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PROJECT TEAM LEARNING IN MEGA PROJECTS: ARE WE TRULY LEARNING THE LESSONS?

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ABSTRACT

With the increasing focus on organizational learning in project organizations, it becomes curtail to understand the learning process and how it evolves within project teams. There is limited and shallow coverage of learning and its challenges in a project team environment. Moreover, there is contradicting views in the literature as to whether learning is truly happening on projects. This paper will investigate through a multiple case study the approach to project team learning in mega projects. Key findings from this study will identify the root causes of project team failure to learn and the challenges and barriers faced by project teams in fostering a learning culture. Moreover, the study will highlight a set of enablers that can be implemented in projects to enhance the learning capabilities of both individuals and groups working as project teams which will eventually lead to a learning organization.

BACKGROUND

The concept of organizational learning and learning organization started to evolve in the early 1990s, with an increasing focus on human and intellectual capital as the primary resource for business organizations, as opposed to financial and tangible resources. A learning organization is "the one that facilitates the learning of all its members and continuously transfers itself" *(Senge, 1990, p. 14)*.

Although several articles have been published discussing learning organizations, few studies have been completed on learning organizations in the engineering and construction environment *(Barlow & Jashapra, 1998; Kululanga, Price, McCaffer, & Edum-Fotwe, 1999)*. Therefore, relatively little is known about whether learning occurs within projects in the engineering and construction industry. Engineering and construction organizations are becoming increasingly project oriented, and their revenues are structured around projects. Such organizations are called "project-based organizations". In project-based organizations, a significant portion of the learning happens within project teams. Senge *(1990, p. 60)* defines team learning as "the process of aligning and developing the capability of the team to create the results its members truly desire." Organizational learning must include individuals, teams and the overall organizational system. While learning within an organization starts at the individual level, Individual learning by itself is not sufficient. An essential component of learning is the one that happens within project teams *(Baker & Neailey, 1999)*.

Project-based organizations have some characteristics that make it suitable entities for learning to be developed. Projects organizations are, by nature, temporary organizations, and learning generated in a project will likely disappear at the end of the project without established procedures and process to collect and disseminate knowledge *(Williams, 2007)*. Ekstedt, Lundinm, Soderholm and Wirdenius *(1999)* for example discusses the central importance of "knowledge formation" *(by which they mean the combination of learning and embedding that learning)*. Generally, permanent organizations, have established processes of capturing and sharing learning across the organization, however, the newly established project based organization is structured around temporary entities that is task-oriented and not adaptable to learning. Secondly, individuals become more able and experienced, but there is often no mechanism or motivation for that learning to be shared within the company. In temporary organizations, the most important thing becomes to combine project members and the necessary resources to execute the project.

Ayas and Zeniuk *(2001)* discuss promoting projects as learning vehicles and developing communities of practice. Similarly, Sense *(2003)* discusses the importance of managing learning in project teams and describes project teams as "embryonic communities of practice" as they provide a focused environment to foster learning across groups and project teams. Aurther, Defillippi, and Jones *(2001)* also look at project-based learning, classifying project success by both dimensions of project performance and learning. Davies and Brady *(2004)* show how knowledge generated by learning from projects could result in significant improvement to the project in particular and to the organization in general.

Therefore, in order for project teams to act as learning entities, implementation strategies and actions should be put in place to encourage a learning focus. However, by simply acquiring the required skills and desire for learning is not sufficient to spread learning across the organization. There are often aspects and requirements for a project team to be able to absorb this culture and understand how to work in a situated environment and how to share knowledge and learning across project teams and to other departments within the organization. Such aspects and requirements will be covered throughout this paper.

1. The Problem

With the increasing focus on both individual and organizational learning as key component in the development of project team learning, it becomes important to understand the learning process associated with projects *(Senge, 1990)*. However, literature on this cross-disciplinary topic is rather limited. According to Sense *(2007, p. 415)*, "there is an extremely limited and rather shallow coverage of learning and its challenges within project team environment in the current literature of learning". Fortunately there are some exceptions to this view which looks more into the learning phenomena within a project team environment *(Ayas, 1998)*. Limited but recent literature on learning has started to identify some of the challenges and opportunities associated with project team learning *(see Aurther et al. 2001)*. This work adds to an increasing demand across

project management, organizational learning and knowledge management literatures on the importance of identifying and dealing with the sociological dimension of learning. What seems to be a noticeable gab in the literature around project team learning is the structure of organization that will support learning within project teams *(Sense, 2004)*.

