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Citation for published version

Batchelor, R and Bobrowicz, Ania (2014) Empathic and Ethical Design of Technology.   In: HCI 2014, 24th - 27th June, Crete, Greece.

DOI

Link to record in KAR

https://kar.kent.ac.uk/41734/

Document Version

UNSPECIFIED

Empathic and Ethical Design of Technology

Rachel Batchelor, Ania Bobrowicz

University of Kent, Canterbury, CT2 7NT, United Kingdom

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 themes emerging from the findings of a study into the ways older people (60+) use technology. The question guiding our enquiry is as follows: How could learning about social history of technology help bridge the gap between generations and lead to a more empathic design? Can the teaching of empathy and ethical understandings assist this process?

Keywords. Empathy, design, ethics, technology.

Introduction

The need for designers to be able to examine viewpoints of the users of digital technology is paramount for successful design to succeed. The word "designer" can carry several meanings depending on the academic discipline and training routes. In this context we use the term 'designer' to represent those who are involved in finding creative solutions to problems in the fields of engineering and technology. For HCI 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 others, for example, older users and especially of digitally dis-engaged non-users.

Findings from an EPSRC (Engineering and Physical Sciences Research Council) project indicate that older users (60+) are much more comfortable with domestic technologies, while finding digital technology generally obscure, confusing and baffling. We have learnt that older people did not recognize digital technologies as tools for everyday use within a domestic context, and considered that they had no need for most of them. This paper aims to contribute to the debate among the pedagogical design community about how to teach empathic and ethical design. We specifically aim to consider what can be

learnt from older people's use of domestic technology, and how might an understanding of this inform the teaching of HCI design practice.

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, inclusive range of user groups. 'Know your user' is a key design principle in HCI, and empathic approaches to design have been explored by a number of commentators from a variety of perspectives [1, 2, 3, 4]. Similarly, ethical issues in relation to the "Internet of things" are an emerging area. Given the inter-connected use of various devices and data sharing that arises, there is arguably a need to teach ethical frameworks which consider the needs and competencies of those older users who are not familiar with emergent technologies. This is particularly clear in the context of use of mobile devices and the cross over with medical and social care devices with consumer technologies [5].

Though concepts which may promote empathic design [6] through reflexive consideration of one's own perspectives and that of others, such as theories relating to 'beholder's share' [7], the 'period eye' [8] and 'ways of seeing' [9] 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, and in doing so, promote reflective practice. Intuitive and emotional responses are part of the process of qualitative research as well as reflective practice as advocated by Donald Schön. Schön's notions of reflection-in-action and reflection-on-action encourages engagement with lived experiences, feelings and emotions [10]. This is also supportive of ethical frameworks in which to consider wider impact of design on users.

To return to the use of domestic technologies, the intuitive use of tools and technologies 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 (see affordances). In contrast, the functions of a mobile phone may be multiple, but they are not always obvious, especially

to a new user. The functionality of a mobile phone may not be seen at first glance; though visually simple, the use is complex as is the hidden technology which enables it to function. It is this gap between intended use, the user and the functionality of the device which, we think, needs empathic consideration. Rather than teaching a reluctant user to struggle with a product which is not suitable, it may be more useful to design inclusively and empathically.

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 [11].

UK education system, and educational experiences of engineering and technology students

Ken Robinson, an international advisor on education, has noted 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' [12]. 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 [13]. In addition, the intellectual challenges and resources required to support good design education are not necessarily recognized by the leaders of engineering and technology institutions [14]. 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." [15]

Russian philosopher and scholar Mikhail Bakhtin considered dialogue and 'aesthetic seeing' to be an essential part of our human existence [16]. Part of our way of being in the world is recognizing each other as unique individuals, each with own values and ways of seeing the world.

