



University of Technology, Sydney

15356 PROJECT PERFORMANCE IMPROVEMENT

Individual Assignment 2013



Learning Through Reflective Practice While Deploying a Load Management System In a Famous Cement Industry

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Submitted On: 17-07-2013
Word Count: 2779

Abstract

Key words: ‘Learning’, ‘Reflection’, ‘Practice’, ‘Agile Methodology’ ‘Power Load Management’, ‘

This paper explains the topics of ‘reflective practice and ‘learning through reflection’ in a practical project environment at one of Australia’s major Cement manufacturing companies (referred as ‘X-Cement Ltd’ in this paper). The project was to develop and deploy a comprehensive new load management system including the equipment and software logic automation in X-Cement Ltd using Agile Methodology and Approach of Project Management.

Implementing Agile methodology within X-Cement Ltd involved:

- Analysis of the project management approach already implemented at the X-Cement Ltd.
- Responsibilities assignment to Staff and vendors teams to develop a project management system based on Agile Methodology which met the specific future needs of X-Cement Ltd.
- Training of staff on Agile and operation of the load management system within the Power House department of The X-Cement Ltd.
- The implementation of new logic metrics and measures to validate the success of, the new methodology.

The project explains reflective practice in the form of brainstorming sessions and fortnightly meetings referred here as “Project review meetings” arranged by the project team to discuss the status of the project success so far or time elapsed by a project iteration, what could be improved, and how to achieve more success in the future/ next project objective. These meetings purely represent Social learning as well as Experiential learning.

The project report explains the benefits achieved by X-Cement Ltd through reflection practice as:

- Increased collaboration and trust among staff and vendor project teams
- Increased work performance due to effective reflection
- No loop holes left unattended during the project
- Increased effective and detailed briefing on the project

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1. Introduction

Reflection is an active process whereby a professional(s) can gain an understanding of how historical, social, cultural and personal experiences have contributed to professional knowledge and practice (Wilkinson, 1996).

While ‘reflective practice’ as per Duffy (2007) is an “active deliberate process of critically examining practice where an individual is challenged and enabled to undertake the process of self-enquiry to empower the practitioner to realize desirable and effective practice within a reflexive spiral of personal transformation”.

This paper explains the topics of ‘reflective practice and ‘learning through reflection’ in a practical project environment at one of Australia’s major Cement manufacturing companies. As this report will be uploaded on a public journal of project management therefore the report refers the company as ‘X-Cement Ltd’ throughout the context. The report first briefs on the project details and aim. Then it outlines the approach and methodology applied for this project. After that the lessons learnt through reflective practice are highlighted and finally the report ends with exploring how learning through reflection could have further improved the outcome of this project and would improve the projects that would be undertaken in future by X-Cement Ltd as well.

2. Project Description

X-Cement Ltd has a huge cement manufacturing facility and it has a huge power plant which is handled by three types of power sources Utility, Gas Engines and HFO generators. The generators are synchronized and two of the three generations are always in ON position and the load is divided by manual synchronization/ changeover systems among them. The project was to develop and deploy a comprehensive new load management system including its equipment i.e. the synchronized changeover switchgears and its automation by software & logic development to view and control the switching system on a MIMIK screen in the power house operator room.

This project is managed through the Agile Methodology. Agile approach of project management sometimes called as the Extreme Project Management is an iterative method of determining requirements for engineering and information technology development projects in a highly flexible and interactive manner; Agile Methods are also mentioned in the Guide to the Project Management Body of Knowledge (PMBOK® Guide) under the Project Lifecycle definition.

There is a pervading myth that the Agile methodology is only good for software projects. There are plenty of other aspects of the methodology that make it a good candidate for projects in other industries. The collaboration, quality, visibility and team work that happens with Agile is relevant to any type of project. In this project the vendor and customer teams which were further divided on one hand into Switchgear sales, design & installation teams and on the other hand into energy automation design, software logic development and finally the staff teams with power house operation, electrical and instrumentation and production teams all were encouraged to 'work with one another in a more collaborative way, solving problems together'. This is a core Agile value: collaboration over contract negotiation.

As per the Agile Methodology, the planning was done for one step at once and the requirements were defined for only that phase. The teams worked in a collaborative way, trained together through workshops. The components were deployed iteratively as they were ready and tested; for example: the new switchgear equipment was first designed then manufactured and installed; the teams got the trainings on the new switchgear and started its operation manually, without any software logic developed. Then the software development phase started and so forth. This does not include any risk as the project phases were completed with more stakeholder involvement and the next phase started when the previous had met the customer requirement. Fortnightly review meetings during/after every project phase focused on reflective learning and helped in improving the project performance and acted as footsteps to implement the agile methodology in X-Cement Ltd for future projects.

