

MONITORING AND MEASURING COMMUNICATION PERFORMANCE IN DISPERSED PROJECT TEAMS

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Karolina Muszyńska

Introduction

Communication is one of the core processes in project management, which strongly influences its final outcome and when inefficient, can lead to a project failure (Devi et al., 2018; Ssenyange et al., 2017; Besteiro et al., 2015). There are many different processes associated with communication management in project teams – communication planning, information creating, collecting, distributing, storing, retrieving and sharing, as well as communication monitoring and controlling (PMI, 2017). All of these processes are crucial in project management, but authors, dealing in their research with the project communication management topic, tend to concentrate mainly on communication planning or generally on effective communication management (among others: Butt et al., 2016; Freeman, 2016; Lys, 2015; Golini et al., 2015; Streich, Brennholt, 2015; Zulch, 2014; Mnkandla, 2013). There seems not to be enough research on how to perform communication monitoring and how to measure communication performance to be able to improve it and work towards a project's success. The aim of the paper is to identify the aspects of communication processes which should be monitored and propose a combined approach to measuring communication performance for controlling and improving it in project teams. A case of an international dispersed project team carrying out an EU project is used to exemplify the proposed approach to monitoring and measuring communication performance. The applied research methods include literature analysis for identification of the aspects of project communication and documentation processes which should be monitored, questionnaire-based analysis of team members' opinions and analysis of project records available from the application used by the project team to manage communication and documentation. The paper is structured as follows. The first part is devoted to the literature review regarding project communication performance and com-

munication performance measuring. In the next section, the research method has been described and it consists of three parts. In the first part the aspects of project communication and documentation processes which should be monitored and measured have been identified, based on the literature analysis and previous studies. In the second part, the structure and contents of the questionnaire used to collect team members' opinions have been presented. The final part of the section includes a list of communication process aspects which can be objectively monitored and measured thanks to the use of communication and documentation management platform. The subsequent section comprises research findings, followed by the discussion of results. The conclusion sections summarises the paper and indicates practical implication and limitations, as well as possible future research directions.

Monitoring and measuring communication performance – literature review

Communication management plays a significant role in carrying out projects, especially by dispersed or distributed teams, that is by teams whose members work in different geographical locations, sometimes also different time zones, usually speak a different language and may be culturally diverse. Such a working environment with limited physical contact and thus limited real-time and non-verbal communication fosters misunderstandings, lack of mutual trust and decline in motivation. In most cases the project team members cannot use their native language in project communication which is also a hindering factor. That is why in such teams communication processes should be particularly monitored and measured to enable an early detection of any irregularities, shortages and communication problems.

If we want to control and improve some processes, first we must be able to measure them (Kupiainen et al., 2015), and to measure them, we need to establish criteria according to which the measurement will be conducted (Pop et al., 2013). After identifying the criteria, indicators can be established, which is often obtained through operationalising relevant terms or concepts. This operationalisation is a specific definition of something in terms that can be measured. Monitoring of project activities should include establishing the purpose of monitoring, its scope, the way it will be done (what indicators will be used), time when it will occur and responsible person. The selected indicators should be specific, factual, directly measurable and based on verifiable data (Mefalopulos, Kamlongera, 2004). The solely indicator-based approach to monitoring and evaluating of project activities lacks however the reference to opinions, feelings and attitudes of team members, which in case of communication processes, is very important and can only be collected through interviews or questionnaire-based methods.

Measuring communication performance remains one of the most ambiguous tasks to researchers and practitioners because of the varied contextual nature of communication. Communication performance is differently conceptualised and operationalised in different context, but communication performance assessment has predominantly been conceived as a measure of the degree of how effectively or ineffectively a communication task is performed (Kwofie, 2015).

Ssenyange and others (2017) suggest measuring communication performance using the communication audit survey proposed by Goldhaber and Rodgers (1979) and adapted by Hargie and Tourish (2000), a questionnaire-based tool with 122 questions addressing issues relating to amount of information, timelines of information, communication relationship, follow up and satisfaction with the level of outcome. The tool has been subsequently adopted by several researchers in their studies. The approach proposed in the present paper also assumes using a questionnaire-based method to measure communication performance, although the scope of questions has been significantly reduced and adapted to project communication characteristics.