Moreover, there is a problem with the existing views on project learning in the literature. Although the literature about learning emphasizes the potential for learning in projects, it also highlights the difficulty in archiving that learning *(Ayas & Zeniuk, 2001)*. While there may be a significant amount of learning happening within a project, this can be difficult to capture and share across projects *(i.e. from one project to another)*, or between the project and the wider organization *(Principe & Tell, 2001)*.

The purpose of this research paper was to explore in depth the issue of project team learning in major projects in an effort to understand the true reasons behind failure to learn and what prevents the project team from improving their learning skills and reflecting their learning from past to future projects leading to improved project performance.

2. Research Theoretical Framework

To understand properly how learning occurs within projects, several theories have been reviewed and studied by the researcher. Several disciplines have examined learning from different perspectives including: adult education, applied psychology, sociology, organizational behaviour, and recently neural science. The topic of learning tends to cover a wide spectrum and is still evolving to a large extent. Learning is highly sophisticated in a way that it cannot be tackled from one angle or perspective and one cannot simply rely on a single theory or approach to explain such sophisticated phenomena. Such phenomena encompass psychological factors, sociological, biological, as well as organizational dimensions.

In an effort to better understand this topic, the researcher developed a conceptual framework based on the theories discussed above: social cognitive theory *(Bandura, 1977)*, transformative learning theory *(Mezirow, 1991)*, and situated learning theory *(Lave & Wenger, 1991)*.

The research conceptual framework illustrated in **Figure 1** represents the research prepositions that the researcher will rely on to explain project team learning. From the previously discussed literature and theories of learning, the researcher argues that project team learning is a combination of individual learning and group learning both happening in different ways at the same time. The individual learning is mostly cognitive driven. This is explained by the social cognitive theory and the transformative learning theory, while the group learning is mostly social in nature and is explained by the situated learning theory. The two are very different learning approaches, however, each must be considered to provide better understanding of the learning behaviour. The strength of this approach is that it does take into consideration two different perspectives of learning supported by three well established theories of learning behaviour.

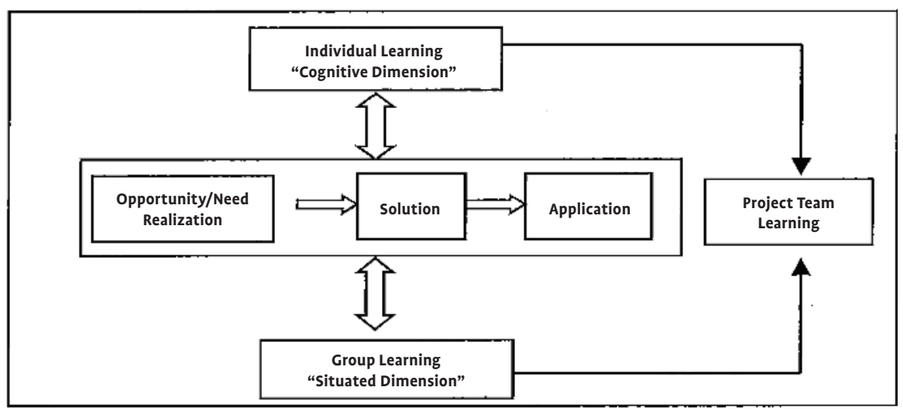

FIGURE 1. *Research Theoretical Framework*

3. Methodology

To address and investigate learning practices in project-based organizations, an in-depth multiple case study approach is more suitable to understand the specific organizational practices that pertain to learning within projects. Case studies are best suited to situations in which a researcher wishes to better understand an individualized outcome *(which may be an organization, group or individual)* or where there is interest in a particular case *(Patton, 1990)*.

