

What Do IT-People Know about the Nordic History of Computers and User Interfaces?

A Preliminary Survey

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Abstract. This paper reports a preliminary, empirical exploration of what IT-people know about the history of computers and user interfaces. The principal motivation for the study is that the younger generations such as students in IT seem to know very little about these topics. The study employed a free association method administered as email. Eight students and four researchers participated, between 26-34 and 48-64 years of age, respectively. Responses totaled 222 and we analyzed and categorized them. First, the Nordic touch was extremely limited. Secondly, the knowledge of both students and researchers seems heavily based on personal experience so that the researchers know much more about the earlier days of computing and interfaces. Thirdly, there is a tendency amongst the students to conceptualize the history of *computers* in *interface* features and concepts. Hence, the interface seems to become the designation or even the icon for the computer. In other words, one of the key focal points in the area of human-computer interaction: to make the *computer* as such *invisible* seems to have been successful.

Keywords: User interface history, computer history, knowledge.

1 Exploring User Interface History

In the last years, I have become interested in the history of user interfaces to computers [4, 5]. My motivation is primarily the scarcity of the literature on this topic and a strong impression that young IT-people know very little about the history of user interfaces – and apparently also about the history of computers. They seem to believe that the PC was the first computer and that Windows was the first user interface. My exploration of the history of user interfaces is fascinating, and being a newcomer with a background in computer science and human-computer interaction (HCI), I have to adopt historians' practices and discourses [3].

The target audience for my research in user interface history consists of three main segments: historians of technology, researchers in IT and HCI, and students of IT and HCI. In accordance with good practice in HCI – know thy user – I would like to know more about the target audience. Getting to know the historians' practice and discourse

takes place through networking and studies of the literature. I do know IT-researchers and IT-students quite well in general, but my understanding of their knowledge of the history of computers and interfaces is rudimentary. Therefore, I conducted an exploratory survey of what the two groups know about these topics. This will help me sharpen my research questions and communicate my results more succinctly.

2 Probing Researchers' and Students' Knowledge

Given the nature of this uncharted territory, I included the broader history of computers in order to contextualize the interface issue. As computing is an international phenomenon I decided only to address the Nordic touch implicitly. I employed an open-ended data collection method: free associations. In addition, I recruited informants in my immediate vicinity. The researchers were four colleagues: two university researchers and two from industry with considerable research experience. They were all computer scientists and knowledgeable or experts in HCI, between 48 and 64 years of age. I recruited the students among the ones I supervised at the master level at the IT University in the fall of 2006. I asked fourteen students and received eight answers. Their median study time at the IT University was 1.5 years. They all had a baccalaureate degree in various areas, including media technology, IT-studies, and Danish. Their age varied between 26 and 34 years. The specific wording of the free association task was as follows.

*Please complete a brief, free association task on the following question:
When I say the history of computers, what do you say?
Write down 5-10 points, names, events, systems, paradigms, etc.*

There was a similar question on the interface. I administered the survey by email. The respondents returned 222 answers, on average 28 for the researchers and 14 for the students, about equally distributed between computer and interface history. The respondents spent between 10-15 minutes and one hour in responding. One respondent in each group returned a 1-page essay, while the remaining respondents returned a list of words or short statements. The lengthy responses were condensed. I categorized all answers twice, with several weeks between to achieve some robustness (inter-rater reliability over time), in categories derived from the data that reflect major historical aspects. The Appendix lists all the responses in abbreviated form, enabling the reader to get an impression of the breadth and diversity of the material.

3 What Do They Know?

A summary of the results appears in Table 1. In the following, I present and discuss the three most noteworthy trends.

The numbers are absolute because of the almost equal number of responses in the four groups. Note that I scored the two last rows independently of the rows above.

Table 1. Responses in categories listed alphabetically, blank cells denote no response

Category	The History of the Computer		The History of the User Interface	
	Researchers	Students	Researchers	Students
Applications	3		3	1
Games		3		
Evolution	6	7	3	3
Internet	1	3	1	2
Miscellaneous	4	1	2	1
Organizations	1	5		1
Personal computer	5	18	2	1
Pioneers	6	1	3	1
Research			7	
Society	2	2		
Software	8	3		6
Technology	11	5	4	2
Use & User	3	1	6	2
User Interface	4	11	27	30
<i>Total</i>	<i>54</i>	<i>60</i>	<i>58</i>	<i>50</i>
Nordic		2	1	1
Pre-pc	36	7	23	9

Firstly, the *Nordic touch* is modest, in fact only four responses out of 222 (1.8%), as seen in the second-to-last row. The responses were:

- The Danish PC Piccoline manufactured by Regnecentralen from 1984 to 1989
- The Danish Computer Fair in Copenhagen
- A user interface development method by the Danish researcher Søren Lauesen
- Jakob Nielsen's alertbox at www.useit.com

These examples do not lend support to a strong Nordic anchoring as the Computer Fair was probably much like computer fairs in other countries and Jakob Nielsen is indeed Danish but has been living in the United States for several decades¹. The limited Nordic touch is in line with the decline of the Nordic IT industry in the last decades. Thus, in Denmark, the best-known IT-company Regnecentralen closed in 1992 after two decades of organizational and financial turbulence [6]. Hence, it seems that knowledge of computer and user interface history is strongly internationally grounded.

