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The Vision on the Future of Software Testing

The ISTQB® established its position in the first years of its existence as the de-facto international software testing standard and as the leader organization for the software testing professionals around the globe.
Therefore, the software testing professionals and their communities are seeking answers and directions towards the future of the software testing profession from the ISTQB®. There are rapid and dynamic changes currently in the software development arena as well as increased growth in innovation, new technologies, and expansion of IT throughout most industries. With our professions immersed in the software development area, we, the ISTQB have developed the Vision on the Future of Software Testing.

Software testing is a complex topic that takes on many shapes and forms, has evolved over the years, and will have an interesting future in both the technology arena and the human societal arena. Significant change in the software testing discipline is on the horizon and testing has become a quality assurance driver engaging other professions and professionals, not just software testers.

We at ISTQB® embarked on an effort to gain insight about software testing and then developed a vision on the future of software testing. We surveyed a group of twenty Thought Leaders in the IT testing discipline, such as Capers Jones, Bill Hefley, Robin Poston, Harry Sneed, to list a few. We actively sought practitioner and academic inputs about the future of software testing and testing engineers. The feedback we received, while extremely interesting and practical was focused more on the near-term aspects of testing.
Therefore, our Vision Core Team within the Academia Committee has articulated a Vision on the Future of Software Testing.

The Vision

In the future, there will be more testing technology solutions which embrace technologies that embed the testing discipline within the complete software development life cycle to deliver quality systems to the user communities.

The testing technology solutions, software testers, and testing experts are joined in a dialog of common sense and explanations of the rationale around what to test, how to test, and why. These discussions are delicately balanced on a foundation of ethics and embrace innovative software development life cycles, such as software creating software.

These testing technology solutions will iteratively learn the testing discipline from testers and testing experts as well as teach all stakeholders the quality attributes to incorporate

throughout the software development life cycle processes. The testing technology solutions will also learn from themselves and, therefore, teach themselves as part of the iterative learning and evolving testing discipline, especially emphasizing testing quality attributes.

These quality attributes will be inherent within the testing technology solutions and will determine what to test as well as how to test. This includes the ability to analyze, troubleshoot, resolve, test, retest, and/or recommend tests or solutions to resolve the software quality issues. The testing technology solutions will have the ability to explain to testers and testing experts the rationale supporting their recommendations and solutions. This will provide the opportunity for continual education, learning, and ethics integration into the testing technology solutions.

Software will continually become integrated into the vast majority of products and services driven by global economies. Testing professionals will be greatly needed in the software development marketplace, as they will be an active principal in the development and education surrounding the decision-making life cycles building and enhancing the testing technology solutions. The testing professionals will have a significantly expanded set of skills, positioning the testing professionals to highly influence the velocity of both the development of testing technology solutions and the delivery of software systems. The testing professionals will be highly valued, due to both their need in the marketplace and their expanded skill sets.

Preparation and Implementation

To prepare for these testing technology solutions, testing professionals need to not only increase their technical skills but also expand their soft skills. This includes such skills as decision-making, leadership, interpersonal communications, project management, and teamwork. Testing professionals must understand the view of quality is ever-changing and it is driven by the Business. Testing professionals and the testing technology solutions must adapt to and adopt the international and global best practices. Users need to be trained on how to effectively navigate the software systems. Business, Governments, and any education systems, particularly Academia and Professional Schools, have a joint responsibility to define, guide, and lead the delivery of overall software development education, emphasizing testing technology solutions. These education systems include areas such as content, processes, methodologies, technologies, tools, and ethics for the training of users, testing professionals, and industry professionals who drive the testing technology solutions. These education systems will drive the required qualifications for testing professionals and the qualifications will have aligned to and associated within certification systems.

