TOWARDS PROJECT COMMUNICATION MANAGEMENT PATTERNS

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Abstract   The paper aims at defining project communication management pattern basing on characteristics of patterns defined in other disciplines like: design patterns in software engineering, knowledge management patterns, enterprise architecture management patterns, enterprise architecture patterns for multichannel management, or project management patterns. All these established patterns share some common concepts and elements but are devoted to different fields and structures of activities and specific problems. The definition of project communication management pattern proposed in this paper is an attempt of adaptation of the existing pattern concepts to the characteristics and nature of communication management and its needs.

1. Introduction

Organizations nowadays often realize their business goals and tasks using project-based approach. Successful realization of projects is closely related to proper and effective project management. Within project management there are many different areas which need to be managed, among others: costs, time, human resources, risks, communication. While every area of project management is important for the overall success of the project, communication management

seems to play exceptional role, because it influences and penetrates all other project areas, and because it seems so obvious and easy, while actually it is very complicated and multi-faceted.

According to PMI's Pulse research, 55 percent of Project Managers agree that effective communication with all stakeholders is the most critical success factor in project management (PMI, 2013). At the same time several research findings indicate that, in case of many projects, activities in the field of communication management are disordered, supported mainly by project managers' intuition or neglected (Paasivaara, Lassenius, 2003; Adera, 2013).

Project communication management methods, recommendations and tips supplied by project management methodologies or standards like PMBoK, PRINCE2 or agile methodologies like SCRUM, seem insufficient to ensure proper, effective project communication management.

Pattern concept, initially introduced in software engineering, offers a different approach. It is about suggesting reusable solutions to common problems, based on past projects experiences. The pattern concept has been successfully introduced in many disciplines and this paper aims at adapting existing pattern concepts to the characteristics and needs of communication management.

The next section is devoted to the pattern concept and its different applications in various disciplines. Section three gives a short characteristics of the project communication management and in section four a definition of a project communication management pattern is proposed. Section five summarizes the paper and suggests further research directions.

2. Definitions and the use of patterns

One of the general definitions of a pattern states that it is "a regular and intelligible form or sequence discernible in the way in which something happens or is done" or "an excellent example for others to follow" (http://www.oxforddictionaries.com/definition/english/pattern). Design patterns are used to represent knowledge that is based on experiences captured in several real world projects and is widely accepted. This representation is often used for describing and presenting the gained knowledge. Sometimes we have similar concepts to the concept of a pattern – success factor, success models, success measures, reference architectures, worst practices, barriers, facilitators or incentives (Rech et al., 2007, p. 281–328).

Different definitions for pattern exist, but they all include a common ground – patterns are a general, reusable solution to a common problem and are dependent on their context (Ernst, 2008).

2.1. Design patterns in software engineering

In software discipline, a pattern describes a problem, which occurs recurrently and supports a solution to that problem in a given context. The pattern has four essential elements: the pattern name, the problem, which describes when to apply the pattern (it explains the problem and its context), the solution, which describes the elements that make up the design, their relationships, responsibilities and collaborations (this is an abstract description, a template of a solution), and the consequences – the results and trade-offs of applying the pattern (Gamma et al., 1994).

Design patterns are a means to reuse software development knowledge on different levels of abstraction. *Problem frames* are patterns that classify software development problems, *architectural styles* are patterns that characterize software architectures, *design patterns* are referred to as micro-architectures and *idioms* are low-level patterns related to specific programming languages. The use of patterns in software development contributes to constructing it in a systematized way, using accumulated knowledge, so that you do not start from scratch each time (Choppy, Heisel, 2003, p. 201–215).

To describe each design pattern, a consistent format has been used, including specific sections like: pattern name, intent (explains what the design pattern does, what particular issue/ problem it addresses), motivation (a scenario illustrating a design problem and how the pattern solves it), applicability (situations when the design pattern can be applied, examples of poor designs where the pattern could be applied), structure (a graphical representation of classes in the pattern, accompanied with interaction diagrams), participants (classes participating in the design pattern and their responsibilities), collaborations (how the participants collaborate to carry out the responsibilities), consequences (the trade-offs and results of using the pattern), implementation (pitfalls, hints, techniques useful in pattern implementation), sample code, known uses (examples of the pattern found in real systems, related patterns (which patterns are closely related to each other). Each defined design pattern is described according to the above mentioned sections, which makes them easier to use, learn and compare (Gamma et al., 1994).

Catalogs of design patterns have been developed in many different areas of software application in a wide range of domains, including telecommunications and data communications, financial services, medical engineering, aerospace, manufacturing process control and scientific computing (Schmidt et al., 2013).

2.2. Knowledge management patterns

Knowledge patterns state lessons learned and best practices for the structuring of knowledge, the design of knowledge management systems, and the development of underlying ontologies. Patterns in knowledge management represent also a form of language that helps knowledge engineers to communicate about knowledge and knowledge management systems.

