A Simple Framework for Project Communications

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ABSTRACT
According to our research, communication is the most important area in managing software projects. Analyzing and improving communication practices may help us succeed in software projects. Developing frameworks and models of project communications is an important step in guiding us to conduct studies in project communications and project management. In this study, we developed a simple framework for project communications. The components of this simple framework include stakeholders, project information, communication capabilities, and project environment. Using this framework we were able to develop a project communications effectiveness measure as a part of project management effectiveness metric for software projects. This paper describes this simple framework.

Categories and Subject Descriptors
K.6.1 [Project and People Management]: Life cycles, Management techniques, Systems development K.6.3 [Software Management]: Software process

General Terms
Management.

Keywords

1. INTRODUCTION
Our research revealed that communication is the most important area among 15 project management areas in software projects [1]. These project management areas are communication, teamwork, leadership, requirements management, organizational commitment, project manager, stakeholder involvement, project monitoring and control, project planning and estimation, scope management, risk control, staffing and hiring, configuration management, risk assessment, and quality engineering. Furthermore, more than 38% of software projects are challenged in the communication area ranking fourth after scope management, requirements management, and project planning and estimation [2]. Forsberg, Moos, and Cotterman state that communication problems are the root causes of many project failures [3]. These findings clearly reveal the importance of project communications management in the management of software projects.

Software Engineering Institute’s Capability Maturity Model Integration Development (CMMI-DEV) is an important guide in the development and management of software projects [4]. CMMI-DEV v1.2 does not include project communications management as one of the process areas. Project Management Institute’s (PMI) Project Management Body of Knowledge (PMBOK) lists project communications management as one of the nine project management knowledge areas [5]. PMBOK only provides a basic model of communication. This basic model simply emphasizes the exchange of a message between a sender and a receiver. The key components in this model are encode, message, medium, noise, and decode. The basic model is provided in Figure 1. This model is very similar to how Shannon describes a general communication system in his seminal 1948 paper, “A Mathematical Theory of Communication” [6]. These models of communication have a mechanistic view and they are widely-used in electronics and computer networks studies. However, these models do not represent the concepts of project communications in the project management domain. Models and frameworks using the project management terminology would help us teach and understand the domain. Therefore, in this paper we provide a simple communications framework that is specific to project management domain. This framework guided the development of a project communications practices questionnaire. This questionnaire is used in the development of a project communications effectiveness measure as part of a software project management effectiveness metric [1]. Such use of the framework provides evidence for the usability of the framework.

The rest of the paper is organized as follows. Section 2 provides an overview of the project communications framework, while section 3 explains the components. The last section presents the conclusions and future work.
2. OVERVIEW OF PROJECT COMMUNICATIONS FRAMEWORK

A successful software project requires constant and healthy communications among stakeholders [1]. Grinter points out that good communication is vital to establish and maintain control over the software development process [7]. While the importance of communications in project management is well-established, it can be argued that the literature on communication practices, dynamics and effectiveness in IT software projects is limited. To conduct such studies, we need communications models and frameworks specific to project management domain. Furthermore, the unique aspects of software project development may require and benefit from domain specific models. These models will guide development of better project management tools helping to succeed in software projects.

According to Webster online dictionary, a framework is “a simplified description of a complex entity or process”. Project communications is quite complex. The simple framework presented here helps us to understand this complex process and it provides a simplified description of project communications. The framework has four main components: Stakeholders, project information, communication capabilities, and project environment. The simple framework is presented in Figure 2. In addition, using the framework we provide a definition of project communications. Project communications is the exchange of project information between stakeholders via the means of communication capabilities in a project environment. The framework may be extended; however, our goal was to develop a simple framework capturing the most essential components of project communications. We observed that this framework is sufficient in capturing the essentials of project communications.
Let’s examine the framework and its components. A project is developed by developers for customers and users with the help of and interference from other interested parties. In other words, a project is developed by stakeholders for stakeholders with the help of and interference from other stakeholders. As a result, stakeholders are an inherent component of this framework. A great deal of work in a project is devoted to generating and exchanging project information. To exchange project information, stakeholders hold meetings, write memos, disseminate project plans and status reports, request proposals, request changes, approve technical documents, have talks over at the coffee table, use whiteboards in the halls, and so on. Therefore exchanging project information is the activity at the heart of project communications. This exchange occurs via the means of communication capabilities. These capabilities include the traditional means of communications as well as communication technologies such as e-mail exchange servers, video teleconferencing (VTC), dynamic web pages (for example wiki pages), and so on. Every project exists in a project environment. The project environment is deeply affected by various factors such as organizational policies and procedures, cultural and social aspects, the geographical dispersion of stakeholders, the use of common terminology, the domain of the project etc. Therefore, project environment naturally has significant effects on the project communications.