The most extensive list of project-related communication performance measures has been proposed by the Construction Industry Institute, although they regard projects in construction industry. The list includes nine distinct performance indicators: accuracy, timeliness, completeness, understanding, procedures, distortions, barriers and gate-keeping (Kwofie, 2015). These indicators have been used in the present paper in the phase of identifying the communication performance aspects.

Research method

The research method includes two steps. In the first step, a list of communication performance indicators is being prepared – based on a literature review and previous studies. In the second step, the communication performance is being measured using a combined approach comprising a questionnaire-based survey conducted among project team

members and an analysis of data available through a communication and documentation management platform used in the project. The results of the questionnaire cover all identified communication performance aspects but, as they express the opinions and beliefs of the respondents, they are subjective. The results of the analysis of data obtained from the communication management platform are objective, but they regard only a few of the communication performance aspects. Blending both approaches offers a richer insight into the communication performance in the project and a more objective measurement. Performing such an analysis periodically throughout the project implementation period enables the project manager to monitor the communication and documentation processes and react accordingly before any negative situations impact the project performance.

Identification of communication performance aspects

In order to identify the communication performance aspects, the communication performance indicators proposed by the Construction Industry Institute (CII) (Kwofie, 2015) have been compared and combined with communication effectiveness aspects identified by this author in a previous study (Muszyńska, 2018) (tab. 1). As it can be observed all the indicators proposed by CII have their equivalent in the communication effectiveness aspects and there are some additional aspects identified in the right column, which could also be used to evaluate project communication performance.

Table 1. Communication performance indicators and communication effectiveness aspects

After CII	Literature review on communication effectiveness aspects
accuracy	accuracy/simplicity aspect
timeliness	time aspect
understanding	intelligibility aspect
completeness of information (overload/underload)	relevancy/personalization aspect
barriers	accessibility aspect
distortion	clarity/undisturbedness aspect
gate keeping	openness aspect
procedures	specificity aspect
	proper medium aspect
	correctness aspect
	purpose clarity aspect
	goal-achieving aspect
	formal-informal balance aspect
	engagement aspect
	personality aspect
	credibility aspect
	past experience aspect

Source: own compilation based on Kwofie (2015) and Muszyńska (2018)

Analysis based on questionnaire results

The analysis based on questionnaire results assumes elaboration of a questionnaire with statements regarding different communication performance aspects and collecting the answers from all team members taking part in carrying out a project and using the communication and documentation management platform. The obtained results are subjective and may not precisely reflect the behaviour of team members or the characteristics of communication processes in which they take part, but they are an important source of information about the team members' feelings, observations and their possible comments. Collecting the opinions about different aspects of the communication process is not the only goal of the questionnaire. It also aims to raise their awareness of and bring to their attention various communication and documentation requirements, rules and obligations, all of which contribute to better project management.

A list of questionnaire statements with corresponding communication performance aspects has been presented in Table 2. All statements are formulated in a 'positive manner', which means that all the statements given the highest possible score (5 – strongly agree) indicate the highest communication performance. This way, the respondents are not confused.

The questionnaire was delivered to the respondents in an online form divided into two sections. The first section included first 22 statements, followed by a comment field where the respondent could write their comments or add clarifications regarding the first part of the questionnaire. The same was possible at the end of the questionnaire, after completing the second batch of statements.

Analysis based on objective data

Two of the communication performance aspects, namely engagement and goal-achieving, can additionally be analysed based on objective data. This includes:

- analysing the data about team members' communication activity and engagement, and
- comparing planned project tasks for a given period to what has been actually achieved.

Data for the above mentioned analyses has been obtained from the communication and documentation management platform used by team members. The available data includes:

- a) number of platform visits by users, which shows their interest in and usage of the tool,
- b) number of messages written by users in a specific period of time, which shows the level of their engagement in project activities,
- c) number of files uploaded by users in a specific period of time, which shows their level of engagement in sharing project documents and knowledge,
- d) list of project tasks with their due dates and percentage of completion.

