IBM makes usability as important as functionality*

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Functionality has for many years been the overriding criterion in the computer industry; in no small measure this has been due to the influence of IBM. Since 1981 a major change of policy at IBM has become evident, but is still little known. This short historical note presents the evidence and describes how IBM no longer gives supreme importance to functionality but now gives equal importance to usability.

In the beginning was the word, and the word at IBM was FUNCTIONALITY. Since IBM started into computers (in about 1955) functionality has been the first and last criterion; anything else could be compromised, but not functionality. Any customer problems would be solved by the next new machine, faster and more powerful; each new marketing drive emphasised more functionality.

This was not wrong. The users of the mainframes, and often also of the minicomputers, were computer specialists (just like the designers) who wanted more machine function and enjoyed the challenge to their skill presented by any problems of usability.

But note, the minicomputer started the move towards the single user/operator who is not a computer specialist, and IBM lagged well behind, effectively losing that market to DEC and others.

When the microcomputer arrived in 1976/7, IBM and all the mainframe and minicomputer companies at first regarded it as a toy. The 300 scientists and others who attended the launch of the Commodore PET in February 1978 in London were captivated; the first show that summer, with Apple, Commodore, Comart, Nascom, Tandy and others, proved the potential. But the 'real' computer people still judged it all a joke. During a lecture to IBM (Hursley) in November 1978 I predicted the potential for many new users and the human factors problems; I also asked how many had seen/used these new machines (answer, 4%) or wished to (no increase) and then chided the audience for its dinosaurian parochialism.

No doubt other stronger voices spoke similarly, but even in September 1981 at the Poughkeepsie Symposium (see below) the IBM members of the discussion panel could only but agree that IBM had been left standing so far by Apple and Visicalc. Nevertheless, by then the decision leading to the IBM PC must have been taken.

In my opinion the decision for usability and human factors was probably taken at the same time. The lesson of the minicomputer had perhaps been remembered; and obviously this new microcomputer era *had* to belong to the new users, the non-computer specialists who would certainly buy this new tool provided they could see at once that they would be able to use it. The importance of human factors for these new 'discretionary' users was already being emphasised by many, including IBM people (cf. Bennett and others in Shackel).[1]

There had been some attention to human factors in

IBM and some professional staff for 25 years by 1981. The Human Factors Center at the IBM San José Development Laboratory had been working for that time (cf. Ref. 2). The human factors division at the IBM UK Laboratory, Hursley, had existed since about 1970, and had been taking ergonomics students in their 'thick sandwich' year from Loughborough since 1977.

Again, there was growing activity in human factors at IBM in the late 1970s; for example, out of 22 papers in volume 2 of a survey,[1] four were from IBM. But still the human factors staff were mainly doing useful research and seldom worked with or influenced the system designers.

The final precipitating factors were the growing concern already in most of Europe in 1979/80 about problems with CRT display units (cf. Ref. 3) and the promulgation of ergonomic standards in Sweden and Germany in 1979–81. The recognition that an ergonomic standard could override all other considerations, and close a market-place to products, came as a sudden shock and had a powerful effect on quite a number of US companies, including obviously IBM.

A corporate decision must have been made in 1980 or early 1981, with substantial funding assigned to various programmes. The results, below, provide the evidence.

The first public announcement, inside IBM as well as outside (I was told), was at the Symposium held at Poughkeepsie in September 1981. In front of approximately 450 IBM staff and 4 visiting lecturers,[4] the Vice-President and Head of the Division in his opening address discussed the IBM background to functionality and then announced that *forthwith usability would be of equal importance*. In response to questions he said that functionality would *not* override usability and that if the criteria gave conflict then a compromise would have to be found. Afterwards some of the IBM staff present explained the enormous significance of this pronouncement.

Corporate Manager for Human Factors (HF). In 1982 this entirely new post was established at Corporate HQ (Armonk) and Dr R. S. Hirsch (Head of San José Human Factors Center for many years) was appointed. During a survey in 1984 I was able to learn from him various details about this post, his responsibility, and the general organisation of Human Factors (HF) in IBM.

HF groups in all development laboratories. By 1984 Dr Hirsch was able to tell me that all 25 IBM development laboratories had resident HF groups.

Corporate Education Programme in HF. It was obviously recognised from the beginning that both design

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* Nothing in this paper is based on confidential information; all is published or from open discussions.

staff and sales staff, who for many years had concentrated primarily upon functionality, would need appropriate training to change attitudes and to be taught new approaches and new methods. For the former, very many two-day 'attitude-changing' meetings have been held involving HF consultants in many countries. For the latter, the principal mechanism has been a one-week HF course specially planned by Professor A. Chapanis and presented by him and a few other specialists to all design staff world-wide. This programme also began in 1982. I understand that subsequently Professor Chapanis has been presenting a more advanced course to some groups.

For part of 1982 and 1983 Dr J. C. Thomas was seconded from the T. J. Watson Research Centre (Yorktown Heights) to be a special assistant to the Vice-President and Chief Scientist Dr L. M. Branscomb. My presumption is that this was both to help co-ordinate and implement the whole set of programmes which had been decided and to signal to the whole of IBM that these programmes had the direct support of the corporate main board.

Further evidence of the IBM commitment is given in two published papers by Branscomb from which brief quotations are apposite. The first was presented by Branscomb himself to the IFIP Congress.[5] The abstract of this paper is as follows.

'While it is becoming increasingly obvious that the fundamental architecture of a system has a profound influence on the quality of its human factors, the vast majority of human factors studies concern the surface of hardware (keyboards, screens) or the very surface of the software (command names, menu formats). In this paper, we discuss human factors and system architecture. We offer best-guess guidelines for what a system should be like and how it should be developed. In addition, we suggest ways in which advances in research and education could result in systems with better human factors.'

The second paper was presented by Branscomb as a university public lecture and subsequently published.[6] This excerpt follows a brief history of the growth of computing through its era of specialist users.

'All that has changed. No longer the exclusive tool of specialists, computers have become both commonplace and indispensable. Yet they remain harder to use than they should be. It should be no more necessary to read a 300-page book of instructions before using a computer than before driving an unfamiliar automobile. But much more research in both cognitive and computer science will be required to learn how to build computers that are easy to use. That is why our industry is paying increasing attention to the field of applied psychology called human factors, or ergonomics ... Equally neglected has been human factors at the level of systems design. We know that system architecture has significant and widespread implications for user friendliness, but we know next to nothing about how to make fundamental architectural decisions differently, in the interest of good human factors.'

As is well known, the IBM Chief Scientist (indeed any chief scientist) does not say such things as camouflage or decoy. If an official pronouncement is made, we can be sure IBM is doing something, and probably more than a little.

Thus the new testament at IBM is manifest. Usability and functionality are of equal power and importance; *both* must be achieved.

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