

THE IMPORTANCE OF SOFTWARE METRICS: PERSPECTIVE OF A SOFTWARE DEVELOPMENT PROJECTS IN SRI LANKA.

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ABSTRACT

Measurement has always been fundamental to the progress to any engineering discipline and software testing is no exception. Software metrics have been used in making quantitative/qualitative decisions as well as in risk assessment and reduction in software projects. In this paper the researchers discuss software measurement and metrics and their fundamental role in software development projects in Sri Lankan organizations. This paper focuses on the importance of software metrics and discusses their key role in software development processes perspective to Sri Lankan organizations and systematically analyses the importance of software metrics in software development projects.

Keywords: Software metrics, Software development project, Sri Lanka, Software development process, engineering discipline

1. INTRODUCTION

The field of software metrics has grown up out of two needs. One is the need for software developers to be able to manage the software development process. For example, developers need to determine the resources or time needed to deliver a product or whether the software is "good enough" to release. The other need comes from researchers, who want to be able to objectively define and measure software attributes in order to get a better understand about software engineering [1]. And this field of software metrics is constantly changing. Therefore there is no standard set of metrics, and new measures are always being proposed. Metrics researchers have to modify their existing parser tools in order to accommodate the new measures. This is a real challenge to developers since such tools usually have very complex source code [2].

Software metric is a measure of some property of a piece of software or its specifications. This can be classified into three categories: product metrics, process metrics, and project metrics. Product metrics describe the characteristics of the product such as size, complexity, design features, performance, and quality level. Process metrics can be used to improve software development and maintenance. And project metrics describe the project characteristics and execution. Such as it explains the number of software developers, the staffing pattern over the life cycle of the software, cost, schedule, and productivity. Therefore Software metrics are valuable entity in the entire software life cycle and the successful

execution of the control over software quality requires software [3, 4].

The concepts of software metrics are coherent, understandable and well established. Therefore it is more useful to develop the software projects with good quality and easy to fulfil the customer requirements.

Therefore this research paper aims to discuss the Importance of Software Metrics for Software Development Project in Sri Lankan software industry and how is the appearance of Software Metrics effect the software practitioners in Sri Lankan and how the organizations in Sri Lanka succeed their software development projects using Software Metrics.

The rest of this paper is organized as follows. Section 3 discusses the related works. Section 4 describes the methodology of this paper. Result and discussion is presented in Section 5 and finally Conclusion is presented in Section 6.

2. LITERATURE REVIEW

Anda et.al. had discussed that methods for estimating software development effort are based on attributes of a use case model that use to describe the functional requirements of a system. The aim of this paper is to provide guidance for other organizations that want to improve their estimation process applying use cases. Their results support existing claims that use cases can be used successfully in estimating software development

effort. The results indicate that the guidance provided by the use case points' method can support expert knowledge in the estimation process. Our experience is also that the design of the use case models has a strong impact on the estimates [5].

Fenton had discussed the reliability of a system is the probability that the system will execute without failure in a given environment for a given period of time. Classical regression-based approaches to modeling and predicting software defects and resources are in adequate and often flawed. They do not provide managers with decision support for risk assessment and hence do not satisfy the most important objectives of software metrics. They believe it is an important way forward for metrics research [6].

Rawat et.al. focuses on different views on software quality and many metrics and models have been developed; promoted and utilized resulting in remarkable successes. This paper examines the realm of software engineering to see why software metrics are needed and also reviews their contribution to software quality and reliability. Results can be improved further as they acquire experience with variety of software metrics. These experiences can yield tremendous benefits and betterment in quality and reliability [7].

Fenton et.al. presented most software metrics activities are carried out for the purposes of risk analysis of some form or another. The new method, using Bayesian nets, provides true decision-support and risk analysis potential. They do not provide managers with decision support for risk estimation and hence do not satisfy the most important objectives of software metrics [8].