Research findings

The above presented research method has been applied in a case project Baltic Museums: Love IT!, which is an EU co-financed international project carried out by nine core partners and seven associated partners from eight different European countries: Poland, Germany, Lithuania, Denmark, Sweden, Estonia, Netherlands and Russia. The organizations engaged in the project represent tourist attractions of the South Baltic region (SBR), such as museums or science centres, scientific and educational institutions and entities dealing with new technologies. The aim of the project is to develop new IT-enabled tourism products for natural and cultural heritage tourist destinations in the SBR in a form of multilingual BYOD-guided tours (*BYOD – Bring Your Own Device*), providing an enhanced visitor experience during and after the visit thanks to gamification, multimedia content, and augmented reality techniques.

The questionnaire survey was conducted among project team members, representatives of all project partner institutions, users of the communication management platform plus a few others who logged into the communication management platform at least 40 times during the time period from May 2017 till August 2018. Thirteen out of seventeen invited team members filled in the questionnaire, which gives about 76% return rate.

Most of the statements included in the questionnaire were evaluated positively by the project team members – all respondents rather agreed or strongly agreed with 18 out of 44 statements. Another 8 statements had only one different rating and other 7 had two different ones. This leaves only 11 statements with a higher number of less positive answers. These are the ones which are the most interesting as they indicate what needs more attention and should be improved. Figure 1 presents a list of statements given several negative ratings (2 – rather disagree or 1 – strongly disagree) and those which received 2 or more neutral ratings (3 – neither agree nor disagree).

The communication performance aspects which could be assessed by analysing the communication management platform database used in the case project together with their values have been presented on Figures 2–5. The results were obtained by querying the database of the communication management platform.

Fifteen out of thirty-two active users, who logged into the communication management platform at least twice, in the period from May 2017 till August 2018, visited the platform more than 100 times. For 10 of them it was more than 200 visits (Fig. 2). The same set of users posted the highest number of messages, with a record of over 400 messages posted by one of them (Fig. 3).

In the considered period platform users uploaded nearly nine hundred files, with one user being extremely active with 226 uploaded files (Fig. 4). The figure presents only users who uploaded 10 or more files.

The last measure aims at comparing planned project tasks for a given period to what has actually been achieved. The communication and documentation management



Table 2. Questionnaire statements with corresponding communication performance aspects

Communication performance aspect	Statement to be evaluated on a five-point Likert scale (1 - strongly disagree; 2 - rather disagree; 3 - neutral; 4 - rather agree; 5 - strongly agree)
accuracy/simplicity aspect	1. The messages/information I receive are precise, so that I know what is expected from me. 2. I formulate the messages/texts in a precise manner to minimise possible misunderstandings.
time aspect	3. I receive answers to my messages immediately (within 1 to 2 working days). 4. I answer to messages addressed to me as soon as possible (within 1 to 2 working days). 5. I inform other team members about any important project issues as soon as possible (within 1 to 2 working days). 6. I make sure that any information shared by me is up-to-date.
intelligibility aspect	7. The recipients of my messages do not ask for clarifications before answering them, which indicates that they understood them properly. 8. Messages received from other team members are formulated in such a way that I understand them perfectly (I do not need to ask for clarifications).
relevancy/ personalization aspect	9. I pay attention to whom I am sending my messages/sharing my files 10. I pay attention to placing my messages/files in appropriate categories in the online communication system. 11. The messages/notifications I receive are meant for me. 12. I have no problems in finding information/files which are intended for me. 13. I have no problems in finding information/files which I need to perform project tasks.
accessibility aspect	14. The messages and files which I need are available (I have access to them or the access is granted to me within 1 to 2 working days). 15. I receive help from other team members when I ask for it. 16. I find it easy to communicate through the online communication platform.
clarity/ undisturbedness aspect	17. I make sure to eliminate any technical disturbances/disruptions hindering the process of communication.
openness aspect	18. I feel that communication within the project team is open, not leaving anyone excluded.
specificity aspect	19. I am familiar with the project communication plan (presented at the kick-off meeting). 20. I follow the communication methods and procedures agreed on in the project communication plan. 21. There is an agenda prepared for any meeting I participate in. 22. The meetings I organize/attend follow the prepared meeting agenda.
proper medium aspect	23. Communication methods and tools used in the project suit me. 24. I do not miss any important messages or information.
correctness aspect	25. I double-check messages to be sent/information to be shared regarding its logic and linguistic correctness (grammar and spelling). 26. The messages I receive/information provided via the communication platform are correct and clear.
purpose clarity aspect	27. I understand the purpose/goal of the messages/information I receive. 28. I formulate my messages/texts so that their purpose/goal is clear for the receiver.
goal-achieving aspect	29. I achieve the expected outcome of my communication. 30. It is clear to me what my responsibilities and tasks are. 31. It is clear to me what other team members are responsible for and what their tasks are. 32. It is understandable to me why certain project tasks are performed.
formal-informal balance aspect	33. I deliver all necessary formal documents. 34. I communicate with other team members on informal matters.
engagement aspect	35. I engage actively in project discussions. 36. I engage actively in project meetings. 37. I engage actively in online meetings. 38. I regularly check project mail and read all messages addressed to me.
personality aspect	39. I find it generally easy to communicate with others. 40. I find it generally easy to control my emotions. 41. I find it generally easy to make others do what I ask/tell them.
credibility aspect	42. I am honest in my communication. 43. The messages/project information are reliable.
past experience aspect	44. Your previous experiences positively influence the project.

