The Value of ISTQB Certification and Training

A White Paper by Randall W. Rice, CTAL (Full), CTFL-AT, CMT, CTAL-SEC

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Introduction

Something is seriously wrong with the current quality levels in software. It seems that there are stories in the mainstream news media almost daily about software "glitches". One of these "glitches" to date has cost the Nasdaq stock exchange over $72 million to compensate for a performance defect encountered during the Facebook IPO.

In describing the remediation of this problem, CNBC reported that Nasdaq, "…has also created two new positions (chief information officer and global head of market systems), an engineering team dedicated to monitoring and analyzing daily system performance, and a quality assurance organization focused on testing the trading systems.

"We recognize that the cornerstone of a market is investor confidence," Greifeld said. (Nasdaq CEO Robert Greifeld)[1]

The issue in today's computing systems is *trusting* that our personal and private data will be handled correctly and securely. However, the data shows that sensitive information is not being handled with the care it deserves due to high levels of software defects and a casual attitude toward software quality.

Over the last 40 years or more, there has been enormous work done to research and understand what it takes to deliver reliable software. This information has been translated into practices and other forms to make it possible to have highly trusted systems. The problem is too many companies fail to see the value in preventing problems. Instead, they are willing to subject their customers to risk, lose massive amounts of money in fixing and remediating defects and pay fines for the careless handling of data.

The Current State of Training in General

The United States has been losing ground in worker education for years. We now rank near the bottom of 23 countries in technical skills.[2] This is an alarming fact and a major slide from where we were during the quality movement of the 1990's.

> "The sharp lack of skills among workers shows that 'employers need to do more for continuing worker education,' an area, says Peter Cappelli, professor of management at the University of Pennsylvania's Wharton School of Business. Investment in employee education has been neglected in recent years as companies have been less willing to train up candidates for fear of losing them to competitors. As a result, programs like apprenticeships, which are more common in Europe, are nearly defunct in the U.S., and new hires are expected to be fully prepared to take over their new duties.
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> 'And companies don't want to spend the money,' Cappelli adds. Nor do they want to pay higher wages to recruit people with the needed skills, he says."[3]

[1] http://www.cnbc.com/id/100736915

[2] http://skills.oecd.org/skillsoutlook.html

[3] American workers are way behind: Blame U.S. employers – Forbes online - http://management.fortune.cnn.com/2013/10/25/american-skills-gap/

However, it's not all bad news. It seems that some smart companies have decided there is value in skill-building and are investing in their people again.

> "About half of businesses say they plan to train new hires this year, up from 39% in 2013, according to a recent survey by CareerBuilder.
>
> "Training budgets that were diminished or nonexistent during the recession are starting to make a comeback," says Matt Ferguson, CEO of CareerBuilder and author of *The Talent Equation*. The firm surveyed 1,025 employers in computers, healthcare, manufacturing, engineering and finance — fields with many open skilled positions."[4]

The Value of Training and Certification

A key question that should be asked and answered about any skill-building effort – training, mentoring, certification, etc. – is, "what is the value to the organization and to the individual?".

The ISTQB (International Software Testing Qualifications Board) program for software tester certification has been in existence since 2002, and was introduced in the U.S. in 2004 by the ASTQB (American Software Testing Qualifications Board).

There are other software test certifications, such as those offered by the QAI Global Institute and the International Institute of Software Testing (IIST). This paper focuses only on the ISTQB certification and it's unique value proposition. Additionally, the value of training in software testing is also shown.

There are strong critics of the idea of software test certification. Those opinions can be found easily on the web. The purpose of this paper is not to refute those arguments, but rather to show the value of certification for those considering it.

The thesis of this paper is that there is value to building a strong basis of knowledge in software testing, based on proven practices. The term "best practices" is also controversial to some people, but it is interesting to observe that many disciplines and professions – medical, engineering, etc. have published best practices. The software industry, and more specifically, the software testing field seems to be particularly critical of the idea of best practices.

Whatever you choose to call it, the ability to do quality work in any endeavor depends on people understanding what they are doing, and using the most effective practices to perform the work.

Certifications seek to codify this knowledge in a way that can be assessed. It is important to understand that any certification or training is market-driven. Without the demand for certification and training, none would exist. **Ultimately, it is up to a company or individual to seek certification and training based on the value they see in it**. There are no requirements in the industry for a software tester to be certified and/or trained (e.g., licensing). If the case for no certification has more merit than the case for certification, then the community of software testers and their managers will agree and the market for certification will disappear.