Secondly, there is a marked difference in the responses in the two groups regarding the *user interface*. Consider first the following student response: Machintosh², Xerox Parc, GUI, Window metaphor, Desktop metaphor, Microsoft, DOS. Note that the first five of these seven items are canonical user interface concepts. Is this a response to the history of *computers* or to the history of *user interfaces*? It is the former, in fact. This student was extreme, but student responses on user interfaces to the question on

¹ In fact, students often ask me if he is Danish or American.

² Spelling error in original response.

computer history were much more frequent than researcher responses (11 versus 4). Hence, students seem to associate computer history much more strongly to the user interface than researchers. This trend is in line with a recent terminological shift towards use of the term user interface at the expense of the term computer. An example from a recent Ph.D. thesis is, “We become part of the interface or rather we bring the interface with us everywhere, we create practices around the interface” [1, p. 88]. Contrasting this, it is interesting to note that the students have far fewer answers in the category use and user (3 versus 9), perhaps because students are brought up with computers and therefore consider user-trouble an inherent and inevitable part of the game?

Thirdly, there is a very marked difference between the researchers and the students regarding the emphasis on *personal computers* in the history of computers. Here the students’ responses are almost four times more frequent than the researchers’ (18 versus 5). This trend is supported by looking at pre-PC responses in the bottom row. Only 7 and 9 of the students’ responses are pre-PC, while the corresponding figures for the researchers are 36 and 23. Hence, there is strong evidence that the students seem to associate computer history with the PC era. Given that in the last two decades or so with client-server architecture, access to mainframe computers happens through PCs and not through “dumb” terminals, it is not surprising that students have little clues about large computers, let alone about their origin. Nevertheless, modern computer users are using more computers and more powerful computers than ever before. Surfing on the internet means using myriads of small and large computers, networks, and protocols – yet the computers are largely invisible. The interface appears to connect the user to other users and the vast amount of information and services. The technology itself has become hidden while the interface has come to the fore [4]. Hence, one of the key focal points in the area of human-computer interaction: to make *invisible* the *computer as such* seems to come closer to realization.

4 Conclusion

First, the Nordic touch was extremely limited as only four of 222 responses addressed the Nordic aspects. Secondly, the knowledge of both students and researchers seems heavily based on personal experience so that the researchers know much more about the earlier days of computing and interfaces. Hence, this study suggests that historical knowledge on computers and user interfaces is relative and associated with generation-specific personal experiences. Thirdly, there is a tendency amongst the students to conceptualize the history of computers in interface features and concepts. Hence, the interface seems to become the designation or even icon for the computer. We should interpret these conclusions with considerable caution due to the very small sample of IT-people recruited in my work context and the open-ended data collection method. The study is an indication of the lie of the land and may serve as a point of departure for future work.

After the study, an interesting twist emerged. It turned out that three of the four researchers did not know about the changing meaning of the term *computer* in the 1940s—from denoting a *person* doing calculations manually to denoting a *digital calculation device* [2] nor did several of them know that many of the first programmers were *women*. Indeed, this is a strong illustration of the above-mentioned generation-specific and experience-based knowledge of computer and user interface history.

References

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Appendix

The 222 responses appear below in alphabetical order. They are organized according to Computer History Researchers, Computer History Students, Interface History Researchers, and Interface History Students. The original responses have been condensed in many cases while preserving the gist of the response.

Computer History Researchers

2. 3. 4. and 5. generation programming languages
 administrative systems
 Alan Turing
 Alan Turing
 Alan Turing
 Apple II
 Basic
 Citizens required to use IT
 Compilers for high-level languages
 DOS
 Edsac/Eniac
 Eniac
 ferrite core
 few and priviled users to everyone everywhere
 Fortran
 Hopeless operational procedures in embedded software, eg in DVD players
 Hype and sales talk
 IBM
 IBM 3270
 IBM pc
 IBM/360
 IBM OS/360
 IBMs waterfall model
 Internet
 John von Neuman
 John von Neuman
 levels in systems and architectures
 Macintosh
 mainframe – mini – micro computers
 mainframes
 mainframes
 microcomputers
 Microsoft overtook IBM on the pc market
 minicomputers
 numerical calculations
 operating systems
 pc
 pc
 pc/Mac
 pc-revolution
 PDAs
 process control
 punched cards
 punched cards
 smaller and smaller

specialist to routine tasks for ordinary users
 superstition and incompetent support
 system development
 the computer: an everyday appliance
 ubiquitous comp.
 Univac
 user trouble
 vacuum tubes to transistors
 Vannevar Bush

