

Making Meeting Success Measurable by Participants' Feedback

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ABSTRACT

In software projects, a continuous exchange of information among team members is necessary to ensure a successful project. Meetings support this information exchange because they enable team members to share information simultaneously with all other team members. However, teams often get lost in endless discussions or developers do not gain a real benefit from a meeting. Consequently, participants are often frustrated by meetings. This leads to a negative mood and the project is endangered. To ensure the quality of information exchange and to prevent frustrated developers, meetings have to be assessed periodically. We ask the participants about their perception during a meeting because participants' satisfaction with the outcome is essential for project success. Hence, the definition of a good meeting bases on effectiveness, efficiency, and satisfaction. In order to measure perceived meeting success, we developed a feedback method and a tool applying it. To validate the method, we conducted a case study during two meetings and compared our results to an objective analysis. During the case study, our feedback method showed the advantages over the compared behavior-based approach. Using our method, teams can easily gather feedback about their meeting and decide whether future meetings need an improvement or can be abandoned. So the method helps teams to find the right manner of communication in meetings and to reduce the developers' frustration.

CCS CONCEPTS

• **Software and its engineering** → **Programming teams**; *Software creation and management*; *Software development process management*; • **Social and professional topics** → *Project and people management*; • **Human-centered computing** → Collaborative and social computing design and evaluation methods;

KEYWORDS

Communication, meeting success, software development teams, human factors

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1 INTRODUCTION

Communication is one of the most important aspects of software projects in order to ensure a continuous exchange of information [3, 12, 15]. An inappropriate amount of communication may lead to an unsuccessful project because important information such as change requests or design decisions can get lost [11].

According to Ambler [2], face-to-face communication is the best way to communicate. Meetings enable an intense and effective face-to-face communication because many team members are present and receive many information with low effort [18]. In the Scrum framework, meetings are an essential part of the process to structure the project and to ensure a successful flow of information [19].

However, team meetings are often not as successful as expected because teams lose focus, people interrupt each other, meetings last too long etc. [10]. Developers who have to attend these meetings are not satisfied with the outcome and get frustrated [17]. Consequently, they get depressed and the meetings are even worse because the creativity and attention of depressed developers are restricted [10]. However, creativity and motivation of developers are important to create a product of high-quality. Depressed developers spread a negative mood among all team members [7]. The general mood of a team is connected to its success because dissatisfied developers exchange less information and important information may get lost [18, 19]. This endangers project success because of ignored change requests or forgotten requirements [21]. Consequently, the quality of meetings has an influence on information exchange and motivation. These both aspects affect the success of a project and consequently customer satisfaction.

To prevent team members from getting frustrated by dissatisfying or unnecessary meetings, meetings should be assessed periodically [13]. One possible way to assess a meeting is to measure how successful a meeting was because the *success* describes if the meeting was relevant for the participants. We want to measure the success as light-weighted as possible in order to encourage teams to use our method on a regular basis without increasing their workload. Therefore, we developed a tool to quickly gather and analyze feedback.

We focus on meetings from the participants' point of view because it is important that they are satisfied with the outcome. Therefore, we decided to measure meeting success by gathering feedback about their perceptions during the meeting with respect to the outcome of a meeting, the return on investment and the general satisfaction by the meeting.

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With our method, we provide a fast and easy way to assess meetings with a low effort of time and cost. Measuring meeting success helps teams to decide for example if a meeting needs an improvement or if it can be abandoned.

The remainder of the paper is structured as follows: In Sec. 2, we present our definition of meeting success. In Sec. 3, we present related work and the *act4TeamsLight* method. In Sec. 4, we discuss our feedback method and tool. The case study is presented in Sec. 5. In Sec. 6, we interpret the results of our study and conclude in Sec. 7.