[4] More employers spend to raise workers' skills – USA Today, March 9, 2014

However, the trend for obtaining test certifications is sharply increasing. **In addition, the requirement for job candidates in software testing is also increasing.** Since 2004, the pace of certifications has continued to increase at a strong growth rate in the U.S. Currently, over 21,500 testers hold the CTFL in the U.S. and over 450,000 people internationally hold the CTFL in 70+ countries. It appears that the ISTQB program is the certification of choice based on numbers of people certified.

Basis of Findings

The information contained in this paper is based in actual results seen from adopters of the ISTQB program in their companies. Also, data from ASTQB-sponsored surveys are shown. While these surveys are taken from those already involved in the ASTQB program, it is helpful to see the attitudes from people who sponsor and/or hold ISTQB certifications.

In addition, Capers Jones has conducted research that spans thousands of software projects and organizations. His findings indicate that "*A synergistic combination of defect prevention, pre-test defect removal, and formal testing by certified personnel can top 99% in defect removal efficiency while simultaneously lowering costs and shortening schedules.*"[5]

Disclaimer

The author, Randall W. Rice, CTAL (Full) is currently Treasurer of the Software Testing Qualifications Board. He was also a founder of the CSTE program from the Quality Assurance Institute (QAI) in 1997. Rice Consulting conducts training in the ISTQB Foundation and Advanced Level certifications.

Basis of Certification

The ISTQB certification program has Foundation, Advanced and Expert levels – all defined by common English language international syllabi:

CTFL – Certified Tester Foundation Level, 40-question multiple-choice exam, 1 hour, $250 exam fee. Formal training is not required but highly recommended.

CTAL – Certified Tester Advanced Level

There are five advanced level certifications. Three of these form the "core" – Advanced Test Manager (ATM), Advanced Test Analyst (ATA) and Advanced Technical Test Analyst (ATTA). When all 3 core advanced certifications have been achieved by a person, they have the CTAL (Full) designation.

There are two specialty advanced certifications – Advanced Security Tester (CTAL-SEC) and Advanced Test Automation Engineer (CTAL-TAE). Each of these certifications has differing levels of examination and course lengths.

Like the CTFL, formal training is not required to sit for the exam, but it is recommended. Also, the certification, once achieved, is for life. There is a $200 exam fee, 3 years of verifiable full-

[5] http://www.ifpug.org/Documents/Jones-SoftwareDefectOriginsAndRemovalMethodsDraft5.pdf

time experience in software or systems testing, development, quality assurance, engineering or a related field, and must hold ISTQB Certified Tester, Foundation Level (CTFL).