Responsibilities of the Testing Professionals

The responsibilities of Quality and Software Testing Professionals are to:

- Accelerate the incorporation of evolving technologies, methodologies, and tools into the testing technology solutions;
- Apply common sense and ethics effectively into the learning cycles with the testing technology solutions;
- Be a major decision-maker in the risk assessment and quality readiness of the software solutions;
- Ensure all stakeholders in the software development life cycle are engaged in and benefit from these testing technology solutions;
- Embrace new ways of software development and production, including techniques where new software will be produced by other software;
- Ensure comprehensive risk assessment and quality readiness within the software development processes to deliver high levels of software systems' reliability.

Clarification Section
For
The Vision on the Future of Software Testing

Clarifying the Vision

Software testing is moving towards more automation. Over time, software testing will become fully automated and embedded in the processes and technologies within the overall software development life cycle. These automated software testing capabilities can be called testing technology solutions; in the future they may have another name.

The testing technology solutions will have 'intelligence' built into them. There are several trends, including artificial intelligence, which address effectiveness and accuracy of testing other systems and can be used to develop innovative testing technology solutions. Over time, these testing technology solutions will evolve into learning/teaching engines. They will learn from testing experts but also learn from other testing technology solutions and from themselves. As software development evolves, these testing technology solutions may be integrated into the software development technologies as part of the overall software development life cycle, particularly where software can create other software.

Software technology continues to be more integrated into the human existence and artificial intelligence becomes more prevalent within software technology. The ethical aspects of decision making by artificial intelligence (hopefully) will be resolved and this requires a level of human intervention in the testing technology solutions where ethical judgment is concerned. This requires the testing technology solutions to have recommendation capabilities built within itself.

Clarifying Preparation and Implementation

Testing professionals will transition over time to provide testing expertise within expanded aspects of the software development life cycle, not just performing testing at the end of the process. Testing will expand across more industries as well as become more integrated within all software development throughout nearly all industries. To meet this need for testing expertise, testing professionals will have to expand their technical skills around methodologies, techniques, and tools to ensure they are of value within the overall development life cycle. As software continues to expand into more industries, testing professionals must increase their soft skills to take on more leadership roles around assuring quality assurance. The routine tasks of testing will be automated into the testing technology solutions and therefore testing professionals need to expand to broader technology and leadership roles.

The perception of quality of software systems continues to change. That perception is affected by factors in the marketplace, economics, technology, culture, software and

technological innovation, and globalization. The Business drives the interpretation of this perception of quality that becomes the expectation for testing professionals to meet through building and/or using the testing technology solutions. It is critical to understand this so testing professionals realize quality is a moving target.

As software systems continue to expand into the human societies, the user communities will be exposed to more and more interfaces to software systems. The users will need to have more training on how to interact with these software systems in order to use them effectively. The software systems need to become easier to use, though in the same token, the users need to become more capable of using these software systems for their intended beneficial purposes.

As more software solutions are being made available for use and as these software solutions expand into more industries, there needs to be a greater definition and integration of the training solutions for testing professionals. The responsibility for leadership of the development and delivery of these training solutions lies jointly with the Business, Governments, and any education systems, particularly Academia and Professional Schools. These entities need to collaborate in developing plans and deliverables for integrated training for testing professionals, including focused training for testing technology solutions.

Clarifying Responsibilities of Testing Professionals

Testing professionals shall need to embrace the new methodologies and technologies around software development and testing, with intent to integrate these faster into their testing technology solutions. Testing professionals shall be required to pick up the pace of bringing greater testing capabilities to the software development life cycle. And these testing capabilities, which will be driven by the testing professionals, shall need to enhance each of the roles of the stakeholders within software development.

In working on behalf of the users, testing professionals will be required to learn how to teach the testing technology solutions to continually improve the quality of software solutions and their evolution. Testing professionals will drive the guidelines for testing and software development good practices from the industry and academia to be incorporated into the testing technology solutions. Testing professionals will have to ensure the testing technology solutions incorporate self-educating lessons and learned capabilities, which provide continuous improvements in the quality attributes of the testing technology solutions and in the delivered software systems.

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Feedback

We would like to have feedback, and raise a discussion if relevant on the paper and topic.

For commenting, or suggesting ideas, please write to us at:

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