Our own experiences as students, educators and inter-disciplinary researchers within the UK education system has led us to question the premise of this system which severely constraints learning and pursuit of interdisciplinary knowledge. Although sciences, arts

and humanities subjects are taught in all schools, there is encouragement to specialize early in the student's education (often at 14 and certainly by the age of 16). This means students entering university have an early specialist, not generalist education background. This early specialisation commonly falls between the sciences/mathematics, and arts/humanities strands. The early emphasis on subject selection at school level, which promotes rapid specialism rather than broad conceptual basis often works against a student taking STEM (science/technology/ engineering/mathematics) subjects as well as ethics/philosophy/reflective subjects (or humanities subjects plus mathematics). We will argue from experience, that this early split results in early barriers to inter-disciplinary understanding which can in turn hinder good inter-disciplinary working and research. In terms of pedagogical construct it has an impact on the teaching of skills needed for complex design solutions. Teaching the creative, flexible process described by Ken Robinson can be challenging when those same processes have been excluded from earlier study. Indeed, the authors' own experience of working on this paper demonstrated our own lived experience of different 'ways of seeing', from a task-oriented and solution-based approach of the sciences to the posing of probing, exploratory questions practised in the arts and humanities. How do we pedagogically value the qualitative and nuanced data of the "lived experience" in order to enable young designers to engage in respectful dialogues and empathic conversations as part of the creative processes and to promote reflexive practice? One issue that arises is how to recognize and value that within creative exploration of a problem that "failed" ideas are an important part of the process while still meeting the requirements of a field 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, 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. Project 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. Altogether 29 interviews with older people (60+) from diverse socio-demographic groups (professionals, military, public and private sector) were recorded. 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, initial findings of which were discussed

in Valentine et al [17]. 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?

The interviews we collected are revealing in terms of how differences in life experiences between generations impact upon the engagement and understanding of different technologies. The importance of contextual and social understanding of interview data was particularly evident in viewing student responses to it. The contextual information included socio economic, geographical and regional differences, work experiences and previous use of differing technologies by the interviewees. Those interviewees who had experienced workplace technologies reported a greater degree of acceptance of e-mail and word-processing in a domestic context, but were still unlikely to see the need for digital technologies at home, seeing it as intrusive. This presents an interesting comparison with the TAM model which supports the use of computerized technologies in the workplace. Technology Acceptance Model (TAM) provides a useful framework for understanding user interaction with technology, and in many cases explains users' reluctance to engage with it. However, it is somewhat lacking in consideration of the empathic and ethical dimensions. The focus is on the workplace management science and workplace information systems rather than on the human-centred design process. Given that the first TAM paper was published in 1989 [18], the SEEDS data indicated that there is a continuing reluctance to engage with new technologies among older people.

What can young designers learn about older people from this study? Practical examples for teachers

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, she did not 'Google it'. Interviewees were more familiar with domestic and non-digital 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.

Respondents from the SEEDS data collection 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.

In our study older participants talk about hand written letters, tactile reminders of the person as well as written communication in preference to e-mail. Several respondents indicated letters as particularly valuable. 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. 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.

For some elderly people, landline telephones used to occupy the same niche, the use 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 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. Compare this to our favourite domestic technology – the wooden spoon, a device which has clear functionality and purpose. Young designers 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 people have experienced.

To return to the perceived intrusive nature of mobile phones, it may be useful for young designers seeking to improve design or encourage usage, to consider some of the social background that the older people grew up with - long waits for letters and parcels, rationing and queuing during the 1940's and 1950's, for example. 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 and leisure. What would the comparable phrases be now? Shall I join you on Wii? Shall I nuke some lunch? Check online? Look up Wikipedia? 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. These abbreviations are increasingly finding their way into more formal contexts. University tutors are reporting such phrases being used in formal assignments. Although considered 'standard' and 'normal' to teens, and initially framed by technological use, they can be baffling to older generations. The responses in interviews to the digital communication in particular may reflect these attitudes. There may then be a need to promote clarity and respectful communication between students and those they wish to design for.

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.

Although interviewees were asked a series of questions relating to the use of digital technologies, they were not asked what they considered 'the purpose of the technology' 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.

