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A metrics collection program can deliver major benefits to a software development company including improving how it estimates and manages projects.

Despite its benefits, post mortem analysis is not always done at project closure (Jalote, 2002). Likewise, at project closure, project metrics are also not always available. This article examines why metrics and post mortem analysis collection is so important for a software development company and the lessons learned from implementing the program at Mitrais.

The arguments for metrics collection program

A metrics collection program is not an exotic or theoretical concept. Rather it can deliver major benefits to a software development company as summarized below.

• Historical data improves the estimation accuracy

Ask any experienced software project manager why projects fail and many would nominate a bad contract or unreasonable commitment. A bad contract often starts with under estimating the effort it takes to complete a project. We have seen some problematic projects that have been underestimated by more than 100 %. However, projects that have been estimated using historical data tend not to have overrun (McConnell, 2006).

But, a word of caution against just acquiring industrial historical data for estimating. Organizational influences such as the processes followed by the projects and team utilization pattern differ from one company to another. As such, historical data collected from projects conducted by the same company are far more accurate for estimating than industrial data (McConnell, 2006).

• To achieve improvements in project development

Historical project data can be a good source for determining which processes require improvement. When metrics are collected from projects, then the baseline (or the company's current productivity and quality level) can be determined as the starting point for measuring the rate of improvement.

IBM is a good example of a company that since the 1960s has used a metrics collection program for quality improvement. The result is seen in the quality of IBM products and its long dominance in computer software industry (Jones, 2008).

In project post mortem meetings, metrics analysis and feedback from team members and customers are the main source of the lessons learned from the project. It is a truism to learn from the past mistakes to ensure that they are not repeated.

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Post mortem cost analysis is important to prevent 'corporate memory loss' and because the cost of lessons learned is not cheap.

- ## For benchmarking

  It is sometimes useful to compare how a specific company is performing against similar companies in certain areas. Examples of metrics often used to compare one company with others in software industry are productivity and defect removal efficiency metrics.

- ## To measure return on investment (ROI)

  A software quality measurement program provides excellent ROI. It has one of the highest ROI when compared with other technology/process improvement initiatives such as object oriented programming or formal design inspections (Jones, 2008).

The arguments for post mortem analysis

The following are the arguments for post mortem analysis:

- ## Cost of lessons learned is often not cheap

  Cost overruns of 100% or more are not uncommon for large software projects. Great lessons can be learned from these projects. Attending workshops on best practice in software project management or reading software engineering or project management books does not replace the experience of participating in real software projects. Experienced project managers or team leaders who have learned from their mistakes are valuable assets for a company.

  It is rare to find an employee in software industry who stays with one company during their entire career. So, it is important to build a corporate asset of project lessons learned to avoid repeating costly mistakes.

- ## To prevent corporate memory loss

  A senior manager who practises metrics collection or phase quality gate review for projects is much respected. But with management changes, resignations and new staff what were seen as good practices can too easily disappear. Organisations can at least have a chance to stop the disappearance of good practice when key people resign by documenting and analyzing what went well and what went wrong.

Lessons learned from implementing a metrics collection and project post mortem program

- ## Appoint an executive and management sponsor

  A metrics and post mortem collection program must be sponsored by a senior executive to have any chance of success. The required budget,

Metrics collection and post mortem analysis:
pointers to successful software development projects

A metrics and post mortem collection program must be sponsored by a senior executive to have any chance of success. The success rate of a program also increases when the organisation has a full time staff or permanent department for collecting metrics and post mortem reporting.

authority and resources must be made available to make this happen.

Each level of management must clearly endorse the program. There are also formal and informal power holders who too must be willing to relinquish appropriate power to ensure the success of the program.

• Set up a permanent department for the metrics program

The success rate of a program increases substantially if the organisation has a full time staff or permanent department for collecting metrics and post mortem reporting. Often the project manager and team leader are too busy. Project team members may not be experienced in setting up the project environment to collect metrics, let alone skilled in metrics calculation.

• Deploy the right support tools

A good process automation tool with the ability to fully collect and track metrics with process workflow engine built-in is quite costly, both to acquire and configure properly.

Often the tool deployed for metrics collection requires human intervention to record certain things. Not all steps in metrics collection are fully automated. Because of this, the quality of the data depends heavily on the team's willingness and cooperation (Kan, 2002). This is the one of the main reasons why metrics collection is always problematic. While ideally metrics collection should be fully automated, metrics analysis should never be so (Kan, 2002).

• Monitoring by management

Any improvement initiative should be monitored by management. Remember the Hawthorne effect which can be paraphrased as "individual productivity may be increased because they know they are being studied." Being monitored and measured on metrics collection and post mortem analysis by a supervisor, project managers and team members will feel that this is an important task to be completed. If there is a permanent department with a responsibility and authority to run this metrics and post mortem analysis collection program (such as a metrics council or

project management office), it is also important for the supervisor of the program manager to periodically monitor the progress of this program.

• Include metrics collection and project post mortem as an audit checkpoint

When a company has a quality assurance department that regularly audits projects, metrics collection and post mortem analysis can be included as one if the items to be audited.

• Integration with Project Management

Since metrics collection requires the project manager's initiative and cooperation, it can be tied into the project management competency system. The same applies to the post mortem analysis practice. Both practices are strongly recommended by the PMBOK.

Many project management standards or models recommend a company implements a formal project management office. One of the purposes of this office is to assist the project manager in metrics collection.

• Use or lose it

Measure only what you need. The metrics collection initiative is costly. As such there is no point in collecting metrics unless they are being used for decision making purposes.

• Proper project grouping

When using historical data for project estimating, greater accuracy can be achieved by using metrics from similar projects. Therefore, having the proper grouping of the project classification or type in the metrics report is necessary. Capers Jones recommends the following 5 layers of project taxonomy for grouping purpose: nature, scope, class, type and size (Jones, 2008). One of the observations we found during the metrics program implementation at Mitrais is that metrics can also be grouped by the experience of the project team members. Projects staffed with junior software engineers may display a defect density that is much higher when compared to the average defect density.

References

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