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Addressing Limitations, Uncertainty & Challenges of Testing and its Future Orientation

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ABSTRACT

This paper predominantly is trying to address or bring out the hardware and software issues, uncertainties, challenges faced by today's user community, governance, process, certification, environment, technology; and how these issues, uncertainties, challenges can b addressed by the testing community thereby enhancing and adding values to the product, company and end users.

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INTRODUCTION

There are various forms of testing depending on the entity of the testing like hardware, software, product which is combination of both hardware and software etc. To put it simply testing means identification of defects or faults. Limitation here means lack of capacity, uncertainty means something which is unknown, challenges here means expression of defiance. The act of testing leads to a usable, stable, reliable, secure, interoperable, compatible, and maintainable product. Some of the testing limitations, uncertainty, challenges are complete or exhaustive testing is not possible, typical issues of constraints like schedule and cost, not sure of zero defects etc. the objective of this paper is to understand the quality, priority, importance , necessity of testing any product with the dependency of process, governance, certification, environment and technological advancements and developments. Each of the parameters or attributes like quality, priority, importance, and necessity of product can be classified in to varying terms like packaging, marketing, advertising, sales, supply chain etc. This paper shall limit to the understanding of testing from an end user's perspective and expectations.

II. Influence of Qualit:y

Quality = f(S,T,C); where S stands for Scope, T for time and C for Cost:

This definition also varies from end user to user based on his expectation and perception, but what is the real role of various bodies like process and certifications over quality, there are various definitions available in various forms depending on the selection of process and certifications. The question here is does the process or certifications selected based on some tested results. Who really validates and verifies the process and certification body on the various parameters of conformance, reliable, applicable, compatible, efficient and usable. The final end result is a compromise on the quality of the product. What we observe today is experimentation of the products on end users. If this is the case what is the role of governance on quality? This question can be directly opposed and supported with various laws like consumer laws etc. in various countries, but what we need to understand is it's a reactive approach; we need to have preventive approach to not to cause mass damage to the end users. Preventive approach here means need to have proper efficient and functioning of accreditation bodies who takes accountability in cases of negative consequences; this is possible only by means of sustenance of properly trained appropriate humans in their respective areas and field. Need to have a correct mindset of properly balancing the validation and verification procedures with both mechanical and automation means. Automation does not means we need less testers, to create automation you need more testers, as to automate you need more efforts and

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these efforts keeps increasing exponentially in an ever changing world of software changes as desired by the current industry.

To name some incidence of Quality, you just buy an USB stick or Memory card or USB MP3 Player for instance. Assume that after a period of usage say one month suddenly the product stops working due to whatever reasons. Is this an expected behavior? Who has to be blamed for this behavior? This has become a normal pattern in common End Users Life. This way we can give numerous examples of product quality, this directly relates to the level and quantum of testing performed based on the parameters of cost, time and scope. On the contrary is there any product that tells you, take this product and it will operate as promised for a minimum duration of time and instead of warranty they provide a guarantee for the same stipulated period of time. Once again here the product quality is attributed with the manufactures interest and not with that of end users interest. Products are supposed to be made based on some standards, but what about the violations of standards ? How does the standards violated product entered in to the market, where is the role of regulatory body to prevent these scenarios, when and how do we test these violations? No what is the impact of non standard products impact on environment and society, how and when are these measured, whose role and responsibility is it to perform these work.

Impact on Quality $\propto$ F(Environment, Society);
Impact on Society $\propto$ F(Business);
Impact on Environment $\propto$ F(Living Forms, Resources);
Impact on Living forms $\propto$ F(Human, Animals, Plants, Matter);

Based on the above factors Impact on quality is directly related to Environment, Society, Business and Living forms.

The areas to be strengthen from the quality angle is once the product is ready for shipment what is the procedure to enter the market namely the ENTRY BARRIERS need to strengthen , may be there needs to be a strict conformance to standards, measurement of impact on Environment, Society by a good governing body who in turn validate and verify based on the important criterias needed for Environment and society there by creating and enhancing the roles and responsibility of testers.

There are many requirements which are tacit implies that they are implicit and no need to explicity state it, the biggest challenges in product development is arriving at an correct level of tacit requirements and testing the same, here testers cannot take a reactive approach and not colloborate in the analysis of requirements, this is a very hard call as testers involvement is much needed in arriving of tacit requirements. If we analyze any system and identify the root causes of defect, mainly we find that requirements missed out as a major category of analysis, the need of hour is that the testers priority and understanding of the scenarios in terms of priority plays a vital role there by a way to clearly enhancing the value chain of the testers.

