
This is an electronic reprint of the original article.
This reprint may differ from the original in pagination and typographic detail.

Knight, John; Dix, Alan; McEwan, Tom; Travis, David

Unsung Heroes, Principled Pioneers, Educational Evangelists and Entrepreneurs – A Potted History of British HCI

Published: 07/07/2020

Document Version

Publisher's PDF, also known as Version of record

Published under the following license:

CC BY-NC-SA

Please cite the original version:

Knight, J., Dix, A., McEwan, T., & Travis, D. (2020). *Unsung Heroes, Principled Pioneers, Educational Evangelists and Entrepreneurs – A Potted History of British HCI*. Paper presented at History of Human Computer Interaction, Swansea, United Kingdom.

This material is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of the repository collections is not permitted, except that material may be duplicated by you for your research use or educational purposes in electronic or print form. You must obtain permission for any other use. Electronic or print copies may not be offered, whether for sale or otherwise to anyone who is not an authorised user.

Educators, Entrepreneurs, Evangelists and Experimenters – A Potted History of British HCI

1980s Experimentation – from controls to interfaces

Human–computer interaction emerged in the UK in the late 1950s. In 1959, Brian Shackel, published the first article in the area entitled ‘Ergonomics for a Computer’. This was based on his experience designing what was effectively the ‘user interface’ of the EMIAC II, albeit one that consisted largely of knobs and lights. While predating true interactive system design, the design methods movement (Jones, 1972)) toolkit including concepts such as ‘the user’, ‘Man-Machine System Design (ibid, pp 123) and the ‘appropriate task allocation between people and machines’. The approach drew on early research and development done by Tom Singleton who was also involved in the NATO conferences on software engineering including the Human Factors Programme that ran from 1967 to 1983.

Shackel’s influence in HCI continued to be felt in later years both in the industry-facing HUSAT research centre at Loughborough, and his role in establishing IFIP TC 13 and the INTERACT conference series in the early 1980s. However, academic HCI in the UK owes perhaps its greatest debt to the Alvey programme. In 1983, and in response to the Japanese 5th generation computer programme, the UK launched its own half–billion-pound funding programme. This covered five core research areas including the ‘Man–Machine Interface’. The choice of these areas was determined by a commercially savvy, industrial committee. The group foresaw the essential role of the human in future computing, something that computing academics at the time regarded as marginal.

This programme was largely responsible for the creation of major cross-disciplinary HCI research groups, including those at York and QMUL, as well as strengthening existing work in the area such as Loughborough, John Long’s Ergonomics Unit at UCL (now UCLIC) and usability standards work under Nigel Bevan at National Physics Laboratory. To this day, the ‘children of Alvey’, PhDs and researchers first employed in the programme, are widespread in the professoriate across the UK and contributed to growing early commercial adoption.

Another initiative of that period was the British HCI Group, (now a specialist group (Interaction) of British Computer Society (BCS), and the British HCI Conference. The latter was one of the core international venues at the time as well as nurturing the growing UK HCI community, both in academia, but also the initially small group of practitioners in companies such as IBM in Warwick and NCR in Dundee and early consultancies.

The close connection between research and practice continued into the 1990s with the UK joint industrial–academic CSCW programme. Whereas Alvey had fostered research connections between psychology and computing, the CSCW programme brought sociologists and management science into the interdisciplinary milieu, which was unusual if not unique in the world. This rich community attracted both Lucy Suchman, who brought ethnography into HCI, and Xerox Europarc to the UK.

By the dot-com years at the end of the 1990s, the British HCI community, in both academia and industry, was mature, and had a character of its own that often connected theory with more practical methods and design. The small but growing number of interactive agencies were filled with graduates of the Ergonomics Unit’s MSc programme. Indeed, some of the children of Alvey, themselves became the hi-tech entrepreneurs of dot.com.

1990s Foundations – from textbooks to standards

The rapid emergence of multimedia for both business and consumers in the early 1990s, extended HCI from the ergonomics of the workplace into the mainstream. Knight et al (1993) was a prevalent HCI textbook for the early masters’ degrees in multimedia. Until this point the consumer had little access to technology, but as early palmtop devices (e.g. Palm Pilot) appeared, and mobile phones became not just a tool for young professionals but a fashion accessory, ergonomics for consumer electronics converged with IT design.