3. Approach and Methodology Applied

There is no magic software or prescriptive formula to be used when implementing Agile Methodology in a project. Every company, team and project is different, and the approach taken to implementing Agile needs to be adapted and tailored accordingly. This section of the report highlights the approach and implementation of methodology taken for this project with a particular focus on the reflective practice.

The important steps which were required and taken in order to implement Agile methodology at X-Cement Ltd were as follows:

- Analysis of the project management approach already implemented at the X-Cement Ltd.
- Responsibilities assignment to Staff and vendors teams to develop a project management system based on Agile Methodology which met the specific future needs of X-Cement Ltd.
- Step wise training of staff, on Agile and operation of the load management system in the Power House department of The X-Cement Ltd.
- The implementation of new logic metrics and measures to validate the success of, the new methodology.

X-Cement Ltd hired a team of consultant who analyzed the already implemented traditional approach of project management, gave the awareness to project teams of “the Agile Manifesto” and the difference new methodology shall make in their project performance as compared to the traditional project management approach.

In the light of the existing implemented approach, the project environment and the organization structures a customized Agile Methodology was developed after discussions with the project managers and teams of X-Cement Ltd. It was noticed that the major challenge in the implementation of the new methodology would be the transition from the traditional approach to the new methodology and detailed step wise training of the staff is mandatory. Organisations are typically anti-change (Sevlan, 2009) and introducing any change requires some sort of change management (Söderlund, 2010). For this purpose, training courses including awareness sessions and workshops were arranged in consultation with all the project teams and power house personnel.

In addition to the arranged trainings the project team members were getting the on-job training while working on this project with the energy services vendor. Meanwhile the Agile consultants kept reviewing the ongoing work and guided the team to drive and refine their performance. This practice was the heart of learning as it is always the practicing and the training on skills that gives the quickest results. As wisely said by Confucius, "I hear and I forget, I see and I remember, I do and I understand." Also narrated in her book Voskamp said “Practice is the hardest part of learning and training is the essence of transformation.” (Ann Voskamp 2010)

The number of Reworks, the speed, quality of the job, number of scope changes and most importantly customer satisfaction are the project metrics which must be measured through reflection to improve the performance as stated by Lewis (2007, p. 272). The project team not only focused on these metrics in the Project Review Meetings but also the other project review metrics as guided by the consultants. The most important of them were the reviews of Status (Cost and budget control, schedule and scope of work), Design (it is the core of success

especially in switchgear and energy automation and logics) and over all Process reviews to improve them where necessary.

While implementing the Agile Methodology the project team strictly followed the fortnightly project review meetings which were the dedicated periods of time specifically put aside to learn through reflective practice, reviewing the team performance and all the measure to be taken in order to improve. These calculative and result oriented review meetings held in the presence of the project stakeholders. The recorded MOMs of a project review meeting were then examined in detail within the next meeting. It was due to the learning of the team through reflection that every iteration was handled and celebrated as a separate goal with the motive of learning and improvement in the next iterative.

4. Reflective Practice-Techniques Used and Lessons Learnt

Reflection is associated with learning that has occurred through experience and is an activity that helps to make sense of and learn from situations. In this section, the report basically explores the lessons learnt through reflective practice' However, in order to reach to the depth of the subject, it also highlights & explains the specific reflective tools and techniques utilized by the Power House Project team with a focus on the reflective aspect of the project management.

The Project manager (of the specific iteration /project phase) arranged the Project Review Meetings, fortnightly basis/ at end of an iteration / process to discuss :

- The objectives successfully achieved
- The objectives which could not be achieved or were delayed.
- The reasons of failure/ delay and their effect on the overall project performance and schedule.
- Brainstorming and ideas to improve in the next time period or to be used in any future project.
- Action plan for the future time period.

For example in this project after the installation phase of the hardware equipment including the switchgear, synchronizing and protecting devices, and the MIMIC diagram screen in the operator's room a project review meeting was called in which the teams of Production, Power House, Electrical and Instrumentation teams and the Agile consultants participated, following main steps were discussed:

- Delay in delivery of equipment was discussed. The main root cause of that came out to be the delay in design freeze of switchgear. This in turn had delayed the whole project by at least 3 weeks.
 - Each team member of the Power house department put up ideas.
 - It was agreed that in future projects a design consultant shall be hired to ensure earliest design freeze.
 - The operational logic for the generators operation was discussed:
 - Production team pointed out a critical load which required non-stop operation.
 - Power House team pointed that Utility approved load should also be improved to cater the critical load in all conditions.
 - E& I team pointed out some trainings were required for operation and maintenance of the new hardware and relay settings.
- 1) After that common ideas were grouped- participants voted individually for the most important things in each category and the requirements of the next iteration were defined
 - 2) Action plan was made and agreed for the next iteration.