Farooq et.al. described software measurement and metrics and their fundamental role in software development life cycle. This paper mainly focused on software test metrics, discussed their key role in software testing process and also classified and systematically analyses the various test metrics. They presented that software measurement and metrics assist people a lot in evaluating software process as well as the software product [9].

3. OBJECTIVES

In order to identify and understand the specific objectives based on the topics "The Importance of Software Metrics: Perspective of a Software Development Project in Sri Lanka", researchers has four main objectives.

1. Identify the current usage of software metrics for software development project.
2. Analyse the pros and cons of software metrics for software development project.
3. Identify the knowledge about software metrics among industrial people.

4. Identify the importance of software metrics for software development projects.

4. METHODOLOGY

Since the questionnaire is the best method to gather high accuracy real time data by using several simple steps, team has decided to do a questionnaire to gather information. A quantitative approach using a questionnaire is adopted to understand the background and the perception of practitioners in Sri Lanka towards software process and software metrics methods. Based on the feedback for the surveys conducted, the research team decided to confine this research to find the answer to the research "The Importance of Software Metrics: Perspective of a Software Development Project in Sri Lanka".

The research team selected Software Architects, Tech Leads, Project Managers, Software Engineers, Quality Assurance Engineers (QA), Business Analysts and other IT related people as participants from Sri Lanka.

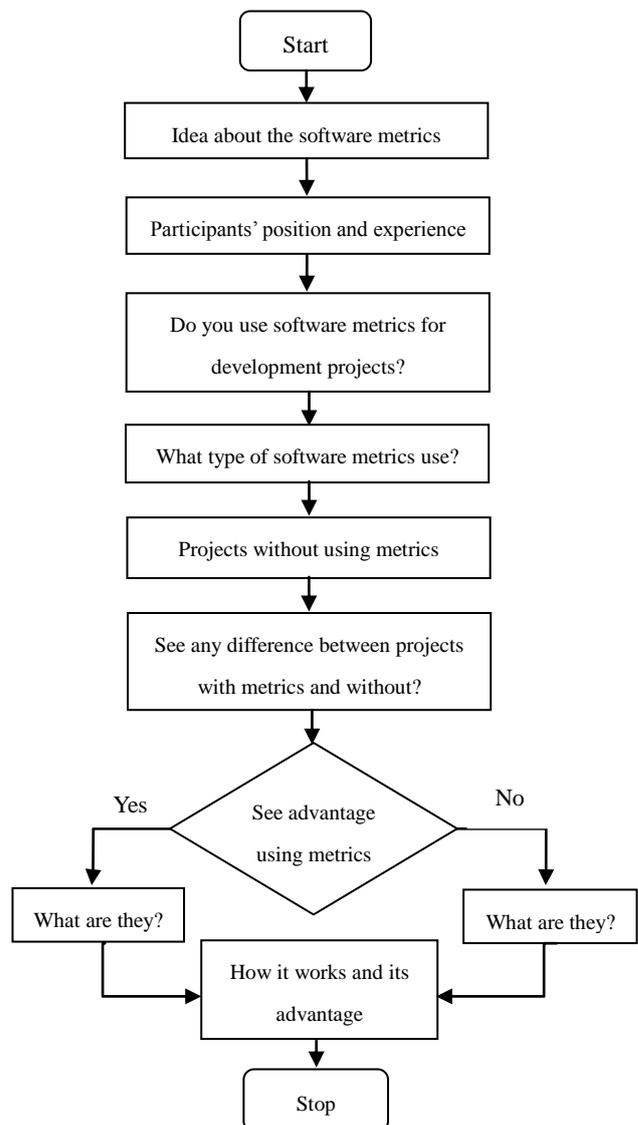


Figure 1 : Flow Chart for the Initial Study

Then design the questionnaire with 11 questions focus on the topic. Administering of the questionnaire, finally send results to participants.

In order to collect responses, the team carefully selected 85 participants from Organizations in Sri Lanka. Each participants, was contacted and the questionnaire was emailed. Out of the 85 participants whom were sent questionnaires, 60 of them responded, thus making it a response success rate of 71%.

