Course Title: Software Quality Assurance
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Assignment on

Review of: A Survey of Software Quality Assurance and Testing Practices and Challenges in Bangladesh

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A Survey of Software Quality Assurance and Testing Practices and Challenges in Bangladesh

1. Problem Statement

Software Quality Assurance and Testing (SQAT) is an integral part of software development. In the past 15 years, Bangladesh has been witnessing tremendous growth in the software development organizations. Now-a-days many companies, IT firms are developing software system that are not used in Bangladesh but in many countries across all over the word. But when an IT industry or organization builds software they faces lots of challenges of soft testing (ST) (like ensuring 100% test coverage, thinking like an end-user for performing effective testing, joint etc.).

In this paper, they shown how software industry assure the quality of a software, challenges faces when testing are practices in Bangladesh. The broad objective of this survey is to identify the current software testing practices, trends and challenges in Bangladesh.

2. Methodology

2.1 Research methodology

This research's tactic is directed and developed using the qualitative research methodologies. The qualitative research method is popular to derive and explore the social, cultural and economic aspects of communities. The qualitative research approaches play an important role to comprehend the insights of a field and the diversities among the contents of that field. This research is a survey-oriented study which includes the face-to-face interviews where participants answer a sequence of questions in different segments.

In this survey, four major areas are explored to encounter:

2.1.1 Characterization: This section discovered the characterization of the organization in terms of its type, service age, number of IT personnel in testing and coding in that organization.

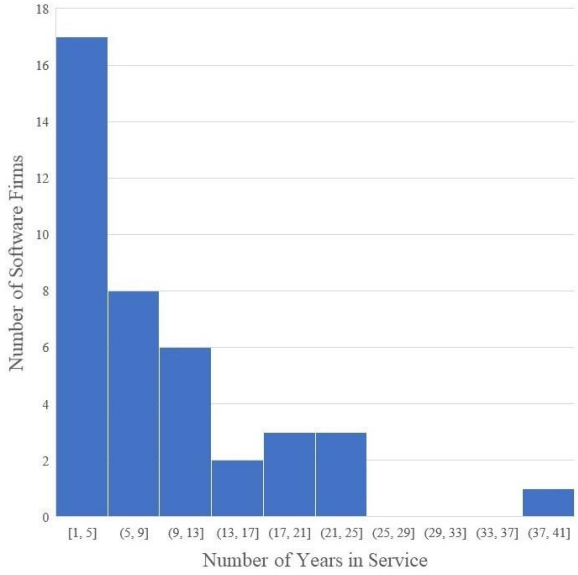

Fig. 1. Number of Years in Service by Software Firms.

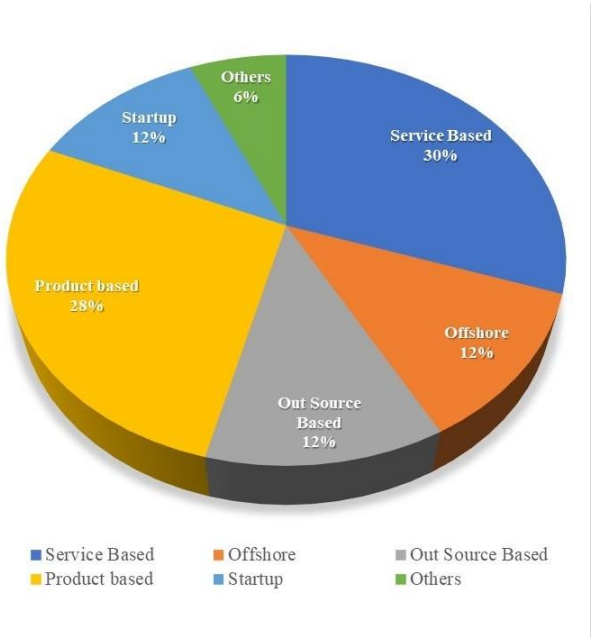

Fig. 2. Bangladeshi Software Firms by Service Types.

