

SQS NEWSFLASH

Opinion

What will the tester of the future be like?

Inspiring trajectories in the world of testing

Daniel Nilsson

TMMI

The global standard for testing process improvement

Innovation

Eur3ka, rapid response to pandemic situations



SOFTWARE QUALITY ASSURANCE

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Editorial

We are about to end the year 2022, the best time to briefly review what happened throughout it. 2022 has been a very special year as it has allowed us to, once again, hold our QA&TEST conference in person in Bilbao, bringing together, after two long years, the testing and software quality community.

The 21st edition of the conference made it clear, once again, that software quality is an absolute priority in

many different industries and, therefore, this issue of our magazine includes several articles that will help us continue advancing in this matter. In addition, we want to introduce you to two projects or initiatives in our sector: The Eur3ka project and the Baidata association.

Have a great end of the year. See you in 2023!

The Testers of the Future



Gerie Owen
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The very nature of testing is undergoing radical and continual change. This means your career as a tester is constantly in transition. Testers need to be aware of these dramatic shifts and prepare to redefine their careers. Over the years, the testing profession has evolved to meet the need for speed, beginning with agile development and increasing levels of test automation, and continuing on to DevOps, continuous testing and quality engineering. We are shifting both left and right, and yet we are only in the early stages of a profound transformation in testing skills and the roles testers will play in delivering quality software.

Today many testers are asking what knowledge and skills are needed to have a successful career in an era

where testing means many different things. While no one has a crystal ball into the future, it is possible to look at current trends and make educated analyses of what the future of testing and test activities may look like.

This article will discuss how the testing profession has responded to the dramatic shifts in the software development lifecycle and provide testers with an approach to prepare for the future. It will describe the “T” shaped skill assessment theory and show testers how to use their “shape” to evaluate their skills, strengths and weaknesses and determine their next direction. Finally, it will suggest ways of becoming a tester of the future.

How the Testing Profession has responded to change

In the early 2000's, agile methodology was developed in response to the need for faster development cycles and increased speed to market. For testers, agile meant developing ways of delivering small increments of work more frequently without negatively impacting quality. We did this primarily by implementing testing including test automation, earlier in the development cycle, more frequently and in greater amounts. Testers were challenged not only to expand their skill sets, but also their mindsets. Not only did testers learn to script and code; but more importantly, they went from being members of "the testing department" to being agile team members. In many organizations, testers were no longer called testers as agile team members were called developers.

DevOps, initially the merger of development and operations, was the first attempt at continuous integration by building an automated pipeline through which code could be continuously delivered and potentially deployed to production. DevOps focuses on continuous collaboration of teams. As such, the team includes members from all disciplines.

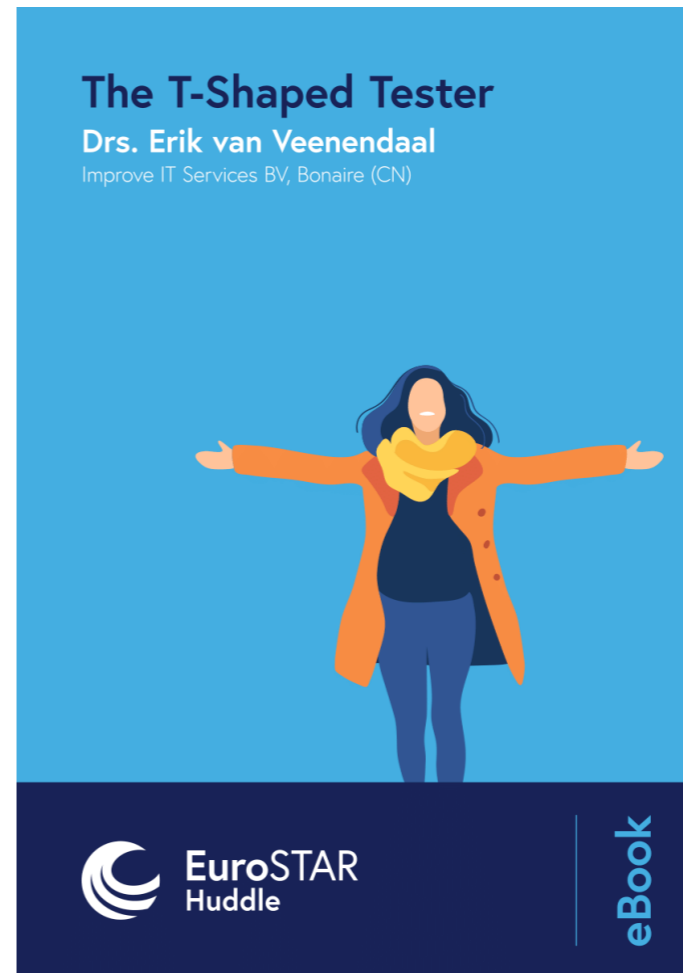
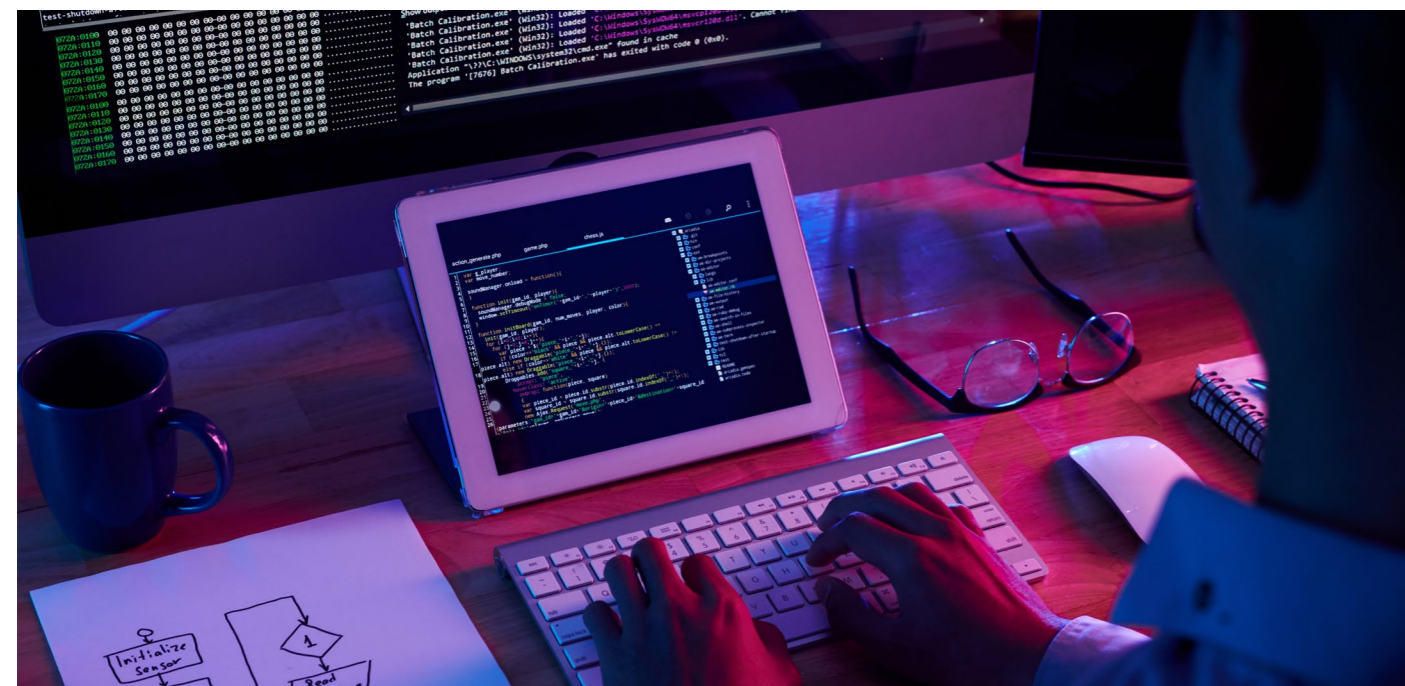
Again, the testing profession must retrofit; testers must reexamine their skill sets and mindsets to find their roles in DevOps. Test automation will be extended and enhanced through continuous testing. Depending on a tester's interests and skillset,