2 BACKGROUND: MEETING SUCCESS

Teams strive for *successful* meetings which have different quality aspects presented in various publications. In order to measure meeting success, we need to quantify the reoccurring quality aspects of successful meetings: *effectiveness* [1, 13, 16], *efficiency* [1, 5] and the *satisfaction* of participants [13]. *Effectiveness* reflects the need for meetings to serve a specific purpose such as information exchange or solving of problems [16]. *Efficiency* expresses the relation between an appropriate effort of time for participating in the meeting, including the preparation and the follow-up processing, and the outcome. The third aspect is *satisfaction* [16]. It is important for meeting success that participants attend gladly because meetings have an influence on the general mood of developers [14]. If they attend gladly, they appreciate the benefits of meetings and are motivated [13, 17].

These three aspects are also related to usability as another human-centered field in Software Engineering. According to the ISO-standard 9241 [20, part 11], these terms are used to define usability:

- **Effectiveness** = Accuracy and completeness with which users achieve certain goals.
- **Efficiency** = The effort of users in relation of accuracy and completeness with which the users achieve certain goals.
- **Satisfaction** = The absence of complaints and discomfort and a positive attitude regarding the use of a product or system.

The explanations for these aspects sound quite familiar to our understanding of *successful* meetings because users of a system and participants of a meeting have similar interests. In both cases, people want to achieve their goals in the least possible time and do not want to feel uncomfortable during the process. Just the goals themselves differ between these two groups. Users want to achieve a goal by using a system. Meeting participants primarily want to get important information. It seems that using a system and participating in a meeting do not differ much from each other. The definition also strengthens the consideration of satisfaction in meetings. As well as effectiveness and efficiency [5, 13, 16] as the mostly stated aspects of good meetings, we have to consider the satisfaction of participants. The satisfaction in meetings affects the general mood of developers. Due to this large overlap of usability and meeting success, we defined meeting success based on these three aspects. They helped us to define the meeting success in an appropriate manner. A meeting is defined to be *successful* if it is effective, efficient and if the participants are satisfied. In this case, effectiveness, efficiency, and satisfaction are defined as follows:

- **Effectiveness** = The perceived degree of achieving the goals of a meeting.
- **Efficiency** = The perceived relation between the invested time and the effectiveness of meetings.
- **Satisfaction** = The absence of complaints and discomfort and a positive attitude regarding meetings.

3 RELATED WORK

There are different approaches to investigate meetings and their impact on project success, developer satisfaction or employee well being.

Schneider et al. [18] investigated how communication and the mood of student software development teams affect their success. As part of communication, the relevance of meetings has been investigated. They found out that teams with a lower participation variance were more successful.

Luong et al. [14] examined the relationship between the number of meetings and the fatigue of employees. According to their results, the feeling of fatigue and workload increased with the number of meetings. Consequently, meeting behavior should be reconsidered and there is a need for better meetings.

Cohen et al. [4] investigated the influence of different design characteristics of meetings on the perceived meeting quality.

Kauffeld et al. [10] videotaped several meetings and analyzed them with the *act4team* method. *Act4teams* uses a coding scheme to categorize behavior during a meeting. In their work, Kauffeld et al. [10] investigated meetings with respect to the occurrence of specific behavior such as interruptions, proactive or complaining statements and its effect on team success. In other work, Kauffeld et al. [13] conducted a survey to find relationships between different behavior in meeting and employees' engagement, satisfaction and meeting effectiveness [13].

Green [8] conducted a survey in order to verify if different habits and practices affect the perceived productivity of a meeting from the participant's point of view. His results are a catalog of general conclusions about meetings and best practices.

Nixon et al. [16] conducted a survey to investigate the impact of different meeting procedures on meeting effectiveness measured by the perceived attainment of goals and decision satisfaction. But unlike this paper, he does not consider the aspect of long-lasting meetings.

Davidson [5] states that there are methods to improve meetings but often a justification for their use is missing. So he created a method to simplify the decision whether an improvement is necessary or not. He conducted a survey in order to validate the relationship between chosen questions and aspects of meetings. Like Kauffeld's [10] approach, his method is mostly based on behavior during meetings.

