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ANALYSIS OF SOFTWARE TESTING CHALLENGES IN SRI LANKAN CONTEXT

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Abstract

Software products are becoming so extraordinarily adopted. Software testing is an important component of software quality assurance (QA), and many software organizations are spending up to 40% of their resources on testing. For life-critical software (e.g., flight control) testing can be highly expensive. For other software like hotel management system testing can be less expensive. But testing and an efficient quality assurance is must for all software products. Because of the importance of testing, many studies about risk analysis and software testing have been made. These term mean the probability that a software project will experience undesirable events, such as schedule delays, cost overruns, or outright cancellation. Developers deserve specific testing approaches for their verification and validation. This research paper analyses the challenges and the problems faced by software developers in testing phase of development cycle in Sri Lankan context by going through these following criteria .The challenges and on testing software applications, Actions taken by Information Technology (IT) companies to overcome those challenges, And the prediction of new ways to overcome some of software testing challenges. We have done this research by getting a survey from well experienced Quality Assurance (QA) engineers, developers and software engineers from various Information Technology (IT) companies across the Sri Lanka.

Keyword: Software Testing Challenges, Quality Assurance, QA issues

Introduction

Today enterprises are more likely to use bespoke software product rather than generic product. The beauty of bespoke product is that they are tailored to the exact requirements of the company allowing the software to fully integrate, helping to meet legislation or key business objectives than a generic product. Enterprises that use bespoke packages are often littered withsoftwaredefects as well as software failures. Although software developingcompanies spend lot of hard work with experienced developers, sometimes they cannot deliver to quality expectations or much more accurate systems.No matter how purely requirements were collected, well-designed methods were used, how the database management and the configurations were controlled, no matter how advanced the tools and techniques were used   all will end up with nothing if testing is not done crystal clearly. In Sri Lankan context, due to the extra pressure to finish software development projects on time project managers are likely to reduce the testing activities.And this urgent approach in software development brings adverse effects on software quality. Sometimes it leads to the overall failure of the software product.

Software testing is a formal process in which a software unit or several integrated software units or an entire package is examined by running the programs on a computer. All the associated tests are performed according to approved test procedures on approved test cases (Daniel Galin, 2004).Finding more efficient ways to perform more effective testing is a key challenge in testing. It is observed that an efficient testing practice is vital

to the quality of the developed product while the task of ensuring the quality for a product is the ultimate objective of development pocess.But the testing process is constrained by a number of challenges and operational limitations.

Research objectives
- Identifying the problem and challenges faced by developers in testing phase.
- Solution for the challenges of testing.

Research questions
- What are the different methods and practices being used for software testing in Sri Lankan software development industries?
- What are the challenges faced by developers in testing phase?

Methodology

In this study data were gathered from Primary as well as secondary data sources. Primary data were collected through a questionnaire survey from 25 software developers who are working at small, medium and large scale software industry organizations and from two interviews with the persons who are being touched with the software developing industry. And secondary data was collected through the former survey relevant to this research subject. Data analysis was done both manually and through computer software SPSS.

Results and discussion

Under this section this paper analyses the challenges of software testing according to the data obtainedmainly through the survey and partially through the interview.
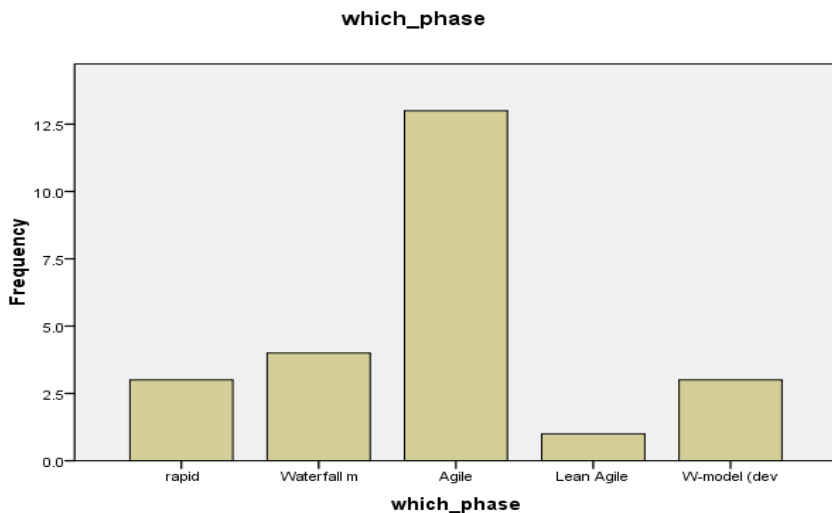

Figure 1: Analysis of development phases (source: survey data)

This research shows that 8% of developers did not perform testing separately. From the survey we observed that, during a development of a software 24% of develpers spend more than 75% of time for testing from develpoment life time.And 36% of developers spend 51% to 75% of time for testing.And it is clear that the develpers who spend this percentage of time for testing follows either Agile or Rapid development and their products have less software defects(figure 1& figure 4).

