
8-20-2020

Using Event Diaries and In-Depth Interviews for Understanding Shared Understanding in Headquarters-Subsidiary Cooperation

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Recommended APA Citation

Seus, F., & Weissenberger-Eibl, M. A. (2020). Using Event Diaries and In-Depth Interviews for Understanding Shared Understanding in Headquarters-Subsidiary Cooperation. *The Qualitative Report*, 25(8), 3085-3110. <https://doi.org/10.46743/2160-3715/2020.4507>

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Abstract

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Keywords

Diary Methods, Event Sampling Methodology, International Management, Headquarters-Subsidiary Cooperation, Shared Understanding, Distributed Project Development

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Acknowledgements

An earlier version of this paper was presented at the EURAM'18, Conference of the European Academy of Management, on 19-22 June 2018 in Reykjavík. The authors would like to thank all the participants and the managers of the company who made this study possible.

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The paper describes the application of a qualitative diary method combined with in-depth interviews in the context of headquarters-subsidiary cooperation. We examine the distinct requirements of studying shared understanding in the case of distributed teams and argue that further research is necessary in order to explain inter-team conflicts arising from incongruent understandings and divergent expectations. Building on this research gap, we perform a case study in the headquarters of a multinational technology company and one of its subsidiaries. With the help of Event Sampling Methodology (ESM) and in-depth interviews, we were able to identify, analyze and comprehend situations characterized by lacking shared understanding. By this, our research contributes to the methodical discussion on event sampling methods and proposes new fields of application. Furthermore, it contributes to the international management literature by analyzing misunderstandings in international R&D cooperation. Keywords: Diary Methods, Event Sampling Methodology, International Management, Headquarters-Subsidiary Cooperation, Shared Understanding, Distributed Project Development

Understanding project cooperation between subsidiaries in multinational companies constitutes a major challenge in management research. An important focus has been laid on joint vision and shared understanding as central factors for project success and team performance (Boles, 1999; Busch & Lorenz, 2010; Cannon-Bowers & Salas, 2001; Cronin & Weingart, 2007; Dougherty, 1992; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Firth, Hollenbeck, Miles, Ilgen, & Barnes, 2015; Kotlarsky, van den Hooff, & Houtman, 2012). However, the conditions for developing shared understanding in teams that are distributed on different sites are difficult: Team members speak different languages, come from diverse cultural backgrounds and are geographically separated. This reduces the degree of shared context and thereby the likelihood of developing a common understanding of the joint work (Hinds & Bailey, 2003, pp. 617–618). Not sharing the same identity, as in the case of teams belonging to different company sites, is an additional factor that impedes shared understanding.

Different methods attempt to measure the degree and content of shared understanding (DeChurch & Mesmer-Magnus, 2010; Mohammed & Dumville, 2001; Mohammed, Klimoski, & Rentsch, 2000). However, it remains underexplored how group identification and role relationship between groups influence the development of shared understanding (Liao,

Jimmieson, O'Brien, & Restubog, 2012, p. 229). Although this is crucial for comprehending subsidiary cooperation projects, common methods fail to address this issue appropriately.

This paper proposes the use of Event Sampling Methodology (ESM) with an event-contingent protocol in combination with in-depth interviews in order to get a deeper understanding of team interactions. ESM belongs to the family of diary methods and consists in a questionnaire-like record in which participants document situations fulfilling specific trigger conditions, which are defined by the respective research question (Bolger, Davis, & Rafaeli, 2003, pp. 590–591). In this case, the trigger is an interaction with a member of another team in which the participant perceives discrepancies about opinions on task fulfilment.

The purpose of this paper is above and foremost methodical in nature and consists in describing the application of a seldom-used method in the empiric field of international management. In this, we contribute to the question of how shared understanding of teams can be studied in the context of headquarters-subsidiary cooperation.

The paper is structured as follows: First, it discusses the importance of shared understanding for inter-team project cooperation and outlines the specific challenges of analyzing conflicts in distributed project management that arise from lacking shared understanding. It then introduces ESM as a method and demonstrates how combining it with in-depth interviews allows mitigating the identified shortcomings. Last, we discuss the application of the method by the help of a case study in Germany and China and outline how to deal with the challenges of the methods.