Because the topic of learning is complex and would encompass confidential information about organizational practices that will not be easily shared with an "outsider; It was seen more appropriate to conduct qualitative in-depth case studies with each project team in order to better understand the learning process.

The case study approach will have the advantages of providing "thick and rich" data that will maintain the same context from which the data will be extracted. In addition, the case study - through the use of several rounds of interviews - will enable the researcher to dig deep into the data and reveal all the facts and in-depth issues related to the topic. Another advantage of the case studies is that it will allow the researcher to collect vast amount of qualitative data using several collection methods including: documents and archival records review, interviews and observation. It provides the ability to validate much of the data collected from several sources. On the other hand, the main disadvantage of case studies is that it will only provide data and results that are specific to the context and situation in which it was conducted and cannot be generalized to a wider population. In addition, case studies are normally labour intensive, time consuming and tedious when it comes to collecting and analysing the data and making sure it is properly interpreted.

A case study explains phenomena in their natural settings and uses multiple methods to collect data. According to Benbasat, Goldstein and Mead *(1987, p. 370)*, such a method is appropriate when the "boundaries of the phenomena are not clearly evident at the outset of the research and no experiential control or manipulation is used". The aim to explore the nature of team learning in projects justifies the use of the case study method. This is because of the need to take into account the natural settings in making sense of those learning practices, and because of the limited prior research in this area *(Cooper, Donald, & Emorny, 1995)*. Moreover, case studies are normally used when the research is focused on the "how" and "why" questions which requires qualitative analysis *(Yin, 1994)*.

4. Data Collection

The selection of cases is extremely important in order to address clearly the research objectives and questions and achieve diversity in outcomes and the ability to compare contrasting views. Because learning is content and context specific, the selection of case studies is meant to address those two variables and be able to control them in the most appropriate way. For this purpose, two case studies were selected. Case studies one and two will be two different types of projects selected from within the same organization in order to control the organizational context variable with two different projects being investigated.

Case Study A

Project A is a major program of projects aimed at developing the transmission system in Western Canada. The program consists of several projects to be executed over a 10-year timeframe. The scope of this program includes the upgrading and expansion of existing electrical substations in and around several cities and towns in western Canada. It also

includes upgrading all the telecommunications equipment in existing substations. The total value of the project is approximately $ 4 billion CAD.

The case study involved reviewing relevant documents and conducting semi-structured interviews with members of the project team. Project team members from a variety of backgrounds and the major functional departments *(engineering, procurement, construction, project controls and project management)* were contacted to participate in this study. Twelve project team members agreed to participate in the interviews. The sample included people with different levels of experience and different roles in the project which helped to enrich the results as it represents a variety of opinions and perspectives. The people interviewed were; lead electrical engineers, junior electrical and civil engineers, cost controllers, schedules, buyers, contract administrators, the construction manager, the project controls manager and the project manager.

Due to their heavy workloads, it was very difficult to convince project team members to participate in these interviews. In order to overcome this problem the researcher found the best approach was to conduct the interviews in the office either during lunch hour or during working hours when the interviewee was more available. Initially 12 interviews were conducted to understand the issues related to learning barriers, individual learning, group learning and the learning process. After analysing the results of these initial interviews, the researcher noticed new concepts and ideas that emerged and need further investigation. It was then decided that additional supplementary interviews should be conducted to investigate these issues. Seven supplementary interviews were conducted. After completing the supplementary interviews the researcher noticed a pattern of repeated concepts, themes and ideas. At that point, it was decided that saturation had been reached and no further data collection would be necessary. All the interviews were audio taped with the exception of two, where participants did not feel comfortable with the audio taping, in which case the researcher took notes during the interview. One interview was conducted over the telephone with the construction manager who was mostly on site and could not be reached at the office. All the audio taped interviews were transcribed and the recordings saved in a secured location.

Case Study B

Project B is a high voltage 240kV transmission project aimed at developing the transmission and substation facilities in western Canada. The scope of the work was to engineer, procure, construct and commission numerous stations and transmission line improvements to accommodate the overall transmission system development. The work will be constructed in three different substations: station A, B and C, in addition to connecting the three substations with a major 240kV transmission line. The project's original budget was $ 65 million. The project started in January 2006 and was completed at the end of 2010.