These approaches rather focus on the behavior of the participants during the meeting. Most of them investigate both *good* and *inappropriate* behaviors and their influence on project success [10] or developer satisfaction [13]. The definition as *good* or *inappropriate* behavior comes from a psychological viewpoint [10, 13]. Nonetheless, a meeting may be categorized as "good" according to the behavior during the meeting, but the participants do not necessarily have to be satisfied with the outcome.

Consequently, we focus on the developers' attitude towards a meeting. We expect that the developers' reaction to the meeting can also indicate the occurrence of negative behavior during the meeting such as interruptions or get off the track.

Act4Teams was developed by psychologists to investigate meetings based on the participants' behavior [10]. We present here a simplification of the *act4teams* method called *act4teamsLight*.

Act4teams is based on interaction research and empirical observations during team consultations. Based on these observations, 44 categories of interactions during meetings were identified and classified as one of four main aspects: *problem-focused*, *procedural*, *socioemotional* and *action-oriented statements* [10]. *Problem-focused statements* concern the addressing of problems and the discussion of solutions. *Procedural statements* are related to organizational behavior during meetings like process proposals and prioritizations. *Socioemotional statements* concern the interpersonal relationships during a meeting like support or feedback. *Action-oriented statements* consider behavior like interest in change or taking responsibility [10]. The categories are used to code team interactions. Each statement fits only one of these categories. To apply this method, team meetings are videotaped. Afterwards, the team interactions were coded by a team of psychologists.

In collaboration with the psychologist team at Technische Universität Braunschweig, the Software Engineering Group at Leibniz Universität Hannover developed a simplification of *act4teams* in order to reduce the needed expertise [9]. This simplification enables an observer of a meeting to use the method simultaneously during the meeting.

The 44 categories of *act4teams* were broken down to 7 central aspects. These categories can be distinguished by people without psychological background after a briefing. These aspects are used to count the behavior of meeting participants during a meeting. These seven aspects are [9]:

- problems
- solutions
- links and interconnections
- destructive behavior
- methodically-structuring behavior
- proactive behavior
- information exchange

The aspect "problems" contains the addressing and discussion of problems (e.g. "Why couldn't we finish all story cards during the last sprint?"). The aspect "solutions" includes all statements presenting or proposing solutions or approaches to solve problems (e.g. "We have to assess the story cards more precisely!"). The aspect "links and interactions" mean that meeting participants draw connections between different problems and solutions (e.g. "Why haven't we noticed the dependency on Team X before?"). The aspect "destructive behavior" contains the whole negative behavior of meeting participants like insults, interruptions, lack of interest etc. (e.g. "This cannot work!"). The aspect "methodically-structuring behavior" summarizes structuring and ordering statements. It contains behavior like leading the discussion back to the topic or changes to the procedure (e.g. "Let us come back to the topic."). The aspect "proactive behavior" means that meeting participants show their

commitment to change within the team and volunteer for tasks (e.g. "I am gonna take care of the problem this week."). The aspect "information exchange" contains each kind of exchange of information among meeting participants (e.g. "I am on vacation next week.>").

4 FEEDBACK METHOD

As already mentioned in Sec. 2 we define meeting success based on three aspects: effectiveness, efficiency, and satisfaction. In order to measure these aspects, we have to define questions which cover these aspects.

Effectiveness. A meeting has seldom just one purpose such as information exchange or the discussion of new strategies. Often meeting participants do not agree on a concrete meeting goal neither work with a concrete agenda [8]. Hence, it does not suffice to ask the participants about the degree of having achieved their goal. In order to narrow down the goals of meetings, we analyzed the common purposes of a meeting. Most meetings serve a continuous exchange of information and knowledge [10, 11] or they help teams to solve problems or discuss their strategies [10]. But these goals are rather part of the more abstract aim of meetings: supporting team collaboration. All activities of solving problems or strategy discussions arrange that a team can complete its tasks successfully [11].