Theoretical Background

The Challenge of Analyzing Shared Understanding in Subsidiary Cooperation

The notion of shared understanding¹ describes the fact that groups develop a common perception of the knowledge they have and of the activities they share (Hernandez, Eberly, Avolio, & Johnson, 2011, p. 1178; Mohammed et al., 2000, p. 123). This enables them to develop a common representation of what they want to achieve as well as of what means are necessary to reach this goal, and thus constitutes the foundation for joint action. Shared understanding has proved to be an important driver of team performance (Cannon-Bowers & Salas, 2001; DeChurch & Mesmer-Magnus, 2010; Lim & Klein, 2006; Mohammed, Ferzandi, & Hamilton, 2010, pp. 891–894). However, questions about the antecedents and the influence of group identity remain open (Liao et al., 2012, p. 229; Tenzer & Pudelko, 2012, p. 2).

The importance of shared understanding for subsidiary cooperation.

Sharing knowledge across organizational entities is critical for multinational companies (Weissenberger-Eibl & Spieth, 2006b, p. 72). To transfer knowledge successfully, it is not only important that the sender succeeds in codifying the information to be transmitted, but also that the recipient disposes of sufficient background knowledge in order to decode it (Hippel, 1994, pp. 430–431). However, teams “not only know different things, but also know things differently” (Dougherty, 1992, p. 187). Groups selectively filter and interpret information based on their existing knowledge base (Fleck, 1979, pp. 38–39). Knowledge in itself, especially implicit one, is influenced by the value and norm system of the group (Weissenberger-Eibl & Spieth, 2006a, p. 13).

¹ Different terms coexist to describe shared understanding, for example, collective cognition, team knowledge, team mental models or transactive memory (Cannon-Bowers & Salas, 2001, p. 197). Recently, the term shared mental models has commonly been used (e.g., Tenzer & Pudelko, 2012; Matteson, 2015).

This implies that building a common ground for knowledge sharing and project cooperation becomes more difficult with increasing team diversity, since diversity creates cognitive distance (Weissenberger-Eibl & Koch, 2013, p. 157). Next to functional diversity, cultural diversity or other factors of group identity can be drivers of heterogeneous perception (Cronin & Weingart, 2007, p. 762).

Differences in the perceptions must not necessarily influence team cooperation negatively. However, it can create mismatches of expectations and contradictions in the actions of team members. Contradictions can occur when team members do not agree on the overall goals, the priorities (e.g. is it more important that the product is long lasting or that it is stylish) or have different assumptions (e.g. timeline restrictions or preference like “form follows function” vs. “form follows emotion”). When the contradictions are too big because the different perspectives are incompatible, conflict is likely (Cronin & Weingart, 2007, pp. 761–766). This phenomenon has been labelled representational gap:

Representational gaps degrade information processing by leading to misunderstanding and potential misuse of information. Representational gaps make coordination difficult by creating contradictions in how teammates believe the problem should be solved, leading them to take actions that contradict each other. Finally, when team members interpret the same information differently and view how the problem should be solved differently, the team is likely to experience conflict. (Cronin & Weingart, 2007, p. 762)

Team members do not instantly become aware of the contradictions that result from representational gaps. The contradictions create a state of ambiguity in which team members believe they know what the other side means, although both parties start from different, or even inconsistent assumptions (Walker, Davis, & Stevenson, 2017, p. 180). Ambiguity causes misunderstandings and cannot only lead to rework, but also to profound disagreements on what the project goal should be or how it could be reached.

Shared understanding is particularly relevant for distributed teams, since distance to one another reduces the degree of shared context (Hinds & Bailey, 2003, pp. 617–618). Empirical evidence confirms the positive impact of having a shared vision on knowledge transfer in headquarter-subsiary cooperation (Li, 2005; Reiche, Harzing, & Pudelko, 2015).

Headquarter-subsiary relationships are particularly sensitive to the lack of a shared vision, since this joint understanding establishes the role relationship between the organizational entities. The role that a subsidiary plays in the multinational company results from the headquarters' attribution on the one hand and the subsidiary's choice how to fulfil this role on the other hand. It is thus a negotiated construct (Birkinshaw, Holm, Thilenius, & Arvidsson, 2000, p. 324). However, headquarters might understand the subsidiary's role differently than the subsidiary itself. This perception gap can cause friction in the cooperation between the two (Asakawa & Aoki, 2016; Birkinshaw et al., 2000, pp. 339–340; Daniel, 2010; Schmid & Daniel, 2011; Seus, Weissenberger-Eibl, & Zern-Breuer, in press). Consequently, role relationship is intimately linked to shared understanding and therefore constitutes a not negligible aspect of distributed project development.