In seeking to address our theme, 'how could learning about social history of technology help bridge the gap between generations and lead to a more empathic design? Can the teaching of empathy and ethical understandings assist this process, and if so, how? We suggest that different, more empathic, approaches to collecting initial data may be of value. The use of cultural probes [19], user diaries [20], technology biographies [21], or narrative vignettes [22] may prove fruitful in gathering information, building empathy and a dialogue of mutual understanding and respect between generations.

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, and 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 design student's 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 technology 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

1. Wright, P. & McCarthy, J.: Empathy and Experience in HCI. CHI'08 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 637-646 (2008)
2. Koskinen, I., & Battarbee, K.: Introduction to user experience and empathic design. In I. Koskinen, K. Battarbee, & T. Mattelmäki (Eds.), Empathic design: User experience in product design, Helsinki, Finland: Edita IT Press, 37-50, (2003)
3. Dandavate, U., Sanders, E. B.N., & Stuart, S.: Emotions matter: User empathy in the product development process. In Proceedings of the 40th Annual Meeting of the Human Factors and Ergonomics Society, Santa Monica, CA: HFES, 415-418 (1996)
4. Black, A.: Empathic design: User focused strategies for innovation. In Proceedings of the Conference on New Product Development, London, UK: IBC, 1-8 (1998)
5. Batchelor, R., Bobrowicz, A., Mackenzie, R., Milne, A.: Challenges of ethical and legal responsibilities when technologies' uses and users change: social networking sites, decision-making capacity and dementia, Ethics & Information Technology, 14, 99-108 (2012)
6. Leonard, D. & Rayport, J.F.: Spark innovation through empathic design. Harvard Business Review, 75 (November-December), 102-113 (1997)
7. Gombrich, E.H.: Art and Illusion: A study in the psychology of pictorial representation. Princeton University Press, Princeton and Oxford (2000)
8. Baxandall, M.: Painting and Experience in Fifteenth-Century Italy: A Primer in the social history of pictorial style. Oxford University Press, Oxford (1988)
9. Berger, J.: Ways of Seeing. British Broadcasting Corporation and Penguin Books, London (1972)

10. Schön, D.: The Reflective Practitioner: How Professionals Think in Action. Temple Smith, London (1983)
11. 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)
12. Robinson, K.: Out of Our Minds: Learning to be Creative. Capstone, Chichester, UK (2001)
13. Hosking, I., Waller, S., Clarkson, P.J.: It is normal to be different: Applying inclusive design in industry. Interacting with Computers, 22, 496-501 (2010)
14. Dym, C.L., Agogino, A.M., Eris, O., Frey, D.D. & Leifer, L.J.: Engineering Design Thinking, Teaching, and Learning. Journal of Engineering Education, January, 103-120 (2005)
15. Blevis, E., Lim, Y.K., Stolterman, E.: Regarding Software as a Material of Design. Wonderground Design Research Society Conference. Design Research Society, (2006)
16. Bakhtin, M.:Speech Genres and Other Late Essays. University of Texas Press, Austin (1986)
17. Valentine, E., Bobrowicz, A., Coleman, G., Gibson, L., Hanson, V., Kundu, S., McKay, A., and Holt, R.: Narrating Past to Present: Conveying the Needs and Values of Older People to Young Digital Technology Designers. Universal Access in Human-Computer Interaction, Lecture Notes in Computer Science, 6766, 243-249 (2011)
18. Davis, F.D.: Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 319-340 (1989)
19. Gaver, B., Dunne, T., & Pacenti, E. Design: Cultural Probes, ACM Interactions, 6 (1), 21-29 (1999)
20. 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, 15-23 (2001)
21. Blythe, M., Monk, A., & Park,J.: Technology Biographies: Field Study Techniques for Home Use Product Development. Proc. CHI'02 (Extended Abstracts), ACM Press, 658-659 (2002)
22. Orr, J.: Talking about Machines: An Ethnography of a Modern Job. New York, Cornell University Press (1999)

Acknowledgements