The Heinz Nixdorf Museums Forum, Central Venue for the "History of Computing"

Norbert Ryska, Jochen Viehoff

The Heinz Nixdorf MuseumsForum, Central Venue for the "History of Computing"

Norbert Ryska and Jochen Viehoff
Heinz Nixdorf Museum, Paderborn, Germany
jviehoff@hnf.de

Abstract: In the late 1970s Heinz Nixdorf began to collect historical calculating devices and early computers to serve as the basic exhibits of a computer museum. After Nixdorf's death, the Nixdorf Foundation was set up to develop the museum. To see the different ways of looking at computer history, a pluralistic approach was chosen, with the focus on the history of objects, ideas, people or societies. This paper tells something of the development, goals and purpose of the museum.

Keywords: Computer museum, Nixdorf, Nixdorf Computer AG, simulations, replicas, designers, builders, education.

1 Prologue: 1975 – 1992

It was in the late 1970s that German computer entrepreneur Heinz Nixdorf began to collect historical calculating devices and early computers. These objects were to serve as the basic exhibits of a computer museum which he intended to establish on his Paderborn premises. Not only had Nixdorf collected some 1,500 objects by the time of his sudden death in 1986, but he had also been presented with an initial exhibition scenario by the Berlin exhibition architects.

2 Development Phase: 1992 – 1996

Following a six-year hiatus, the idea of the museum was revived by the Nixdorf Foundation and a ten-strong working group comprising technology historians, exhibition architects and one of the authors (Ryska) was established with a view to performing a feasibility study. The contextual framework stipulated by the Nixdorf Foundation was initially restricted to the history of office computing in the light of the product range manufactured by Nixdorf Computer AG. However the working group opted to dispense with this narrow outlook, instead developing an extensive tour through the 5,000-year history of arithmetic, writing and communication. This idea, which ultimately cost DM 120 million, was finally sanctioned by the Nixdorf Foundation. The concept was absolutely unique.

The following objectives were pursued and achieved in planning the permanent exhibition on the "History of Computing" which was to be set up over 6,000 square metres of floor space in the former headquarters of Nixdorf Computer AG:

3 Concept and Goals

The working group identified 60 topics to be elaborated by technology historians from around the globe and local curators before being implemented across two 3,000-square-metre storeys.

- 1st floor: From the abacus to the computer (3000 BC – 1950)
- 2nd floor: Computers conquer the world (1950 – present)

A chronological presentation of the "History of Computing" was preferred to a diachronic approach, i.e. a "back to the roots" or "from the roots onwards" perspective.

In a bid to get to grips with the different ways of looking at computer history, a pluralistic approach was chosen, with the focus on the history of objects, ideas, people or societies, depending on the topic in question.

To avoid having to forgo more complex yet important issues, it was decided that the individual topics could certainly call for different levels of understanding, in line with the principle that not everyone is interested in everything in any case.

The objects, contents and presentations should be "unique", i.e. not be available in the same form anywhere else in the world.

In a bid to render the museum experience more memorable for visitors, exhibits should, where possible, have a "back story", whether this be the curious tale of the Chess Turk, Hollerith's use of the punched card for data processing, the fact that Friedrich Nietzsche typed on a Malling Hansen, Zuse's construction of the Z1 in his living room, how Curt Herzstark's Curta calculator was developed in a concentration camp, the cracking of the ENIGMA code at Bletchley Park and Moore's Law as the only "law" in IT history.

An important objective for a public simply wallowing in superlatives was of course to procure "exhibits with cult status" (firsts, rarities, exotic models) such as the Apple I, Altair, CRAY 2, Enigma, computers used in space and Heinz Nixdorf's first computer, to name just a few examples. In the case of IT products such as calculators and mobile phones, their range and diversity was also to be demonstrated.

The successful procurement of significant loans such as components of the ENIAC (NMAH), the Typex encryption machine (Science Museum London) , the Geheimschreiber machine (Siemens AG), the D11 tabulator (IBM), the on-board computer of the Gemini Space Capsule (Air & Space Museum) and encryption devices (NSA) is evidence of the importance attached by international lenders to computer history.

4 What about Stories about the Designers and Builders of these Computers?

A central "Hall of Fame" (15 people) and an electronic "Wall of Fame" (152 people) expressed the concept that man was to serve as the focal point in the contemplation of his dealings with technology – in his role as a scientist, inventor or entrepreneur.

5 Using Simulations and Replicas to Illustrate the History of Computing

From the outset, content planners endeavoured to create an even balance between hands-on functional models (some 30 in number) and multimedia methods of communicating information on technology (around 30 multimedia presentations). For the first time, the computer became an instrument used to impart information on its own history.

The idea was to demonstrate the inventive spirit and technological competence of earlier ages by means of numerous replicas of historical calculators and machines.

6 Problem Areas

In researching historical computers, we came across surprisingly little awareness of tradition, particularly in the IT industry itself. Even "classic devices" were often no longer available (in sufficient quantities) at their manufacturers. The "last of the Mohicans" included Digital Equipment, IBM, Siemens, Bull and Ericsson. Philips, for example, closed its spectacular company museum Evoluon in Eindhoven in 1989 in the midst of a financial crisis.

The central exhibition area "How does a computer work?" was implemented for the first time in 1996 and completely revised in 2003. Both approaches fell short of our own and visitors' expectations. It is still difficult to illustrate clearly how a computer works by means of analogies or modelling – especially, of course, in the case of software. The HNF nevertheless created an exhibition section entitled "Software and computer science" in 2007 in an attempt to remedy these deficits. The HNF is the first museum ever to address this topic and has now been presenting it for ten years in a variety of ways.