The Need of Theorizing and Methodical Diversity.

Conflicts and their impact on team performance are well explored (De Dreu, 2016; De Dreu & Weingart, 2003; Hinds & Bailey, 2003; Puck & Pregel, 2014; Tekleab & Quigley, 2014). However, the role of expectation mismatches among team members and their

consequences are hardly addressed (Bosch-Sijtsema, 2016, p. 362). The concept of shared understanding appears pertinent in order to acknowledge the influence of expectations.

Although there is ample evidence that shared understanding has positive influence on coordination and on team performance (Ambos & Müller-Stewens, 2017, p. 13; Tenzer & Pudelko, 2012, p. 2), knowledge about this concept is still limited and ambiguous. Little is known about the antecedents and the development of shared understanding (Tenzer & Pudelko, 2012, p. 2), especially when it comes to group identification mechanisms like departmental identities (Liao et al., 2012, p. 229), as in the case of distributed teams belonging to different company locations.

Moreover, the measurement of shared understanding represents a challenge to traditional research designs. Since it is not possible to look directly into the minds of research participants, different operationalization approaches are used and have been critically discussed (DeChurch & Mesmer-Magnus, 2010; Mohammed et al., 2000; Mohammed et al., 2010, pp. 881–891; Mohammed & Dumville, 2001). However, available measures are insufficient and hard to apply on "real" groups in the field (Cannon-Bowers & Salas, 2001, p. 200; Matteson, 2015, p. 57). The main point of criticism is that this indirect measurement can only offer an approximation of what people believe (Matteson, 2015, pp. 66–67).

Therefore, research needs to investigate project cooperation of distributed teams regarding misunderstandings resulting from a mismatch of expectations. A special focus should be laid on expectations that result from role attribution in the headquarters-subsidiary relationship (Seus et al., in press). In order to do so, it is necessary to understand the meaning behind the behavior of the acting persons (Blumer, 1986; Weber, 1922, pp. 1–3). "While survey research is good at describing what people do, it is rather less effective at explaining or understanding why they do it. Accessing individuals' interpretations of their world is the only way to do this" (Alaszewski, 2006, p. 36). Therefore, pure quantitative approaches are inappropriate. In order to acknowledge the perspectives of the involved persons, both in the headquarters and the subsidiary, an interpretative approach is necessary.

Event Sampling Methodology - A Diary Method

ESM belongs to the family of diary methods where participants are asked to keep record of specific situations in a questionnaire-like diary. The aim is to analyze ongoing events in their natural environment with little interference of the researcher. During the investigation period, participants are asked to report specific events with the help of a pre-structured template. The reporting can be based on three types of protocols: Interval-contingent reporting defines a given interval in which participants are asked to keep record (e.g. every two hours). Signal-contingent reporting uses a signal at varying times throughout the day to inform participants that they have to make a diary entry. Last, the event-contingent protocol defines specific events requiring the recording of a diary entry. This protocol is particularly useful for the detailed analysis of recurring, but irregular phenomena (Christensen, Barrett, Bliss-Moreau, & Lebo, 2003, pp. 60–63; Reis & Wheeler, 1991, pp. 280–283).

Although the first known study to explicitly use self-reported records from research participants goes back to the 1930s, the proliferation of this kind of data collection method came with the 1990s as an opposition to the dominating positivist and objectivist approach in the social sciences (Kunz, 2016, p. 101). Based on the assumption that social reality is the result of subjective construction, the interpretive paradigm considers that the study of social phenomena is only possible through understanding the meaning that the involved persons attribute to things (Blumer, 1966, 1986; Welch, Plakoyiannaki, Piekkari, & Paavilainen-Mäntymäki, 2013, p. 246). Since diary methods focus on documenting subjective experience of reported events, they are employed in order to obtain pictures of social reality from the

perspective of the involved actors (Corti, 1993, np; Filep, Turner, Eidse, Thompson-Fawcett, & Fitzsimons, 2017, p. 453).