Source: own elaboration

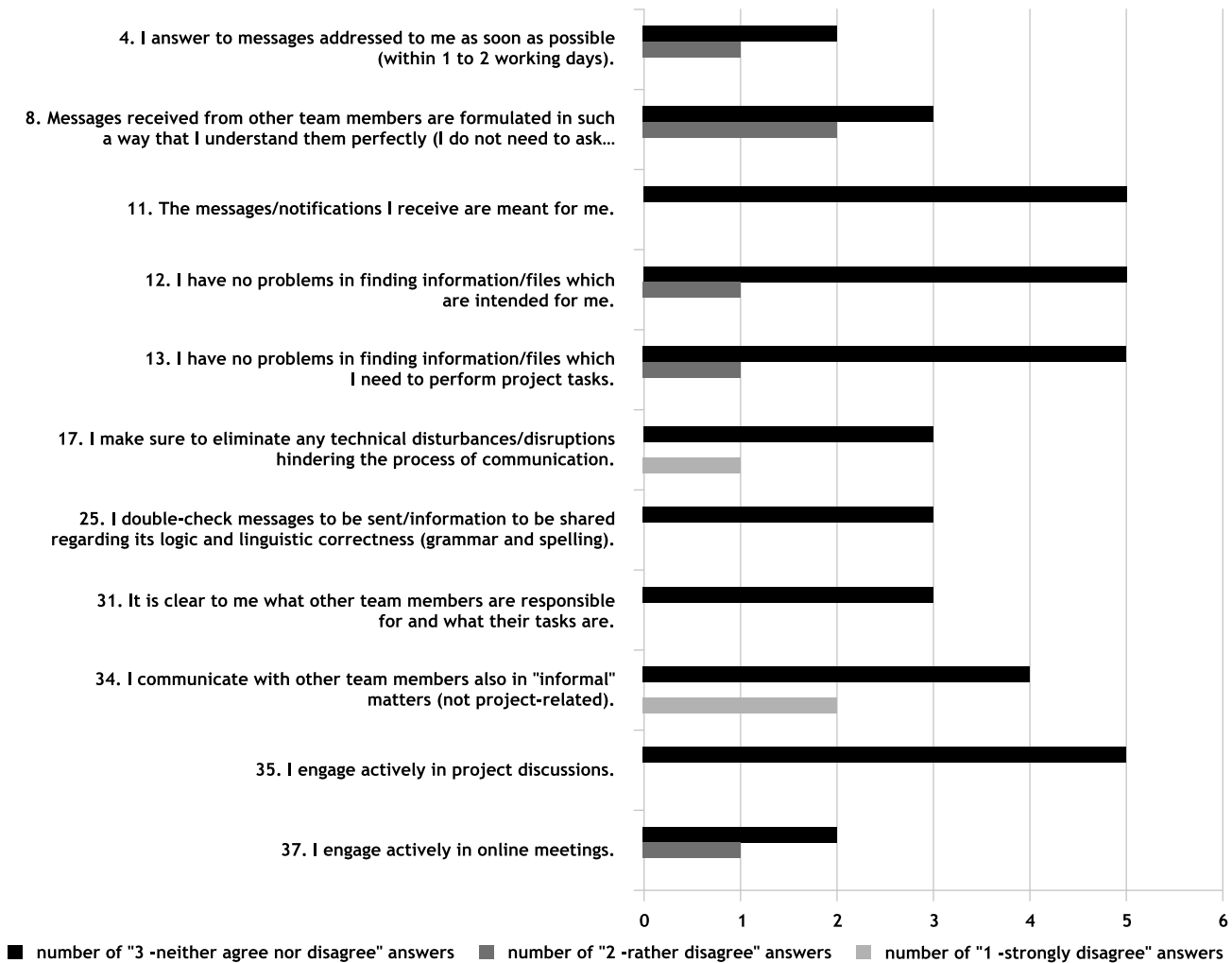


Figure 1. Questionnaire statements with negative or neutral ratings. Source: own elaboration

platform enables to track project tasks and monitor their progress. At the beginning of the project all main tasks, listed in the application form, which constitutes an integral part of the subsidy contract for the project, were inserted together with their due dates into the communication management platform. Completion of tasks has been indicated in the tool. By the end of August 2018, there were only 7 overdue tasks out of a total of 67 which were supposed to be done by that time (10,4%). However, it is worth mentioning that delays in some of the project activities, especially those which do not cause the delay of the entire project, can be negotiated with the supervisory authority and do not negatively affect the project.

Discussion of results

The proposed approach to measuring communication performance in dispersed project teams offers a double-source evaluation of different project communication aspects and, if performed on a regular basis throughout the period in which the project is carried out, may be used to monitor communication performance and undertake corrective actions in case any communication problems