The first edition of Dix et al is often thought to be engineering-driven, and iterative waterfall methodologies are not unusual for its time of publishing. Part I, Foundations, spends a hundred pages on “the science bit” and part III a similar amount on futuristic and emergent issues, but part II, Design Issues, spends three hundred pages on the process. Therein are multiple references to standards and guidelines (pp 161-168) for that which is produced, but also for the processes (pp168-188) for producing it, leading with Usability Engineering. This focus on design rules and guidelines is extended further in later editions of this book and also in Preece et al (1994), Benyon et al (2005), Sharp et al (2007), other definitive textbooks that followed.

Nowadays, the engineering focus is almost a curiosity. At the time, however, constraints of processor, memory and connectivity were considerable, and, in our experience, the risks of any failure were high and expensive. Personal computers booted from floppy disks, CD-R was an expensive (£20 per disk) and fragile technology. In 1991, a SCSI hard drive with the capacity of a CD cost over a thousand dollars. It cost \$25,000 (and a flight to LA) to digitise an hour’s MPEG-1 video to fill a CD-i in 1994. Any failure or unnoticed error in the digitisation, the authoring, the mastering, or the pressing, erased profit margins and drove many early multimedia companies out of business in the latter 1990s.

Nevertheless, it became clearer that good usability is a fundamental objective of digital design and that this should be achieved by conforming to standards both for content *and* for process. By INTERACT’99, the conversation had progressed to how to make usability, itself, usable. The gathered academics viewed usability as mature, the attendees from government felt that “Usability Now!”, a decade earlier, had “transferred the technology” to industry, and local TV captured industrial exhibitors using “ease of use” to differentiate their innovations. Yet employers complained about graduate skill sets, and major product investments were still leading to marketplace failure due to poor usability or accessibility.

In the meantime, dedicated individuals such as Charles Brennan, Nigel Bevan, Jonathan Earthy, Martin Maguire and Catriona Campbell had succeeded in codifying, first into British and then ISO Standards (e.g. ISO13407 (1999)), and then into government policy, definitions of process and content.

At this time, the British HCI Group saw two opportunities - one, to create a website that would provide a global hub for usability knowledge and debate, and two, to update the standards used by business to define job roles and employment contracts. UsabilityNews.com went live in 2001, employing an editor/author part-time to create and collate content. Over the next few years it achieved a global following and was the conduit by which tales of practice fed back into the group - initially as accounts of practice and, increasingly, as detailed job vacancy descriptions. This information fed into the efforts led by Jonathan Earthy to have HCI more adequately reflected in the primary definition of skills in this sector, SFIA - The Skills Framework for the Information Age.

SFIA had grown out the BCS’s Industry Structure Matrix (or Model) ISM (1986) and is used in many countries as the basis for employment contracts, identifying training needs, and demarcation of labour. In the UK, Sector Skills Councils (SSC) coordinate this effort, and most work domains have a relevant SSC. The challenge in design practice is that there are (at least) three relevant ones which sometimes overlap (SFIA, Skillset, CCSkills). SFIA, by 2009 defined 86 “skills” each at several levels of competency, with each of these based on underlying items of knowledge or other attributes. Bodies such as e-Skills or BCS then build more detailed definitions, with BCS’s SFIPlus running to several thousand pages of detail. Employers then might define a job role as, say, requiring level 3 of skill X and level 4 of skill Y. While this may sound reductive, equality legislation has required human resource professionals to use objective ways of measuring the demands of, and capabilities needed for, a specific job. This enables equal pay, removes possible areas of ethnic discrimination, and provides the individual with a clear career ladder.

An HCI2009 Educators Workshop paper (McEwan, 2009) records that joint efforts from 2002, by BCS and the Usability Professional Association, to develop accreditation of competency in usability had foundered, both in terms of the legal implications of administering ‘licence to practice’, and the dearth of competency definitions in the upper (Professional) levels of SFIA. This effort subsequently led, however, to five rather than two HCI-related skills (and 20 separate role-levels) in version 3 of SFIA (2005), including at the most senior professional level. This success was not unqualified, as SFIA continued to use outmoded terminology, such as ‘non-functional needs’, and HCI and Usability were still excluded from relevant skill sets such as ‘requirements engineering’, and ‘content creation’. In subsequent revisions HCI roles have become more closely integrated with these roles.

2000s – Acceleration – from labs to agencies

A handful of digital ‘labs’ emerged in the late 1980s, that provided HCI style offerings, such as usability testing. Some way distant from marketing, these evolved into the 1990s as highly specialised industrial and product design organisations (e.g. IDEO), emerging technology service providers (e.g. Sapien) or inhouse teams and consultancies including IBM and NCR. As Interactive CD-ROM production companies foundered, their staff found a new niche as rich media web developers. The growth of a new kind of agency was sustained by the New Economy (Tapscott, 1997). Here the emergence of email, the internet, mobile communications and ever maturing software platforms created demand for ‘digital’ design and improved usability.