Research diaries are used in a variety of academic disciplines and are compatible with different research designs, from experimental and survey research to naturalistic research (Alaszewski, 2006, pp. 24–45). Traditionally, they are often employed in the field of psychology and health studies, but also in different domains of social research (Bolger et al., 2003, p. 580; Kunz, 2016, p. 83). Lately, there has been a growing interest in this method from the field of organizational behavior and innovation management (Fisher & To, 2012; Roth, 2019; Uy, Foo, & Aguinis, 2010).

Method Development for Analyzing Shared Understanding in Subsidiary Cooperation

Diaries can be used on their own or in combination with other methods and allow the gathering of rich data (Alaszewski, 2006, p. 122; Corti, 1993; Uy et al., 2010, p. 48). Especially the use of follow-up interviews based on the recordings of the participant has proved to be pertinent and beneficial (Radcliffe, 2013). Combining diaries and interviews permits the instant recording of events without the need of the researcher's presence and, at the same time, the detailed reconstruction of events during the personal interview with a reduced memory bias (Roth, 2019, pp. 77–78). In order to get a better understanding of shared understanding in the context of team cooperation in multinational companies, this paper proposes the use of a combination of an event-contingent diary protocol with in-depth interviews.

Capturing Decisive Moments in Team Cooperation

Misunderstandings and conflicts between cooperating teams represent a "hard-to-reach" (Alaszewski, 2006, p. 43) activity. First, it is not foreseeable when exactly such a situation will occur. Thus, the observation cannot be planned. Second, misunderstandings and conflicts are delicate situations and cause discomfort (Shaw et al., 2011, p. 392). Therefore, there is need for a data collecting method that allows timely and honest recording of the situations. Diary methods are valuable when it comes to analyzing phenomena where the presence of a researcher would not be possible or would disturb the natural setting of the events. Since event-contingent diaries are ideal for analyzing phenomena which are difficult to observe from outside, which occur routinely or which are highly intimate and sensitive (Kunz, 2016, pp. 99–100), we argue that they are an appropriate method in studying lacking shared understanding in team cooperation.

First, ESM allows the *identification* of situations where discrepancies of task understanding occur. Since the simple documentation of an event in a diary-like questionnaire is little time-consuming, this data collection method easily integrates in day-to-day business where misunderstandings actually happen. Hence, the general space-time problem of field research, which also applies to the observation of team cooperation conflicts, is bypassed (Roth, 2015, p. 342).

Furthermore, the event-contingent protocol permits the immediate *recording* of situations where discrepancies of task understanding occur. This procedure thus avoids retrospective distortion of events in the subsequent interviews. With the help of the filled-in event logs, interviewees are more likely to recall details of the event during the interview (Roth, 2015, p. 343). The risk of memory bias specifically applies to the retrospective report of emotions, negative ones in particular (Fisher & To, 2012, p. 866). Since we are interested in understanding how team members perceive mistakable situations in the daily cooperation with other subsidiaries, it requires a method that minimizes retrospective distortion of recounted experiences.

Moreover, ESM enables the documentation of situations that would otherwise not have been recorded. Since some confusions are clarified shortly afterwards or are deemed irrelevant, they are not reported. This can be explained by Schütz' concept of relevance systems which acknowledges the fact that relevance is attributed subjectively to things. Our systems of relevance influence not only the original perception (impressions), but also primary remembrance (retentions) as well as secondary remembrance (reproductions; Schütz, 1967, pp. 48–49). Situations classified as irrelevant represent an important key to identifying the origins of misunderstandings since they provide information about the underlying systems of relevance (Tenzer & Pudelko, 2012). With the help of diaries, it is possible to retain primary remembrance and thus, to stay as close as possible to the original perception (Kunz, 2016, p. 137). Knowledge about the nature of the situations that cause irritations allows the drawing of conclusions about the process in which different project teams resolve such mistakable situations and thus about still unknown antecedents of the formation of shared understanding (Tenzer & Pudelko, 2012, p. 2).

Shifting Perspectives: Taking into Account Different Understandings

Misunderstandings or conflicts in project cooperation arise when a mismatch between the expectations of different team members occurs (Bosch-Sijtsema, 2016). When analyzing misunderstandings, it is therefore important to consider the standpoints of all involved actors in order to understand their interpretation of the situation (Blumer, 1966, p. 542). Thus, it is indispensable to choose a method that takes several perspectives on the same situation into account.