testers may take a specialized focus in functional test automation or in other quality attributes such as performance testing or user experience. Others may choose to become champions of the quality process, implementing requirements reviews or embedding themselves in behavior driven development.

And along with DevOps comes quality engineering, a set of people, processes and tools that transcend and transform the product lifecycle. In quality engineering, we focus on building quality in, defect prevention rather than defect detection and quality assurance becomes a technique rather than a discipline. And the entire team is responsible for quality.

Testers, practitioners of quality assurance, now must find roles in quality engineering. There are many roles in quality engineering for testers but all require a mindset shift. Testers have the opportunity to become champions of the quality throughout the development. Or they can update their skillset and become specialists in test automation, non-functional testing or user experience.

Throughout the evolutions and revolutions in approaches to software development, there remains one constant: the need for quality is more important than ever. How does team responsibility for quality impact the role of the tester? That evolution may scare some testers, yet in reality, it opens up so many possibilities. Testers can bring the testing mindset to a multitude of different roles so the question becomes how do today's testers determine their own directions?



How testers self-determine their own directions

As testers, in order to determine our future, we need to look at our skills. One approach is the to evaluate ourselves in terms of the "T-Shaped Tester". It is important to stress that becoming the "T-Shaped" tester is not necessarily the goal. The goal is to use the model as a way of assessing our skills to determine to which roles we might and might not want to aspire.

The "T-Shaped" Tester

Eric van Veenendaal, in his eBook, The T-Shaped Tester, describes the "T-Shaped" tester as one whose skills include various combinations testing knowledge, domain expertise, technical skills and soft skills. The vertical pillar is the tester's primary area of expertise; where they have the strongest skills and could be considered a specialist. This tester's horizontal bar is comprised of the remaining skill sets; the areas in which this tester is more of a generalist. Empathy, flexibility, adaptability and curiosity, especially about other disciplines, are emphasized as key horizontal skills.

It might seem as if the "T-Shaped" tester must have it all; technical expertise, contextual skills and soft skills, but in reality, what this tester needs is a balance of skills and an appreciation of and ability to work with those who are strong in different areas. This is where the curiosity and empathy come into play. Becoming a true "T-Shaped" tester takes a lot of skill development and self-awareness as well as a strong desire to learn.

The "T-shaped" tester analogy is a good starting place to assess our skills and interests; as we look at each section, we can determine where we are strongest and where we are weakest and, most importantly, where our interests lie.

If you thoroughly enjoy the domain in which you work, you might consider business analysis roles as a backup plan or even a potential move. If you love exploratory testing, thinking like the customer and finding user experience issues, you might become a UX test specialist.

One of the most important roles of a "T-Shaped" tester is that of a test champion. The test consultant or test coach manages the test process throughout the software development lifecycle. They use various shift-left approaches to implement quality engineering. The test champion must be flexible, adaptable and innovative to develop creative solutions to issues. Finally, the test consultant must be empathetic to understand the needs of both their colleagues and customers in order to influence and lead change. Often this role is entitled Quality Engineer.

Although it is always worthwhile to improve on our weaknesses, it is just as important to become even more proficient in the areas we already shine. If you are a square peg, don't force yourself into a round hole. In the long run, you will be happier, healthier and ultimately more successful.

The "I-Shaped" Tester

Dr. van Veenendaal suggests that an alternative to being a "T-Shaped" tester is to be an "I-Shaped" tester. An "I-Shaped" tester has deep knowledge in one area of expertise such as test automation or non-functional testing. In practice, "I-Shaped" testers would be in roles such as Software Developers in Test (SDETs), performance test engineers, security test engineers etc. These testers still need some level of soft skills to work collaboratively as a team member.

A test specialist is an important role and there will be lots of opportunities in the future. Test specialists must concentrate on keeping up with the latest technologies and tools in their specialties. As Jeff Atwood points out, in software development knowledge becomes rapidly obsolete; often as fast as within five years. Therefore, it is important to broaden the deep knowledge across as many relevant tools and methodologies as possible.

As a test specialist, you will work very hard to keep current in order to remain at the top of your field. Up-to-date industry knowledge becomes even more important at higher levels as become you responsible for planning the test architecture and selecting right tools to solve the issue at hand. As a test specialist at all levels, it is so important that your favorite tool doesn't become a hammer at which you swing at everything.

What are the Skills of the Testers of the Future?