The commercial application of HCI had two effects. Firstly, it shifted and extended research agendas into commercial product and service contexts, thus opening up hitherto unaccounted for issues and domains such as use. Secondly, it spurred growth in what would now be called ‘start-up’ organisations, seeking to provide commercial variants of classically developed tools and methods. In 2001, the UK market for such services was limited to approximately 50 organisations, with the biggest concentration in London (Knight and Jefsioutine, 2003) including Oyster, FramFab and Wheel.

These early pioneers were a mix of the traditional advertising agency, with some of the strategic mettle of their global counterparts (e.g. Frog and IDEO) and a close connection to academic HCI founded through the Alvey programme. In this climate, some students started their own commercial agencies (e.g. Amberlight) or gained employment in niche design oriented ergonomic and usability labs (e.g. System Concepts). This diverse milieu found common cause in developing a small but influential community of practice through discussion lists (e.g. London Usability Group that first met in 2000) and catalysed the growth of the BCS HCI Group, UPA (now UXPA) and IXDA (now SDA).

A further significant shakeout of advertising-oriented agencies occurred during the dot.com bubble. Frenzied capitalisation in new, internet-oriented business led to a bonanza in web design. The resulting downturn and reaction against ‘creative’ fostered commercial interest in usability and process. ‘Web 2.0’ (O’Reilly, 2005) heralded venture capital’s love affair with the tech start-up scene. Lessons learnt in the dot com bubble had a significant economic impact too. Behemoths such as Amazon and Apple were deeply scarred and shaped by that experience, including their embrace of design. The particular type of design that these companies, and the many agencies that serviced them employed was a hybrid. This HCI based fusion encompassed ‘User-centred Design’ (UCD), that drew on the distinctively British socio-technical tradition of Trist (1951), Scandinavian Participatory Design (Ehn, 1988) and instrumentally oriented engineering approaches (e.g. Usability Engineering, Gould and Lewis, 1985).

2010s – Diffusion – agile, lean, Design Thinking and training

Nascent agencies, internal teams and researchers adopted a loosely defined User-centred Design (UCD) process at this time. This methodology evolved from across traditional disciplinary boundaries of computer science, design and even political activism. A common factor in these seemingly disparate elements was in front-ending audience research and testing with low-cost prototype before undertaking any development work. This pre-development work reduced risks, costs and readily fit with waterfall development methodologies and marketing approaches to new product development.

Participatory Design’s emphasis on a common language using “low-fidelity” prototypes (Ehn and Kyng, 1991) not only fitted engineering methodologies and a focus on risk mitigation (albeit downplaying the social democratic political agenda) but were also valuable in a commercial context. Cheaply made, early prototypes bought marketing ‘ideas to life’ and were thus useful in pitching for work, let alone aiding workplace democratisation. Low-fidelity prototyping also provided a bridge between traditional design disciplines and software development. Yet over time prototyping widened a gulf between design and development, that had been absent in HCI. Focusing on prototypes rather than working software gradually shifted the focus of design, firstly from collaboration with engineers at a philosophical and practice level and secondly from “making stuff in the here and now” to a future (idealised) state as is the orthodoxy in much academic design research.

UCD’s future was now assured, albeit with a final important shift toward the experience economy (Pine and Gilmour, 1988). The result was a loose amalgamation of what were by now relatively robust design practices (e.g. wireframing) applied to a holistic definition of quality (e.g. Service Design and User Experience, respectively). The core set of practices extended into vogueish notions of ‘Design Thinking’ that provided an innovation focused counterbalance to the discipline’s risk mitigation strategies. UCD’s future was also secured

with the launch of highly successful consumer devices such as the iPad and the exponential growth of the tech giants of today. The speed and magnitude of this growth as well as further disciplinary accumulation of Lean and Agile has further obscured the critical role that HCI played in developing a global digital economy.

This potted history would be incomplete without noting the critical role that agile development (Beck, et al, 2001) has had on digital design. While agility traces back to the previous century, its impact has accumulated over nearly fifteen years but with a seismic change to practice and even the very nature of design outcomes. The Government Digital Service (GDS) has incubated the latest incarnation of digital design that adds agility and a service orientation to UCD. GDS has also been critically important in growing the wider industry. As direct employer, it has sustained many seasoned practitioners, a mass of early career designers and developers as well as a legion of mid-level contractors.