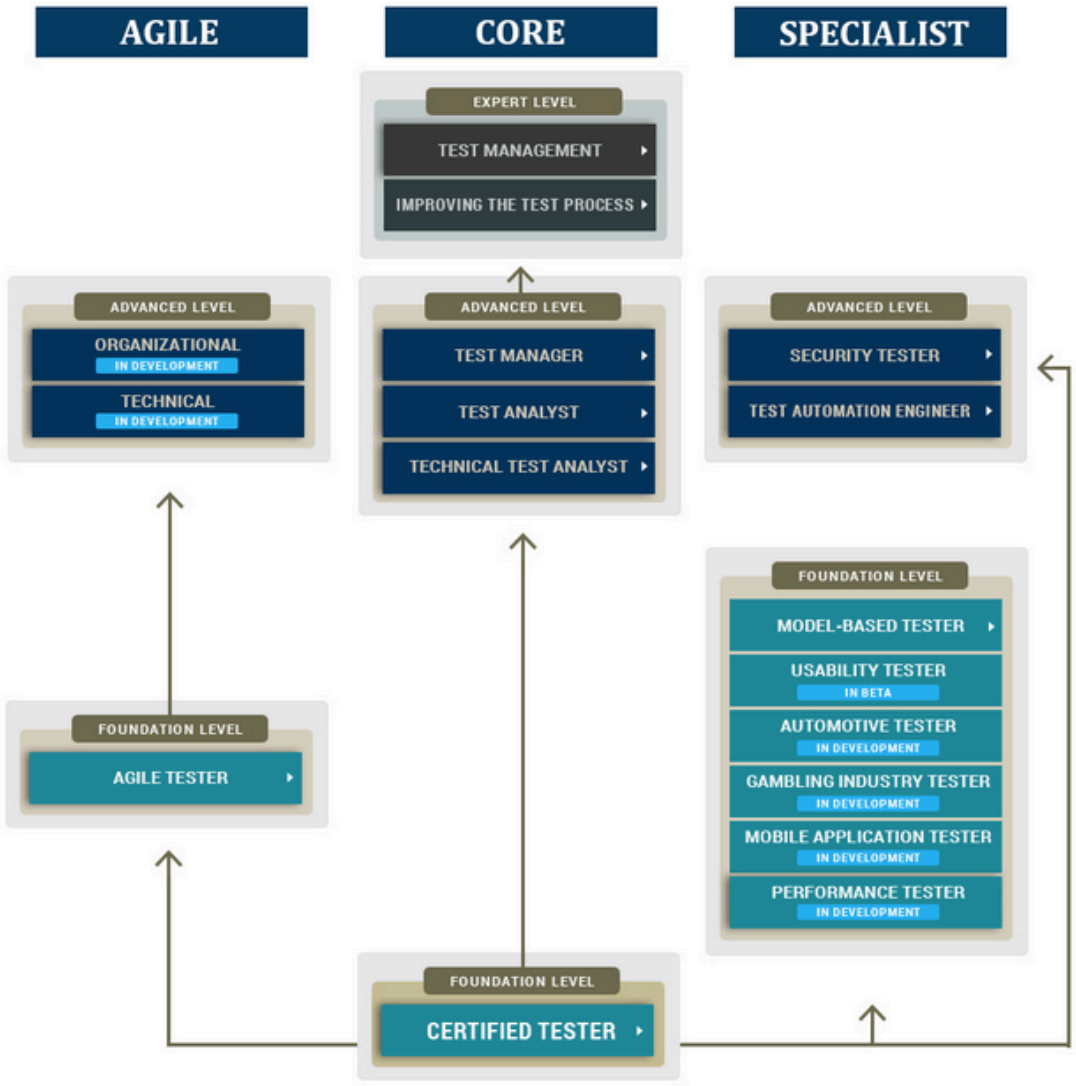
Expert Level

Currently, there are two expert levels of ISTQB certification – Expert in Test Management and Expert in Test Process Improvement.

Agile Certifications

The CTFL-AT is the Foundation Level for Agile Testing. This is a one-hour exam with 40 questions. There is a pre-requisite of holding the CTFL. Advanced levels for Agile Tester certification are in development.

The roadmap shown below shows the syllabi currently available, plus those in active development. As you can see, the ISTQB program is developing into a very robust coverage of testing areas.



The Value of ISTQB Certification

There are other software tester certifications, so what is the value of ISTQB certifications?

Builds a Common Vocabulary of Software Testing

Over the years, each company and each tester have come to use various test-related terms in their own ways. This leads to misunderstandings and miscommunication between people and teams that can cause project delays and missed defects. We have seen this on many consulting projects performed by Rice Consulting. For example, one group may fail to perform a certain type of level of testing because they didn't realize everything the desired testing involved due to a lack of test terminology knowledge.

One test manager of over 200 people credits the ISTQB Foundation Level Certification for a smooth project and early delivery, mainly due to having a common basis of terminology.[6]

Conveys Common Practices for Software Testing

The ISTQB syllabi are not test standards or test processes, but they are based on a broad consensus of international test experts in all industries and test standards from a variety of sources – IEEE, ISO, BSI and others. By understanding this broad road of testing, your team becomes aware of proven practices that are effective in software testing and when to use one technique over another.

As test manager and adjunct professor Marc Rene writes, *"Certification across an organization gets all testers on the same playing field with terminology, approaches, methodology, and general testing principles. Certifications focus on foundational testing knowledge and sound testing practices. Furthermore, they allow all testers to have a shared understanding about the maturity of testing processes in the organization. Certification also provides a competitive edge – allowing skilled testers to find the right defects with the right amount of effort."*[7]

Using effective processes for testing is a major step toward high levels of defect detection, better software and happier users.

Establishes a Framework for Skill Building

There are many topics available for training in software testing, but which ones are best for the development of your team? The ISTQB certification program lays out a structure of training, with well-defined syllabi and learning objectives developed by international testing experts. The ISTQB syllabi forms a strong basis of topics and timings that can be applied at corporate and university levels.[8]

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[6] Joe Gance, former test manager at EchoStar presented this information at a debate of software test certifications at the AST conference in Seattle in 2007

[7] http://www.astqb.org/why-istqb/director-quality-services-pub.php

[8] Higher education using the ISTQB syllabi include Villanova and Rhode Island College.

This structure starts with Foundation Level as the basis, then grows into branches of Advanced Levels for Test Managers, Test Analysts and Technical Test Analysts. Specialist areas are in place for Agile testing, Advanced Security Testing and Advanced Test Automation. As mentioned earlier, Expert Levels are in place for topics such as Test Management and Test Process Improvement.

Builds Credibility and Professionalism for Your Team

As a tester or test manager, people must find you credible, or they won't believe your message. While test certification does not mean someone is a great tester, it does attest to a level of knowledge they have achieved.