Although we cannot predict the future, when we look at how the testing profession has evolved to meet the challenges of the most recent decades, we can see themes or advances in the skillsets and mindsets that have brought us, as testers, into our present-day practice and profession.

These themes suggest that testers of the future will be flexible, adaptable and empathetic. They will be willing, figuratively and sometimes, literally to walk a mile someone else's shoes, whether that is a team member, a customer or a stakeholder. They will be curious and innovative and will excel at communication and collaboration. They will use critical thinking to solve problems. They will continue to develop and evolve deep skills in testing approaches and techniques as well as embrace new trends in the practice including AI, Robotics, Security, Codeless/No Code Automation and more. They may or may not become specialists, yet they will recognize the importance of having a basic understanding of upcoming trends.

Current research collaborates those themes. As documented in Practitest's State of Testing Report 2022, Joel Montvelisky and Lalit Bhamare found that the largest number of responders, when asked to rate testing skills and knowledge needed to succeed, gave the "Very Important" rating to Communications Skills (81%), API testing (65%), General Test Methodologies (62%) and Web Technologies and testing (60%). Further they found that the desired skills, knowledge and experience for which hiring managers are looking is a balance of soft skills (30%), technical skills (35%) and testing experience (35%).

Who are the Testers of the Future?

Peter Varhol, in his presentation, "Careers in Transition", suggested that the Tester of the Future will be a "Flexible Generalist". He described a "Flexible Generalist" as someone who doesn't necessarily know the answer, but who can very quickly find the answer, even though it may not be in their area of expertise and apply it to the problem at hand."

Joel Montveliski and Lalit Bhamare, in Practitest's State of Testing Report 2022, suggest that "a tester was and continues to be the equivalent of a Swiss army knife for his or her team. This means that we need to have a combination of skills that will serve our needs depending on the challenge being thrown at us."

We all have the potential to be the Testers of the Future whether we are "T-Shaped" or "I-Shaped", a "Flexible Generalist", a "Swiss Army Knife" or some combination of these. In fact, Developers, DevOps Professionals, Business Analysts and User Experience professionals as they embrace quality as their own responsibility will, in some ways, become testers of the future.

The Testers of the Future, whether their titles reflect tester, QA, QE or a totally different discipline, will apply their testing skills and mindset to whatever role they may be embracing, championing quality and the customer in all they do.



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TMMi, the world standard for Test Process Improvement



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TMMi is a well-known and world-wide most used framework [1] for improving test processes. Using the TMMi one can measure the maturity of test processes and derive recommendation for improving these processes. Much TMMi information, including an abstract of the model is, with the publication of the Pequeño TMMi [2], now also available in Spanish. The publication of this new Spanish (e)-book is a good enough reason for the Spanish testing and quality community to look more in detail into the TMMi model, how it can be used, the benefits that can be achieved and how one can get involved in TMMi initiative.

Test Maturity Model integration (TMMi)

The TMMi framework has been developed by the TMMi Foundation as a guideline and reference framework for test process improvement, addressing test related issues important to test managers, test engineers, developers and software quality professionals.

Testing as defined within TMMi in its broadest sense to encompass all software product quality-related activities. TMMi uses the concept of maturity levels for process evaluation and improvement. Furthermore, process areas, goals and practices are identified.

Practical experiences are positive and show that TMMi supports the process of establishing a more effective and efficient test process. The world-wide TMMi user survey revealed that a high 88% of the TMMi users are experiencing benefits in product quality e.g., reduced product risks, and test efficiency (77%), e.g., increased testing productivity. [3] TMMi has been developed to support organizations with evaluating and improving their test processes.

Terminology

TMMi is aligned with international testing standards, and the syllabi and terminology of the International Software Testing Qualifications Board (ISTQB). The TMMi Foundation has consciously not introduced new or their own terminology but re-uses the ISTQB terminology. This is an advantage for all those test professionals who are ISTQB certified (more than 800.000 worldwide at the time of this writing). TMMi is an objective- and business-driven model. Testing is never an activity on its own. By introducing the process area Test Policy and Goals already at TMMi level 2, testing becomes aligned with organizational and quality objectives early in the improvement

model. It should be clear to all stakeholders why there is a need to improve and what is the business case behind this initiative.

Architecture

TMMi has a staged architecture for process improvement. It contains stages or levels through which an organization passes as its testing process evolves from one that is ad hoc and unmanaged to one that is managed, defined, measured, and continuously being optimized. Achieving a maturity implies that all goals of that level have been achieved and the achieved improvements are again the foundation for the next step. The internal structure of TMMi is rich in testing practices that can be learned and applied in a systematic way to support a quality testing process to be improved in incremental steps. There are five levels in TMMi that prescribe the maturity hierarchy and the evolutionary path to test process improvement. Each level has a set of process areas that an organization must implement to achieve maturity at that level. The process areas for each maturity level of TMMi are shown in Figure 1.