The 50% of testers spend their non testing time with writing test plans /test cases, interaction with other peers i. e.dev team and 50% of testers spend non tesing time with client /cutomer interaction.52% of developers indicate the most likely reasons for an increase in software defects as more platforms/operating system used by enterprise users,and 20% of developers say that the reason is more products/versions being developed by a single company,and 20% say that, arrival of different devices and peripherals in enterprises is the reason for software defects.And some suggest that ambiguous requirements , poor code quality, lack of integrated and unit testing,and bad process model follwed by developers,lack of management support may be the reason for increse in software defects.

The survey illustrates that 52% of developing teams have testing trainer staff.20% of developers say that most testing challenges can be included in project management category and 16.1% developers say that pcyhological reasons also influence the testing process and 64.51% developers say that technical challenge is the most significant challenge in testing process.(figure 6).Figure 3 illustrate that majority of the company use less than 25% of automated test tools in Sri Lanka.Using automated test tool is an efficient way to reduce defects.
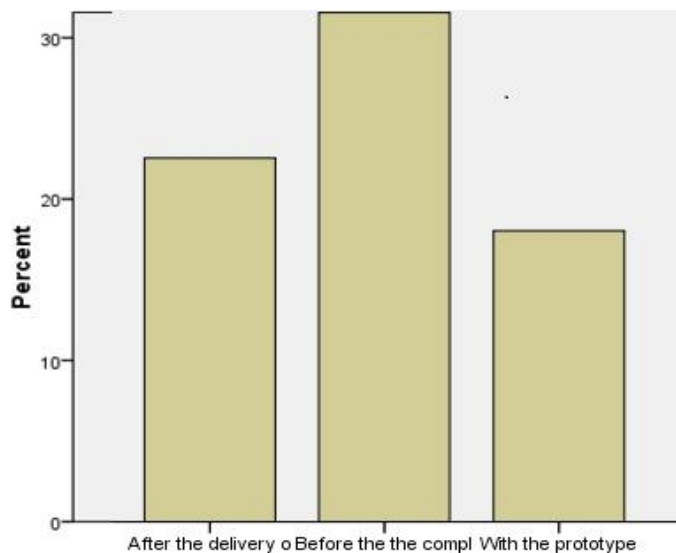

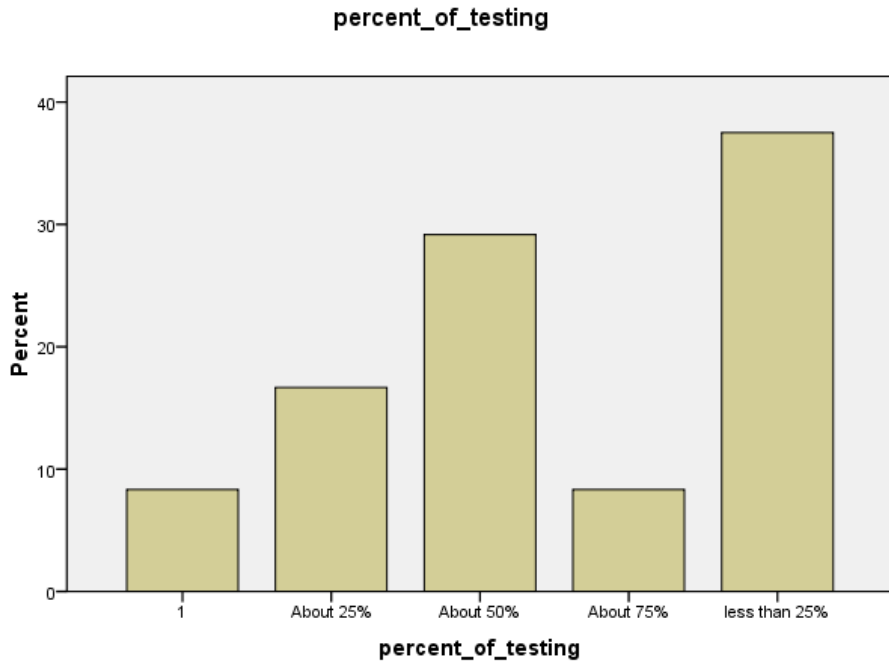**Figure 2:When training is provided to user(Source: survey data)**