We formulated two questions to ask the participants about the achievement of these two goals. The first question concerns the exchange of information among meeting participants. An adequate exchange of information does not necessarily mean to get a lot of information. A *good* information exchange implies to receive new and helpful information. However, receiving too many or unnecessary information increases the workload of a developer [6]. This danger especially exists during meetings because participants exchange information face-to-face and have to remember all information or take notes. However, it is difficult to simultaneously take notes and actively attend a meeting. Therefore, meeting participants mostly try to remember the information and just document the most valuable information. Participants cannot keep too much information in mind. Consequently, they forget information and information exchange suffers. So getting too much information is as bad as getting too less information.

The second question deals with the improvement of team collaboration. The main aspect of *collaboration improvement* is the addressing and the solution of problems [10]. The questions are:

- (1) How many new and important information did you get during the meeting?
- (2) Did the meeting improve your team collaboration?

Efficiency considers the relation between the invested time and the meeting's outcome. The invested time includes preparation as well as participation. Consequently, the question covers these three aspects:

- (3) How satisfied are you with the relation between the time spend for the preparation, the meeting itself and the outcome?

Satisfaction. The fourth question considers the satisfaction of meeting participants.

(4) How satisfied have you been with the meeting?

These four questions cover the definition of meeting success in a very light-weighted and time-saving manner. We created our method in this simple manner on purpose in order to enable developers to integrate the method into daily work without increasing the workload and annoying them. Other approaches would have demanded a lot of more questions and would have counteracted our motivation for a light-weighted method.

We want to provide a method enabling teams to get an assessment of their meeting fast and easily. Therefore, we developed an application to gather and analyze the feedback. The tool returns one value representing meeting success. So the teams do not have to analyze many different values.

Treiblmaier et al. [22] recommend using a continuous scale to gather feedback. So we decided to use sliders to gather feedback. The slider ranges from *not at all* to *very*, as shown in Fig. 1.

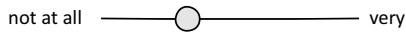


Figure 1: Slider

Answering the first question differs from the other questions. We had to adapt this slider because participants can get too much information. We related the left end of the slider to *absolutely none*. The right end of the slider is related to *too much* and the middle to *many*.

To calculate meeting success, we decided to calculate the mean of all participants' answers to all questions. To calculate meeting success (MS), calculate:

$$MS = \frac{1}{4n} \sum_{i=1}^4 \sum_{j=1}^n q_{ij},$$

where n is the number of participants and 4 the number of questions. q_{ij} is the answer to question q_i of participant j . Each slider returns a value between 0 and 1. Accordingly, the value of meeting success also ranges from 0 to 1. In order to enable a statement about whether a meeting was rather good or bad, we divided the range between zero and one in five equidistant intervals:

- (1) very bad meeting: [0.0 , 0.2)
- (2) rather bad meeting: [0.2 , 0.4)
- (3) satisfactory meeting: [0.4 , 0.6]
- (4) good meeting: (0.6 , 0.8]
- (5) very good meeting: (0.8 , 1.0]

Meeting participants can investigate the mean of each question and the anonymous feedback of each participant as well. This breakdown enables teams to examine their problems during their meeting and help them to find the appropriate improvement.

5 METHODOLOGY

We conducted two case studies in a company that is working with Scrum. We applied our method in two review meetings in different teams (Team A and B) and compared it with the objective *act4teamsLight* method. We concentrate our study solely on the feedback of the developers. After the meeting, each developer entered his feedback into the tool on a tablet.

Table 1: Categorization of meeting behavior

Positive behavior	Negative behavior
Problems	Destructive behavior
Solutions	
Links and interconnections	
Methodically-structuring behavior	
Proactive behavior	
Information exchange	

5.1 Act4TeamsLight

In order to compare our method with *act4teamsLight*, we need a way to express meeting success by *act4teamsLight* as well. For that purpose, we divided the seven aspects into positive and negative behavior [10], as shown in Tab. 1.

The addressing of *problems* and working on *solutions* are next to *information exchange* important purposes of meetings. Hence, we consider their occurrence in meetings as positive. Drawing *links and connections* is part of these activities as well. Hence, we also consider this behavior as positive. *Methodically-structuring behavior* ensures discipline during meetings because it includes behavior like leading the discussion back to the topic. So we consider this behavior as positive, too. *Proactive behavior* shows that the participants are motivated because they are open to change and volunteer for tasks. So this behavior is positive as well.