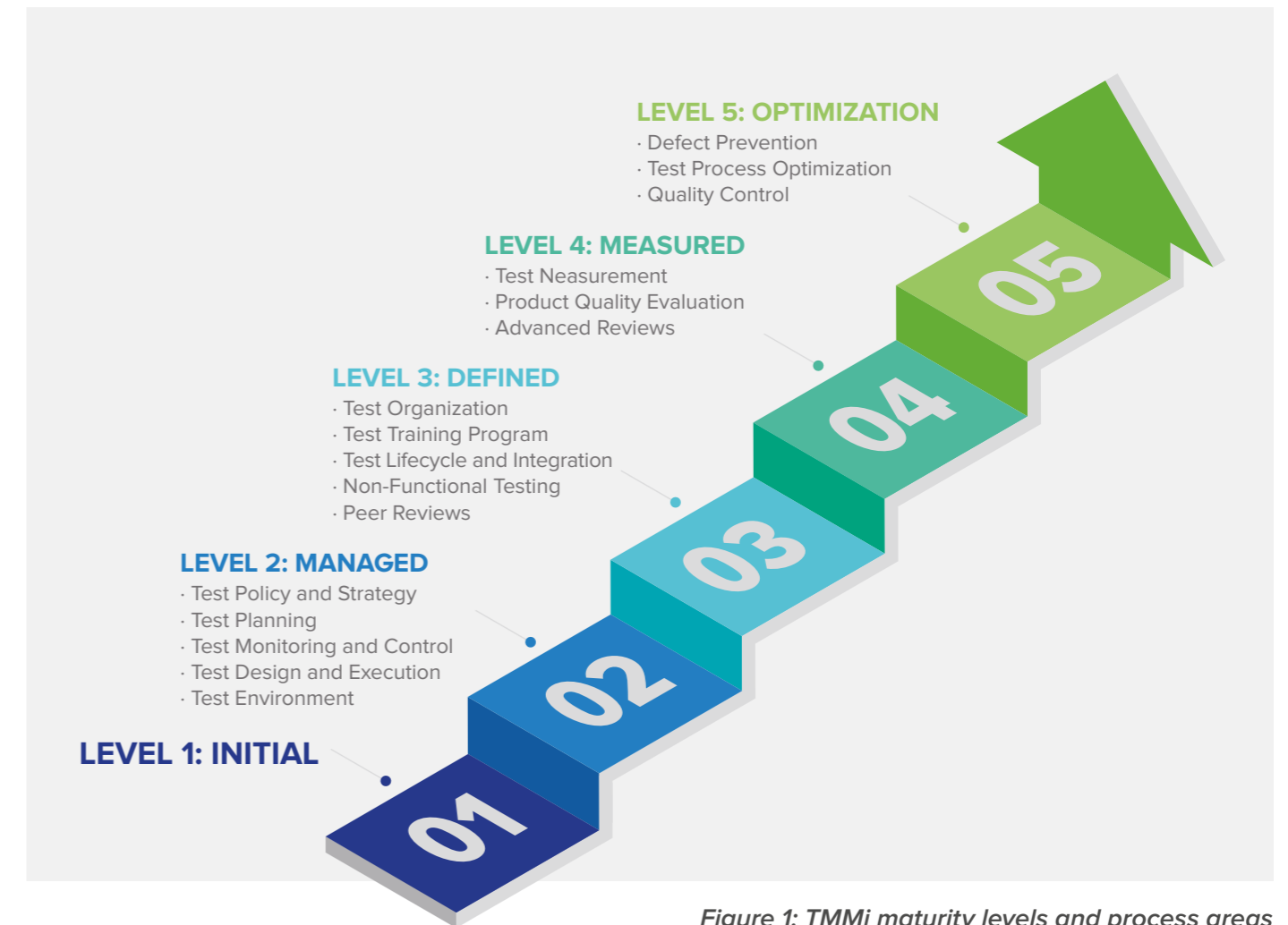


Figure 1: TMMi maturity levels and process areas

Lifecycle models

A main underlying principle of the TMMi is that it is a generic model applicable to various life cycle models and domains. Goals and practices as defined by the TMMi have shown to be applicable with both sequential and iterative life-cycle models, including Agile. Note that within TMMi, only the goals are mandatory, the practices are not. TMMi is freely available on the web site of the TMMi Foundation (www.tmmi.org). The model has amongst others been translated in Spanish, French and Chinese. TMMi is also available in published book format [4], [5].

Assessments

Aligned with TMMi model, the TMMi foundation published the TMMi Assessment Method Application Requirements (TAMAR) defining the requirements for TMMi assessment methods. Within TAMAR two types of TMMi assessments are defined: formal and informal. Formal assessments are used to formally rate (parts of) an organization on a certain TMMi level. Informal assessments are less rigorous, take less time and you can't rate the maturity level of an organization. In practice many organizations perform so-called quick scans to get an indication of the test maturity for certain process areas and identify recommendations.

TMMi Documents

In addition the TMMi reference model and TAMAR, the TMMi foundation has published many useful documents, all freely available on the TMMi website: www.tmmi.org, for example:

- TMMi in the Agile World, how to use TMMi in an Agile context.
- TMMi and DevOps, how TMMi can support a DevOps implementation.
- TMMi Professional training syllabus which forms the basis for the TMMi Professional model training and subsequent examination.

All these documents can be downloaded from <https://www.tmmi.org/tmmi-documents/>.

How to use TMMi

With TMMi, organizations can have their test processes objectively evaluated by accredited (lead) assessors, improve their test processes, and even have their test processes and organization formally certified



when they comply with the requirements. At the time of writing 220 organizations are formally certified worldwide. However, it is generally considered that the number of informal assessments performed and user of the TMMi model is much higher. Assessors are stating to do many more informal assessments and quick scans compared to formal assessments. Unfortunately, numbers for this statement are still missing.

Body of knowledge

TMMi can be used for much more than just for assessments purpose. Most organizations are using TMMi for their internal test improvement process and do not even care about certification. At a closer look the TMMi model it is a very well-structured set of goals, practices and elaborations. The knowledge of many well know test specialists are incorporated in the model. Test professionals can use this body of knowledge by determining what they want to improve and use the TMMi model to identify useful practices on how to implement and achieve these improvement goals. [6]

TMMi Professional

It's also possible for test professionals and consultant to become certified for their TMMi knowledge. A full certification scheme is available called TMMi Professional. This way consultants can show their knowledge of test process improvement in general and TMMi in particular. They can distinguish themselves this way in the marketplace.

Benefits and adoption of TMMi

All in all, TMMi is perceived as a complete and useful set of tangible assets that can be used in different ways for test process improvement. But how about the adoption of TMMi. In this context the TMMi Foundation has published different figures and facts. At the time of writing this article almost 1500 professionals have been certified, the TMMi foundation has over 2700 members, there are 27 local chapters and, as already mentioned, 220 organizations have been formally certified against the model. And all numbers are rising! In 2021 the number of formal TMMi assessment has shown a growth rate of 39% and the number of TMMi professional exams grew with 7%. [1]

IEEE uptake study

There has also been research, published in IEEE Software, concerning the uptake of test process improvement models [1]. Based on this research the conclusion can be drawn that TMMi (including its predecessor TMM) is today by far the mostly used model for test process improvement. Recently a paper has been published in IEEE dedicated to TMMi only, thereby showing the importance and acceptance of TMMi in the (scientific) software quality and testing community [7].

TMMi Survey

Today there is more evidence that implementing TMMi is beneficial for organizations. In 2021 the TMMi Foundation and some university researchers

designed and conducted an international user survey [8]. All previously TMMi assessed organizations were invited. A high return rate of 64% resulted in a confidence level of 85% meaning that the real value is within about 5% of measured value.