3. FRAMEWORK COMPONENTS
There are four components of project communications framework. They are stakeholders, project information, communication capabilities, and project environment. This framework provides an abstraction of project communications at the highest-level. The detailed analysis of components and their interactions will reveal how complex project communications is. Let’s explore the components briefly.

3.1 Stakeholders
Project Management Institute’s Project Management Body of Knowledge [4] defines project stakeholders as “individuals and organizations who are actively in the project, or whose interests may be positively or negatively affected as a result of the project execution or successful project completion”. Stakeholders include developers, customers, users, contractors, subcontractors, and third parties. In a project development effort, stakeholders need project information to do their jobs. Developers require a needs identification document to understand the problem to be solved with the project. In the government acquisition process, a request for information (RFI) and a request for proposal (RFP) are examples of these kinds of documents. Executive management and customers need project status reports to monitor the status of their project. All development teams and user representatives need to be informed about project plans to synchronize their activities. Development teams need to learn about change and configuration management policies.

For every project, ideally the stakeholders must be clearly identified. While some stakeholders are obvious such as the customer and the developer, some stakeholders may not be obvious at first. For example, a company that produces supporting equipment or product for the product being developed is actually an important stakeholder. Since this stakeholder may need the specifications of the product to guide her own development activities for the supporting product. In a project involving development of an operating system there are many secondary stakeholders such as companies developing applications for the specific operating system. A company developing a database application may need specialized hard disks. There are many examples.

Certain activities are essential for effective project communications. Stakeholders and their information needs must be identified. All stakeholders need to understand the importance of communication. In addition, they must be committed to good communication. Certain people must be assigned responsibility for conducting communication activities. Not just formal communication but also informal communication channels must be created between stakeholders. There are a lot of best practices to achieve effective and healthy communication in a project environment.

Inherently, there is a constant flow of information between stakeholders to achieve the project objectives. Therefore, stakeholders are a part of communication framework.

3.2 Project Information
Project information is any type of information related to the project that needs to be communicated to other stakeholders. As emphasized earlier, stakeholders need project information to do their jobs. In reality, IT project organizations generate high volumes of information. Unlike a civil engineering project, the intermediate products of IT projects are mostly documents. An intermediate product is the result of a certain activity, step, or process. Project glossary, requirements documents, design documents, test scenarios, risk analysis documents, project plans, change control policies specific to project are examples of these intermediate products. In addition, project status, performance, risks, visibility, problems, and change in project plans are among the important types of project information required by stakeholders.

Information needs of stakeholders must be identified. Not all stakeholders need all types of project information at all times. Disseminating all the project information to all stakeholders is unnecessary and moreover it will create
disturbance rather than help stakeholders to do their jobs. In projects involving the development of secure systems, the distribution of project information should be carefully handled. The information should be disseminated on a need to know basis. In these types of projects, analysis of information needs becomes vital.

Project stakeholders need timely information. Information arriving late will delay tasks to be accomplished. Problems reported late will be harder to solve. Therefore, all project information has an inherent property that is its timeframe of relevance. Information arriving outside of its timeframe will prevent effective communication and coordination.

The frequency of project information distribution depends on the needs of stakeholders. Sometimes a report is only distributed once during the project, sometimes there are daily reports. The frequency may be once in a project, a few in a project, daily, weekly, biweekly, monthly, quarterly etc. This frequency has to be carefully determined to achieve effective communication and sufficiently satisfy the information needs of stakeholders.

While a portion of information needs are satisfied in a formal fashion, according to our research, informal communications within the team and stakeholders are also an important part of software project development environment [1].