After gathering the information, that information will be discussed and analyzed in order to get a meaningful result.

5. RESULTS AND DISCUSSIONS.

A questionnaire done with 60 industry participants and those people are who currently working on a software development project or have previously worked in a software development projects. So the audience of this questionnaire can be considered as industry experience group of participants. Most of the participants having less than two years of experience and the percentage are 57%. And 27% having two to five years of experience, 12% having five to ten years of experience and the rest of the 5% having more than ten years of experience.

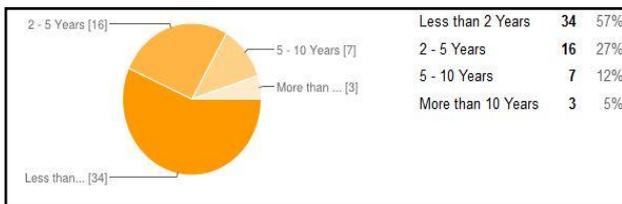


Figure 2 : Years of Experience

Among the participants 20 are involved in Quality Assurance field, it represents 33% of total participants, 30 are involved in software developing field, it represents 50% of total participants, 7 are involved in System designing field, it represents 12% of total participants and other 5% represents Web Developers and a Maintainer.

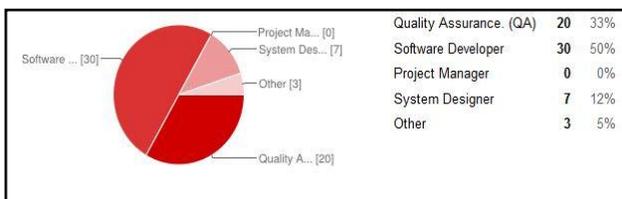


Figure 3 : Field of Work

From the participants 87% of them have an idea about what software metrics are and 13% of them have no idea about it.

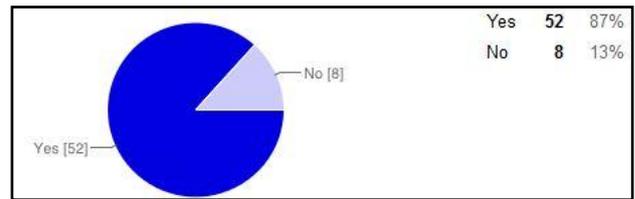


Figure 4 : Idea about Software Metrics

From the participants who know about of software metrics 83% of them use software metrics and it represents 73% of all participants. So it says that 27% of them are not using software metrics though they know about usage of software metrics.

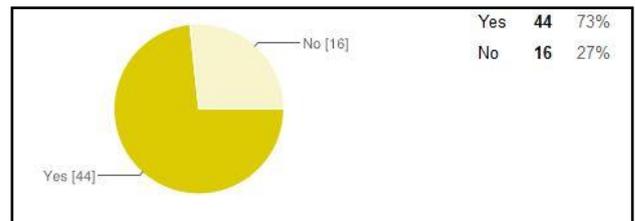


Figure 5 : People who used software metrics.

From the participants who know about software metrics, 70% have done software projects without using software metrics also. It's 62% of all participants.

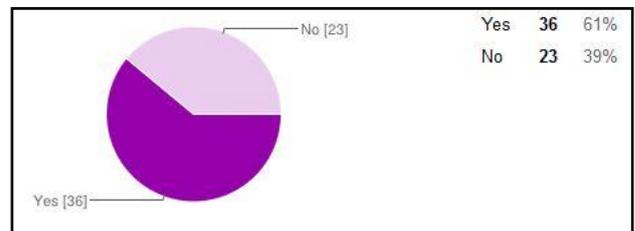


Figure 6 : Projects done without using software metrics

From the participants 80% have identified a difference between projects that have done with software metrics and without software metrics. Rest of the 20% has not identified any difference between projects that have done with software metrics and without software metrics.

