Nigel Bevan: An Overview of His Contributions to Usability and UX

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Abstract
This paper outlines some of the most important of Nigel Bevan’s many contributions to the evolution of the changing concept of usability and in particular to Nigel’s input into, and leadership of, the development of usability-related international standards. It traces the concept of usability from the very early days when the focus of human-computer interaction (HCI) was predominantly on hardware ergonomics in the context of office work, through the much wider, more recent, concepts of designing for user experience, and finally designing for high quality human experience. It also presents the history as well as several freely available resources for usability professionals outlining what usability is nowadays, how it can and should be measured, and criteria for designing to support people of all ages and abilities. Finally, it acknowledges Nigel’s long-standing involvement in the UXPA, culminating in him being posthumously honored with the UXPA Lifetime Achievement Award in 2018.

Keywords
Usability, usability definitions, user experience, International Standards Organization (ISO) standards, accessibility, UsabilityNet, UsabilityPlanner, Usability Body of Knowledge
Introduction

I first met Nigel Bevan at a meeting hosted by the National Institute of Standards and Technology (NIST) in March 1998 in Gaithersburg, Maryland. The result of that meeting and subsequent work was the Common Industry Format for usability test reports (NIST, 1999). This evolved into ISO Standard ISO/IEC 25062:2006—Software product Quality Requirements and Evaluation—Common Industry Format (CIF) for usability test reports (ISO, 2006).

Nigel's contributions to usability standards is probably what many people know about, and other articles in this special issue focus on that work. But I want to take a broader view and look at his legacy through his own publications and contributions to the usability community. Nigel was a prolific writer; I count over 50 publications in just my collection of his papers. His publications began as early as 1981 with his first article that I've seen (Bevan, 1981) in which he studied the effects of presenting text at different speeds on a computer screen. He found that the optimum presentation speed for understanding and retention was 10–15 characters per second. This early study reflects his focus on the user and on measurement that are hallmarks of his work.

The rest of this article will be organized around three main areas of Nigel's publications and contributions: Defining Usability, Measuring Usability, and the Usability Body of Knowledge (BoK).

Defining Usability

People newer to the field may not realize that there wasn't always agreement about what usability is. Although the term has been in use for many years (Sauro, 2013; Soegaard, 2012), it started to be more commonly used in the manner we use it today in the mid-1980s, perhaps largely due to the introduction of computers that individuals could afford. One of Nigel's early papers (Bevan, 1982) reflects the terminology in common use "pre-usability," with a focus on human factors and ergonomics. But he clearly is talking about what we have come to characterize as usability:

"As costs have decreased, computers have become widely used by people with no previous experience of them. Unfortunately, many systems are still designed more for the convenience of the programmer than for the user. This problem will become more acute as further cost reductions lead to even more widespread use of computers in professional applications..." (Bevan, 1982, p. 75)

Nigel and co-authors Jurek Kirakowski and Jonathan Maissel tackled the topic head-on in 1991 with a paper entitled simply: "What is Usability?" (Bevan, Kirakowski, & Maissel, 1991). They proposed the following:

Usability should be defined as the ease of use and acceptability of a product for a particular class of users carrying out specific tasks in a specific environment. Criterion levels for measurements of attitude and user performance determine whether the design of the product is successful in achieving usability. (Bevan et al., 1991, p. 1)

They go on to conclude the following:

Usability lies in the interaction of the user with the product or system and can only be accurately measured by assessing user performance, satisfaction and acceptability. Any change in the characteristics of the product or system, user, task or environment may produce a change in usability. A product is not itself usable or unusable, but has attributes which will determine the usability for a particular user, task and environment. (Bevan et al., 1991, p. 4)

These attributes of usability are widely recognized by most usability or UX professionals today. But they didn't just appear out of thin air; Nigel and others helped to define them.

In 1995, Nigel built on the topic further by introducing "quality of use":

Quality of use should be the major design objective for an interactive product: does the product enable the intended users to achieve the intended tasks? This
relates usability to business objectives and elevates usability from an optional extra to the prime design goal. (Bevan, 1995a, p.1)

This relationship of usability to business objectives is something that has become critical in more recent years but was a relatively new concept in the mid-1990s. He goes on to conclude the following:

*The objective of usability is to achieve quality of use. Usability requirements should be stated in terms of the effectiveness, efficiency and satisfaction required in different contexts. User-based evaluation can be used to validate achievement of these requirements.* (Bevan, 1995a, p. 7)

As the field began to mature, Nigel focused more on the user-centered design process and on inclusive design, such as his chapter on "Quality in Use for All," in which he proposed the following:

*Design for All entails both physical and cognitive accessibility. New hardware and software technologies are required to make it easier to provide physical accessibility. New integrated approaches to system development are required to make it easier to provide cognitive accessibility. Only by combining these activities can Design for All be achieved.* (Bevan, 2001, p. 353)

He also elaborated on his observations of the usability and accessibility communities:

*Currently, there are two separate professional communities concerned with improving product accessibility and product usability. Both of them share the objective of meeting user needs in order to achieve quality in use. However, whereas usability has been primarily concerned with the range of "typical" or "average" users (by implication able-bodied), accessibility is concerned with extending design to incorporate users with physical and cognitive disabilities. User-centered design can provide a common framework for enhancing current design practice, in order to meet the real needs of both these majority and minority user groups.* (Bevan, 2001, p. 366)

This focus on accessibility along with usability is something Nigel continued for many years, such as his 2009 collaboration with Helen Petrie, "The evaluation of accessibility, usability and user experience" (Petrie & Bevan, 2009). They also recognized the entry of "user experience" into the lexicon as a more overarching term:

*User experience (often abbreviated to UX) is the newest term in the set of criteria against which an eSystem should be evaluated. It has arisen from the realization that as eSystems become more and more ubiquitous in all aspects of life, users seek and expect more than just an eSystem that is easy to use. Usability emphasises the appropriate achievement of particular tasks in particular contexts of use, but with new technologies such as the Web and portable media players such as iPods, users are not necessarily seeking to achieve a task, but also to amuse and entertain themselves. Therefore the term user experience, initially popularized by Norman (1998), has emerged to cover the components of users' interactions with, and reactions to, eSystems that go beyond effectiveness, efficiency, and conventional interpretations of satisfaction.* (Petrie & Bevan, 2009, p. 20–3)

As consensus began to emerge in the field about what usability and user experience actually are, Nigel focused more on the user-centered design processes that can help in achieving those goals. Some of this work was reflected in the UsabilityNet.org website (Bevan, 2003). Figure 1 shows the Methods Table from that website. This was the first attempt that I’m aware of for making detailed information about usability methods freely available online. Unfortunately, the site appears to have been taken down at some point in 2018, but I know that I was one of many who used the site frequently and pointed others to it. Nigel's willingness to freely share his knowledge was at the core of his work.
Figure 1. Screenshot of the Methods Table from the UsabilityNet.org website, about 2018.

Finally, in collaboration with Xavier Ferre and Tomás Antón Escobar, even more detailed information about the selection of user-centered design methods for various stages of a project was embodied in the Usability Planner (Bevan, 2009; Ferre & Bevan, 2011; Ferre, Bevan, & Escobar, 2010). Thankfully, this tool is still available online at UsabilityPlanner.org (Figure 2).
Measuring Usability

Anyone who knows me knows that I'm a bit of a UX metrics geek. I'm not sure if Nigel thought of himself that way, but if his publications are any indication, it's pretty clear he was. His focus on measurement went hand-in-hand with his work on defining usability and user-centered design processes. You don't know if something is usable unless you can measure it.

Some of Nigel's early work on usability measurement was as part of the European initiative entitled Metrics for Usability Standards in Computing, or MUSiC (Bevan, 1992). He stated the following:

The usability of a product for a particular task for specified users and environments can be most concisely summarized by one measure in each of the following categories:

- Effectiveness: the completeness and accuracy of the goals achieved
- Efficiency: the relevant resources expended (e.g., time, money, mental effort)
- Satisfaction: the user's feelings about the work system (Bevan, 1992, p. 124)

Of course these have become commonly accepted ways of measuring usability, reflected in ISO standards (ISO, 2006) as well as books devoted to usability/UX measurement, including one I happen to be pretty familiar with (Tullis & Albert, 2013). Nigel and his colleague at NPL, Miles MacLeod, went on to provide a much more detailed treatment of how to measure these attributes in their 1994 paper in *Behavior and Information Technology*, "Usability Measurement in Context" (Bevan & MacLeod, 1994).