As of 2014, it is planning an IT_Lab to impart the basics of computer technology in interactive fashion in the style of science centre exhibits.

7 Motivation

In the future, the museum both can and should play an important role as an extra-curricular educational resource for the imparting of core skills in areas such as the natural sciences and technology and in the provision of experience-oriented learning environments. In this context, the successful special exhibitions at the HNF demonstrate clearly the value of interactive and multimedia exhibits in the modern-day transfer of knowledge.

The objectives in updating the permanent exhibition are to preserve the fundamental character of the venue as a museum for information and communication technologies, while meeting the new expectations of future generations of visitors.

8 Concept

As part of the planned renovation and updating of the permanent exhibition (Update 3), the “exit area” on the second floor is to be extended as a laboratory for scientific experiments in the field of information technologies. To supplement the sections “How does a computer work?” und “Digital workbench”, clusters of hands-on exhibits will enable visitors to work on basic scientific aspects from the fields of electronics, computers and the media interactively in a “laboratory situation”.

Unlike “conventional” science centres, the Laboratory for Information Technologies has a clearly defined contextual focus on topics relevant to the HNF. In-depth levels of information as well as the reference to objects that is so characteristic of the HNF are also planned for each individual section.

The modular topic islands allow the integration of current technology trends almost as they happen. Moreover, the focus on the scientific and technical basics will considerably extend the duration of the cycle – and thus the topical reference – vis-à-vis device developments and application ideas.

The new laboratory unit geared to basic aspects can be advertised in targeted fashion as part of marketing measures with a view to attracting more groups from schools. A “science centre” in the museum context oriented clearly towards the information technologies in terms of topics would furthermore constitute another unique feature of the HNF.

9 Planning Stages

- Stage I: Five stations with basic scientific aspects of information technologies
- Stage II: Five stations with other topics relevant to the HNF

Completed project: 10 stations each with 3-4 laboratory workplaces for scientific hands-on experiments oriented towards basic aspects

10 Main Topics

Bits and bytes, electricity, microelectronics, calculation and logic, peripherals, semiconductors, data storage, GPS, networks, nanoelectronics, computers of the future, energy, green computing, digital media, mobile communications, robotics

We have discovered over time that current IT devices which are generally already in private use attract relatively little attention in the museum. Due to the extremely rapid pace of development in the industry, many of these devices become “obsolete” within a few years, if not months in some cases. A period of at least 40 years then elapses before these devices are once again looked upon with some degree of curiosity by visitors from the younger generations. In the meantime they are largely regarded as nothing more than electronic junk.

A museum is also no longer capable of reproducing the vast variety of products available in today's ICT industry. What's more, a serious evaluation of technologies and products can only take place once several years have elapsed.

The maintenance of early computers in particular (1950s-1980s) has proved and continues to prove impossible or unfeasible on conservational grounds in many cases, due to the frequent difficulty of obtaining spare parts, a lack of software and insufficient know-how.

Fortunately, the number of simulations of historical computers – of particular interest to fans of retro computers – is rising steadily. Some of the historical operating systems of home computers implemented by the HNF in its PC gallery and elsewhere via emulators include the Apple II, C64, CPM, MS-DOS 1.x, 2.x, 3.x, 5.x, 6.x, Windows 1, Windows 2, Windows 3.11 and Windows 9.x. Retro computing can be traced back to a longing to return to the origins of information technology; it also offers the opportunity to work with hardware at close quarters and to "have a say" at systems level. It is easiest to explain the basic principles of technology with reference to historical systems, as the latter are not overly complex.

11 The Importance of Education in Making History of Computing Relevant

HNF has compiled a varied educational museum programme to motivate children and young people to take an active approach to the exhibits and their history. At workshops children can, for example, build robots, encrypt messages or learn how to 'make' paper. Teachers and pupils are given numerous ideas for study content. Besides a guided tour of the permanent exhibition, special tours can be booked on such topics as arithmetic, writing, inventors and entrepreneurs, women's work in information technology, cryptology and the history of communications.

12 Trial phase (1996 – present day)

Numerous activities have taken place in a bid to further popularise the "History of Computing" since the HNF first opened in October 1996. Only the biggest projects are named here.

In 1998, 1999 and 2001, the HNF joined forces with Westdeutscher Rundfunk 3 to stage the "WDR Computer Nights", a 7-hour live TV marathon attracting 3,000 visitors to the HNF as well as hundreds of thousands of television viewers.

The permanent exhibition was updated in 2004 with the addition of new themes such as robotics and artificial intelligence, mobile communications and digitization. The new galleries present the latest information technology themes in an interactive, multimedia exhibit. Visitors can try their skills at old and new computer games, test advanced man-machine interfaces and experiment with the latest applications and products from research and industry in the showroom

In 2004, the big special exhibition "Computer.Brain" offered a comparative presentation of these two thinking tools. Significant fields of application of the

computer were subsequently also presented in the form of “Computer.Medicine” in 2007 and “Computer.Sport” in 2009.

The relevance of the “History of Computing” for the public is ultimately also clear from the HNF visitor figures: over 16 years, the museum has registered some 1.9 million visitors, 36,000 guided tours and 13,000 events, as well as generating a huge media response (400 million readers and viewers/listeners ??) and a consistently high level of appreciation from within the computer industry.