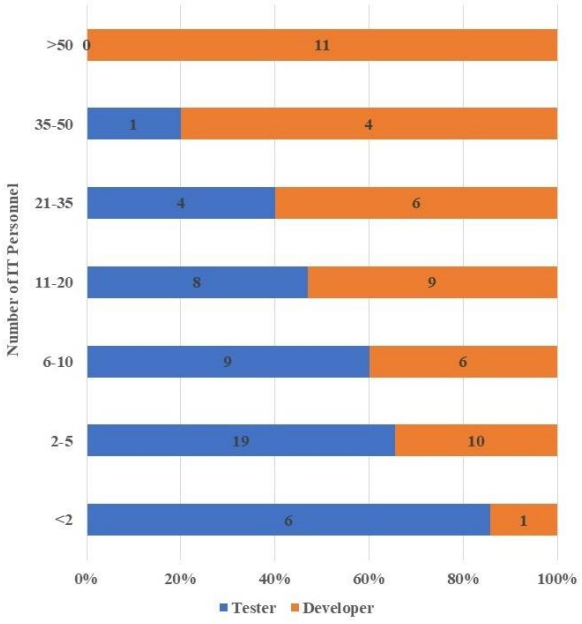

Fig. 3. Number of IT Personnel in Organizations by Tester and Developer.

2.1.2 Software testing Methodologies: This section was aimed at identifying the SQAT practices among the software firms in Bangladesh. To achieve this goal, questions were asked to capture the main reasons behind performing testing, the usage of structured testing methodologies, the process maturity or quality models that are followed and other aspects of testing activities as well as effort allocation.

From figure 4, we can see that almost 50% respondents perform testing to ensure the quality of their software which is a good indication of the mentality among the interviewees. However, 22% respondents do testing as it is their client's requirement.

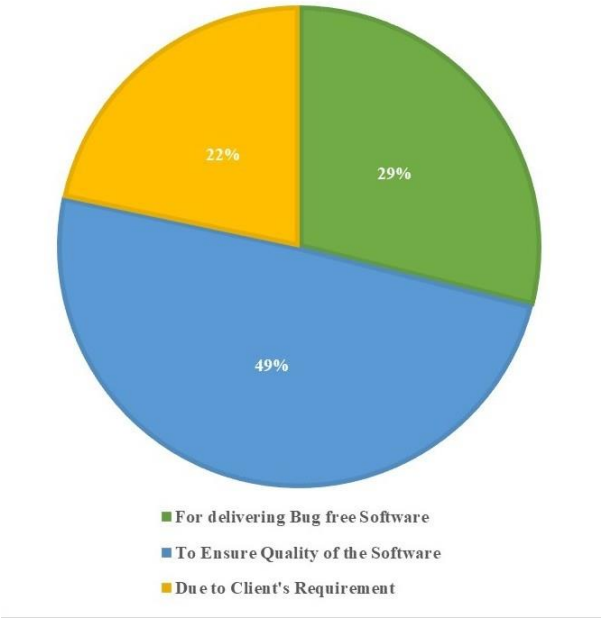

Fig. 4. Reasons behind Performing Testing

Figure 5 shows that testing is the most commonly per- formed QA activity followed by Inspection/Formal Review and Walkthrough/Informal Review