are detected. Project team members are asked about their opinion regarding different communication and documentation processes and their declared attitudes and behaviour are investigated. As in the described case, there may be some statements which were not evaluated positively by all team members and when there is a considerable number of such statements the given communication or documentation aspect should be analysed, discussed and brought to the attention of the whole project team. While questionnaire results may not be quite objective, the data obtained through the project communication management platform reflects the real level of engagement and its influence on the project development progress. In the case project, it can be clearly seen that a group of about 15 team members is actively engaged in communicating with each other and sharing project information. It is worth mentioning that this group comprises at least one representative of each of the nine core project partners carrying out the project. That proves that all project partners are active participants in the project. The overall positive results obtained in the presented case project are most likely owed to the following circumstances: the cultural background of the cooperating team members is similar, most of them can freely communicate in English,

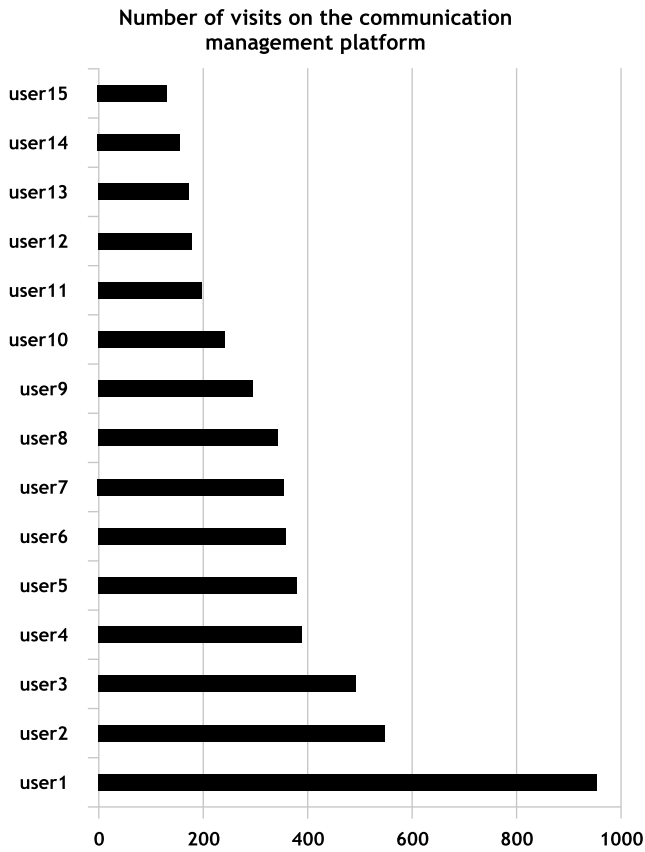


Figure 2. Number of visits on the communication management platform
Source: own elaboration