In a recent ASTQB survey of certified testers and test managers:

- 96% of managers feel that professional certification helps to demonstrate professional competency.
- 92% of managers feel that professional certification helps to gain professional recognition.
- 94% of managers feel that a software tester is more valuable to the organization after receiving professional certification.
- 98% of managers believe that certification helps in career development.
- 93% of testers believe that ISTQB Advanced Level Certification helps testers to gain professional recognition. In addition, 94% believe it helps testers to demonstrate a higher level of professional competency.[9]

Has International Recognition and Consistency

With other 440,000 CTFLs worldwide and over 20,000 CTFLs in the United States, the ISTQB program is the most recognized and adopted testing certification in the world. In fact, the ISTQB certification program is 3# in the world behind the PMI and ITIL certification programs in terms of individuals certified to date.

There are over 100 countries that participate in the ISTQB. You can rest assured that the ISTQB certifications will be known by others.

Many international companies are adopting ISTQB certification as a way to get consistent training of all their test teams worldwide on a common syllabus.

Transfers Practical Knowledge for Software Testing

The ISTQB certifications require that you demonstrate the ability to actually perform key learning objectives. At Rice Consulting, our goal is not only to prepare people for the ISTQB exams, but also to impart practical testing knowledge that will be used for years to come. We do this by including value-added topics and all major course points are reinforced with exercises.

[9] ASTQB Newsletter, March 2011 and June 2011

Training is not required to take the ISTQB exams, however it is strongly encouraged. The entire ISTQB program depends on training providers to promote it and to deliver the training services. This allows candidates to choose the training vendor and method that best meets their needs. The goal of achieving an ISTQB certification is not to get letters after your name – it is to build software testing knowledge. This knowledge can be obtained through self-study and/or through formal training.

Demonstrates Investment in People and the Testing Process

One of the key indicators of management support of software testing is the level of investment in people, processes and tools. Management sponsorship of software testing certification and training is a tangible way to show that management understands and values skill building.

A challenge in building good teams is keeping the best people. Skill development is one of the five major things people value in their job according to Human Resources expert Susan Heathfield.

"Employees want to learn new skills, develop their capabilities, and grow their knowledge and careers. Making developmental opportunities available to each employee demonstrates your commitment to helping them develop their careers. They appreciate this."[10]

The Value of Formal Training

Learning the Subtleties of ISTQB Terminology and Approaches

People who have been in the testing field for many years may understand topics from their experience and previous training. However, people with over 30 years experience have failed the CTFL exam – not because they lack knowledge, but because they lack the ISTQB perspective.

Small details in understanding can make the difference between passing and failing the exam. The syllabi provides the learning objectives and what should be covered in a training course. They do not convey the knowledge behind the topical outline. That is where formal training comes into play.

Instructor Guidance and Feedback

A good instructor will make sure all learning objectives are covered and that your questions are answered. With self-study, you are largely on your own. Terminology and process details are explained so the candidate will be able to understand the concepts and apply them on the job.

Focused Attention

[10] http://humanresources.about.com/od/managementtips/qt/four_factors_b4.htm

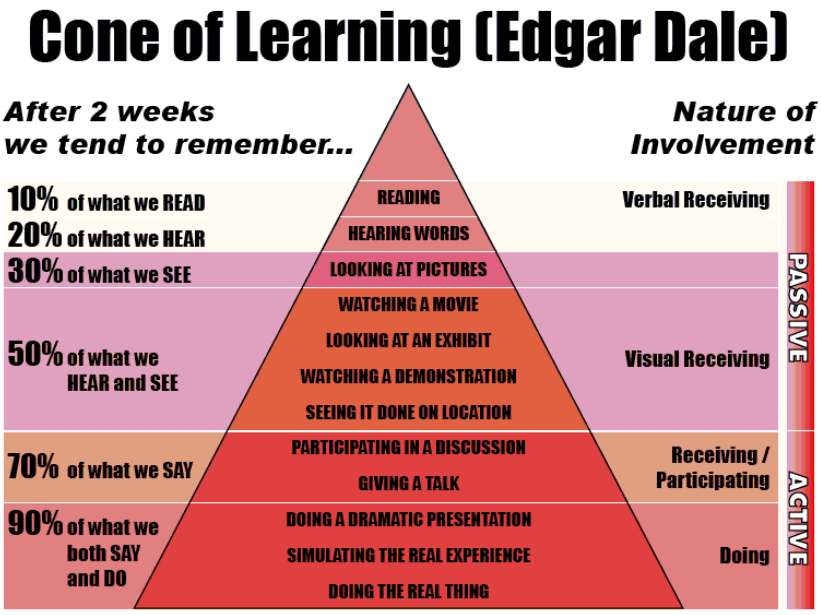
Whether in live classroom training or in e-learning, you are focused on the topic of software testing for a period of time. This is more than just reading a book. (Which, by the way, reading books on testing is something few testers do.)