percent_of_testing

Figure 3: percentage of automated testing being usedby it companies(Source: survey data)
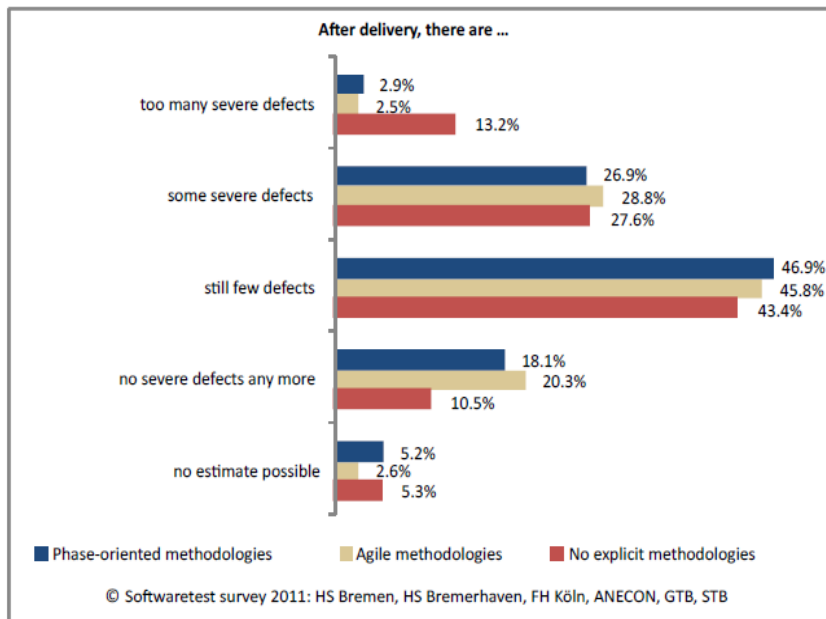
Figure 4: Source: Secondary data analysis (Software test survey 2011: HS Bremen)
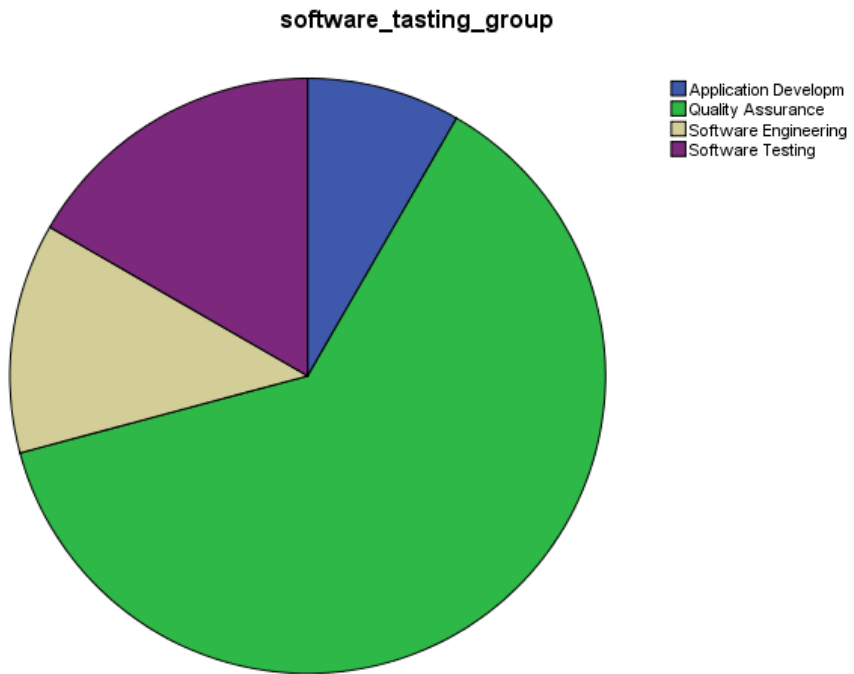
software_tasting_group

Legend:
- Application Developm
- Quality Assurance
- Software Engineering
- Software Testing