The survey revealed the three reasons to start a TMMi implementation are: 1) to enhance software quality, 2) to increase testing productivity and 3) to reduce product risk.

The top reported benefits using TMMi are (see figure 2) 1) enhanced product quality: 88% (including reduce product risk, 2) Enhanced compliance: 84%, 3) Enhanced efficiency: 77% and 4) enhanced people aspect: 77%.

Another interesting outcome is the agile adoption amongst the TMMi user. 78% of the TMMi users are using TMMi in an Agile setting.

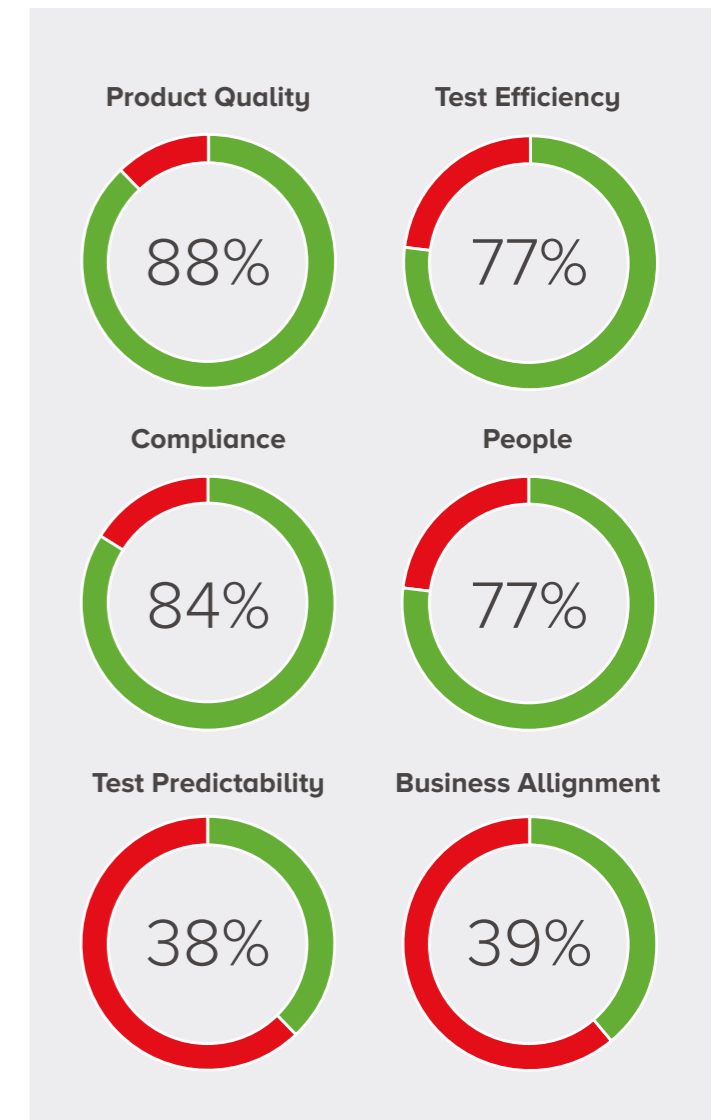


Figure 2: Ration of respondents which reported different benefits of adopting TMMi



Getting involved in TMMi

One can draw the conclusion that TMMi is not only a complete and useful model for assessing and improving test processes, but today there is also verified evidence that implementing TMMi adds value to the organizations using it. This brings us to the last question: how to become a part of the TMMi community. The first way is to use the model where it is made for: improving your test process! As mentioned the model and all the other TMMi documents are freely downloadable from the TMMi website www.tmmi.org.

In case you don't want an assessor or consultant helping you, use it in a more context driven way to improve your own processes! [6]. But of course, you can ask for support from a TMMi assessor or consultant. The accredited (lead) assessors, certified test process improvers and training providers are all listed on the TMMi website. And of course, you can also become an accredited (lead) assessor, certified test process improver or training provider.

Finally, you can also become active in the TMMi Foundation, there are different working groups active to improve TMMi and developed more useful TMMi assets.

Spanish TMMi Local Chapter

But maybe the best way to start getting involved with TMMi for you is to contact the Spanish TMMi chapter (the local representation for the TMMi Foundation).

More information see <https://www.qaspain.es/>. Or buy and read Pequeño TMMi – Mejora del Proceso de Prueba Guiada por Objetivos [2].



About the authors



Jan Jaap Cannegieter has over 25 years of experience in ICT, he did assignments in requirements, testing, quality assurance, process improvement, Agile transformation and digitalization. Jan Jaap is Principal Consultant at Squerist, a consultancy company of 100 employees specialized in process management and testing. Jan Jaap is consultant at different clients of Squerist. Jan Jaap is the well-known author of several articles and books in the Netherlands and is a regular (keynote) speaker and workshop leader on international conferences. You can contact Jan Jaap via LinkedIn:

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Eur3ka: Manufacturing as a Service Network for Fast Pandemic Reaction



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About the project:

The Eur3ka - European Vital Medical Supplies and Equipment Resilient and Reliable Repurposing Manufacturing as a Service Network for fast Pandemic Reaction - will be repurposing the manufacturing for vital medical supplies and equipment. Enhancing personal skills, new industrial value chains, service innovation, technological innovation, innovation methodologies, process innovation to fight Pandemics like Covid 19.

Eur3ka will deliver a trusted and unique capability to plug and collectively respond to a sudden increase in demand in a coordinated and effective manner at an unprecedented scale.

Eur3ka's vision builds on and accelerates current digital transformation industry4.0 efforts, as well as flexible regulations and tailored workforce re-/up-skilling.

One measure that can be observed across industries and countries is companies repurposing their production and R&D capabilities to support the fight against COVID-19. For example, luxury brands are switching production lines from producing perfume to making hand sanitizer, industrial companies are making hygienic masks, luxury hotels are becoming quarantine centres, distilleries are creating disinfecting alcohol, and automotive companies are evaluating options to producing urgently needed medical devices such as ventilators.