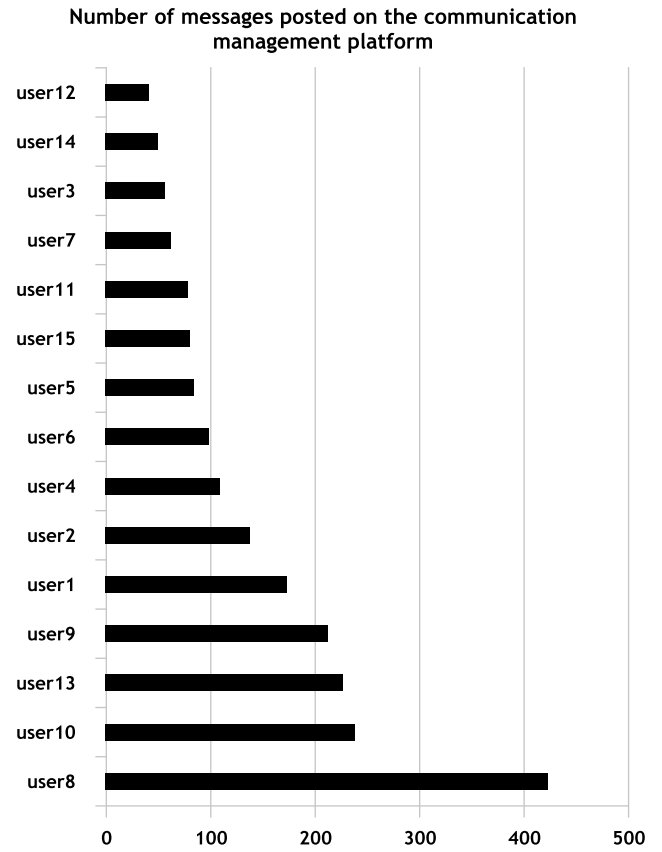


Figure 3. Number of messages posted on the communication management platform
Source: own elaboration

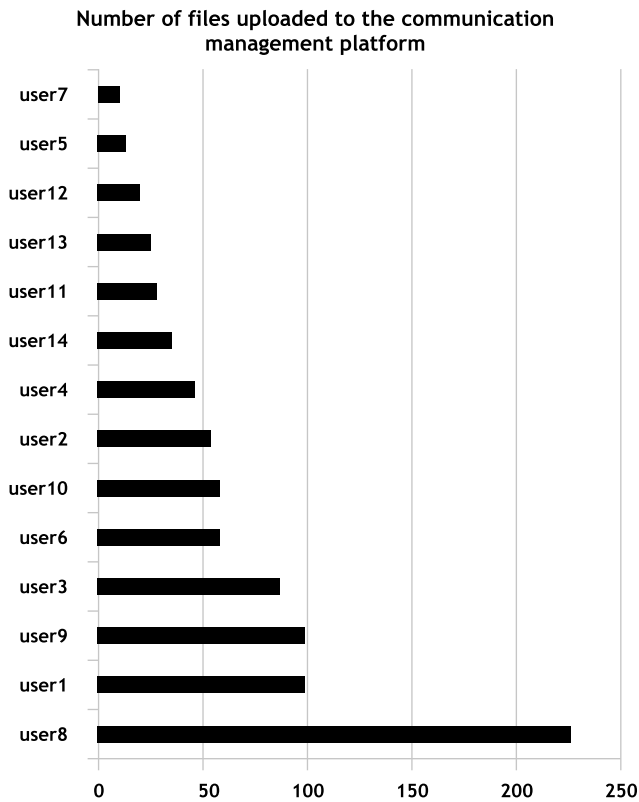


Figure 4. Number of files uploaded to the communication management platform
Source: own elaboration