Similarly to case study A, a group of project team members working on project B were contacted to conduct individual interviews. Ten project team members agreed to participate in the interviews. The sample included people with different levels of experience and with different project roles which helped to enrich the results as it represented a variety of opinions and perspectives. The researcher noticed the same problem in project B with regard to participation in the interviews – due to heavy workloads and busy schedules it was very difficult to convince project team members to conduct this interview. There were times the researcher had to reschedule interviews more than once due to urgent work that prevented participants from attending the interview. The people interviewed were; lead electrical engineers, junior electrical and civil engineers, cost controllers, schedulers, buyers, contract administrators, the construction superintendent, and the project manager. Initially 10 interviews were conducted to understand the fundamental practices related to learning in project B. Seven supplementary interviews were also conducted. After completing the supplementary interviews it was then decided that data saturation had been reached and no further data collection would be necessary. All the interviews were audio taped. One interview was conducted over the telephone with the project manager, who was out of town on a business trip. The rest were face-to-face interviews conducted at the office. All the audio taped interviews were transcribed and saved in a secured location. In both case studies, the researcher also took notes on key issues and ideas that emerged during the interview discussions and kept it in a special log book.

5. Content Analysis

Case Study A

In qualitative data analysis the researcher often looks for concepts, ideas and themes in the data and observes common patterns. The researcher looked at each interview transcript separately, and read the whole transcript initially to understand the issues and ideas discussed. The analysis procedure used a combination of post-it notes® and qualitative software *(Atlas ti®)* to manage the data analysis process. Each interview transcript was analysed separately. Notes and codes were recorded on the margins beside each paragraph.

Case Study B

The analysis procedure started with open coding using post-it notes® and qualitative software to manage the data analysis process. Codes were noted in each paragraph and memos were taken to explain and define the codes in a proper way. The second run of the data helped the researcher in grouping similar codes into categories of related ideas and themes. All concepts and themes were also grouped in terms of related codes. Similar to case A, all the interview transcripts were analysed separately and coded, then the results were all combined together.

6. Results & Discussion

Analysis of the two cases separately indicates that there were common concepts and themes between the two cases that were used as a basis for the analysis. However, there were differences in some instances between the two cases in terms of the learning problems that exist in the project and the suggested strategies and actions to be taken by the team to avoid repeated mistakes and improve learning by the project teams. The following is a discussion of results obtained from the two cases in terms of the key learning issues investigated.

Learning Barriers

Crucial to the understanding of a learning phenomenon is to understand the barriers associated with it and to know what could prevent learning from occurring and prospering on major projects. Such barriers include:

Reluctance to Share

Although this was noted in both projects, it was identified in the interviews that this reluctance is unintentional and that people are generally cooperative and willing to share information and learning. However, for project A it was mostly the lack of time and insufficient project meetings to enable sharing and communication of lessons-learned or even project-related information. For project B, the team even regarded sharing as additional work that is not generally required and not part of the job requirement. People normally avoid sharing unless it is specifically requested. Other reasons offered by project team A were lack of time, or sometimes not having the information to share with other team members. Interviewees in project B indicated that busy people have difficulty sharing their learning, resulting in lost learning opportunities by the project team.

Training & Mentorship

Both project teams agreed that there is lack of training and mentorship in the organization, mainly attributed to lack of time and busy senior-level people who cannot find the time to train newly hired and junior team members. A senior lines engineer stated: "We have to think of individual improvement of our team and keep them educated. We have to consider training, bringing in speakers and providing up to date information to the team."

Culture and Language Barriers

Due to the diversity of ethnic backgrounds in the organization, project team members consist of individuals from different countries across the world. This was a very dominant pattern across the organization; as these people come from different cultures and speak different languages. The culture and language barrier becomes very dominant and impacts the learning practices of those individuals. According to one interviewee "It is difficult to get those people to communicate properly and the older they get the harder it is to engage them". Project

team A suggested ways to deal with this barrier such as; creating an open culture where people can freely express their ideas and opinions, organizing team-building sessions and listening actively in meetings and group discussions. Project team B suggested to generally start by using written communication with those individuals until they feel more comfortable to speak and discuss in groups.