Project's Mission:

Eur3ka's mission is to bring together most recent R&D results in:

- Industry 4.0 standards, open automation modular manufacturing production line enablers;
- Industrial international common data space enablers and digital infrastructures;
- Global on-demand and manufacturing as a service platform;
- Connected and smarter supply networks and global medical supplies and equipment repositories;
- The vibrant European and Global network of manufacturing DIH network innovation services and open experimental facilities.

Outcomes of the Project:

A Plug & Respond (P&R) repurposing resource coordination framework for pandemic crisis response.

A common open standardized modular manufacturing reference architecture and solutions.

Top digitally sovereign cross-sectorial manufacturing networks and capacities.

To validate the outcomes and technologies of the project, Eur3ka pilots are being conducted by project partners in various industries and countries.

Trial 1: Fast deployment of an automated line for COVID-19 PCR Testing.

Trial 2: The experiment's Test Bed is the repurposing of SEAC's diving FF (Full-Face) mask into a medical FF mask.

Trial 3: Enable the repurposing of low cost 3D printers into a decentralized crowd production setup by providing the right platform to makers to achieve such crowd production successfully.

Trial 4: How to innovate and digitalise factories with the aim to support sudden demand peaks of Vital Medical Supplies and Equipment (PPE/CCE), pointing out the main sources to identify competencies related to repurposing and data management skills provision and to take into account existing analyses dealing with the same topic.

Testing experiences: Inspiring trajectories in the world of Testing



Daniel Nilsson
Senior test consultant
at Quality Minds,
Sweden

Daniel Nilsson is a software testing professional with over 20 years of experience within software testing of complex system. He has mainly worked with embedded software in the automotive industry, assisting several large global automotive companies in their work with increasing the quality mindset within the organizations.

Last October 2022, Daniel was one of the speakers at the QA&TEST conference. During his talk, he showed what the main challenges are in testing AI based system compared to traditional system. His great work and contribution, allowing those who attended his talk to return to their organizations with a lot of new ideas and knowledge, made him deserve the award for the best speaker at the conference.

1. What experience do you have in the Testing world?

I have been working in the software testing field for almost 20 years, mainly within the automotive industry. During the last 5 years I have been working with verification strategies for Advanced Driver Assistance System (ADAS) and Autonomous Driving (AD).

2. Why did you decide to be a tester?

I did my master thesis at Volvo Technology where I did some research on Test automation on in-vehicle system and got into a team of very dedicated testers. I immediately felt that testing was something for me, I enjoyed that I could use my curiosity, that I could challenge the software and the systems and that I could use the reasoning in the detective work to understand how, why and when the software didn't behave as expected. I was triggered by the challenge that I had to be a step ahead of the programmers and that I as a tester had to be a little bit smarter to find out the limitations.



3. What do you do to keep updated?

With the speed that the technology is evolving these days it is really important for me to make sure that I am up to date. I try and go to several international test conferences every year, preferably on site, maybe not so much for the conference program every time as much as for the discussions and interactions with other test professionals from different countries, different domains, and different companies. I have a daily procedure where I try and invest some time in my own professional development, just 15 minutes or so on a challenge or digesting new information. It can be a puzzle, making an improvement in my ongoing test project, a programming exercise or just reading a test blog or test article.

4. Which was your most difficult project / job? And why?

I worked for a supplier in the automotive industry recently as part of an architect/technical sales team. We were designing and discussing system solutions for autonomous vehicle systems and features with potential customers. My role was as Verification and Validation architect. In that role I had to create

verification strategies for systems that did not exist yet, for technologies where test methods and verification strategies were only available on research tables and at the end, I had to make an argumentation for that they are correct and complete. That was a tough role that often put me in exposed situations, but also a role where I benefited greatly from my curiosity and willingness to learn new things.

5. What good testing practices do you think organizations should adopt?

The biggest problem that I see in the companies that I have been working at is the lack of (relevant) testing strategies. Also, they invest in testing as an activity but not necessarily in the testing craftsmanship and it is hard to get any quality or value out of the activity if

you don't do that. Test is about gathering information to answer different questions, these questions will differ depending on several different aspects, for instance test objectives, software maturity, quality ambitions, system safety levels etc. To get as much value as possible from the test activities they need to be adopted to these different aspects.

With a strategy I don't necessarily mean a big, tedious document that no one reads but rather in the form that is easily conveyed and easy for the recipient to absorb. The quality of the testing and the value of the output will be heavily improved if each member can not only understand the test objectives but also themselves argue for why a certain test method or a certain test technique is most suited for the work that they are doing.

Similar to that I would expect let's say the programmer to be able to argue for why a certain programming language has been selected for a certain part of the product.

