July 2016

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NISHA GUPTA

Department of Computer science Punjabi University regional Campus, Mohali Punjabi University, Patiala (Punjab), nisha.nishagupta.gupta@gmail.com

JAGPUNEET KAUR BAJWA

Department of Computer science Punjabi University regional Campus, Mohali Punjabi University, Patiala (Punjab), jagpuneetbajwa@gmail.com

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Recommended Citation

GUPTA, NISHA and BAJWA, JAGPUNEET KAUR (2016) "ANALYSIS OF KNOWLEDGE SHARING PRACTICES IN DISTRIBUTED AGILE ENVIRONMENT," *International Journal of Computer and Communication Technology*: Vol. 7 : Iss. 3 , Article 1.

DOI: 10.47893/IJCCT.2016.1357

Available at: <https://www.interscience.in/ijcct/vol7/iss3/1>

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ANALYSIS OF KNOWLEDGE SHARING PRACTICES IN DISTRIBUTED AGILE ENVIRONMENT

NISHA GUPTA¹ & JAGPUNEET KAUR BAJWA²

^{1,2}Department of Computer science

Punjabi University regional Campus, Mohali Punjabi University, Patiala (Punjab)

Email:nisha.nishagupta.gupta@gmail.com, jagpuneetbajwa@gmail.com

Abstract-Knowledge plays a key role in the software development process. Knowledge is necessarily required at all the phases of software development life cycle. Knowledge is the core resource, so organizations are now attempting to manage it in more efficient and systematic way. Knowledge sharing plays a very important role in the successful development of software. Knowledge sharing in distributed agile team is helpful in achieving the goals like better quality of products delivered on time and at lower cost. Our research analyzes the knowledge sharing practices in distributed environment and found the best implicit and explicit knowledge sharing practices.

Keywords: *distributed agile environment, implicit knowledge sharing practices, explicit knowledge sharing practices.*

1. INTRODUCTION

Software engineering tends to adopt better practices for development so that they achieve better heights and stability in their produced products. In traditional approach or heavy weight methodologies the work starts with discussion about requirements of development, documentation of a complete set of requirements, after that the design is developed according to the given requirements and project goes on to completion. The main disadvantage found in traditional approach was fixing the product functionality in very early phase of the project and plan everything in advance then following it, which affect its use in unplanned and complex environment, due to this, the approach was known as Plan Driven. Project failure rate is quite high in traditional approach because of upfront planning. During the mid nineties, group of practicing software engineers grouped together some of the existing software practices into a new software development methodologies which was known as Agile Methodologies. These methodologies are developed to overcome the limitations of heavy weight approach. Unlike traditional methods, agile methodologies employ small iterations and pass tacit knowledge within the development team. A true agile process will have the characteristics like iterative, incremental and self organized by team members. Nowadays software's are developed by the teams which are distributed in different geographical locations. When the development teams are distributed then we need to create a proper communication channel for the success of project because communication is the major issue in

distributed projects and it creates gaps between the developer and user. Distributed projects require a proper knowledge sharing structure for the completion of products on time and according to the given requirements so they can achieve the success criteria. Knowledge sharing is the core for the success of products. Knowledge sharing involves the processes through which knowledge is passed between a source and a recipient.

In traditional practices we found that there is no proper mechanism for knowledge sharing in distributed teams, these practices are only effective for non-distributed teams. For making knowledge sharing possible between distributed teams the agile methodologies are adopted. The early advocates of agile said that these methods were not applicable for knowledge sharing in distributed environment. But now the agilists prove that sometimes it is difficult but if great care is taken then it is possible to adopt the agile methodologies for knowledge sharing in distributed environment.

2. KNOWLEDGE SHARING

Knowledge sharing is an activity through which knowledge is exchanged between people, friends, or members of a family, a community or an organization. Knowledge is related to particular subject, which is not a commodity that can be passed freely and easily to anyone. Knowledge sharing is not a technique of communication but it is related to communication in some ways. For knowledge sharing there must be a relation between at least two parties, one that share knowledge and the other that acquire knowledge.

based on observation and experience. It is something that is very much powerful because it is relevant and gained from experience. It is directly applied without any change to the activities that will need to be done in future. With tacit knowledge people are not often aware of the knowledge they possess or how it can be

2.1 Types of knowledge shearing:-

1. Implicit (Tacit) knowledge sharing
2. Explicit knowledge sharing

Implicit knowledge sharing: This knowledge is difficult to transfer by means of writing it down. It is

valuable to others. Effective transfer of tacit knowledge generally requires personal contact and trust of people.

Explicit knowledge sharing: This knowledge is easy to transfer by means of writing it down. It is opposite of implicit knowledge. This type of knowledge can be quantified. It is tangible in nature. This is not gained from experience. Specific laws and procedures are defined for this knowledge. This knowledge can be expressed in words and numbers and can be easily communicated and shared in the form of hard data.