Making the Best Use of Your Exam Investment

A candidate can re-take the exam at any time if they don't pass. However, each exam sitting is $250. With training, you have a much better chance of passing the exam, plus you get the benefit of testing training which can be used on the job for years to come.

Practical Application

Any type of software testing training should include practical exercises to reinforce the key concepts. People only retain 50% of what they hear and see, but 90% of what we say and do.[11] Accredited ISTQB training must include exercises for each training objective that requires candidates to perform on the exam.



Edgar Dale, *Audio-Visual Methods in Technology*, Holt, Rinehart and Winston.

Analysis of Return on Investment

Some people may say that software test certifications and training are expensive. This begs the question, compared to what?

Let's take an example of a company that has 10 testers to be trained and certified. At the present time, each release of software at the company averages 20 post-release defects found by users and not by testers.

[11] Edgar Dale, *Audio-Visual Methods in Technology*, Holt, Reinhart and Winston

Research from Rice Consulting shows it is not unusual for a production defect to cost over $4,000 to find, fix, re-test and re-implement. Twenty defects at this cost would be around $80,000 per release.[12]

At 2016 rates, a Rice Consulting ISTQB Foundation Level course for 10 people would cost around $13,000, including instructor travel expenses.

If the training resulted in a defect reduction of 20% (there would be 16 post-release defects found), the defect cost in this example would be $64,000 for a savings of $16,000. This would more than pay for the training and certification.

However, this just considers the cost savings for one release cycle. If the improvement efforts continue for future releases, the cost savings would be seen in each release. This could justify even more training and more process improvement.

In addition, it's not uncommon to optimize testing processes and reduce the cost of testing by the better use of techniques, skills and tools. A 10% cost savings is on the low side for test improvement processes conducted by Rice Consulting.

If the testing budget is $500,000 per year, test process optimization could save $50,000 per year, while finding more defects than before!

That kind of cost savings can pay for a lot of training, certifications and other things (such as tools).

This kind of return on investment is not automatic from certification and training. Management leadership and support are required to improve processes and lead people in creating better software using the information gained from certification and training.

Summary

The value of anything depends on what someone sees in a product or service. When it comes to test certifications and the training needed to achieve them, you are not buying training and certifications. You are buying consistency of software testing knowledge, higher levels of credibility, reduced defects, more efficient and effective testing, and happier end-users.

Of all the test certification programs, the ISTQB program is the most recognized and adopted, with over 330,000 certified testers worldwide. In the U.S., there are over 12,000 CTFLs, which means this is the strongest program by far in the U.S.

[12] Capers Jones has an excellent paper on the cost of defects at www.semat.org/pub/Main/PubsandRefs/a_short_history_of_the_cost_per_defect_metric.doc. As of 2009, Jones writes that industry information showed the cost of post-production at around $5,000 each.

If you compare the cost of certification and training with the cost of software defects, it is easy to see how the certification and training pay for themselves in terms of better software and more efficient test processes.

The choice is clear. Companies can continue to risk their customer's information and corporate profits by ignoring the value of software testing education and living with the impact of poor quality software, or they can invest in building knowledge in software testing, prevent defects and increase profits.

About the Author

Randy Rice is a leading author, speaker and consultant in the field of software testing and software quality. Rice, an ISTQB Certified Tester – Advanced Level (Full), and a Fellow of the Life Office Management Association, has worked with organizations worldwide to improve the quality of their information systems and optimize their testing processes.

Mr. Rice has over 38 years experience building and testing mission-critical projects in a variety of environments.

Randy is a director of the American Software Testing Qualifications Board and has been published by *Better Software*, the *Journal of the Quality Assurance Institute, Crosstalk* and *Enterprise Systems Journal*. He is a regular speaker at international conferences on software testing in North America and Europe, and is also publisher of *The Software Quality Advisor*. He is co-author with William E. Perry of the books, *Surviving the Top Ten Challenges of Software Testing* and *Testing Dirty Systems*.

Randy serves as a Director for the American Software Testing Qualifications Board (ASTQB). He also served as chair of the Quality Assurance Institute's International Software Testing Conference from 1995 – 2000 and was a founding member of the Certified Software Test Engineer (CSTE) certification program. As author of 2 books and over 60 software testing training courses, Randy has had the privilege of training thousands of software testers throughout North America.

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