High Turnover

Both projects clearly suffered from high turnover rates. Project team A strongly attributed this to booming market conditions as well as lack of training and mentoring. Project team B also pointed to heavy workloads as a contributing factor to this high turnover. At the same time, both project teams agreed that some internal reasons also contribute to this including: frustration with work processes and corporate systems, and financial reasons.

Lack of Communication

Clearly this is a major concern to both project teams. Project team A identified three levels at which communication is lacking; inter-disciplinary communication, cross-functional communication, and communication across projects. Project team A attributed this lack of communication to heavy workloads and strict deadlines, which does not give people sufficient time to communicate with their project team. It was noted from the two cases that as the circle of communication grows larger, the effectiveness of communication is lower.

Individual Learning

The following concepts were noted in the two cases:

Work in Silos

It was noticed by both project teams that a major factor influencing the individual learning capabilities is the tendency to "work in silos". As human beings, people generally tend to work in isolation of each other and avoid interaction with colleagues. Project team A attributed this to the absence of a sharing culture and an outlet to facilitate interaction among project team members. Scattered project teams is also a factor, as the project team is actually located in two different office buildings and they rarely meet together, which makes communication difficult among people who hardly know each other. Project team B indicated that some team members avoid interactions because they feel they will be blamed and criticized for their opinions or ideas, so they prefer not to share anything.

Resistance to Change

Among the individual barriers to the learning process is the resistance to change. People normally develop their own working patterns and habits based on their past experience and personal preferences. This is called the "comfort zone." Each individual develops his own comfort zone and likes to stay in it. When a new change is introduced, people are reluctant to accept it and they sometimes resist this change. Project team A emphasized the role of the project manager to introduce the change to his team. Project team B recommended incentives and recognition for distinguished team members who can embrace the change and apply it smoothly. Both project teams emphasized the role of active listening in understanding the change and accepting it.

Disengagement

It was clearly noticed for project A that junior team members felt that they are disengaged from the project and not informed about major changes. One junior lines engineer stated: "Probably one of the major barriers to learning is the fact that you are only exposed to certain aspect of the entire project out of the big picture. You are not exposed to other aspects." This was a result of busy lead engineers and senior team members who cannot find the time to update their subordinates on recent changes that are happening on the project. There were also insufficient meetings to engage the project team. However, it was also noted by project team A that the individual is also responsible for engaging himself in the project by approaching senior members and attending meetings as necessary.

Learning Diary

When asked whether each member actually keeps a learning diary to document lessons-learned on a regular basis, most of the individuals interviewed stated that they do not, although they admit that this is something useful. Only two senior engineers stated that they do keep some kind of a learning diary. The main reasons for not keeping a learning diary were the lack of time and lack of incentives to document learning. Project team members are too busy to the extent they cannot find the time to maintain this diary which is a fairly extensive task that needs sufficient time. "I think it is difficult to maintain a learning log, it is boring, irritating and difficult to do…. It is useful, but it is difficult to do," a civil engineer on project B noted.

Group Learning

The following factors were related to the group learning aspect:

Reward & Retention

Both project teams agreed that rewarding and retention mechanisms have to be in place in order to encourage team members to learn as a group and communicate their learning in group settings. A scheduler on project B noted: "Financial rewards are always good. But it also helps to give incentives for people to get promoted and grow with the organization; this will encourage them to share their lessons-learned." Some of the suggested mechanisms to enable that are: financial rewards, acknowledgement letters, career progression plans and promotions.

Leadership Role of Project Managers

An important factor in fostering group learning is the leadership role that the project manager can play to build a cohesive team and align project team members together. A common problem noticed by both project teams was the lack of team spirit and sense of belonging to the project in particular and the organization in general. A lines engineer on project A noted: "One of the barriers to learning is that project managers seem very distinct from the team, and do not know exactly who works on their projects and who does what. Project managers rarely bring the team together and communicate their vision." On project B, the project manager stated: "I think it is the matter of communication and the ability of the project manager to create bonds among team members." Both project teams suggested similar techniques to help the project manager accomplish this task such as: team building sessions, team alignment through project meetings and socializing.

