design changes which happen to handsets, at this point. Young designers and engineers may benefit from some engineering/design history based on products available (domestically and in the workplace) and the restrictions on telecommunication devices that the older-old have experienced.

In terms of the intrusive nature of mobile phones, it may be useful for young designers to consider some of the social background that the older-old grew up with, long waits for letters and parcels, rationing and queuing during the 1940's and 1950's. Colloquial phrases relating to children from the early twentieth century in the UK include 'being seen and not heard', 'speaking when spoken to', 'careless talk costs lives' and being treated 'firm but fair', these phrases do not promote the need to continually be in communication with others. It also raises differences in language relating to the technology of communication leisure, what would the comparable phrases be now? Get off DS? Shall I join you on Wii? Shall I nuke some lunch? Check online? Look up Wikipedia? Where's the mobile?

For a generation of online social network users 'posting' has a clear meaning (digital), distinctly different to that of older generations (paper based). Slang abbreviations and slang use such as "lol" (laugh out loud), "fb" (Facebook), "omg" (Oh my God), are frequently used by young people in texting. To the dismay and annoyance of university tutors these abbreviations are increasingly finding their way into more formal contexts - in students' email communication with their tutors, and, increasingly, in students' written work. Although considered 'standard' and 'normal' to teens, these

phrases, initially framed by technological use, can be baffling to older generations. The responses in interviews to the digital communication in particular may reflect these attitudes.

### **Discussion**

Digital technology often has multiple applications and this seems to cause some barriers to use – interviewees see that there are alternatives for different aspects of digital technology. This caused respondents concern over confused functions and remembering how to access different options (Kent female, Dundee male). This seems to be compounded with the need for guidance to demonstrate how to access and ‘set up’ the equipment, both in the first instance and in updating and problem solving. Clear, none screen based, printed instructions would be a key feature here.

Interviewees were asked a series of questions relating to use of digital technologies, however respondents were not asked what they considered ‘the purpose of a computer’ to be. There are references in responses to ‘the computer’ but often little clarity over what it is that ‘the computer’ is for, which contrasts with responses referring to other tools and technology. Unlike the example of the wooden spoon whose purpose can easily be determined. We find this a particularly important perspective on the possible barriers to use, yet this point does not seem to follow through into the verbal and design responses from the students or into the data coding.

It can be argued that the coding structures analysing student responses to interview material and to the dissemination of the interview information do not relate to this broader contextual background and do not ask young designers to consider previous social/historical/practical experiences of the older people. Though some of the questions relate to current social activity and perceived lifestyle choices, stereotypical views of older people, questions relating to the older person’s

participation as an active (digital) citizen and barriers to this are less evident.

In order to answer our question ‘will understanding of the context of use help inform better, more user-friendly design solutions?’ we suggest that different approaches to collecting initial data may be of value. The use of cultural probes [9], user diaries [10], designers shadowing client groups in various tasks (maybe using student engineer/designers in residence in a community location) may prove fruitful in gathering information, but the need will then remain as to how to promote creativity and empathy in the student groups accessing the information.

### **Conclusions**

A generation which relies on constant communication and digital information has a different view point and language use to older generations for whom modes of communication are less constant. Additionally, a picture emerges that generations involved in the study have differing ideas on what constitutes the related concepts of communication, friendship, privacy. A generation which is familiar with Facebook, is in constant contact with 500 ‘friends’, and is comfortable with the open disclosure which is part of that forum, will necessarily have a very different perspective to a generation in which an occasional handwritten letter from a friend of 50 years standing is highly valued.

In order to further engineering design student understanding of differing user groups we would like to develop their appreciation of broader design history as well as history of social constructs. Though there have been useful developments in recent years in the study of history of science, ethical and inclusive design, it is harder to find the history of, or social critiques of, engineering and engineering design. We would like to call for a discussion on the use of interdisciplinary critical thinking and reflection on the social context of engineering design in undergraduate and graduate training.

## References and Citations

- [1] Leonard, D. & Rayport, J.F. Spark innovation through empathic design. *Harvard Business Review*, 75 (November-December), 102-113, 1997.
- [2] Gombrich, E.H. *Art and Illusion: A study in the psychology of pictorial representation*. Princeton University Press, Princeton and Oxford, 2000.
- [3] Baxandall, M. *Painting and Experience in Fifteenth-Century Italy: A Primer in the social history of pictorial style*, Oxford University Press, Oxford, 1988.
- [4] Berger, J. *Ways of Seeing*, British Broadcasting Corporation and Penguin Books, London, 1972.
- [5] Coleman, R., Clarkson, J., Dong, H., & Cassim, J. *Design for Inclusivity: A Practical Guide to Accessible, Innovative and User-Centred Design*, Gower Publishing, Aldershot, UK, 2007.
- [6] Robinson, K. *Out of Our Minds: Learning to be Creative*, Capstone, Chichester, UK, 2001.
- [7] Hosking, I, Waller, S., Clarkson, P.J. It is normal to be different: Applying inclusive design in industry. *Interacting with Computers*, 22, 2010, 496-501.
- [8] Blevis, E., Lim, Y.K., Stolterman, E. Regarding Software as a Material of Design, *Wonderground Design Research Society Conference*, Design Research Society, 2006.
- [9] Gaver, B., Dunne, T., & Pacenti, E. Design: Cultural Probes, *ACM Interactions*, 6 (1), 1999, 21-29.

[10] Colbert, M. A diary study of rendezvousing: implications for position-aware computing and communications for the general public. *Proc of the 2001 Int ACM SIGGROUP Conference on Supporting Group Work*, 2001, 15-23.

## Acknowledgements

This research was carried out under the auspices of the SEEDS project (An organic approach to virtual participatory design), EPSRC Grant No. EP/H006834/1.