Destructive behavior antagonizes these positive behaviors and complicates the accomplishment of the team's meeting goal. Therefore, we consider this behavior as negative. We calculate meeting success by the difference between these two types.

The aspect of *destructive behavior* pools a lot of the categories of the original *act4teams* method. In order to create a balance between negative and positive behavior, we multiply the number of destructive behavior by six. So both negative and positive behavior have the same number of categories and each behavior has the same weight.

To explain the calculation, we create a short counting example, as shown in Tab. 2. We sum up the number of behavior of each category to get the total sum of the counted behavior: $2+1+6 \cdot 3 = 21$.

Afterwards, we calculate the proportion of positive and negative behavior in order to measure meeting success on a solid range. The proportion of positive behavior is $3/21 = 0.14$. And the proportion of negative behavior is $18/21 = 0.86$.

We base the meeting success by *act4TeamsLight* on the difference between positive behavior and negative behavior. So we subtract the proportion of negative behavior from the proportion of positive behavior: $0.14 - 0.86 = -0.72$.

Table 2: Example for counting by *act4teamsLight*

Aspect	Counting
Problems	2
Solutions	1
Destructive behavior	3

Due to the calculation of meeting success, the values range from -1.0 to 1.0 . In order to compare this value (ms_a) with the meeting success calculated by our feedback method, we translate these values on the same range by the following calculation:

$$MS = \frac{ms_a + 1}{2} \quad 0.14 = \frac{-0.72 + 1}{2}$$

So this is an example of a *very bad meeting*.

5.2 Case Study I: Review in Team A

We applied our approach in team A during a review meeting. The Scrum team consisted of five developers. All of them, the customer, the product owner, and the Scrum master attended the meeting. The developers reported the customer about the last sprint and presented their product increment. In the second part of the meeting, the team discussed problems with the customer, which have occurred during the meeting. For example, the customer had to make some design decisions. The meeting lasted approximately one and a half hour.

5.2.1 Feedback method. The developers answered our questions. The mean values and standard deviations for each question are shown in Fig. 2.

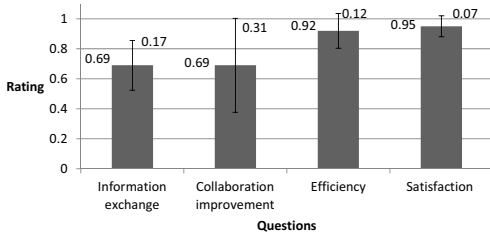


Figure 2: The mean and the standard deviations of the results of our feedback method of the review in team A

Mostly, the developers reported the progress of the last sprint to the customer. So information mainly flew from the developers to the customer and the developers did not get many new information. This may explain the low rating for *information exchange*. The question about *collaboration improvement* was answered very differently but overall rather low. But this meeting was more a report meeting and the team could not gain a real progress.

The *efficiency* and *satisfaction* were both rated as very good. Based on our approach we calculated a value of 0.81 , which indicates a *very good meeting*.

5.2.2 Results of act4teamsLight. The results of *act4teamsLight* are shown in Fig. 3. The exchange of information was the main activity during the meeting. This high amount of information exchange is due to the purpose of a review.

The team received feedback from the customer about its increment, too. Besides this intense information exchange, the team discussed problems with the customer and worked on solutions.

The occurrence of *methodically-structuring behavior* was high. Only one statement categorized as *destructive behavior* occurred.

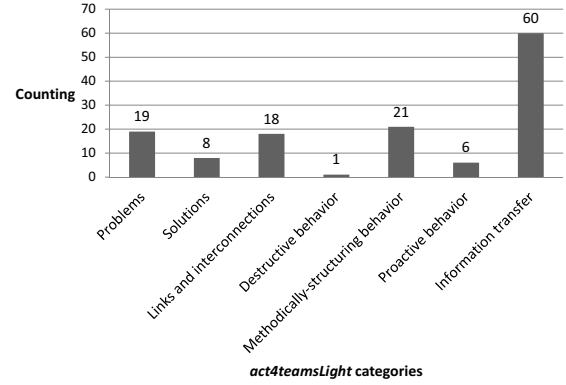


Figure 3: Results of *act4teamsLight* during the review in team A

That shows that the meeting was well structured and disciplined. Based on the calculation of meeting success by *act4teamsLight*, we calculate a value of 0.96 , which indicates a *very good meeting*.

