

## Standards and Deviations: The Role of Routine in Testing

Michael Bolton  
DevelopSense  
<http://www.developsense.com>

PNSQC 2011

## Acknowledgements

- Jon Bach
- James Bach
- Cem Kaner
- Jerry Weinberg
- Ben Simo
- Joel Spolsky
- and the ISEB, the ISTQB, and the ISO 29119 committee, who never seem to let me down.

## Updates



- This presentation is ALWAYS under construction
- Updated slides at <http://www.developsense.com/past.html>
- All material comes with lifetime free technical support

## An Epigram

- “I'd appreciate your support in helping your student learn the importance of being responsible & following directions, rules, & procedures.”
  - Ben Simo's kid's teacher
- I'd appreciate your support in helping your student learn the importance of being responsible **versus** following directions, rules, & procedures.



## What Problems Do Standards Purport to Address?

- The Knowledge Problem
  - What testers need to know
- The Language Problem
  - Definitions and descriptions for actions and objects; terms of art
- The Skills Problem
  - What testers must be able to do
- The Credibility Problem
  - How testers can be trusted; how trust is delegated and managed
- The Legibility Problem
  - How the work of testing can be observed
- The Management Problem
  - How testing is to be guided, directed, or controlled
- The Deviance Problem(s)
  - Unpredictability; undesired variance; normalization of deviance

## James Bach on Standards

- Unless you know what is the right thing to do...
- Doing it rigorously will be reckless and irresponsible.
- Doing it rigorously will retard your learning.
- Premature standardization has harmed our craft.
- See The Myth of Rigor
  - conference talk; ask me if you can't find it

## Introducing Standards!

- Common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices.
  - Source: <http://www.standards.gov> (NIST)
- Standardization: "the process of developing and implementing technical standards"
- "Standardization is defined as best technical application of consensual wisdom inclusive of processes for selection in making appropriate choices for ratification coupled with consistent decisions for maintaining obtained standards."
  - Wikipedia, "Standardization"

note: non-standard spelling

note: missing word

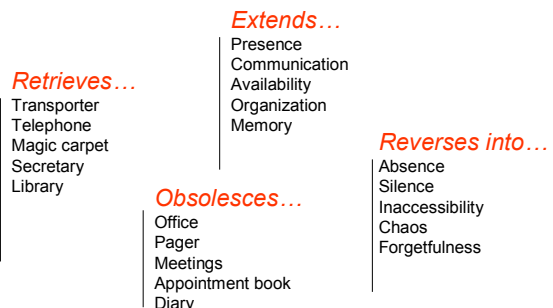
## Standards Creep into Regulations

- "Governmental regulations, also called rules, specify mandatory (legal) requirements that (1) must be met under specific laws and (2) implement general agency objectives."
- By reference: "An agency may adopt a voluntary standard without change by incorporating the standard in an agency's regulation or by listing (or referencing) the standard by title."
- By deference: "An agency may grant strong deference to standards developed by a particular organization for a specific purpose. The agency will then use the standards in its regulatory program *unless someone demonstrates to the agency why it should not.*"
- By revision: An agency adopts a standard, with adaptation based on public comment.
  - <http://www.standards.gov> (NIST)

## McLuhan's Laws of Media

- Standards are *media*
- McLuhan proposed that every medium
  - *extends* some human capability
  - *retrieves* the idea of some currently obsolescent medium
  - *obsolesces* some existing medium
  - when overheated, *reverses* into the opposite of its original or intended effect
- A medium, by mediating, reduces *immediacy*

## Laws of Media Tetrad Example: Smartphone



## A Question

What are the effects of testing standards?

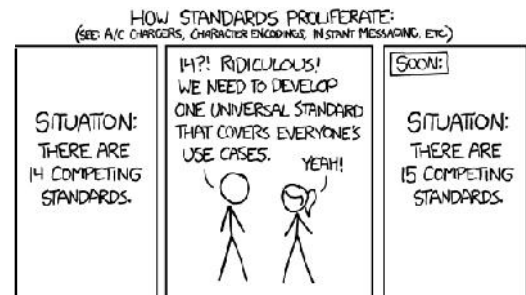
## ISO/IEC 29119: The Goals

- The aim of ISO/IEC 29119 Software Testing is to provide **one definitive standard** that captures vocabulary, processes, documentation and techniques for **the entire software testing lifecycle**.
- From organisational test strategies and test policies, project and phase test strategies and plans, to test case analysis, design, execution, reporting and beyond, this standard **will support testing** on **any** software development or maintenance project.

## Tom DeMarco on Certification

- “Whatever the merits of certification, it has always been a big hit among those who get to do the certifying... Though the rationale for certification is always societal good, the real objective is different: seizure of power. Certification is not something we implement for the benefit of the society but for the benefit of the certifiers.”
- Certification as promoted in our craft is a sham. It’s certainly NOT a viable standard.