One of the things that impresses me about Nigel's publications is that he didn't limit himself to traditional human factors or HCI journals or conferences. For example, his 1995 paper on "Measuring usability as quality of use" was published in the *Software Quality Journal* (Bevan, 1995b), helping to get the usability measurement message to the computer science and quality assurance communities. In that paper he spelled out some of the benefits of measuring usability:

Specifying and measuring usability as quality of use provides several potential benefits:

- Unless usability is an objective criterion in the requirements specification, there is often little incentive to put resources into designing for usability;
测量目标可以提供一种判断需要进行多少额外工作（如果有的话）以达到目标的方法；

- 它提供了一种建立基准并比较不同设计、早期版本或竞争产品的方法。
  (Bevan, 1995b, p. 8)

Nigel 也确保了向我们 UX 社区的成员讲述测量可用性中的实际问题。例如，他指出我们需要小心地考虑测量可用性的多种上下文。

资源限制意味着可用性测试通常在最常使用的上下文中进行。但是，在不那么常见的情况下，会提出许多重要的可用性问题：

- 学习性：以完成培训课程或使用学习材料的方式，衡量达到足够性能的任务。
- 可访问性：测量特定残疾用户。
- 通用性：在不同上下文和文化中测量可用性。
- 风险：在可能具有商业或个人风险的情况下测量可用性。
  (Bevan, 2006, p. 43)

虽然 Nigel 的早期工作主要集中在传统任务导向的衡量标准，如有效性和效率，但他的后期工作明显引入了一种更广泛的观点。例如，他指出，ISO 标准中定义的满意度需要拓宽...

...要包括实现愉悦通过实现愉悦目标和使用经验。满意度被分解成四个子特性：目的成就、信任、愉悦和舒适。新的定义应该促进更广泛的满意度解释。 (Bevan, 2010, p. 246)

例如，Nigel 的“比较 Kansei 工程和 AttrakDiff 评估厨房产品”(Bevan, Liu, Barnes, Hassenzahl, & Wei, 2016) 是一个很好的例子。这与 Nigel 的更传统的工作，即在计算机系统和网页中工作。他们将产品与消费者产品——具体来说是抽油烟机——相结合。Kansei 工程是一种分析产品情感感知并将其融入设计的方法（如，Nagamachi & Lokman, 2011）。Kansei 方法倾向于消耗更多资源，因为它是为每种类型的产品量身定制的。AttrakDiff 方法，另一方面，是包含 28 项的语义差异量表，旨在测量两个广泛维度：情感质量和实用质量 (Hassenzahl, Burmester, & Koller, 2003)。他们发现，在这个案例研究中，Kansei 结果与 AttrakDiff 结果之间存在高度相关性，Kansei 方法提供更丰富和更具体的信息，但也需要更多的资源。

**Usability Body of Knowledge (BoK)**

以前对 Nigel 的工作在 UsabilityNet.org 和 Usability Planner 中的早期讨论强调了他分享关于可用性及以用户为中心设计方法的热情和广泛性。他希望进一步通过他在 Usability Body of Knowledge, 或 BoK (UsabilityBoK.org) 上的工作来实现这一目标。这是一个由 User Experience Professionals Association (UXPA) 赞助的项目。许多人对 BoK 贡献了力量，但 Nigel 是其中的驱动因素之一。他作为 BoK 的管理编辑。值得庆幸的是，到目前为止，BoK 仍然可以在网上找到。首页如图所示。
Figure 3. Homepage of the Usability Body of Knowledge.

It’s hard to give the reader of this article a good sense of the scope of the BoK, so I encourage you to look at it yourself. But to try to convey a bit of the scope, Figure 4 shows the topics included in just the "Methods" section of the BoK.
Figure 4. Methods section of the Usability Body of Knowledge.
The Usability Body of Knowledge is a tremendous resource that everyone from novices to experts in UX and usability can learn from and make use of. I hope that some people in the UX community will step up to updating and expanding this extremely valuable work.

**Conclusion**

In addition to his publications and his contributions to standards, Nigel contributed to the usability profession, UXPA, and the worldwide UX community in many ways:

- Serving on the UXPA International Board from 2002 to 2007
- Playing a key role in getting the annual World Usability Day started
- Acting as UXPA's Regional Director for Europe, the Middle East, and Africa
- Serving as UXPA's Co-Director for Outreach in 2004 with Elizabeth Rosenzweig
- Serving as UXPA's Director of Professional Development
- Acting as Managing Editor of the Usability Body of Knowledge

Because of these contributions to UXPA, Nigel was presented with the UXPA President's Award in 2014. (See Figure 5.) Finally, because of his contributions to the field in general, he was posthumously awarded the UXPA Lifetime Achievement Award in 2018.

**Figure 5.** Nigel accepting the UXPA President’s Award in 2014.
References


About the Author

Tom Tullis
Dr. Tullis is a consultant, author, and speaker with over 40 years of experience in human factors, usability, and user research. He retired in 2017 as Vice President of UX Research at Fidelity Investments. He has published over 70 papers in the field, holds 8 US patents, and co-authored the books Measuring the User Experience and Beyond the Usability Lab. He also is a member of the adjunct faculty at Bentley University. In 2011 he was given the Lifetime Achievement Award by UXPA International and in 2013 was inducted into the CHI Academy by ACM.