A knowledge pattern is defined as a general, proven, and beneficial solution to a common, reoccurring problem in knowledge design, i.e., the structuring and composition of the knowledge or the ontology defining metadata and potential relationships between knowledge components. Knowledge management patterns are described in seven groups regarding different aspects of knowledge: content, usage, ontology, presentation, transfer, knowledge management systems organization and social knowledge management. Each pattern is described according to a template including the following sections: name, issue (problem addressed by the pattern), q-effect (what knowledge quality aspects are affected by the pattern and if it is a positive, negative or neutral effect), solution (principal solutions underlining the pattern), causes (basic causes of the pattern) (Rech et al., 2007, p. 281–328).

2.3. Enterprise architecture management patterns

Enterprise architecture management discipline has also developed a pattern catalog for describing solutions, based on observed practices for recurring problems in enterprise architecture management. The following three kinds of enterprise architecture management patterns have been introduced:

– methodology pattern – defines steps to be taken in order to address a given problem; as a guidance for applying the method, statements about the intended usage context and the problem which is addressed are provided, together with possible consequences and known usages,

– viewpoint pattern – provides a language used by one or more methodology patterns and thus proposes a way to present data stored according to one or more information patterns,

– information model pattern – supplies an underlying model for the data visualized in one or more viewpoint patterns; it contains an information model fragment including the definitions and descriptions of the used information objects.

The enterprise architecture management pattern catalog also includes a graphical overview of the described patterns and their relationships. The pattern template includes the following sections: name, example, context, problem, solution, implementation, variants, known uses, consequences and relations to other patterns (Ernst, 2008).

An important aspect of using enterprise architecture management pattern catalog is integration of selected patterns, which includes performing suitable adaptations (Buckl et al., 2008).

2.4. Enterprise Architecture Patterns for Multichannel Management

Enterprise architecture patterns for multichannel management are functional structures for designing organizational and technical solutions that help organizations to manage and align the various information channels they use in communicating with their customers. The general structure of the pattern catalog is defined by a framework that positions the various aspects of multichannel architectures for which patterns could be relevant. The first dimension of the framework is given by the four aspects characteristic to multichannel architecture – client, service, provider and channel, plus two additional ones: assistant (who provides assistance), method (how are services delivered/realized). The second dimension of the framework includes the elements of service delivery process – selection, delivery and realization.

Architecture patterns abstract from specific technological solutions, but focus on functionality needed to solve a given architectural problem. In order to organize the structure of multichannel management solutions and patterns, a layered framework, including functional aspects of multichannel service provisioning has been defined. The layered model consists of the following aspects: situation (circumstances, needs), preferences, dialogue (from needs to matching services), channel, content, business logic (procedures, rules), data, communication. These layers describe functional aspects, i.e., the functions that must be carried out to provide a service.

Each multichannel pattern includes the following elements: name, context, problem, solution, forces, structure, consequences, known uses and related patterns. Relations among patterns are shown using a mind map and can be of one of three main types: patterns that often occur together, patterns that provide potential realizations of other patterns at a higher abstraction level, and patterns that provide alternative solutions to a similar problem (Lankhorst, Luttighuis, 2009).

2.5. Project management patterns to prevent schedule delay caused by requirement changes

Another area, where patterns have been identified, is project management. In this specific case they capture various typical project management techniques for preventing schedule delays caused by requirements elicitation. The patterns are arranged in two-dimensional framework. The first dimension is a set of nine knowledge areas of project management such as scope, time and cost management. The second dimension is a group of project management processes such as planning, executing and controlling processes. In order to relate a project goal and the project management patterns with each other, the project goals are decomposed into various issues to be solved, and these issues are arranged in the nine knowledge areas. Each pattern is described by: name, context, problem, solution and new problem (what further problems may arise) (Hori et al., 2009, p. 115–120).

3. Project communication management characteristics

Project communication management, one of the areas of project management, is considered to be of crucial importance to the success of the project (Ofori, 2013; Kerzner, 2013), in particular IT projects (Holzmann, Panizel, 2013) carried out by dispersed teams (Tone et al., 2009; Sidawi, 2012; Niinimäki et al., 2012; Han, Jung, 2014). But even though its importance is generally acknowledged and communication practices are found to be associated with most of the project success dimensions, the communication processes formalized in the company's project management methodology are often ignored or not given enough attention (see, among others, Monteiro de Carvalho, 2013; Papke-Shields et al., 2010). Effective communication management is a fundamental competency that, if properly executed, connects every member of a project team, so that they can work together to achieve the project's objectives. If communication is not managed effectively and fully understood by project managers, project outcomes may be at risk.