## XKCD on Standards



<http://xkcd.com/927/>

## Martian Headsets



Version 1: one-to-one



Version 2: phone support (market flop)

Joel Spolsky, <http://www.joelonsoftware.com/items/2008/03/17.html>

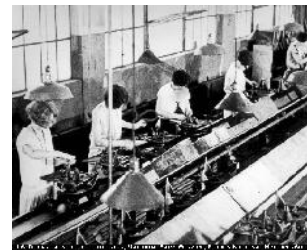


(with a spec, even)



Version 3: phone support (success... but standard?)

## Software Development Is Not Much Like Manufacturing



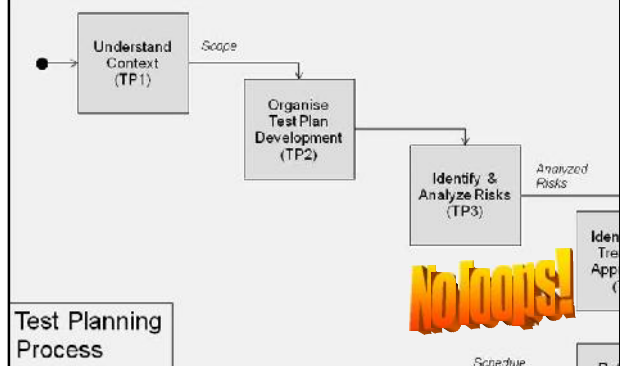
- In manufacturing, the goal is to make zillions of widgets *all the same*.
- Repetitive checking makes sense for manufacturing, but...
- In software, creating zillions of identical copies is not the big issue.
- If there is a large-scale production parallel, it's with *design*.

## Software Development Is More Like Design



- If existing products sufficed, we wouldn't create a new one, thus...
- Each new software product is novel to some degree, and that means a new set of relationships and designs every time.
- Should the process of design be standardized?

## Testing As Assembly Line



## Six Assumptions For Testing Standards

1. We, the standards' authors, are the right people to declare and describe them.
2. We've made the important stuff explicit.
3. Our knowledge is complete.
4. There's no controversy.
  - or at least none from people who *matter*.
5. Standards won't get in the way.
6. There will be no coercion from the unskilled.

What could possibly go wrong?

## Problems With Testing Standards

- Misperceptions in the institutionalization of knowledge and behaviour
- Oblivion to the role of tacit knowledge
- Focus on mimeomorphic actions (while the interesting parts of testing are largely polymorphic)
- The ontology problem
- Intolerance of (or oblivion to) context
- Delegation of authority and expertise
- Reification
- Suppression of diversity and The Fundamental Regulator Paradox

## Problems With Testing Standards

- Evolution of (bad) standards into (worse) regulation
- Goal displacement (standards compliance over good testing)
- The time-binding problem
- Market manipulation
- The Bogus Maturity Argument
- The Bogus Research Problem
- The Bell Curve Problem
- The Black Swan Problem

Don't forget the appeal to authority!



## The Biggest Problem

Bugs don't follow standards!

- Testing is open-ended, investigative research focused on *discovery* and *learning*.
- The technology of confirmatory research is designed to *prevent* discovery. (Kirk & Miller)
- Follow testing standards by all means...
  - if your goal is to find only standard bugs.
- *No standard ever found a bug.*

## Deviation and Science



Alexander Fleming



Penzias & Wilson



Henri Becquerel

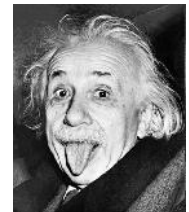


Galileo



Charles Goodyear

## Science *Requires* Deviation



- As Paul Feyerabend suggested, any prescriptive scientific method would limit scientists and restrict progress.
- “Cheating” is necessary to allow science to move ahead.
- Theory *frequently* has to play catch-up with observation.

## So You Want Process Improvement?

The Positive Deviance approach is

- an asset-based,
- problem-solving, and
- community-driven
- approach that
- enables the community
- to discover these successful behaviors and strategies and
- develop a plan of action
- to promote their adoption by all concerned.

Source: The Positive Deviance Initiative  
<http://www.positivedeviance.org/>

## Positive Deviance

Positive Deviance is based on the observation that

- in every community
- there are certain individuals or groups
- whose uncommon behaviors and strategies
- enable them to find better solutions to problems than their peers,
- while having access to the same resources and
- facing similar or worse challenges.

Source: The Positive Deviance Initiative  
<http://www.positivedeviance.org/>

## Positive? Deviant?

- Positive
  - “doing things right”
- Deviant
  - “engaging in behaviour that others do not”

A tester is someone who knows that things can be different.  
— Jerry Weinberg

PD isn't limited to testers, of course.  
Anyone, everyone, can contribute.  
Testers, as the antennae of the project, should be on the lookout for PD opportunities.

## An Example of Positive Deviance

- Problem: Hospital staff wear disposable gowns that can become contaminated by contact with MRSA patients. The garbage gets full and overflows quickly, risking more contamination.