Figure 5:How software testing groups are named and functioned (source: survey data)
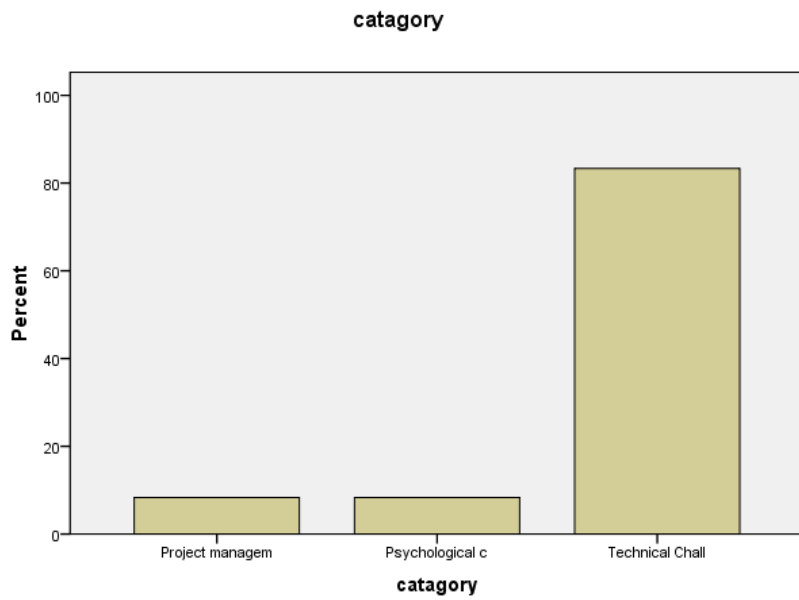
catagory

Figure 6: challenging factors for testing (source: survey data)

From the survey 75% of developing companies provide training for user about the software product.From that 75% ,25% of companies povide training to their users with the prototype ,43.75% of companies provide training before the delivery of product and 31.25% of companies provide training after the delivery of software product to the user enterprises(figure 2).

Meanwhile 25% of companies did notstudy technology skills of staffs of user side,but 75% of companies do.Figure 1 shows the quanitative view of phase oriented process in Sri Lankan software industry in which framework developers based on.And figure 4 reflects that neither agile nor phase-oriented methodologies have an advantage with regard to the quality of the software systems.Figure 5 reflets that mojor part of developing companies who perform software testing in a high rate, name their software testing group as quality assurance.

Conclusions and Recommendations

Through the analysis of this research authors conclude that more than 52% of organizations who have testing staffs and also provide training to testers are likely to deliver software products with fewer defects. It clearly demonstrates that the software testing in software development need to become more professional in Sri Lanka by appointing testing staffs to the each and every developing team and need to become more structured by providing essential testing training periodically to the testers.

Through the analysis of research result it is recommended to provide the following skills to the testing staffs such as logical thinking, attention to detail, thinking out of the box, patience, willingness to learn, adaptability, ability to understand about developing style, quick understanding about the user requirements and prediction power of future enhancement of the system and other requirements of user, domain knowledge of the product that they are testing, and better communication.

The developers who are from private and government institution with the degree of software development sector have less experience in testing. So quality assurance and testing should be introduced as a separate subject for the developers before they entered to the software developing industry.

Meantime, developers as well as testers are quietly neglecting the building of relationship with users. So that as a new dimension of testing, authors suggest testing should be fragmented like, unit and structural testing by developers, independent testing by testers and business oriented testing by users should be done. Lack of understanding of the usefulness of test tools may be the reason for the minimal use of automated test tools by especially small scale developing companies in Sri Lanka. So these people should train their team in tool usage. In Sri Lanka majority of developers are depend on testers to find bugs. It consumes time for the fulfillment of product. So developers should be provided with ownership and responsibility of the quality of their work. Moreover management should be fully aware of what is required for effective testing and should be focused on product rather than process. So a cultural change is needed in the management structure of software developing team to bestow software products without defects.

In Sri Lanka perception of testing must be changed. Testers must be paid for each defect they found in order to grow the interest on testing. Testing is highly related with human rather than machine. So introducing new parameters in prevailing testing training method which could make testing process more comfortable, desirable to testers. Evolving towards rapid and agile developing cycle might give more favor result in software product. Furthermorethis research also points towards the need of conducting further research on this topic to study the possibilities for the introduction of new dimension of testing in Sri Lanka.

Acknowledgments

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