5.3 Case Study II: Review in Team B

We conducted the second case study in Team B in a review meeting as well. The Scrum team of five developers, the customer, the product owner, and the Scrum master attended the meeting. One participant failed to report plausible data. As a consequence, we obtained only four data points.

The team could not reach its sprint goal and was rather depressed. Also, the team got a new Scrum master and she often interfered during the meeting. At that time, she did not know the team well and should have trusted the team members more to handle the situation by themselves. Overall, the atmosphere in the meeting was rather tense. The meeting lasted about one and a half hour.

5.3.1 Feedback method. The results of our feedback method are shown in Fig. 4. Except the rating for *information exchange*, the general rating for this meeting is rather low. This is especially expressed by the low rating of *satisfaction*. There are two possible reasons for this outcome: Either the meeting was indeed unsatisfying for the developers or the overall depressed atmosphere in the team had an effect on the results. The high standard deviation for each question supports the second case. Some participants rated more the meeting itself and others were influenced by the situation.

Based on our approach, we calculated a value of 0.42 , which indicates a *satisfactory meeting*.

5.3.2 Results of act4TeamsLight. The results of *act4TeamsLight* are shown in Fig. 5.

We see a similar distribution of behavior as during the review in team A. The information exchange was the main part of this meeting as well. The team discussed a lot of problems with the customer but rarely worked on solutions. More destructive behavior occurred during the meeting than in the other team. This conforms to our

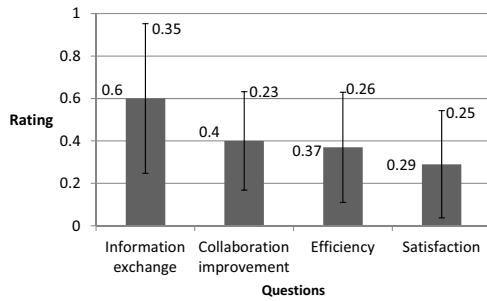


Figure 4: The mean and the standard deviations of the feedback method of the review in team B

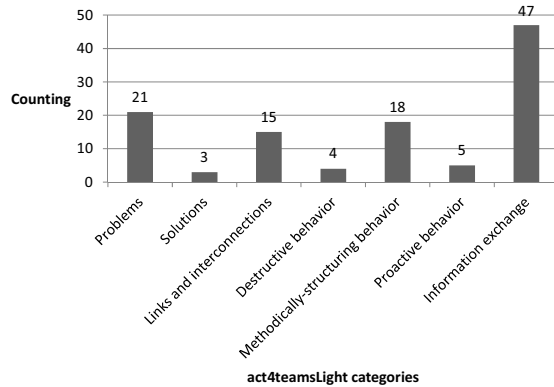


Figure 5: Results of *act4teamsLight* during the review in team B

general observations during the meeting. The meeting was admittedly disciplined but the developers were still a little bit irritated because of their missed sprint goal.

Meeting success based on *act4teamsLight* shows a value of 0.82, which indicates a *very good meeting*.

5.4 Threats to Validity

Our case study is subject to some threats to validity. According to Wohlin et al.'s [23] classification of threats to validity, we consider construct, internal, conclusion and external validity.

Construct validity: To enable ourselves to investigate meetings, we used *act4teamsLight*. Admittedly, *act4teamsLight* has not been validated yet but the method was created by the same group that created *act4teams*. Each meeting was analyzed by just one person. But this person has experience with *act4teamsLight* and was involved in the development of *act4teamsLight*. Due to the order of the questions, the participants might base their answer about their satisfaction on their answers to the previous three questions and do not answer the question independently.