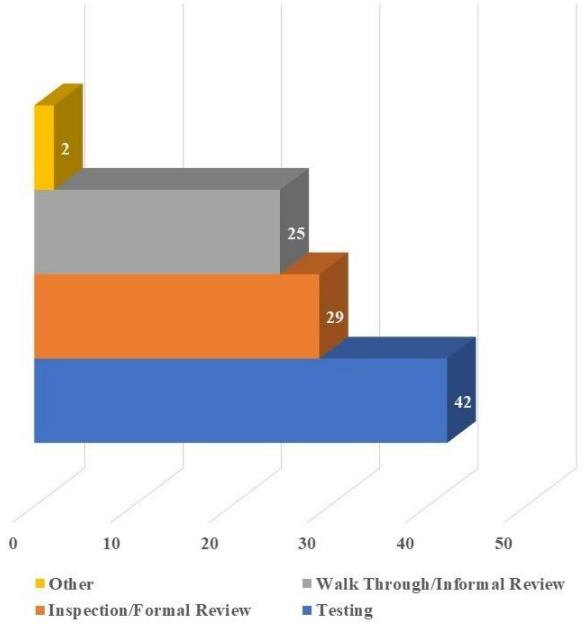

Fig. 5. Most Commonly Performed QA Activities.

. Figure 6 illustrates that functional testing receives the most effort according to 20 respondents followed by Regression testing according to 12 respondents.

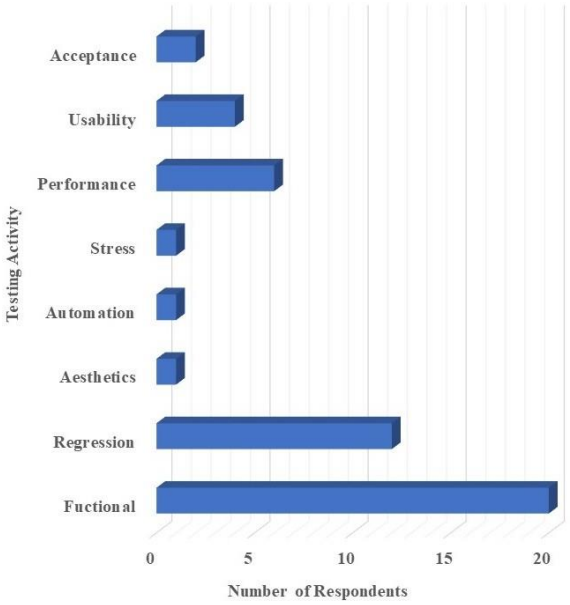

Fig. 6. Effort Received by Testing Activities.

Figure 7 illustrates the responses further. For further investigation regarding this issue, we looked at the average years in service of the software firms

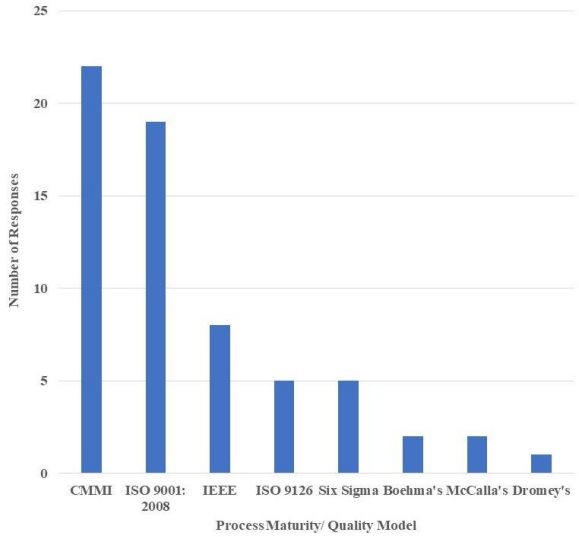

Fig. 7. Responses to Process Maturity/Quality Model

2.1.3 ***Testing Terms and Tools****:* This section was dedicated to de- rive the information regarding test team organization and testing tools as it finds the vitality of quality assurance and testing for in- terviewee's organization. It also captured the teams' association in the organization. This section explored the tools and its types of testing that were used in the organizations.