6. What suggestions would you give to somebody who wants to start in this world?

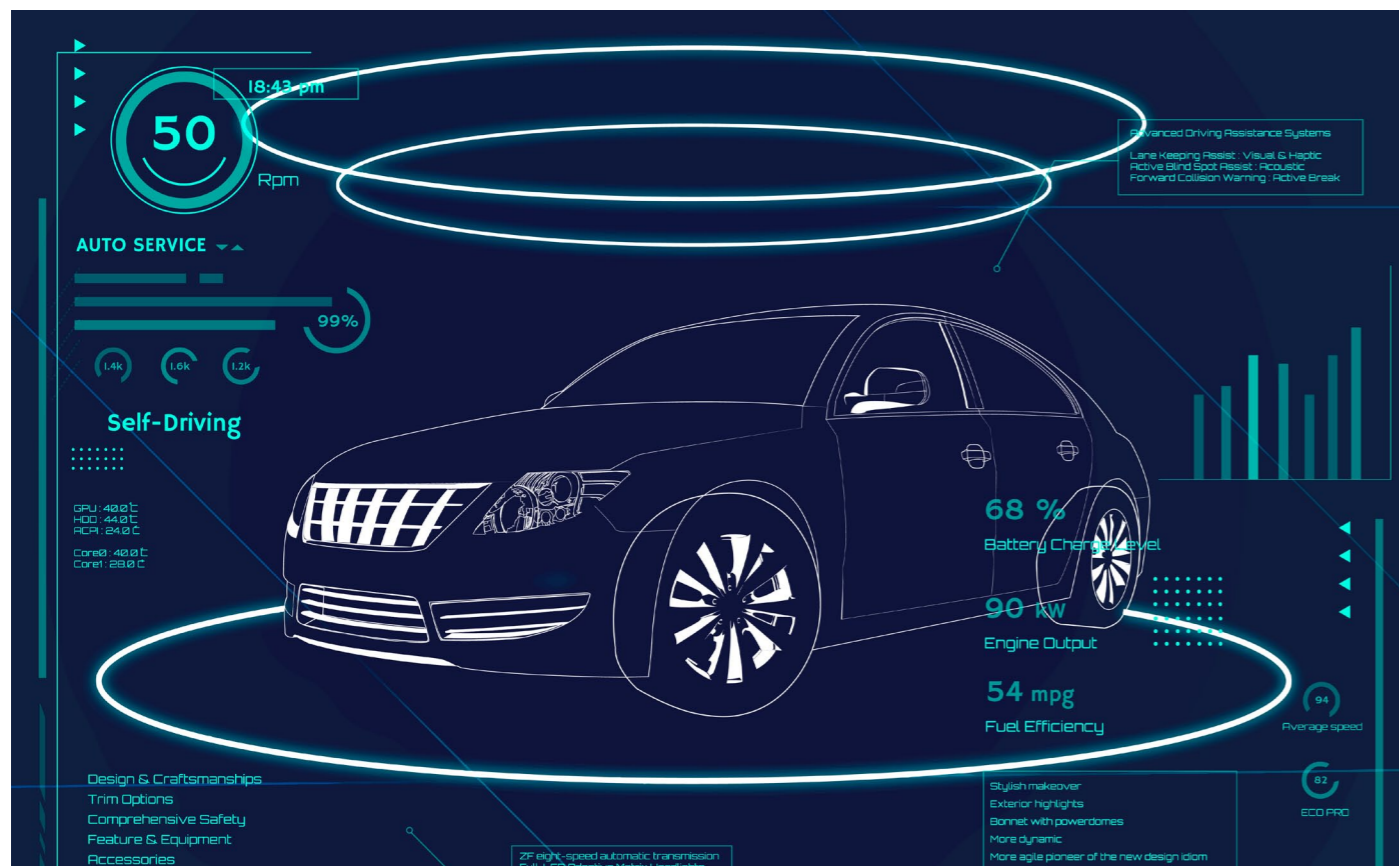
Stay curious, ask questions, and make sure to bring your quality mindset, it is of course important in any (new) role to be curious and ask questions but especially as a tester since these are two of the most valuable tools or skills in the tester's toolbox. If you can master them then your future as a tester is bright.

7. What 3 people from the testing world do you admire / follow?

The one that I follow the most but that I have actually never met is Philip Koopman, associate professor at Carnegie Mellon University, USA. He is sharing a lot from his lectures in embedded system software in general but for me I am especially interested in what he shares regarding Automated Vehicle Safety.

I have met and listened to Tariq King at several conferences and in my mind, he is one of the most interesting and inspiring within the testing field at the moment. He was running the test.ai up until just recently and has a lot of interesting talks, ideas and activities around test and AI that he is happily sharing.

As a third I will pick my favorite QA and Test, Bilbao speaker, Paul Derckx. I met him for the first time in 2014 and listened to his talk at the QA and Test conference and I still remember that I brought with me home new ideas about structuring and sorting tests for configurability. Luckily Paul has been on the program every year that I have visited the QA and test conference. This year I found his talk especially



QA&TEST Bilbao, where the software testing and quality community meets every year



On October 19, 20 and 21, Bilbao became the center of the software testing and quality industry, with the celebration of the 21st edition of the international conference on testing and software quality for embedded systems, QA&TEST organized by SQS.

The conference, which was able to return to presentality recovering its essence and the advantages of direct contact with other attendees and speakers, brought together developers and testers from all over the world, who can have first-hand access to the latest methodologies, techniques and tools to face the changing challenges that the world of software development and testing presents.

Software engineering has changed radically, while the consequences of software bugs and vulnerabilities are increasingly visible. From ransomware attacks or computer outages to electronic device problems or data leaks that have affected some of the largest multinationals and millions of customers around the world. Such is its importance that, according to the Consortium for Information and Software Quality (CISQ), a non-profit organization that develops international software quality standards, the total cost of poor software quality exceeds 2 billion euros a year.

As technologies advance, the number of digitized devices grows with embedded systems found everywhere from microprocessors to transportation management systems, increasing the potential risk. To

talk about it, professionals such as Udy Hershkovitz, an expert in the development of embedded security systems, and Ariel Cymberknoh, head of a team of more than 100 engineers in charge of validating the software of a large number of products, participated on behalf of the technology giant Intel. Meanwhile, ERNI, the Swiss software design and development company, showed the keys to automate tests for medical devices.

As we can see, with this small sample of the QA&TEST programme, all sectors were represented at the conference: railways, electronics, air navigation, telecommunications or the pharmaceutical and medical industry, among many others.

As we can see, to help reduce the risks in this constantly growing sector, the QA&TEST programme puts on the table currently very important issues such as test automation, application development, cybersecurity, new trends such as low code or testing new technologies such as Artificial Intelligence, the Internet of Things and Quantum Computing.

Likewise, in view of the energy crisis, it was decided to dedicate a specific track to energy consumption and how to test its efficiency to build much more sustainable systems.

The ultimate goal of QA&TEST is for companies to improve the quality of their software while reducing the costs of correcting errors and their maintenance and, in that sense, conferences like this one are essential.

interesting with how they started using AI as support in the test of medical devices at Philips Healthcare.

8. And what are the most topical topics at the moment for you?

In general, it is test of AI or AI for test and more specific if it is part of a safety critical device or system. What information do we need to gather to be able to argue for that the system is safe to use and then how do we plan and structure our testing to gather the needed information.

9. How do you see the world of Testing in 5 years?

Some tasks might change but in general I don't think there will be so much different. I went on my first testing conference, Eurostar, in 2004 and the main discussions at that time was whether there would be any need for testers in the coming years since test automation would take over. The same discussions have been going on since then, and most likely before as well, so I don't expect any revolution or any decrease in the need of testers.

On other levels I see that the tester mindset will be useful in new areas, as mentioned I my talk at the QA and Test conference 2022, for instance in designing datasets for training and validation of AI based system.

