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Nigel Bevan's Broad and Strategic Contribution to International Standards

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Abstract

A personal memorial to Nigel Bevan's work in standardization, usability, and ISO standards for UX and for usability professionals. Standards themselves are created to provide requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that materials, products, processes, and services are fit for their purpose. Knowing the context of use enables the setting of such requirements, application of guidelines, and measurement of usability. Nigel Bevan was a champion for the formalization and definition of usability, safety, and accessibility (quality in use) as important to software intensive systems and was later involved in the definition of human-centered design processes. He thus brought together different strands of such human-centered design—previously treated as distinct—in ergonomics and systems software. Some of his major achievements and interventions in influential ergonomics standards are listed and discussed as is his legacy in quality in use implications for the design process for all products, systems, services, and organizations. A short section on personal reminiscences concludes the memorial.

Keywords

Nigel Bevan, usability, ISO ergonomics standards, quality in use, human-centered design

Introduction

My day job with Lloyd's Register (an international technical assurance organization) is to coordinate Human Factors assessment services and the R&D program. This focusses on how best to assure that ergonomics and human-centered design has been carried out with sufficient rigor to mitigate human-system hazards including inadequate usability and user experience. As a Recognised Organisation, Lloyd's Register can assess against its own standards. However, to ensure consistency, we prefer to adopt international standards when these are of sufficient quality. To this end, we participate in the development of international standards for ergonomics. I am convenor of ISO TC159/SC4/WG6 Human-centered design for interactive systems and liaison from SC4 Ergonomics of human-systems interaction to ISO/IEC JTC1/SC7 Systems and software engineering. For several years I was chair of the British Standards Institution (BSI) mirror group for SC7. I have participated in standards at a national level since 1986 and internationally since 1992.

What Are Standards For?

We have to first understand what standards are for. ISO creates standards that provide requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that materials, products, processes, and services are fit for their purpose.

From an ergonomics point of view, this means that products, systems, and services can be used for their intended purpose. And we have to know the context of use in order to set requirements, apply guidelines, or measure usability. This is what (from 1990 onwards) we realized: We need to define human-centered design and specify usability as a quality measure. Nigel's insight was that there is little point in ergonomists defining measures or processes independently of the engineering disciplines that create systems, products, or services. This meant reaching out to systems and software engineering standardization rather than staying within the confines of ergonomics. Nigel championed usability, safety, and accessibility (described as quality in use) as important attributes of software intensive systems, and later he engaged with the definition of human-centered design processes as the means of assuring that it could be achieved. Rather than pick one part of Nigel's broad and lengthy contribution to international standards, I would like to present his connections and interventions that have established a firm basis of standards for UX and usability professionals and that have provided credibility for a human-centered approach in the development of interactive systems.

At the BCS British HCI Group conference in Exeter in 1986, Nigel asked if I had ever thought about standards work. He was convenor of the BSI panel to the ISO group that later became ISO/IEC JTC1/SC35 User interfaces. This group was working on international standards for the design and specification of icons (including pointers and controls), specification of objects and actions, and gestures. We also developed a British standard for user documentation. This subsequently became ISO/IEC 18019:2004 Software and system engineering -- Guidelines for the design and preparation of user documentation for application software. This panel also somehow reported in to the software ergonomics panel, so we reviewed the software parts of ISO 9241 Ergonomics of work with VDTs (as it then was).

At this time (1980s to the early 1990s), the prevailing belief was that usability was conferred by the application of design guidelines. The user documentation standard was unusual for its time in that it also described the process for specification and user testing.

Nigel Bevan's Involvement

There are several levels of contribution to standards: project leader, editor, expert, and reviewer. Nigel contributed perceptively and enthusiastically at all levels across many standards. He therefore contributed to a huge number of standards, including several important standards, in different ways. Many times he started as a reviewer and ended up a key member of the editorial team. Assessing the importance of a standard is also not easy. ISO is reticent about publication figures, and the "grey" traffic in pirated standards is similarly hard to define. In addition, a relatively low-volume standard may be highly influential on other standards and academic work.