To give some examples with mobile phone scenarios, people drive their vehicles and simulaneously talk using mobile phones and we have witnessed numerous incidence of accidents cause of this behavior, this is a classical example of end user priorityas to what he wants to do, but isnt it the systems responsibility to define the priorities level of multitasking or the testers who test the system also would have also encountered such situations in any of their types of testing, but it remains to see that it has become an area of unknown unknowns. It has become very difficult and challenge for testers as well as developers to understand and arrive at such tacit requirements.

Any product making starts with Idea conceptualization, once the idea is finalized then a whole lot of priorities are defined as to which idea needs to take importance and which needs to be dropped, so here when we talk about idea finalization it needs to be arrived at based on some qualitative or quantitative data, and anything to do with data testers play an vital important role at arriving at the data. Hence testers need to shift their priorities to identify , realize and contribute to product making by identifying the various areas of value chain and making significant contribution so to help in arriving at an informed decisions.

III.Influence of Importance:

Importance here in this context applies to the tester's action plan. What do the testers test? Generally the testers test whatever we ask them do, i.e. whatever is the organization defined process. More specifically the tester is an employee of some organization and he or she needs to follow the organization or self-allotted KPI's or in other words he needs to align to the organization directions. In general the old school of thought as per the software defined process it shall be either "waterfall" or some "incremental process followed with Dissection, blueprinting, construction and check. Similarly development of product has its own life cycle. With the advent of latest processes like agile etc. organizations are moving towards newer way of execution and development strategies. But the problem of what is important has never changed i.e. the concepts of requirements, design and testing still remains the same. For instance think about some of the following problems like In UCLA [1], after exposing the children to electronic screen it was identified that children's have problems with understanding emotions. Digital media has many benefits but it cannot be at the event of social skills.2hrs watching of television by kids at risk of BP.The cartoon channels broad casted are mostly involved with violence and usage of weapons and the kids watch the same and repeat the similar incidences

in day today life. So if you compare this what forms of testing is needed to address this type of problems, the contents need to be properly scrutinized and tested with an act of social responsibility. Our day today testers need to employ or get in to different types of testing instead using the humans as test beds. The testers perform various testing like usability, Integration but these are limited to the domain of functionality, how about integrating the domains of testing human impacts.

IV.Influence of Necessity:

The biggest problem faced by the end users in the current digital and social networking world is privacy issues. This issue has tight bindings with political, law, ethical and cultural practices, any personal information needs to be protected, today lots of personal information and adult content gets uploaded in to website without the knowledge of the end user. This can be simply closed by saying that these are not part of requirements and we testers don't do this testing, but as informed earlier these are old school of thought as systems become complex and information processing changes its shape, it's absolutely necessary to adapt and align to those changes. Now these are typically falls under the domain of usability testing, usability engineering and requirements are new emerging areas but these can easily fall under legal and regulatory requirements as well, if so what are the roles of testing department to not to miss-out or ignore these type of issues, this can be a major area and very much challenging for testers to keep up their involvement in value chain of product development.

There are other privacy issues linking to online banking where the different stakeholders have access to the end users credit information, also the same is the case with personal data management and e-commerce transactions as well where the severity of the information is very high and this calls for very high security, as is the case the challenge for testers is to find out if they can break this security so that the systems can be made more secure and no information is lost in the field and production environments.

The challenges for testers are manifold with technologies like big Data; ubiquitous computing where the importance is only given to personal data and the challenge here is only the absolutely necessary or defined personal data only is captured as these data may reveal tracking of individual personality's behaviors and patterns which is big invasion of their privacy.

V.Influence of Technology:

(Proceedings of the World Congress on Engineering and Computer Science, 2009) user Interaction is the buzz word of the current industry and if goal is to reduce frustrations of end users there by achieving change in levels of satisfaction then the call of the hour is to focus on designs that are user focused, if this is the agenda how the testers can participate in achieving the goals needs a re-orientation from the conventional ways of testing and moving towards adapting the newer technologies and its limitations.

It is a well-known fact that any new technology will have some impacts on the environment. Hence testers have a major role in understanding the purpose of new technology and their adverse negative factors impacting the environment. We have already witnessed the major impacts of environment by means of poorly designed interfaces that lead to ThreeMileIsland accident, aviation sector witnessing accidents because of non-standard hardware's and controls. Hence the testers view of thinking needs to change from the conventional way of testing to identifying problematic areas that are being exploited by technology there by adversely impacting human lives. This is very big challenge to change the way of thinking from the conventional way to a disruptive way there by changing the conventional roles and responsibilities of testing.

VII. Conclusion:

This paper articulates various influencing parameters that change the roles and responsibilities of testers significantly needing to re-orient. This paper also captures the Quality, Technological, governance, environmental up gradations that testers can perform and enhance their spectrum by increasing their identity, potential and work areas.

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