Naturally, project information is a part of project communications framework. There are a lot of research opportunities related to project information issues. What are the information needs of stakeholders, how these needs are satisfied in a formal fashion and informal fashion, what should be the quality of project information are only a few of the issues to be researched.

3.3 Communication Capabilities
Communication capabilities correspond to medium in basic communication model. Communication capabilities consist of traditional means of communications as well as communication technologies. The traditional means of communications include face-to-face meetings, phone talks, written reports, memos, letters, and so on. In recent years, there have been quite a number of advancements in communication technologies. These communication technologies include databases, e-mail exchange servers, video teleconferencing (VTC), dynamic web pages and specific project management and communication tools. Effective uses of these technologies help to achieve good communication.

Today’s global environment enables projects having stakeholders from all over the world. These projects require necessary communication technologies to eliminate the effects of geographical dispersion of stakeholders.

Not all media types are appropriate for distributing certain project information. Sometimes a simple phone call will be sufficient to inform about a project problem instead of sending a formal report. Selection of appropriate medium is important in achieving effective communication.

A recent trend in project management is the use of dynamic web pages for the project. An example is wiki pages that enable the users to enter information into a web page. Stakeholders may enter project information into the wiki pages. A project manager may utilize project wiki page to publish the project plan to interested parties. Stakeholders are notified about updates and changes to project plan without delay. Using this communication capability comes with an added benefit that is the automatic tracking of changes in wiki pages. A historical record of changes in project information is kept automatically. Later these records may be used to analyze project implementation. Blogs is another tool that may be utilized as a communication means.

Establishing necessary communication capabilities in project environment is vital to project communications.

3.4 Project Environment
The environment project development occurs is called project environment. It has both physical and social aspects. Physical aspects are mostly related the geographical location of stakeholders. Projects may have stakeholders statewide, nationwide, or even international. Geographical dispersion may put extra burden on stakeholders for achieving project communications. It should be noted that a project development occurring within a small location does not necessarily ensure healthy communication. Because project environment is deeply affected by many factors including organizational policies and procedures, social and cultural issues, the use of common terminology, the domain of the project and so on.

A project environment inherently has a set of communication procedures either explicit or implicit. Naturally stakeholders have to satisfy their information needs and they will eventually follow a set of communication procedures if there isn’t any enforced communication procedures. These procedures may help or disrupt project development activities. For example, developers may use backchannels to talk with users regarding requirements and they may not document the changes in the requirements.
Organizational policies, existence or nonexistence of communication procedures, the flexibility of communication procedures, acknowledgement and response procedures, the tolerance for informal communications, the use of common terminology, freedom of bad news reporting, degree of free initiation of communication, the need for information security, cultural, social, and linguistic differences, and similarities are among the factors that are part of project environment affecting project communications effectiveness.

Project communications do not occur in vacuum but in a project environment. Therefore inclusion of project environment in the framework is crucial.

4. CONCLUSIONS AND FUTURE WORK

In this paper, a simple project communications framework is laid out. This simple framework has four components: Stakeholders, project information, communication capabilities, and project environment. These components and their roles in project communications are discussed briefly.

The usability of the framework is validated with another study [1]. The framework enabled us to categorize factors influencing the effectiveness of project communications management. With the help of categorization, we were able to identify best, worst, and common practices in project communications. This led to the development of a questionnaire and model to measure project communications effectiveness as part of a software project management effectiveness metric [1].

The power of this framework comes from its simplicity. Project communications is a complex subject and abstracting it to the highest level enables us to see the big picture and realize the importance of components in communication activities. Having a simple framework actually helps with understanding and teaching the basics of project communications.

Our research shows that communication is the most important area in project management [1]. Furthermore, achieving successful communication in software projects is challenging. Dynamics of project communications is quite complex and understanding it is not easy.

Future work will include developing a model of project communications. The model will explain the interactions of the components clearly. Furthermore, there may be models at various levels of abstraction. Another line of work may be the development of project management and communication tools using the framework as a basis.

5. ACKNOWLEDGMENTS AND DISCLAIMER

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6. REFERENCES