Internal validity: The calculation of meeting success by *act4teamsLight* and our feedback method are based on different approaches.

Actually, they can be hardly compared. But we arranged both calculations to return values on the same range to enable us to compare them nevertheless.

Conclusion validity: We just had the opportunity to investigate two meetings but both meetings were held by different teams.

External validity: We conducted our case studies at least in different teams but in the same company and only asked the developers. We investigated only two meetings and both meetings were reviews. So our number of representatives regarding people and meeting types is rather small.

6 INTERPRETATION

Act4teamsLight shows which behavior occurs during a meeting and if a meeting observed from the outside was rather good or bad. But it does not show if the meeting participants perceived the meeting the same way. This is especially shown by the results from the first review meeting. The rating for *information exchange* is significantly lower than *act4teamsLight* indicates. If we want to prevent developers from getting frustrated by bad meetings, we have to know how the participants and not someone else perceived the meeting. So gathering feedback about a meeting is important and tells us more than a behavior-based approach.

But the advantage of *act4teamsLight* is that meetings are assessed objectively and the general mood and work situation within a team do not influence the measurement. The atmosphere in team B may have an influence on our feedback method.

Nevertheless, the results of our study are promising to pursue our method. In the first case, both methods calculated the same category of meeting success. In the second case, our feedback method admittedly calculated the meeting success two categories worse than *act4teamsLight*. But both methods showed similar tendencies. So limited to our case study, we can confirm our assumption that the occurrence of negative behaviors is also shown by feedback.

7 CONCLUSION

It was our goal to prevent developers from being frustrated by bad meetings because these bad meetings have a negative influence on the success of teams. We measure their success by gathering feedback from participants about meetings. We use a tool to gather and analyze feedback because we want to provide a method with a low effort of time and money to developer teams to assess their meetings. Our method should work as a warning signal for teams to recognize whether they have to improve their meetings.

To create our questions, we had to define the abstract term of *meeting success*. The concept of *meeting success* has significant similarities to usability. The definition of usability helped us to bring appropriately the reoccurring terms of effectiveness, efficiency, and satisfaction together and take it as a base to create questions.

In a case study, we validated our approach. The results indicate that our feedback method also shows if a meeting was rather good or bad like a behavior-based approach. It also shows if the participants are satisfied with the meeting. That is especially important to ensure a successful project.

So we recommend to pursue this usability based approach for meetings and assess meetings by this light-weighted method.

In our case study, we concentrated us on the developers because our motivation was to prevent developers from getting frustrated by bad meetings. Whether our method can be used for other roles and domains would be part of future work. Investigating reasons for bad ratings will also be part of future work in order to suggest improvements for team meetings.