Consolidation is also evident in merging of a number of practitioner organisations including the union of the IXDA and Service Design Network. Growth in training for UX is symptomatic of this change and providers span commercial organisations such as General Assembly and The Interaction Design Foundation through to membership driven organisations such as The UXPA. The BCS launched their Foundation Certificate in User Experience in 2016. The aim of the Foundation Certificate is to show that candidates understand the fundamental concepts in user experience as detailed in ISO 9241-210. which superseded ISO 13407 and was drafted by Tom Stewart of System Concepts.

2020s – Futures

Conclusion

This paper has attempted to bridge an important gap in design research and history. This account charts the important role that HCI has had on the growth of digital design between the 1980s and present day. Its influence extends beyond an instrumental focus on accounting for people in developing technology to one that promotes human values that are then practically operationalised through a set of robust tools and methods that are now deeply embedded into academic and industry practices.

References

Beck, K., Grenning, J., Martin, R. C., Beedle, M., Highsmith, J., Mellor, S., van Bennekum, A., Hunt, A., Schwaber, K., Cockburn, A., Jeffries, R., Sutherland, J., Cunningham, W., Kern, J., Thomas, D., Fowler, M., & Marick, B. (2001). *Manifesto for Agile Software Development*. <http://agilemanifesto.org> [accessed on January 27th, 2016].

Benyon, D., Turner, P., & Turner, S. (2005). *Designing interactive systems: People, activities, contexts, technologies*. Harlow, England: Addison-Wesley.

Dix, A., Finlay, J., Abowd, G., and Beale, R. (1993). *Human-Computer Interaction*. Prentice Hall.

Ehn, P. (1988). *Work-oriented design of computer artifacts*. Falköping, Sweden: Arbetslivcentrum/Almqvist and Wiksell International.

Ehn, P. and Kyng, M. (1991). Cardboard computers: Mocking-it-up or hands-on the future. In J. Greenbaum and M. Kyng (Eds.), *Design at work: Cooperative design of computer systems*. Hillsdale NJ USA: Erlbaum.

European standard. EN ISO 13407:1999, Human-centred design processes for interactive systems, (ISO 13407:1999). (1999). Brussels: CEN.

Gould, J.D. and Lewis, C.H. (1985) *Designing for usability – key principles and what designers think*. *Communications of the Association for Computing Machinery*, 28(3): 300-311.

Jefsioutine, M and Knight, J. (2003). *USER-LAB - A case study of academic enterprise*. University of Central England, Corporate Development Centre. ISBN 0904354490.

Jones, J C. (1970). *Design Methods: Seeds of Human Futures*. Wiley-Interscience.

Knight, J. 2017. Go with the Flow: Accelerated digital design in the age of Post-agility. *The Design Journal*, 20:sup1, S2700-S2715, DOI: [10.1080/14606925.2017.1352781](https://doi.org/10.1080/14606925.2017.1352781)

McEwan, T. (2009). *Playing the game: HCI careers in the competency era*. Proceedings of HCI Educators 2009, University of Abertay Dundee, UK. Swindon: BCS.

Mumford, E. & MacDonald, B. (1989) *XSEL'S Progress*. Wiley, New York, NY, UK. Murray, R. (1999) *Creating W*

Nielsen, J., Snyder, C., Molich, R and Farrell, S. 2001. *E-Commerce User Experience*. Nielsen Norman Group.

Preece, J.; Rogers, Y.; Sharp, H.; Benyon, D.; Holland, S.; Carey, T. (1994) *Human-Computer Interaction: Concepts And Design*. Addison Wesley.

O'Reilly, T. 2005. *What Is Web 2.0 Design Patterns and Business Models for the Next Generation of Software*

Pine, B., and Gilmore, J. 1998. Welcome to the experience economy. *Harvard Business Review* 76 (4): 97–105.

Shackel, B., 1959. Ergonomics for a computer. *Design* 120, 36–39.

Sharp, H., Rogers, Y., & Preece, J. (2007). *Interaction design: Beyond human-computer interaction*. Chichester: Wiley.

SFIA Foundation. (2005). *Skills framework for the information age version 3*. London: SFIA Foundation.

Tapscott, D. 1997. *Digital Economy: Promise and Peril in the Age of Networked Intelligence*. McGraw-Hill Inc.,US

Trist, E.L. and Bamforth, K.W., "Some social and psychological consequences of the longwall method of goalsetting", *Human Relations*, Vol. 4, 1951, pp. 1-38