10. Tell us what was the most interesting anecdote that happened to you in your professional career

When working as a tester at an automotive company some years ago we used to have integration events

every 6 weeks or so when the different Sw/Hw/System suppliers brought in their latest releases and it was all integrated together with the OEM, the number of defects grew exponentially for each event. The project manager for the complete sub-system in the vehicle started to get frustrated so at one of the events when we were getting closer to launch, he informed all the testers that in that specific integration event focus was on closing defects and NO new defects were allowed to be opened. All the testers were "loyal to the organization" and followed order so at the end of the event two weeks later the project manager was standing on stage, in front of everyone, showing a nice graph with a declining curve of defects.

The message was that we had finally stopped the bleeding, the defect trend was broken, the project was saved, and we would be able to launch on time. Monday morning, the first working day after the integration event, all testers picked up their notebooks and started to add all their sightings from the event the previous two weeks and suddenly the defect curve was steeper than ever.

The project manager somehow could not understand what had happened.

This story has so many angles for me, not only poor leadership or risks with driving projects or quality based on numbers rather than content, but also shows how crucial a functional working culture is.





BAIDATA

INTERNATIONAL DATA
SPACES ASSOCIATION

CONNECT TO THE DATA ECONOMY

BAIDATA, the first association to drive Spain and Portugal's leadership in data sovereignty and the data economy

The world is changing at an incredible speed and a good example of this is the use of Big Data and Artificial Intelligence, which is beginning to transform societies and revolutionise the industry across all its sectors. In the past, these tools were just another mean for companies to improve their productivity. Today, however, it has become a necessity, without which companies are left behind.

The generation of quality data and its sovereign use is the building block of this reality. And that is where BAIDATA comes in, the first association aimed at fostering the public-private leadership of Spain and Portugal in the data economy. To this end, it has created a community with the aim of joining efforts and actors with whom to develop pilot actions and training, promotion, evaluation, counselling, and internationalization activities around the sovereign use of data.

BAIDATA is an initiative promoted by the International Data Spaces Association (IDSA), a leading European organization for the development of data spaces, that has made its resources, models, technologies and knowledge available to interested entities so that companies and institutions can share their data in a secure, trustworthy and sovereign manner, through them. All this with the ultimate goal of building a common European data space, such is the commitment of the EU institutions and its Member States in this regard. In this sense, BAIDATA aims to help Spanish and Portuguese organizations to be the first to join the data spaces and learn how to benefit from them.



A year into its existence, BAIDATA has already 40 members committed to the development of data spaces and one of the main objectives of the association has been to train professionals for these future data spaces, which has been a complete success. So far, more than a hundred professionals from close to 25 companies have had the opportunity to take part in the two editions of its training program, which is made up of modules related to the Fundamentals of Data Spaces at an international level where they have been able to train in the IDSA reference model and its main assets.

Likewise, BAIDATA has sought to bring together different organisations to set up pilot actions and use cases, as well as to discover the key factors for the development of data spaces in the different sectors. In this sense, after interacting with various clusters, associations and more than 4,000 companies, the initiative has managed to identify up to 34 challenges and needs in fields such as the automotive sector, logistics and transport, digital technologies or the distribution and supply chains sector, which has led to the launch of 3 working groups (Tourism and Smart Cities, Industry 4.0 and Automotive, and Mobility 4.0 and Logistics) to accelerate the development of new chains and data ecosystems in these sectors. In the meantime, since the launch of the project, 5 pilot projects have been carried out and also the development of an embryonic data spaces in the sociosanitary sector led by the public administration, through the Provincial Council of Bizkaia, as well as progress in relation to another one linked to the energy sector.

BAIDATA offers a unique opportunity for companies in Spain and Portugal that wish to connect their business to the data economy, through the development of infrastructures to have secure and controlled data spaces, training, dynamization activities and much more.



We recommend you:

This section aims to be a living one, a section that grows and accommodates the numerous initiatives in the world of testing and QA that are being developed in the world and that may be of interest to our community.

We are looking forward to reading your proposals and sharing them in this publication!

[Send your recommendation](#)

BOOKS

**The little TMMi:
Objective-Driven Test Process
Improvement**
Erik Van Veenendaal, Jan Jaap Cannegieter



How Can I Test This?
Nicola Lindgren, Mike Harris, Suman Bala,
Philip Wong, Shawn Shaligram

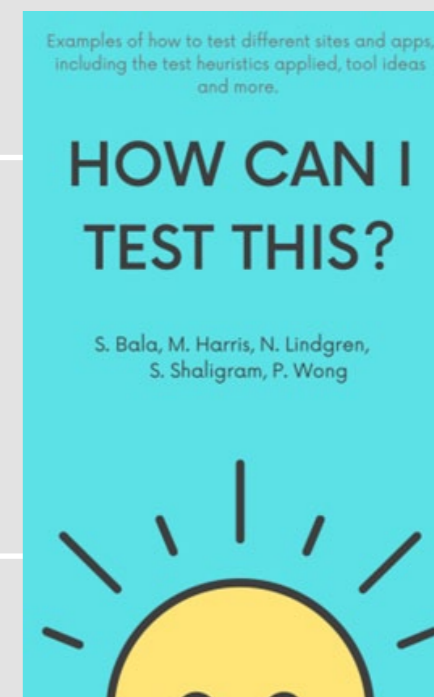
Examples of how to test different sites and apps, along with the test heuristics applied, the reasoning and tool ideas.

This book puts examples at the forefront.

Instead of test theory being front and centre, with maybe an example or two if you're lucky, this book makes examples the focus.

We'll share the examples that need to be tested, test heuristics to apply, any assumptions, how we would limit scope, test ideas and tools we would utilise.

<https://leanpub.com/howcanitestthis>



We recommend you:

Podcast

Coaching for Quality: How to Inflict Help & Change Perspective (The People Behind Your Favorite Apps)

When coaching software teams, it's easy to bark orders and tell people what they're doing wrong.

But if you want to foster creativity and positive output, try asking: What problem are you trying to solve?

People are incredibly talented; what they often lack is perspective.

A lesson Vernon Richards, Quality Coach and Founder of Abode of Quality, is here to teach alongside conversation on the proper time to start looking for quality in the software development life cycle.

<https://podcasts.apple.com/us/podcast/coaching-for-quality-how-to-inflict-help-change-perspective/id1614310667?i=1000560452761>



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