Communication Channels

There was clearly lack of communication on both projects. Project team B attributed this to fragmentation of the project team, which worked between two offices, and suggested more regular meetings and socializing among team members to break the barriers and facilitate information exchange. Project team A attributed this lack of communication to the disengagement of team members and suggested several solutions to improve communication such as: small group discussions, storytelling, brainstorming sessions and socializing.

Lessons-Learned Sessions

Both project teams agreed that they should be having lessons-learned sessions where team members get together at a certain stage of the project and start capturing and discussing lessons learned in order to draw on experience from the project. Project team A, however, indicated that these sessions have to be properly planned and executed in the sense that they should be topic specific with a specified content of issues to be discussed. The session has to be informal, everyone has the right to present his ideas and opinions freely without any criticism, and there should be a focus on active listening to those opinions and ideas by fellow project team members. Project team B emphasized the importance of face-to-face dialogue, sharing knowledge and the notion of "knowledge experts" where the company nominates certain individuals who have specific knowledge and professional skills in certain fields of the work, so that project team members can refer to those experts. Project team B also emphasized the need to develop a classified lessons-learned database to store lessons-learned in a way that facilitates access and sharing of those lessons.

The Learning Process

The following factors were related to the learning process:

Transitory nature of project teams

One of the barriers to the development of a learning process is that project teams are often dismantled as soon as the project is completed and in many cases some project team members even leave the project before the end of it due to shortage of resources and the need to deploy them to higher priority projects. As a result, a

learning opportunity is lost by the departure of a project team member to another project. The high turnover is also a contributing factor, as some of those team members leave the organization to pursue other job opportunities. In other cases, project team members may also leave their project role due to their personal preferences or even sometimes a specific request made by the client to replace certain individuals. All of these factors were clearly defined by project team A as contributing factors to failure in project learning. Project team B also indicated that, as a result of this movement of project team members, the project will undergo productivity losses as the new team member joining the project needs time to become familiar with the project. The team suggested that there should be better resource planning to minimize the movement of project team members as much as possible.

Reluctance to Support Lessons-Learned

The in-depth investigation of this issue with both project teams indicated reluctance from the senior management side to support lessons-learned initiatives. Both teams felt there is lack of incentive to support such activity due to the fact that both projects are actually cost-plus contracts. "I do not think lessons-learned should be part of our job description," said the project controls manager in project A. There is an implicit assumption that with more hours billed to the project, more profit is achieved. Hence the idea of avoiding mistakes is not so appealing. There was also the feeling that this is a low priority issue in senior management's agenda due to lack of time and other commitments that were deemed more pressing. On the other hand, given the fact that both projects suffered severe shortage of resources, there was no resource dedicated to the lessons-learned exercise. Heavy workloads are also a contributing factor, as it prevents team members from focusing on lessons learned and distracts their attention.

Corporate Culture

Both project teams felt that the corporate culture is not supportive to learning and does not create a suitable learning environment where people can freely share and communicate learning. Moreover, project team A indicated that there is lack of interaction between senior managers and project team members; so they felt that they are left on their own and the project team felt that they are isolated from the rest of the organization. Crucial to the improvement of learning is the development of professional skills. Although senior management publicly claims that they support this, in reality it was hardly seen by project team members who suffered from the lack of training and mentoring. Project team A also noted that engineering standards and reference materials were outdated. Project team B attributed this to the lack of a formal lessons-learned process that is supposed to guide, regulate and promote learning in the organization. They also noted that corporate systems and software tools are not adaptive to learning, making the process so frustrating to project team members that they would abandon it.