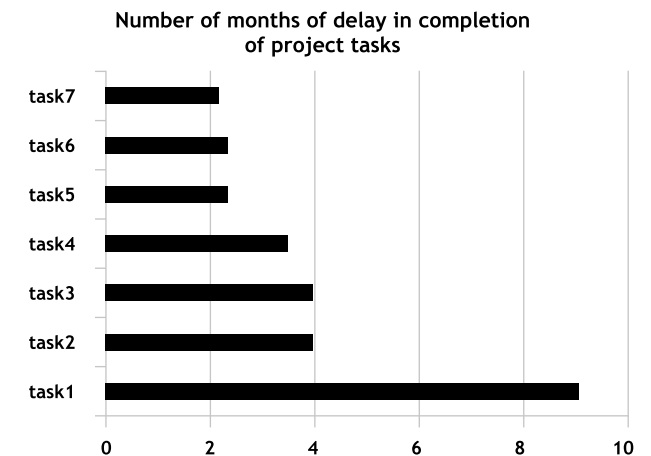


Figure 5. Number of months of delay in completion of project tasks
Source: own elaboration

which is the project language, some team members have already collaborated with each other in previous projects and have developed more personal ties. On the other hand, some of the less positively assessed aspects regard mainly the use of the communication and documentation management platform, which imposes some difficulties especially for the non-technical team members, but which at the same time facilitates and organises the project communication and documentation processes contributing to successful development of the project.

Conclusion

Communication management is undeniably one of the most important project management areas. In order to ensure proper implementation of the project and its success, communication and documentation processes should be adequately planned, executed, monitored and measured. The present paper concentrates on monitoring and measuring communication performance, using a combined approach which blends two methods which together give a more objective and clear view of communication and documentation processes carried out within a project. The first method is a questionnaire-based analysis of communication and documentation processes, which enables to reveal possible communication problems or improper habits of the project team. The second method includes an analysis of project records available from the database of the communication and documentation platform used in the project. The results obtained by applying the proposed method on a sample international project show that it delivers a comprehensive view of communication and documentation processes, revealing information about possible problems or alarming situations. The presented approach enriches the project management body of knowledge by offering a method to monitor and measure communication performance, which enables the project manager to keep track of the communication and documentation processes and react when problems emerge. A limitation in this approach is that the database analysis, which constitutes an important part of the communication monitoring process, can only be applied when a database-based project communication management tool is being used by the team.

In the scope of this research the proposed approach was applied only in one case project. Possible future research, where the combined method would be applied in several projects with different characteristics, could enrich the studied area of measuring communication performance. Another valuable extension of this research could be to design a response matrix to different communication problems which are revealed during the monitoring process. This would be a helpful tool for project managers.

Karolina Muszyńska, PhD
University of Szczecin
Faculty of Economics and Management
e-mail: karolina.muszyńska@usz.edu.pl

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Monitorowanie i mierzenie wydajności komunikacji w rozproszonych zespołach projektowych

Streszczenie

Celem artykułu jest, po pierwsze, identyfikacja aspektów procesów komunikacji i dokumentacji w rozproszonych, międzynarodowych zespołach projektowych, które powinny być monitorowane w celu zapewnienia skutecznej komunikacji projektowej, a po drugie, zaproponowanie połączonego podejścia do pomiaru wydajności komunikacji projektowej. Identyfikacja aspektów, które powinny być monitorowane, opiera się na analizie

literatury i wcześniejszych badaniach. Zaproponowane podejście łączy dwie metody, które razem umożliwiają wszechstronny pomiar wydajności komunikacji w ramach projektu. Pierwsza z nich to kwestionariuszowa analiza wydajności komunikacji i jej postrzegania przez członków zespołu. Druga polega na analizie bazy danych rekordów projektu. Połączone podejście do monitorowania i pomiaru wydajności komunikacji projektowej zastosowano dla konkretnego przypadku międzynarodowego projektu. Uzyskane wyniki pokazują, że proponowane podejście zapewnia kompleksowy wgląd w procesy komunikacji i dokumentacji w projekcie, oparty zarówno na obiektywnych danych pozyskanych z bazy danych, jak i na opiniach członków zespołu, dostarczając informacji o ewentualnych problemach i niepokojących sytuacjach.

Słowa kluczowe

wydajność komunikacji, monitorowanie komunikacji, zarządzanie komunikacją