3. KNOWLEDGE SHARING PRACTICES

Knowledge sharing practices includes the factors, plans, methods and techniques that the organization has to use in their daily operations for better productivity. These practices can be categorized as either those that transfer explicit (easily-codified) knowledge or those that transfer implicit (fact-based, cognitive) knowledge.

3.1 Methods for sharing Explicit knowledge:

Documentation: Documentation is a technique that is used to represent explicit knowledge. It is used for codification and documentation of processes in the organization. Documented data is used by the individuals when they required that data. In this technique there is no need to concern with another person because everything is available in written form. Documented procedures and policies are the most profitable for transferring knowledge to individuals and it provides clear instructions for performing repetitive tasks and duties. The individual with procedural knowledge have left organization but, these documented procedures always help employees in every condition [32].

Interview and Videotaping: Interview is a technique of explicit knowledge that is used for capturing information from those who participate in interview session. Knowledge capture interviewing elaborates a procedure for obtaining crucial tacit knowledge by conducting video interviews of knowledgeable staff. These interviews are managed by dividing it into short, retrievable video clips or other formats such as interview transcripts. Video tapping and interview transcripts are explicit knowledge methods that are used for providing the knowledge among staff members. Videotaping interviews are widely used in private sector for capturing the critical tacit knowledge from employees. Knowledge capturing interviews are often used as a short term approach to capture the knowledge of individuals those who wants to leave the organization. This technique is useful to capture the knowledge of those employees who plays very important role in all the processes of the organization. The benefit of this technique is that

the captured knowledge is reused by the other staff members in future [32].

Training: This technique includes the development program, qualification and formal training. Formal training and development program describes a method for defining, obtaining and widening the knowledge of employees that is required to carry out day to day tasks for a specific operation. It is a procedure for ensuring that specific organizational knowledge and experiences are transferred to replacement staff in a reliable and systematic way. Many effective and well established formal training, qualification and development programs are used in organization for enhancing the knowledge of employees[32].

Training Courses and Technical Seminars:

Training courses and Technical seminars are designed to elaborate the important skills and knowledge of the organization staff. These courses are developed using both internal and external subject matter experts to capture their unique knowledge and experience and to spread these widely throughout the organization. These courses and seminars are used to transferring knowledge from experienced to less experienced employees for improving their knowledge and skills [32].

Knowledge Management Overview Training:

Staff members need to understand the vision and expectations of higher management for knowledge capture, fetching, transfer and sharing. Managers and supervisors need to understand their roles and responsibilities under organizational knowledge management program and learn how the tools are used that they need to meet their responsibilities. All employees required an effective training on how and when to use the organizational KM practices and techniques. Organizations designed many courses which gives training to employees regarding knowledge management practices and techniques.

3.2 Methods for sharing Implicit knowledge:

Storytelling: Stories are the real life situations that are faced by someone. Normally it is finding that sharing stories an easy, interesting and effective way of illustrating solutions to problem situations and lessons learned. This is a method for experienced staff to share their knowledge and experience with others, so that the less experienced employees are learn from their experiences and able to face the abnormal conditions. This technique is available for sharing experience and it is use without constraints. It is used in work groups meetings, unit meetings, team projects, in some training courses and in some development assignments for sharing experiences.

Mentoring: Mentoring is a mutually agreed-upon relationship in which mentors advice and assist their mentees. This technique allows individuals to pair

with experts as needed to learn ways to improve their skills. The use of this technique is very effective in individual cases because it allows mentors to share their knowledge with individuals who need to obtain advice and guidance to enhance their knowledge and skills. Currently the organizations have very well elaborated career mentoring programs for less experienced staff [32].

Early Replacement Hiring: Organization uses the early-replacement hiring method to provide salaries and benefits funding for up to one year for the purpose of transferring critical skills, competencies, and institutional memory from an employee who is planning to leave the organization to a replacement employee. Under this the experienced employees share their experiences and knowledge with new employees appointed on their places, and helps in improving the skills of new staff members [32].

Rotational, Detail and Exchange Assignments: Organization uses rotating and assignments as developmental opportunities. From other view of knowledge transfer, these methods give individuals experience in performing the jobs of current employees and employees who are leaving an organization. Moreover, they are an effective way to transfer critical skills [32].

Teamwork: Work teams provide perfect environments for transferring technical knowledge on essential subjects and procedures. This is especially correct when teams are used to review and recommend improvements in key agency processes. Teams are generally created by management to work on projects and tasks so this Knowledge Management tool is already available and has widespread use [32].

4. OBJECTIVES

- To identify knowledge sharing strategies in distributed agile teams.
- Quantitative analysis of knowledge sharing in traditional and agile practices through questionnaires. (IT companies)
- To find the mostly used agile practices in distributed environment.
- To find the mostly used implicit and explicit technique of knowledge sharing in distributed environment.

5. QUESTIONNAIRE

To achieve the set of objectives, survey questionnaire are presented to the respondents with the criteria to assess the knowledge sharing techniques in organizations. Questionnaires are filled by the various employees from various departments of the companies.