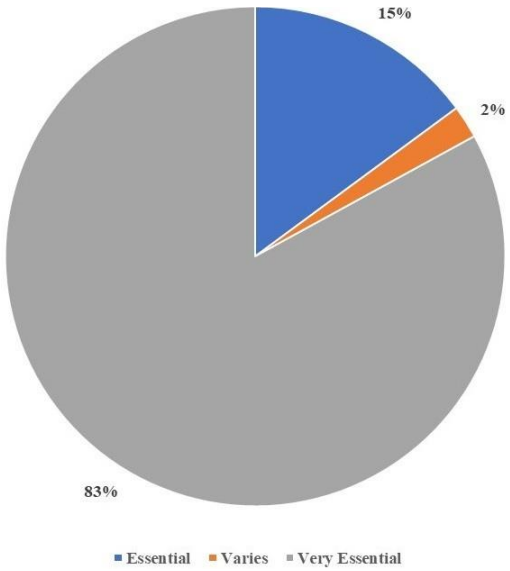

Fig. 8. Responses to Recognize the Importance of Testing Team in Orga- nization.

Table 1. Organization of Testing Teams in Bangladeshi Software

Vertical Model (Project Oriented)	**Horizontal Model (Task Oriented)**	**Mixed Model**
22	10	15

Table 2. Frequency of Conflicts between Tester and Developer

Conflict Frequency	**Count of Responses**
Frequently	20
Rare	18
Very Frequently	3
Very rare	5

Table 3. Responses to Commonly Used Testing Tools

Name of the Tool	**Type**	**No. of Responses**
JIRA	Issue Tracking	27
Selenium	Functional Testing	27
Apache JMeter	Performance Testing	19
Appium	Mobile App Testing	13
Redmine	Issue Tracking	8
Helium	Web Testing	5
Sikuli	GUI Testing	5
TestComplete	Functional Testing	3
Watir	Functional Testing	2
Taurus	Performance Testing	2
In-house built	Custom	1
JUNIT	Unit Testing	1
Ranorex	Functional Testing	1
Gatling	Performance Testing	1
TestLodge	Test Management	1
Trello	Issue Tracking	1
TestLink	Test Management	1
Test Raid	Automated Testing	1
BugZilla	Issue Tracking	1
Postman	API Testing	1

Figure 9 clearly supports our hypothesis as most of the respondents use open source-based testing tools followed by in-house-built.

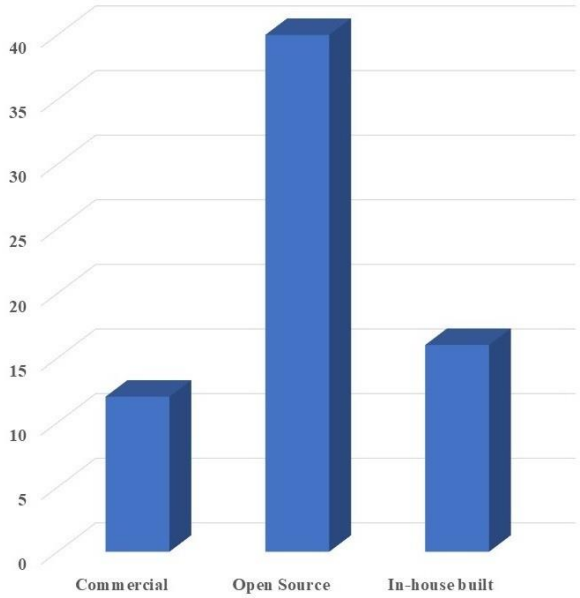

Fig. 9. Types of the Tools Related to SQAT.

2.1.4 SQAL challenges, Training, Education and Training prospect: *This section* was included to explore the thoughts of the IT personnel of SQAT challenges, future possibilities of software quality assurance, curriculum and training from the tertiary institu- tions. This section also segmented to understand the satisfaction of the interviewees in terms of mental and financial soundness.

Figure 10 portrays that CEO/CTOs are the most disappointed personnel in terms of job role and salary in Bangladesh followed by SQAT personnel. In contrary, Managers are the most satisfied in Bangladeshi IT sector in terms of job role and earnings.