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REFERENCES

- [1] Milam Aiken, Del Hawley, and Wenxia Zhang. 1994. Increasing Meeting Efficiency with a GDSS. *Industrial Management & Data Systems* 94, 8 (1994), 13–16. <https://doi.org/10.1108/02635579410069300>
- [2] Scott Ambler. 2002. *Agile Modeling: Effective Practices for eXtreme Programming and the Unified Process*. John Wiley & Sons, Inc., New York, NY, USA.
- [3] Kent Beck and Cynthia Andres. 2004. *Extreme Programming Explained: Embrace Change (2Nd Edition)*. Addison-Wesley Professional.
- [4] Melissa A. Cohen, Steven G. Rogelberg, Joseph A. Allen, and Alexandra Luong. 2011. Meeting Design Characteristics and Attendee Perceptions of Staff/Team Meeting Quality. *Group Dynamics* 15, 1 (3 2011), 90–104. <https://doi.org/10.1037/a0021549>
- [5] Robert Davison. 1997. An instrument for measuring meeting success. *Information & Management* 32, 4 (1997), 163–176. [https://doi.org/10.1016/S0378-7206\(97\)00020-7](https://doi.org/10.1016/S0378-7206(97)00020-7)
- [6] Angela Edmunds and Anne Morris. 2000. The problem of information overload in business organisations: a review of the literature. *International Journal of Information Management* 20, 1 (2000), 17 – 28.
- [7] Daniel Graziotin, Fabian Fagerholm, Xiaofeng Wang, and Pekka Abrahamsson. 2017. Unhappy Developers: Bad for Themselves, Bad for Process, and Bad for Software Product. *CoRR abs/1701.02952* (2017). arXiv:1701.02952 <http://arxiv.org/abs/1701.02952>
- [8] Walter A. Green and Harold Lazarus. 1991. Are Today's Executives Meeting with Success? *Journal of Management Development* 10, 1 (1991), 14–25. <https://doi.org/10.1108/02621719110139034>
- [9] Ann-Christin Haak. 2017. Bachelorarbeit: Analyse von Interaktionen in Softwareprojekt-Meetings eng.: bachelor thesis: Analysis of interactions during software project meetings. (2017).
- [10] Simone Kauffeld and Nale Lehmann-Willenbrock. 2011. Meetings Matter: Effects of Team Meetings on Team and Organizational Success. *Small Group Research* 43, 2 (2011), 130–158. <https://doi.org/10.1177/1046496411429599>
- [11] J. Kluender, C. Unger-Windeler, F. Kortum, and K. Schneider. 2017. Team Meetings and Their Relevance for the Software Development Process Over Time. In *2017 43rd Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*. 313–320. <https://doi.org/10.1109/SEAA.2017.57>
- [12] Jil Klünder, Kurt Schneider, Fabian Kortum, Julia Straube, Lisa Handke, and Simone Kauffeld. 2016. *Communication in Teams - An Expression of Social Conflicts*. Springer International Publishing, Cham, 111–129. https://doi.org/10.1007/978-3-319-44902-9_8
- [13] Nale Lehmann-Willenbrock, Joseph A. Allen, and Dain Belyeu. 2016. Our love/hate relationship with meetings. *Management Research Review* 39, 10 (2016), 1293–1312. <https://doi.org/10.1108/MRR-08-2015-0195>
- [14] Alexandra Luong and Steven G. Rogelberg. 2005. Meetings and More Meetings: The Relationship Between Meeting Load and the Daily Well-Being of Employees. 9 (03 2005), 58–67.
- [15] Seyed-Ali Marjaie and Urvashi Rathod. 2011. Communication in Agile Software Projects: Qualitative Analysis using Grounded Theory in System Dynamics. (2011).
- [16] Carol T. Nixon and Glenn E. Littlepage. 1992. Impact of meeting procedures on meeting effectiveness. *Journal of Business and Psychology* 6, 3 (01 Mar 1992), 361–369. <https://doi.org/10.1007/BF01126771>
- [17] Steven G. Rogelberg, Joseph A. Allen, Linda Shanock, Cliff Scott, and Marissa Shuffler. 2010. Employee satisfaction with meetings: A contemporary facet of job satisfaction. *Human Resource Management* 49, 2 (2010), 149–172. <https://doi.org/10.1002/hrm.20339>
- [18] Kurt Schneider, Olga Liskin, Hilko Paulsen, and Simone Kauffeld. 2015. Media, Mood, and Meetings: Related to Project Success? *Trans. Comput. Educ.* 15, 4, Article 21 (Dec. 2015), 33 pages. <https://doi.org/10.1145/2771440>
- [19] Ken Schwaber and Mike Beedle. 2001. *Agile Software Development with Scrum* (1st ed.). Prentice Hall PTR, Upper Saddle River, NJ, USA.
- [20] International Organization For Standardization. 1998. *ISO 9241-11 - Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs): Part 11: Guidance on Usability*. ISO.
- [21] The Standish Group International. 1995. The Chaos Report. (1995).
- [22] Horst Treiblmaier and Peter Filzmoser. 2011. Benefits from using continuous rating scales in online survey research. (2011).
- [23] Claes Wohlin, Per Runeson, Martin Höst, Magnus C. Ohlsson, Björn Regnell, and Anders Wesslén. 2000. *Experimentation in Software Engineering: An Introduction*. Kluwer Academic Publishers, Norwell, MA, USA.