From my point of view, the standards with good sales or high influence in which Nigel took a lead in the conceptualization and/or editing of the contents from an ergonomics point of view are as follows:

- **ISO 9241-11 Ergonomics of human-system interaction - Usability: Definitions and concepts.** This was first published in 1998 with Nigel as editor, and an extensively updated version with Nigel as project leader was published in the same month as Nigel's death in 2018. It defines in detail two fundamentals of HCD/usability/UX: usability as a measure and context of use.
- **ISO/IEC 25010:2011 Systems and software engineering - Systems and software product Quality Requirements and Evaluation (SQuaRE) - System and software quality models.** Although contentious, this standard represents a huge achievement in the integration of usability and software engineering. Nigel was active in the development of this standard and was appointed the project leader for the revision of this standard. It has since been divided into three parts. The part on quality in use is being developed based on his concepts for the quality in use of products, systems, and services.
- **ISO 9241-220 Ergonomics of human-system interaction - Processes for enabling, executing and assessing human-centred design within organizations.** This is the most detailed process model so far for human-centered design. Nigel was one of three editors, the evaluation expert, and did most of the "heavy lifting" in ensuring its integrity and consistency, and in managing the inevitably large number of detailed changes arising from each round of comments.
- **ISO 20282 Usability of everyday things.** This is a multi-part standard that provides requirements and recommendations for the design and evaluation of easy-to-operate everyday products. Nigel took over the leadership of this multi-part standard, becoming founding convenor of the working group that managed it.
- **ISO/IEC 25063 Systems and software engineering - Systems and software product Quality Requirements and Evaluation (SQuaRE) - Common industry formats for usability reports.** Nigel was instrumental in the conceptualization of this family of standards and edited 25063 Context of use description.

However, this is only from my perspective. The fact that other contributors will have different lists reflects the breadth of Nigel's contribution to international standardization.

Nigel Bevan's Legacy

As described above Nigel was central to many initiatives in standardization, and his impact is their existence. For more than a year after his death, we were processing his comments on standards that were under development and working out if we could continue with projects that he started. Because he drove innovation in different standards groups, and it progressed at different speeds and in different environments, it is unlikely that any one person or even group will be able to step into his shoes.

Another theme that highlights Nigel's legacy is his enthusiastic sharing of knowledge and expertise. Throughout his long career, he was a valued mentor, wrote many papers, gave many tutorials, and attended many conferences worldwide. He had a big part in cultivating the (growing) understanding that whether you call it quality in use, human-centered quality, big usability, user experience, customer experience, service quality, or even user friendliness, the outcome of a human-centered approach to the development of a product, system, or service (at any scale) can be measured through user performance and the consequential impact on the design process for all products, systems, services, and organizations.

Rather than pick an individual publication that best illustrates his work in standards, I will provide a statistic: 16 out of his 51 publications listed in DBLP are about the contents or use of one or more standard. I feel that this is a testament to his work in communicating standards to the intended user audience. Despite knowing and indeed setting the state of the art in many areas of usability/UX and perhaps because of having a career in the British Civil Service rather than academia, Nigel was not interested in academic status or in promoting consultancy

services. Setting, communicating, and improving best practice across the community was his purpose.

Personal Reminiscences

Nigel was an entertaining travelling companion and a loyal friend. I am sure that many will also comment on his tireless enthusiasm and inquisitiveness. I would like to mention something different. Generosity with that most precious resource of all—time. He was always willing to help. I can't think of anyone else who could be more trusted to assist with a piece of work that had to be done, regardless of resources or inconvenience. Examples include the original Common Industry Format for usability reports, the SFIA Software Ergonomics competence definition, and IEC 62508 Guidance on human aspects of dependability.

About the Author

Jonathan Earthy
Dr. Earthy is technical authority for HF in Lloyd's Register, including the R&D programme and the introduction of Ergonomics into Class. His technical speciality is the assurance of the quality of Human Factors Integration and HCD, with special reference to advanced ICT. He has participated in standards development since the mid-1980s and is convenor of ISO TC159/SC4/WG6 HCD for interactive systems.