Effective project communication management ensures that the right information reaches the right person at the right time and in a cost-effective manner. Communication is the key to keeping team members, managers, and stakeholders informed and on track to pursue the project objectives, as well as to identifying issues, risks, misunderstandings, and all other challenges to project completion. Effective communication is a critical element of team effectiveness, both in traditional and virtual teams (Pitts et al., 2012). Project communication management ensures timely and appropriate generation, collection, dissemination, storage, and disposition of project information. Open and clear communications are required among planners, implementers, and all levels of the organization for project success. It includes having a communication plan, infor-

mation distribution path, progress reporting, and information sharing system for management and customers (Kwak, Ibbs, 2002). Project communication management should also include methods and techniques to build trust and relationships among team members, as well as propagate desirable personal behaviors and clear communication rules.

4. Definition of a project communication management pattern

The definition of the project communication management pattern proposed in this section is a result of the analysis of patterns and their frameworks developed in different disciplines, and combining selected aspects of these patterns with project communication management characteristics and practices.

Project communication patterns could be grouped into four categories according to the communication management practice categories described in (Muszyńska, 2015) – strategic, informational, emotional and practical. Within each category several communication management patterns will be defined. Each pattern should comprise of the following sections: pattern name, context, problem, q-effect (what communication quality aspects are affected by the pattern), solution, applicability (situations when the communication management pattern can be applied), participants (parties participating in the communication process and their responsibilities), consequences (the trade-offs and results of using the pattern), implementation (pitfalls, hints, techniques useful in pattern implementation), known uses and related patterns.

For specifying q-effect the following communication quality aspects should be considered: clearness and cohesion, right level of detail, right time, meeting needs of communicating participants, engaging right people, guarantee of uniform understanding of the content, communication workflow supporting openness, redundancy and feedback.

Solution within a pattern should describe what functions must be carried out to realize communication goal, including preferences of communicating parties (concerning content, manner and channel of communication).

Table 1 provides an exemplary project communication management pattern, from the informational communication management practice category, developed on the basis of the defined template.

Table 1. An exemplary project communication management (CM) pattern

Informational CM pattern	
Name	communication time schedule
Context	the project team is dispersed, some team members are in different time zones; according to the project communication plan project partners should inform each other of the project status to get feedback and encourage involvement
Problem	communication between team members is too scarce, team members communicate with each other only in emergency situations
Q-effect	positive on the following communication quality aspects: up to date information on the project tasks status; feedback

Informational CM pattern	
Solution	prepare a communication time schedule, including bilateral communication between particular team members, as well as multilateral audio/video conferences among wider forum of team members; communication participants possibilities and preferences concerning communication medium should be taken into account; time zone shifts should be taken into account
Applicability	the pattern can be used for any kind of project and team, although it is especially useful for dispersed teams and projects longer than three months
Participants	any team member that is included in the communication time schedule; team members are responsible for adhering to the time schedule or timely informing about any derogations
Consequences	ensures regular communication among team members, adjusted to their working day schedules and communication preferences, and keeps everybody informed about the status of project tasks and encourages instant feedback
Implementation	setting up a communication time schedule requires time, effort, cooperation and goodwill of team members, so that it is adhered to and beneficial; it should be agreed upon during the project kick-of meeting, accompanied by a clear message of its goal and instructions of realization
Known uses	used by virtual teams as described by Bilczynska-Wojcik (2014, p. 64–65)
Related patterns	-

Source: own elaboration.

5. Summary and future research

The definition of a project communication management pattern proposed in the previous section is the second step towards developing a catalog of project communication management patterns. The first step, involving identification of communication management practices described in literature and grouping them into categories has already been done by this author (Muszyńska, 2015).

Future research assumes preparing an initial version of the catalog of communication management patterns, according to the defined template, for all previously identified communication management practices, in all four categories. Then the catalog will have to be consulted with project managers for verification. Such a catalog will hopefully make project communication management easier to perform and more successful, contributing to the overall success of a project. Basing on past experiences and following solutions verified in practice, what constitutes the core of patterns, may be more motivating and convincing for project managers and team members than simply using methods and procedures described in project management methodologies.

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POSZUKIWANIE DEFINICJI WZORCA ZARZĄDZANIA KOMUNIKACJĄ PROJEKTOWĄ

SŁOWA KLUCZOWE	zarządzanie komunikacją projektową, wzorzec zarządzania komunikacją, adaptacja wzorców
STRESZCZENIE	Celem pracy jest zdefiniowanie wzorca zarządzania komunikacją projektową na podstawie cech charakterystycznych wzorców zdefiniowanych w innych dyscyplinach, takich jak: wzorce projektowe w inżynierii oprogramowania, wzorce zarządzania wiedzą, wzorce zarządzania architekturą przedsiębiorstwa, wzorce architektury do zarządzania wielokanałowego w przedsiębiorstwie czy wzorce zarządzania projektem. Wszystkie te wzorce mają pewne wspólne koncepcje i elementy, ale dotyczą różnych obszarów i struktur działania oraz specyficznych problemów. Definicja wzorca zarządzania komunikacją projektową zaproponowana w niniejszej pracy jest próbą adaptacji koncepcji istniejących wzorców do cech i istoty zarządzania komunikacją i jej potrzeb.