Computer History Students

Alan Kay
 Amiga 500
 Apple
 Arpanet
 Atari, Commodore 64
 Commodore 64 game console
 Commodore 64 games
 Commodore 64 programming
 Commodore 64 tv and cassette tape
 Computer Fair in Bella Center
 Computer technology: IO to silicone chips etc.
 Desktop-metaphor
 Diskette development from 8" til 3.5" to CD etc
 Displays: from large and clumsy to flat, less bulky
 DOS
 DOS: this weird, impoverished place
 Ethernet
 Game consoles: Amiga, Sega, Nintendo
 GUI
 HTML – opened up with Flash etc – had not happened since LEGO
 IBM
 IBM
 IBM
 Internet – the computer becomes much more interesting
 large computers
 Machintosh
 Macintosh: the first that my dad had in his office

matrix printer
 Microsoft
 Microsoft Bill Gates
 miniaturization:
 mainframe, PC, PDA, portable, desktop computer etc.
 miniaturize one computer for many users – one computer for one user
 my first portable: an IBM Thinkpad
 one user uses many computers: portable, PDA, cell phone, ...
 operating systems like OS/2 and Windows'
 pc
 pc 286
 pc 386
 pc 486
 pc 486 Windows 3.1
 pc AT
 pc IBM PC my mom used
 WordPerfect
 pc Pentium
 pc Pentium 2/3/4
 pc XT
 Piccoline
 portable – a cool invention
 portable in backpack, as you go
 printer development:
 Matrix/9-24 til ink/laser printers
 punch cards
 the computer invented in the USA, applied in the military
 the first computer was as large as a room
 the first computers were as large as a room
 the desktop computer becoming prevalent in a few years
 time sharing
 Unix
 window metaphor
 Xerox
 Xerox PARC
 Xerox PARC

User Interface History Researchers

"terminal"
 3-D animation
 Adobe
 Alan Kay
 Apple II
 Ben Shneiderman
 CHI conferences,
 especially in 1984
 Command dialogue
 Command dialogue still
 thrives in Linux
 Control panels with
 switches by the hundred
 Convergence between
 word-processing and
 desk-top publishing
 CUA standard
 Direct Manipulation
 Displays
 Displays
 Donald Norman
 Donalds Norman's book
 Psychology of Everyday
 Things
 DOS on the microcomputer
 Function keys in
 WordPerfect & Word
 Gould & Lewis paper in
 Comm. ACM 1985
 "Designing for
 Usability..."
 Graphics in process control
 applications
 GUI
 GUI
 homepages still only made
 by freaks
 HTML metafor differs
 from GUI metafor
 IBM 3270
 IBM 3270
 Internettet
 Jakob Nielsen's Alertbox
 Jef Raskin's Apple II user
 manuals
 Jef Raskin's work on the
 Macintosh
 John Seeley Brown's
 keynote at CHI '83
 Macintosh
 Microsoft's Office-suite
 Online access, not only
 specialists
 Patricia Wright's FLUID
 model
 Punch card/tape as input,
 print/batch as output
 punch tape

scripts – a kind of
 command language
 switches
 teletype
 teletypes
 the Mouse
 the mouse
 the mouse
 the user as factor
 thinking aloud test
 typewriter
 user frustrations
 walk-up-and-use need
 web not applicable to GUI
 interfaces, but is being
 used anyway
 websites: surf to another if
 it doesn't work
 wide application of home
 computers because of the
 graphical user interface
 WIMP: Windows, Icons,
 Menus and Pointing
 Devices
 Windows, especially
 Windows'95
 WYSIWYG: What You
 See Is What You Get
 Xerox PARC
 Xerox Star

User Interface History Students

Accessibility
 Apple
 Apple II
 Browsers: Netscape,
 Explorer
 Cognitive load
 Colour displays
 Command dialogue to
 graphics
 Desktop metaphor
 Desktop metaphor
 DOS
 DOS
 Double click: learning
 problems
 Douglas Engelbart: As We
 ..
 Graphics vs. codes, easier
 for ordinary users
 GUI and not UI
 HTML: decide appearance
 yourself

IBM PC used by my mom,
 blue-white, cursor block
 Iconic user interfaces
 Icons
 Intuition: my two-year old
 nephew could swith
 Windows XP on and off
 Joystick, not keyboard on
 C64 game console
 LINUX
 LINUX: various Linux
 distros
 Macintosh
 Microsoft
 Microsoft made the use of
 computers increase –
 early 1980s
 Mobile devices
 Operating systems
 OS X
 Piccoline – graphic
 interface
 Software on mobile devices
 Text-based – DOS
 Piccolone
 Text-based interaction
 User Interface & usability
 focus today vs. 1980s
 User Interface term -
 invented by tech people –
 hard, interface better
 User Interface: engineering
 paradigm – before the
 human aspect
 Virtual Windows by Søren
 Lauesen
 WIMP: Windows, Icons,
 Menus, Pointing devices
 Windows 2000
 Windows 3.1 lack of
 consistency
 Windows 3.11
 Windows 95
 Windows 98
 Windows ME
 Windows various versions
 Windows various versions
 Windows XP
 Word
 WordPerfect's commands
 WWW