The analysis of cases A and B indicated many similarities in the concepts and ideas expressed by both project teams. There seems to be an agreement between the two cases on the problems and challenges preventing learning improvement in project teams. However, the solutions and strategies that should be adopted by the organization to improve and foster learning on projects somehow differ between the two projects. In the instances where there was a difference in the root causes of problems or the suggested strategies to deal with them, it was more due to the differences in opinions between certain individuals in project team A versus project team B or difference in the nature of the project and practices specific to it.

7. Root Causes of Project Team Failure to Learn

During the interviews with both project teams, the researcher tried to explore the causes and problems leading to lost learning opportunities and insufficient learning on projects. The researcher was asking questions in order to dig deeper into the root causes. Several "why" questions were asked to reach the root causes that lead to failure in project learning. The following is a description of these causes as defined by both project teams.

High Turnover

This has an indirect impact on learning on projects. High turnover was a major concern to the entire organization, not only to projects A and B, although it was more apparent on project B than project A. The booming market of Canada and tremendous opportunities in the oil and gas industry created an environment where people can move easily from one project to another or from one organization to another. Those individuals who depart from the project have accumulated a certain amount of learning and knowledge gained by working on the project. This knowledge and experience is lost without properly capturing and documenting what has been learned by those individuals. When a new member joins the project team as a replacement, this new member has to start from scratch and take some time to study and understand the project. The whole learning cycle will start all over again.

Lack of Time

The sudden growth in electricity demand across western Canada has created a tremendous need for many projects within a fairly short period of time. In order to accommodate the growing needs of the oil sand industry in the North as well as the sudden domestic and industrial urban expansion, there is a big push by the government to proceed with these projects quickly. However, there is also a severe shortage of resources in this field and very few companies that specialize in designing and constructing high voltage transmission lines and power substations. As such it was noticed that both projects under study suffered very tight schedules and strict deadlines by the client, coupled with shortage of engineering resources for the project, this resulted in heavy workloads on both projects.

Lack of Training and Mentorship

It was noted that for both projects A and B no training and mentorship plans are adopted by functional managers to train and mentor juniors and new hires on company work processes and procedures. This was mainly attributed to shortage of senior people and lead engineers who can hardly find the time to cope with all project deliverables and client needs, so they do not have the time to train and mentor junior staff.