As per the theory given Albert Bandura (1977) the Project review process as explained above is an example of Social Learning with experimentation, reviews and reflective observation, planning and experimenting the learning.

This process is also an example of Experiential Learning, which Alvin Toffler endorses as "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

The main benefits gained through reflective practice by X-Cement Ltd are mentioned below:

- The group discussions allows the team to learn to trust each one another recognizing the importance of other team members in the project. "When a team dedicates itself to unselfish trust and combines instinct with boldness and effort, it is ready to climb" (Patangali 150 BC)
- Reflective practice makes the goals and objective more clear to the team members. "Reflecting on the work and tools you will do and use respectively in the light of the project environment gives you a clear focus on whether those tools will be effective or not" (Nagapitiya, 2010).
- These project reviews helps the team members to work in collaborated manner with the process itself and are highly-structured. As York (2010) said "Understanding the people you are going to work with gives you a clear focus on what their aspirations and dreams are "
- The project teams discuss not only their achievements but also their failures and learn to beat them in future iterations. This is a true example of the famous saying "Problems are not stop signs, they are guidelines" and also as Archibald MacLeish (1958) quotes "There is only one thing more painful than learning from experience and that is not learning from experience."

The major lessons learnt by the teams involved in this project through reflection are mentioned below:

- The importance of design freezes in any engineering project should be of critical value and deadlines should be counted after design freeze
- The group discussions should be done in the project area so that all the work is in front of the team physically as well.
- The teams in the discussion should be in small groups to focus on the actions easily.
- The Minutes of the meetings are of extreme importance which should be recorded, circulated and strictly followed-up for status of the actions planned in the meetings.
- Planning of the Project Review Meeting is of the same importance as the planning of the project itself. It is wastage of time and effort to jump up for a meeting without the complete status of the iterations and MOMs.
- If advanced operational maintenance is required in any engineering project, the maintenance contract should be given to the vendor so that the teams get hands-on experience on the equipment by practice.
- The importance of Flip Chart should also be highlighted; anyone with an idea at any time could write any iodea for improvement on a flip chart and stick it up in the workspace where all can see. These ideas should be gathered for the next Project Review meetings and could save more time and focus on some ignored issue of importance.
- The goal of the discussion should be achieving the goals through practice and encouragement not to highlight the problems or failures of the team.

- In order to implement justified actions, the actions should be planned and prioritized by the team themselves and not by the project manager.
- Action plans should be clear and agreed by the person accountable for them.

• **Improved Outcome- Learning through Reflection**

Reflective practice is the mean of assisting us to think, to explore our thoughts and feelings and to work through an experience, in an attempt to gain new understandings, fresh insights and awareness. This part of the report analyzes how ‘learning through reflection’ could have improved the outcome of this project and would affect the outcome of the future projects of X-Cement Ltd.

Change of the project management methodology involves great measures to be taken and faces a lot of hurdles. As this project was the about implementing the Agile Methodology it involved Single loop learning (SLL) which is the repeated attempt at the same problem, with no variation of method and without ever questioning the goal. The ‘Learning through reflection’ could have improved the outcome to a significant amount if the team would have been engaged in ‘Double-Loop Learning’. The work of Chris Argyris (1923-) describes the concept of double-loop learning (DLL) in which an individual, organization or entity is able, having attempted to achieve a goal on different occasions, to modify the goal in the light of experience or possibly even reject the goal. This would allow the team to improve the methodology they have implemented over forth-coming projects.

In this project, X-Cement Ltd should have incorporated or should have reviews any measures to support the process improvement through reflection. The same would then have required flexibility in the methodology as Sevlan (2009) said “we know that organizations are typically anti-change” therefore as per Sevlan (2009) introducing any change requires some sort of change management (Söderlund, 2010). This change management would track the changes made during the project reviews and further their effects on the improvement of the team.

As Michel Eyquem de Montaigne said that “It is good to rub, and polish our brain against that of others”; A company-wide project experience sharing could also have given a lot of impact on the project success and would be of core importance in the next project of X-Cement Ltd.

• **Conclusion**

Now the power house of the X-Cement Ltd has the latest load management system installed with the flexible logics of operation which allows them to use any or two of the sources to run and handle the load and switch any of the load On/OFF from a simple but detailed MIMIC screen. X-Cement has now implemented Agile Methodology and their team is continually improving the methodology through reflection.

The report explains the importance of the reflection and learning by reflective practice in the project environment. The report explains a unique project of implementing Agile Methodology in a Cement Industry which is normally though of developed only for the IT Industry.

The report proves that Reflective Practice (project review meetings) can allow the project team to learn from their failures in a ‘safe’ and constructive environment. As Donald A. Schön (1983) said “Reflective practice is a dialogue of thinking and doing through which I become more skillful”.

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