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CROWD TESTING



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The “New” Standard for Software Product Quality

Column

Like most of you, I have spent most of my testing career using ISO 9126 as the standard for software product quality. This well-known ISO standard defines product quality by means of six main characteristics and a number of so-called sub-characteristics (see Figure 1). The standard has been very popular, not only with testers, but also with those involved in requirements engineering and software development. For many years it has even been one of the best selling ISO standards worldwide. As a test professional, I always use the ISO 9126 product quality standard as a (terminology) framework during product risk assessments, and test strategy and test approach determination. It is especially useful when non-functional testing is part of the test process, which is almost always the case (or should be the case).

Discussion items

The ISO 9126 standard is also used and/or referenced in the various ISTQB syllabi, the ISTQB Glossary and many other text books. I have personally trained many testers in this framework, on how to use it and how to communicate on non-functional testing with stakeholders. Many liked it and have adopted it in their day-to-day practice, although there were also comments like:

- I’m missing accessibility!
- Surely security cannot be part of functionality?
- People familiar with RAMS were also complaining that availability was missing.

The successor of ISO 9126, ISO 25010 (Figure 3) was released some years ago, but until now has had little recognition uptake. I, too, have not been using it. Usually I tend to keep things that have proven to work and do not let myself be dictated to a new version, e.g. of a standard. Most standards anyway have little added value. I had a quick look at ISO 25010, but it did not appeal to me.

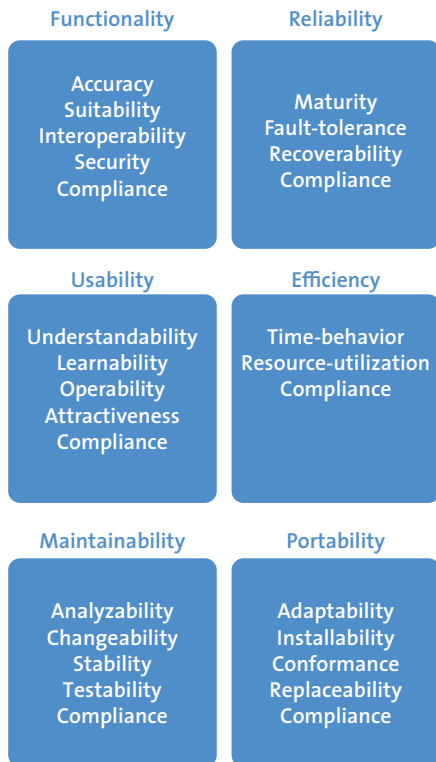


Figure 1: ISO 9126 quality model

History

In 1977, McCall proposed the idea of breaking down the concept of quality into a number of quality factors. This idea has been followed by many other authors who have tried to capture software product quality in a collection of characteristics and related sub-characteristics which, in turn, are connected to indicators and metrics. By doing so, every author has imposed his or her own hierarchically layered model of software product quality. The International Organization for Standardization (ISO) and the International Electro-technical Commission (IEC) have followed this concept and defined in 1991 a set of quality characteristics now known as ISO 9126. This set reflects a huge step towards consensus in the software industry and thereby addresses the general notion of software quality. The original ISO 9126 from 1991 was slightly updated once in 2001.

SOFTEC Malaysia

At SOFTEC 2014 in Malaysia I met Prof. Azuma, editor of both the ISO 9126 and its successor ISO 25010. I attended his keynote and later had a talk with him. It was then that I started to understand the background and reasons for replacing ISO 9126 with ISO 25010. It was not a replacement as such, but a replacement against the background of evolution in ICT, e.g. stronger microprocessors, bigger memory, better displays, more hard disk storage, and improved communication networks (see Figure 2). The

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ICT evolution has enabled the development of new application systems, which in turn needed different quality properties. In 1991, when 9126 was originally released, there was no Google, no Facebook, no smartphones, no cloud computing, no e-commerce, etc. The IT landscape, i.e. its application, has changed dramatically over the last 20 years due to the possibilities the ICT evolution has provided to organizations.

	1991	2001	2011
Micro Processor	80496Sx 25MHz 20MPS	Pentium IV 2 GHz	Intel Core i5 2.8 GHz 50KMIPS
VLSI Memory	640KB-10MB	256MB	2-4GB
Display	CRT 640x400	LCD XGA	LCD SXGA
Hard Disk/SSD Storage	20-40MB	80GB	SSD: 256GB- HDD: 1TB-
Communication Network	9600 bps internet	ADSL 12Mbps	Optical Network 100M – 1Gbps WIFI: 40 Mbps
Quality Model	ISO 9126	ISO 9126-1	ISO 25010

Figure 2: ICT Evolution

Software quality is core

With systems becoming more and more complex and larger, the quality of the underlying software is essential for business success. The critical nature of software systems has increased enormously. Applications today are different to those of 20 or even only 10 years ago; they also have different needs for product quality:

- Interactive customer software has high needs for usability and co-existence
- Internet and open systems have high needs for security and interoperability
- Mission critical systems have high needs for functional correctness and reliability.

In practice, ISO 9126 is still the most commonly used software quality characteristic standard. However, ISO 25010 is gradually becoming more popular. ISO 25010 standard was developed to replace ISO 9126 based on the ICT evolution enabling the development of new application systems, which in turn needed different quality properties. I now understand, the ISO 9126 framework needed to be updated to cope with the today's ICT world and its applications. It was not a change for the sake of changing. The new software product quality standard ISO 25010 is available and should become the leading standard for testers and other software disciplines as soon as possible. Interesting enough some of the issues raised on 9126, as stated earlier in this column, have also been addressed. Let's adopt this new framework and start using it in our day-to-day testing practice.

Characteristics	Sub-characteristics
Functional suitability	Functional completeness Functional correctness Functional appropriateness
Performance efficiency	Time behavior Resource-utilization Capacity
Compatibility	Co-existence Interoperability
Usability	Appropriateness recognizability Learnability Operability User error protection User interface aesthetics Accessibility
Reliability	Maturity Availability Fault tolerance Recoverability
Security	Confidentiality Integrity Non-repudiation accountability Authenticity
Maintainability	Modularity Reusability Analyzability Modifiability
Portability	Adaptability Installability, Replaceability

Figure 3: ISO 25010 product quality model

> about the author

Erik van Veenendaal (www.erikvanveenendaal.nl) is a leading international consultant and trainer, and a widely recognized expert in the area of software testing and quality management. He is the founder of Improve Quality Services BV (www.improveqs.nl). He holds the EuroSTAR record, winning the best tutorial award three times! In 2007 he received the European Testing Excellence Award for his contribution to the testing profession over the years. He has been working as a test manager and consultant in various domains for more than 20 years. He has written numerous papers and a number of books, including "Practical Risk-Based Testing: The PRISMA Approach" and "ISTQB Foundations of Software Testing". He one of the core developers of the TMap testing methodology and a participant in working parties of the International Requirements Engineering Board (IREB). Erik is also a former part-time senior lecturer at the Eindhoven University of Technology, vice-president of the International Software Testing Qualifications Board (2005–2009) and currently board member of the TMMi Foundation. You can follow Erik on twitter via @ErikVeenendaal.