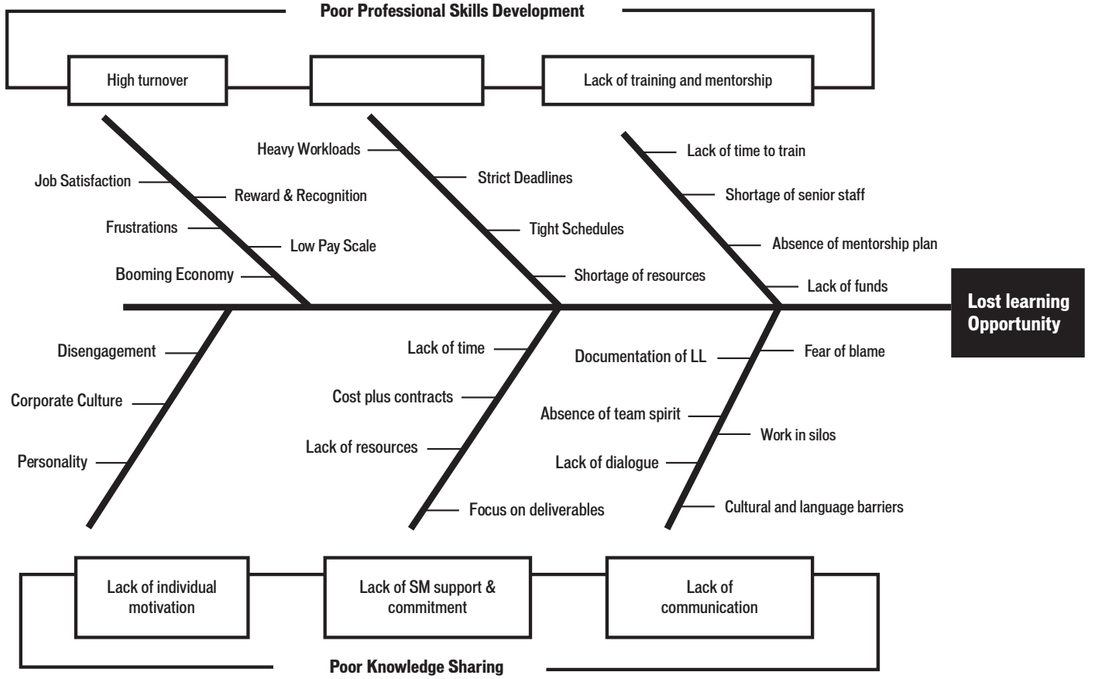

FIGURE 2. *Fishbone diagram - immediate root causes of project team failure to learn*

Lack of Individual Motivation

A curtail factor in the improvement of individual learning is the individual's motivation to learn and improve him- or herself. It was expressed by project team members in project A, especially senior staff, that some junior team members are not very keen to learn and not willing to put in an extra effort to improve and learn new skills and techniques. Junior team members are less motivated than other team members, and are not willing to go beyond what they were specifically asked to do as part of their job requirement.

Lack of Senior Management Support

The in-depth interviews with both project teams highlighted the role of senior management in supporting lessons-learned initiatives on the project. It was clear to members of both teams that this was not the case. There is no interest from senior management to support this initiative. The direct causes of this were lack of time and resources to embark on such initiatives, as well as being busy with other strategic management initiatives that are deemed more profitable and higher priority to senior management.

Lack of Communication

It was largely agreed in both projects that there is a major issue with communication on all three levels: cross-functional communication, interdisciplinary communication and communication across project teams. This lack of communication was both in terms of communicating learning and sharing knowledge as well as communicating project-related information.

Finally, looking at the big picture of project team learning we can classify root causes of project failure to learn into two groups: poor professional skills development and poor knowledge communication. These two major factors along with subsequent causes will result in lost learning opportunity for the project and therefore causes team failure to learn as depicted from the fishbone diagram in **Figure 2**.

8. Conclusions

The learning process is a complex psychological and social process that involves several factors related to the execution of projects including individual, group and organizational issues. It is a process that is impacted by many internal and external factors. Therefore, it is very difficult to manage this process as it requires deep understanding of social relations between team members as well as understanding individuals' behaviours towards learning.

The implementation of a learning process within an organization requires strong belief and serious commitment from senior management to support this journey all the way through. It requires long-term strategic planning as organizations should not expect to reap the benefits in the short term. It is a radical change to organizational norms and practices that will take time, effort and resources before it reflects any significant improvement.

The case studies indicated, surprisingly, that there is no incentive for learning in the organization. Clearly the main reason is the current business model in project-based organizations as it stands and which revolves around billable hours and is more focused on short-term direct profit rather than long-term sustainable improvement. More mistakes, more changes, more studies, more design alternatives, all of which means additional revenue to project-based organizations. Significant improvements in project learning will require radical changes to the structure of the business model and more alignment of project stakeholders towards a common goal.

There are a number of barriers identified in this research study that would impact project team learning either directly or indirectly. These barriers and factors tend to affect project learning on three different levels: individual learning, group learning and organizational learning. The basic building block of a project team is the individual member. Therefore, the focus should be on building and enhancing individual learning through the professional's skills development of team members.

To answer the question of "Are we truly learning from projects?" It was concluded from both case studies that a certain level of learning is already being achieved by individuals. However, it was mostly the individuals' capabilities, skills and motivation that led to this individual learning. There is room to improve individual learning by investing in the development of professional skills. On the other hand, the group learning dimension is obviously missing in both cases and is the immediate challenge on which the organization should focus to improve project team learning. There should be more focus on the social relationships between members of the team, as well as improving communicative learning.

Moving from the individual learning level to the group learning level is a big challenge. However, if the organization wants to become a "learning organization," the next level of improvement should be improvement of organizational learning. This is a big change to current organizational norms and practices that will take a long time and much effort to implement. Organizations should aim at improving work processes and corporate software tools to make them more adaptive to learning. This step is very crucial if the organization wants to make significant improvement in the transfer of lessons learned across projects.

authors

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