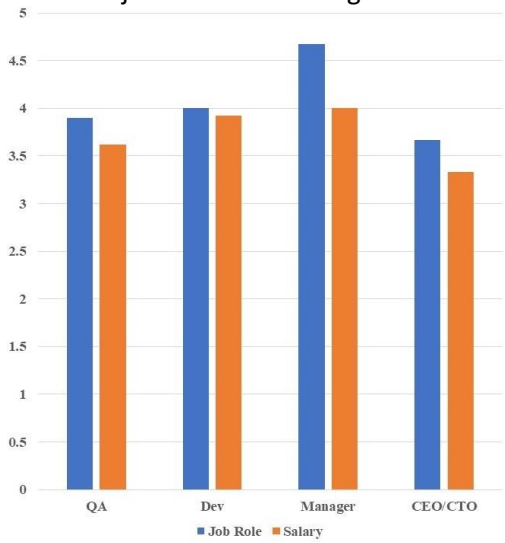

Fig. 10. Responses to Job Satisfaction of Different Personnel.

3. Scope of work

According to 70% s, the career prospect as a tester is bright in Bangladesh. On the other hand, the career prospect is very bright according to 24% of them. Next, the curriculum of the educational as well as training institutes is adequate or not for a potential tester. 72% think that the curriculum is not up to mark for a potential tester with different level of disagreeing and 79% interviewees strongly agree with adding more testing specific courses. In case of certification/ formal training of the SQAT personnel, we observed that 72% of do not have any kind of certification or formal training on testing.

Ensuring high quality software within given budget and time. Variations in terms of devices, networks, operating systems, demography of end users.

4. Future scope of work

As for future work, it is recommended to perform a more detailed survey of automated testing practices in Bangladesh. Also performing an SQAT survey only on startup companies would be interesting. In this study, we have observed that many of the respondents have identified requirement analysis as a challenge in SQAT. So as for future work it is recommended to conduct a survey to understand the current practices and challenges regarding Requirements Engineering in Bangladesh.

5. Recommendation & Conclusion:

Raise awareness among practitioners to make them understand the importance of SQAT for developing high-quality software through training, seminars and workshops. In this case, all the stakeholders i.e., Government, organizations, educational institutes, training centers should work in collaboration.

The ratio of developer and tester should be reasonable. Organizations may practice different test effectiveness measures as well as performance measures to figure out the proper load of SQAT personnel.

Process maturity and/or quality model should be practiced among the organizations. Further investigation should be under- taken to understand the reasons behind the organizations that are not practicing any process maturity and/or quality model.

To meet the demand of skilled SQAT personnel in the IT industry, the curriculum of the tertiary level educational institutes as well as training centers should be updated.

The professional atmosphere should be created in the organizations to reduce conflict between tester and developer. They need to understand that they are not competitors to each other rather they are part of a team to deliver high quality software.

Automated Testing should get more focus by the policy makers in the Government, IT Industry and educational institutes.

To overcome the challenges in requirements analysis, educational institutes should include a course on requirements engineering and organizations should have specific personnel for requirements analysis (i.e. there should be a defined role for requirements analysis, like programmer, tester) in every software development project.

Right now, there are only few training centers (e.g. New Horizons CLC, BITM-BASIS Institute of Technology & Management) that offer training course on SQAT. More training centers should be established to produce more skilled test engineers.

As for conclusion, this paper presents the findings of the survey conducted to identify the software quality assurance and testing practices and challenges in Bangladesh. The authors along with the assistance of current students and alumni of American International University-Bangladesh (AIUB) steered the survey on software quality assurance and testing practices in Bangladesh between August, 2017 and January, 2018. A wide variety of IT firms, from CMMI Level 5 to newly established, from domestic to foreign-owned, were invited to participate in the survey. The authors believe that findings from this survey will help the policy makers in Government, Software firms and educational institutes to device their further action to nurture the SQAT sector in Bangladesh.