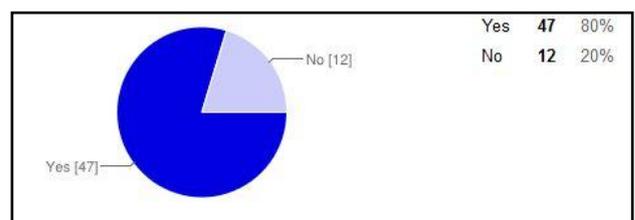


Figure 7 : Projects that have done with and without software metrics.

From the participants 76% have identified an advantage of using software metrics in software development projects. And the rest of the other 24% have not identified any advantage of using software metrics in software development projects.

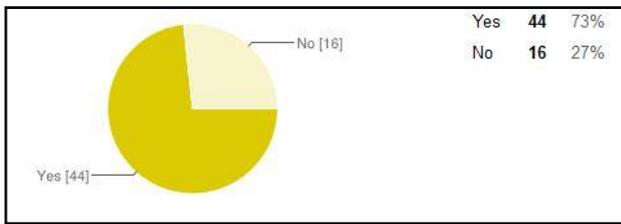


Figure 8 : Projects that have done with and without software metrics.

From the participants who know about software metrics 97% of them recommended to use software metrics for software development projects. It's 85% of all participants.

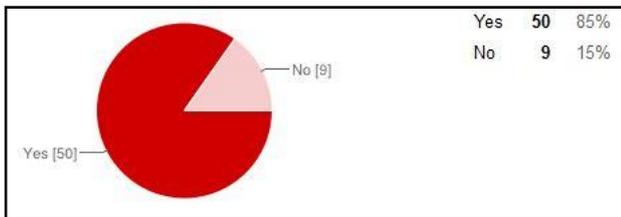


Figure 9 : People who recommend using software metrics

According to the questionnaire participants' responses, Software metrics always make it easy to understand complex projects. Using software metrics, can have a quality product at the end of the project, with less bugs and it makes it easy to maintain, can be used for time boxing decisions, it will increase Rate Of Income, manage workload and recourses usage, reduce product implementation cost, it is very helpful to provide objective information throughout the software development project, it will describe the current state of the project and software will maintain standard qualities.

According to the responses from industrial participants, software metrics measurement can support the decision making process in system design of software engineering; specially in identifying whether product can be released, whether project needs more resources, very useful to reduce the complexity of the project, whether the project is feasible and whether the system meets safety requirements and real time deadlines.

Metrics provides objective information throughout the software organization. This reduces the ambiguity that often surrounds complex and constrained software projects. Metrics provides an effective rationale for selecting the best alternatives. For example, the current software and IT business environments demand

successful project performance. Business, technical and project managers must be able to defend the basis of their estimates and plans with historical performance data.

Mainly 13% of industry workers do not know about software metrics though they are working in software development projects.

Some industrial people consider software metrics as a time consuming process since it takes some additional time from the development time. And it requires knowledge about usage of software metrics; it can be seen as a problem with software metrics since all the organizations are not familiar with those knowledge areas. Some organizations and industrial people are not ready to use software metrics because they do not like them and some of them identified it as a process that requires lots of time and effort.

Some were very experienced in the IT industry and their idea is they can do software development projects with their experience and can achieve success without using software metrics.

6. CONCLUSION

The results gain from the survey showed some disadvantages of using software metrics in software development projects and more advantages over the disadvantages.

The main drawbacks and reasons for not using software metrics in software development projects because heavy knowledge base and lack of knowledge, needs lot of effort and time, company policies that not allowed us to use metrics for projects, It is much cost worthy, some are confident with their experiences and considered as no need of metrics.

The main advantages of using software metrics in software development projects can be listed as metrics provides an effective rationale for selecting the best alternatives, it saves development effort, time and money, provides objective information throughout the software organization, can have quality product at the end of the project, software metrics always make complex projects easy to understand, can identify potential problem areas of product early also it describes the project and product status clearly, make easy to manage workload and recourses and maintain process, this reduces the ambiguity that often surrounds complex and constrained software projects, metrics can accurately describe the status of software project processes and products.

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