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THE BEST OF THE NEW TESTING TECHNIQUES

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THE BEST OF THE NEW

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What new testing ideas are most promising?

To paraphrase Dickens: "It was the best of times, it was the worst of times." Are the levels of software quality, test effectiveness and testers' quality of life improving? Or are we deluding ourselves?

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THE CURRENT SITUATION

In the testing profession, we live in a blizzard of new ideas, silver bullet magic solutions, reminders about how to obtain value from old ideas, and other helpful advice. This flow of ideas includes test patterns, agile methods, design for testability, CMM and ISO, automated oracles, exploratory testing, and tester certification.

We have all heard the buzzwords and acronyms -- system installation process testing, scalability testing, six sigma, stress testing, smart monkeys, security controls testing, statistical sampling, situational analysis, scenario testing, etc., to name just some starting with “s”.

THE CURRENT SITUATION (Continued)

That's part of being involved in a vigorous, fast-evolving field.

But which promising leads should a test professional pursue?

This presentation suggests where test professionals and managers can profitably focus in order to improve their effectiveness.

TRENDS, INNOVATIONS & BLIND ALLEYS

I will review the leading ideas and techniques, and discuss them in these categories ---

- (1) External factors influencing software testing -- for better or worse.**
- (2) Non-starters -- trends I'd like to see which don't seem to be happening.**
- (3) Significant trends which do have promise -- and pseudo trends -- in testing & QA.**

(Continued)

TRENDS, INNOVATIONS & BLIND ALLEYS (Continued)

- (4) Quality assurance & testing techniques which DON'T work well.**
- (5) Promising and/or problematic techniques which still are worth trying.**
- (6) Good old techniques which work but are under-utilized or often mis-utilized.**
- (7) New(er) techniques which are not yet being well applied.**

TRENDS, INNOVATIONS & BLIND ALLEYS (Continued)

This presentation gives one person's opinions (mine).

I surveyed approximately 60 experienced, leading practitioners in the profession and found that they were about two-thirds in agreement with the positions I am taking.

There was sharp dissent expressed by at least one person on every single claim of mine.

The lack of a higher consensus is an indication of the newness and evolving nature (immaturity?) of the testing field.

TRENDS, INNOVATIONS & BLIND ALLEYS (Continued)

For every idea and technique mentioned here, there is both a plausible case that can be made for it, and a case which is the opposite. This presentation will include a summary of the dissenting viewpoints.

These opinions will no doubt challenge some scared cows and may be controversial -- which is appropriate, because the intention is to stimulate reflection and debate.

My list is not exhaustive – there may be good ideas I have overlooked. There also are some contradictions.

HOW DO WE DECIDE WHAT'S BEST?

Testing is context-specific: one person's best opportunity is not promising for everyone.

We will use the word "best" in the spirit of Jeremy Bentham: the greatest good for the greatest number.

WHAT'S CONSIDERED NEW?

Some ideas suggested here were being practiced successfully 25 years ago, but only by a tiny percentage of the profession.

Others are so new that it is almost too soon to assess their potential.

(1) External Factors Influencing Software Testing

(For better or worse)

Agile methods (XP, RAD, etc.)

Requirements modeling (UML, use cases)

Component re-use and design patterns

System integration

Increasing system complexity

Increasing deadline pressures

Declining average competency of software engineers?

Increasing bug densities?

New technologies, especially the Internet

UCITA

(2) Non-Starters

(Trends I'd like to see)

Executive buy-in and support of testing

Empowerment of and respect for testers

Shrinking wage gaps between testers and developers

Improvement in tester-to-developer staff ratios

Better unit and integration testing by developers

**Better test planning and estimation skills, and the
application of project management on test project**

E.g., utilization of project management tools

More sophisticated risk management

(3) Significant Trends in Testing & QA

The context-driven school of testing

Test automation – the next wave

Beyond capture/replay

Beyond a focus on just test execution

Automation frameworks and tool integration

Oracles

Tools for component/unit testing

The rise of specialized tools – e.g., load testing tools

Design for testability

Test patterns

**(4) Quality Assurance & Testing Ideas and Techniques
which DON'T Work Well
(The Emperor has No Clothes)**

*This section means no disrespect to the trail-blazers
who developed these methods – experimentation and trial
efforts are natural to progress.*

**Six Sigma Quality
Provably Correct Software
Total Quality Management
Quality Circles
Statistical Process Control
Statistical Sampling (with some exceptions)**

**(4) Ideas and Techniques which DON'T Work Well
(Continued)**

Bebugging, Error Seeding and Software Fault Injection

Mutation Analysis

Function Points

Cyclomatic Complexity

The Software Cleanroom

CMM and ISO

Certification of Software Testers

Paying Testers by the Bugs Found

**(5) Promising and/or Problematic Techniques still
Worth Trying**

Coverage Analysis

Software Reliability Engineering

Formal Specification Methods and Languages

(e.g., TTCN)

**Traditional Waterfall / V-Model Development
Methodologies**

Orthogonal Arrays

Rate Monotonic Analysis

Smart and Dumb Monkeys

Regression Testing

**(6) Good Old Techniques which Work but are Under-
or Mis-Utilized**

*Even if you have dismissed some of these ideas before,
they are worth a re-visit and a re-examination.*

Independent Test Teams

Early Involvement of Testers in Projects

Requirements Management and Traceability

Walkthroughs and Inspections

Bug Advocacy and Problem Reporting

Defect Aging

Test Case Design

**(6) Good Old Techniques
(Continued)**

Release Management

Configuration Management

Writing Effective Functional Specs.

Reliable System Design and Defensive Programming

Interoperability and Standardized Interfaces

Designing Code for Maintainability

Test Process Improvement

(TPI; process re-engineering)

(7) New(er) Techniques which are not being well Applied

“If it was easy, everyone would already be doing It”

Fault Tolerant System Design

Performance, Load & Stress Testing

Robustness & Reliability Testing

Scalability Testing

Usability Testing

Database Integrity Testing

Compatibility Testing

Component- and System-Level Integration Testing

Security Controls Testing

Ross Collard

Ross Collard is president of Collard & Company, a consulting firm located in Manhattan. His experience includes several software testing & QA projects; strategic planning for technology; and managing large software projects.

His consulting and training clients have included: ADP, American Express, Anheuser-Busch,

AT&T, Banamex, Bank of America, Baxter Healthcare, Bechtel, Blue Cross/Blue Shield, Boeing, British Airways, the CIA, Ciba Geigy, Cisco, Citibank, Computer Associates, Dayton Hudson, DEC, Dell, EDS, Exxon, General Electric, Goldman Sachs, GTE, the Federal Reserve Bank, Ford, Fujitsu, Hewlett-Packard, Hughes Aircraft, Intel, Johnson & Johnson, JP Morgan, Lucent, McGraw Hill, MCI, Merck, Microsoft, Motorola, NASA, Nortel, Novell, Oracle, Procter & Gamble, Prudential, IBM, Swiss Bank and the U.S. Air Force.

Mr. Collard has conducted seminars on business and information technology topics for businesses, governments and universities, including George Washington, Harvard and New York Universities, MIT and U.C. Berkeley. He has lectured in the U.S.A., Europe, the Middle East, the Far East, South America and the South Pacific.

He has a BE in Electrical Engineering from the University of New Zealand (where he grew up), an MS in Computer Science from the California Institute of Technology and an MBA from Stanford University.

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