It is divided into six parts:

1. About organization: Collecting information about the participated company.
2. General awareness: Collecting information regarding potential knowledge sharing policies.
3. Perception on Implicit knowledge sharing techniques: collecting information regarding awareness of these techniques.
4. Perception on Explicit knowledge sharing techniques: collecting information regarding awareness of these techniques.
5. Gaps: identify gaps in existing techniques.
6. Future line of research: information about the adaption of new techniques for betterment of products.

6. RESULT

6.1 Reliability test

The consistency of a score from a measurement scale is assessed with reliability test. In this research for checking the reliability of questionnaire the Cronbach's alpha is used. The value of Cronbach's alpha lies between 0 and 1. A higher value of this shows the greater consistency in variance of the sample test score. Usually the value of Cronbach's alpha more than 0.6 is considered to be reliable in survey research, but some statisticians considered 0.7 to be reliable.

Reliability Statistics

Cronbach's Alpha	N of Items
.845	43

From the above test we find the Cronbach's alpha is .845, which is more than 0.7 (.845>0.7). Hence we can say that the questionnaire formed is reliable.

6.2 Analysis of Implicit Knowledge Sharing Technique

Through the questionnaire we are able to know that how many employees are aware about these techniques properly and on the other hand we get to know about those employees those who have no ideas about these techniques. Formal interviews are conducted with respondents of questionnaire to collect their ideas regarding these techniques which help us to find the best or mostly used implicit knowledge sharing techniques.

Storytelling

This technique is helpful for unskilled employees to have knowledge from their senior's experiences. Through this technique the new employees get knowledge in advance that how they have to tackle with abnormal conditions if they ever faced these conditions in future. This is useful only when seniors want to share their experiences with juniors.

In distributed environment teams are located at different locations. The geographical differences between different teams create a big problem in the efficient use of this technique.

Mentoring

When the unskilled employees are working under the supervision of well skilled employee then they get knowledge from the senior skilled employee. This technique is helpful only when senior employee give right directions to the unskilled new employees. This increases the responsibility of senior employees because they are responsible for the every task performed under their supervision.

Early Replacement Hiring:

Through this technique the employees get all the skills of the leaving skilled employee. Use of this technique disturbs the leaving person emotionally. Therefore this technique is harmful for the future carrier of leaving employee.

Team Work

When the unskilled employees are working with the experienced and well skilled employee then they get knowledge from the senior skilled employees. Through the use of this technique the team members not only get knowledge and skills from team leader but also gain the knowledge of team members indirectly. This technique is helpful for increasing the

creativity level of employees and they learn how to face the abnormal conditions.

The use of teamwork improves the productivity of the company and further improves the quality of the produced software. This is easy to adopt and cheapest technique of knowledge sharing.

Rotational, Detail and Exchange Assignments

This technique allows the individuals to share their ideas among employees of the company. Some respondents are undecided because they don't use this knowledge sharing technique in their company. Some are disagreeing with this technique because they think that the use of this technique does not increase the skills of employees and it does not play any role in improving the productivity of company.

6.3 Analysis of Explicit Knowledge Sharing Technique

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Documentation

This is the oldest technique of explicit knowledge sharing. This technique is helpful for new employees because they easily get information about the produced products of the company. This is helpful for employees in re-engineering of products. This is effective if the documents are quickly updated. In distributed environment this technique is useful only when electronic data base is used.

Interview and Videotaping

The use of this technique is helpful for new employees because from this they are able to get knowledge of old and oldest employees of the organization. This technique is mostly used in the large scale companies. This is useful for future if these videotaping are properly maintained and stored safely.

Training Courses

Training courses are organized in most of the companies for their employees. These courses are helpful in improving the skills of the employees.

Technical Seminars

Technical seminars are organized in most of the companies for their employees. These seminars are helpful in improving the skills of the employees and give knowledge about the new technologies.

7. CONCLUSION

Knowledge sharing is the vital part of any organization as per the effectiveness of management and products are concern. Many products fail to achieve the success rate due to lack of information sharing. This is the important part of software industry as knowledge sharing is known to be the core of successful development. The early advocates of agile said that these methodologies were not applicable in distributed environment. But now the agilists prove that sometimes it is difficult but if great care is taken then it is possible to adopt these methodologies. For making knowledge sharing possible between distributed teams the agile methodologies are adopted.

Through this distributed teams are trying to achieve better quality of products on time and at lower cost & risk. In this survey based research it is analyzed that most companies are trying to create knowledge sharing culture for betterment of software products.

From the responses of the respondents it is concluded that 'Teamwork' is mostly used Implicit knowledge sharing technique and 'Training courses' & 'Technical seminars' are mostly used Explicit knowledge sharing techniques in distributed agile environment.

The result of this research helps the globally distributed teams to prefer the agile methodologies for software development. Through this research the distributed teams are able to select the best knowledge sharing techniques for the better quality of products.

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