## Enter Jasper Palmer



See "Jasper Palmer Method"  
[http://www.positivedeviance.org/resources/multimedia\\_center.html](http://www.positivedeviance.org/resources/multimedia_center.html)  
The Positive Deviance Initiative  
<http://www.positivedeviance.org/>

## Productive Deviation in Testing

- Alternation strategies
  - Focusing and defocusing and the power of randomness
  - Branching and backtracking
  - Working with the artifacts vs. working with the product
  - Careful vs. quick
  - "Crazy Ivan"
- The Law of Requisite Variety
  - A controlling system needs more states available to it than the system it controls.
  - "If you want to understand something complicated, complicate yourself." (Karl Weick)

## Testing Is Strengthened By Diversity

- Educational experience
- Writing skill
- Cultural background
- Domain knowledge
- Temperament
- Gender
- Programming skill
- Testing experience
- Age
- Experience in the current culture
- Experience *outside of* the current culture



## So What Are We Testers?

**Skilled  
investigators**

Software testing is the investigation of *systems* composed of people, computer programs, and related products and services.

The tester doesn't have to reach conclusions or make recommendations about how the product *should* work. **Her task is to expose credible concerns to the stakeholders.**  
- Cem Kaner, *Approaches to Test Automation*, 2009 (my emphases)

## What Is Testing?

- Excellent testing is not merely a branch of computer science
  - focus only on programs, and you leave out questions of *value* and other relationships that include people
- To me, excellent testing is more like *anthropology*—interdisciplinary, systems-focused, investigative, storytelling



Biology



Archaeology



Language



Culture

## Standardized Testing?

- Do we have standardized business domains?
- Programmers?
- Managers?
- Technologies?
- Problems?
- Products?

"To a mouse, cheese is just cheese.  
*That's why mousetraps work.*"

Wendell Johnson



## Are Standards The Only Way To Advance? What Else Could We Use?

- Guidance, rather than rules
- Checklists
- Guideword heuristics
- Diverse half-measures
- Humility and safety language
- “Trading zones” and open definitions
- Uncertainty and confusion as resources
- Practice
- Craftsmanship

## Are Standards The Only Way To Advance? What Else Could We Use?

- Testing for adaptability
- Personal syllabi
- Serious study of measurement
- Coaching, mentoring, apprenticeship
- History
- Philosophy
- Continuous conversation
- Extending increasing authority over one’s own work

## Conclusions

- Standards can be useful
  - but mostly for physical widgets or in specific domains
- Standards can be profitable
  - but mostly for the standards-makers
- Instead of standards, what we really need in testing are *skills* relevant to specific *contexts*.
  - rapid learning skill
  - observational skill
  - systems thinking skill
  - critical thinking skill
  - ...et cetera.

## Updates



- This presentation is ALWAYS under construction
- Updated slides at <http://www.developsense.com/past.html>
- All material comes with lifetime free technical support

## Book References

- *The Shape of Actions*
- *Tacit and Explicit Knowledge*
  - Harry Collins
- *Seeing Like a State: Why Certain Schemes to Improve the Human Condition Have Failed*
  - James C. Scott
- *Ideas on the Nature of Science*
  - David Cayley
- *The Power of Positive Deviance*
  - Sternin, Pascale, and Sternin
- *The Social Life of Information*
  - Paul Duguid and John Seely Brown

## Book References

- *The Checklist Manifesto*
  - Atul Gawande
- *The Black Swan*
- *Fooled by Randomness*
  - Nassim Nicholas Taleb
- *Secrets of a Buccaneer Scholar*
  - James Bach
- *Sciences of the Artificial*
  - Herbert Simon
- *Validity and Reliability in Qualitative Research*
  - Kirk & Miller

## Book References

- *Blink*
- *Outliers*
  - Malcolm Gladwell
- *Tools of Critical Thinking*
  - David Levy
- *The Visual Display of Quantitative Information*
- *Envisioning Information*
- *Visual Explanations*
- *Beautiful Evidence*
  - Edward Tufte

## References: Cem Kaner

- The Ongoing Revolution in Software Testing
  - <http://www.kaner.com/pdfs/TheOngoingRevolution.pdf>
- Software Testing as a Social Science
  - <http://www.kaner.com/pdfs/KanerSocialScienceSTEP.pdf>
- Software Engineering Metrics: What Do They Measure and How Do We Know? (with Walter P. Bond)
  - [www.kaner.com/pdfs/metrics2004.pdf](http://www.kaner.com/pdfs/metrics2004.pdf)
- Approaches to Test Automation
  - <http://www.kaner.com/pdfs/kanerRIM2009.pdf>
- Lessons Learned in Software Testing
  - Kaner, Bach, & Pettichord

## References: Jerry Weinberg

- Perfect Software and Other Illusions About Testing
- Quality Software Management
  - Volume 1: Systems Thinking
  - Volume 2: First Order Measurement
- Quality Software Management: Requirements Before Design
- An Introduction to General Systems Thinking
- The Psychology of Computer Programming