ESM combined with in-depth interviews allows the comparison of two perspectives based on different records of the same event and thus reveals the origins of the misunderstanding in this specific situation (Radcliffe, 2013, p. 173). The different records of team interactions make it possible to elicit the mental models based on which the involved persons act and interpret the behavior of the other (Matteson, 2015, pp. 58–59). Constant comparative analysis allows the assessment of the models' similarity and highlights differences (Matteson, 2015, p. 61). Consequently, this combination of methods directly addresses discrepancies in task understanding.

Moreover, the proposed method reveals underlying assumptions about role understanding and role relationship that are at the origins of task misunderstandings. During the in-depth interviews, the expectations of the involved persons can be made explicit and linked to the understanding of the other's role in the joint project. Thus, it contributes to explaining how team identity and subsidiary role relationship affect the development of shared task understanding.

A Naturalistic Approach to Team Cooperation

In order to understand shared understanding, it is crucial to analyze how the involved persons perceive and interpret such situations where divergent views cause irritations in the project cooperation. Self-reporting methods provide insight "into the ways in which individuals perceive and interpret situations" (Alaszewski, 2006, p. 37). Event-sampling questionnaires therefore constitute an appropriate means to retain these impressions (Kunz, 2016, p. 137) and understand the meaning that individuals attribute to these situations (Blumer, 1986, pp. 2–3). Indeed, such qualitative methods have proved to be effective in order to reveal a group's mental model (Matteson, 2015, p. 66).

Shared understanding in team cooperation and the problems that result from the lack of it represent hard-to-reach phenomena. Thus, an adequate research approach is necessary. "A

fundamental benefit of diary methods is that they permit the examination of reported events and experiences in their natural, spontaneous context, providing information complementary to that obtainable by more traditional designs." (Bolger et al., 2003, p. 580) The proposed combination of ESM with in-depth interviews allows recording and analyzing team interactions in real life context and therefore answers the call for a naturalistic and interpretive approach of the phenomenon of shared understanding discrepancies.

Case Study Findings

In the following, we present findings of a case study where we applied the described methodical approach. For this, we start with providing the context of the study. We then present the data - first from the filled-out event logs, then from the interviews - and discuss how this enabled us to detect discrepancies in the task understanding of the two teams.

The Case Study

The study was conducted in autumn 2018 in a company in the automation equipment industry with more than 10.000 employees. We will call it ALPHA. ALPHA serves the global market and has subsidiaries all over the world. Most R&D activities take place in the German headquarters. Given the two opposing forces of global integration and regional differentiation (Doz & Prahalad, 1984), the company has decided to establish eight R&D centers in the Americas, Asia and Europe where existent products are adapted to local markets. More and more, these R&D centers also develop new products for global markets.

For the purpose of the study, two sites that closely cooperate with each other had to be selected. Since R&D activities in the company remain centralized, the cooperation would always involve a development team from central R&D at the headquarters. From the other R&D centers, the one in China was identified as the most interesting subsidiary for several reasons. First, the Shanghai R&D center is of growing strategic importance for the company because of the dynamics of the Asian market. Second, the different requirements of the Asian market and the geographical distance require a higher degree of autonomy. Third, the Chinese R&D center, and thus the role relationship with the headquarters, has undergone a significant evolution. After a build-up phase in close cooperation with the headquarters, the R&D center has reached a new maturity level where both headquarters and the local management agree that it needs to act more independently in the future. Thus, the cooperation between headquarters and the Shanghai R&D center represents an interesting sample in order to analyze shared understanding in the context of headquarters-subsidiary R&D cooperation.

The focus of the investigation lay in R&D cooperation, excluding cross-functional interactions.² Participants thus all belonged to the development department, which is divided in several sub-departments: development group of component A, development group of component B, testing department and project management office.³ For every sub-department, there are counterparts in both sites, which closely cooperate. Selecting counterparts as participants of the study permits the comparison of task and goal understanding for every sub-department. In total, 25 engineers (13 from the headquarters, 12 from the Chinese subsidiary

² Cross-functional communication causes many problems in technology companies and has been object of a lot of research. Functional diversity increases the probability of having representational gaps (Cronin & Weingart, 2007, p. 762). Since the purpose of the study was to analyze the impact of headquarters-subsidiary relation on the development of representational gaps, we excluded the confounding variable of functional diversity.

³ As the name indicates, the project management office is concerned with the project coordination during product development and the standardization of engineering methods. As it is part of the engineering functions, it was included in the sample.

with 2 of them being expatriates) took part in the study. All hierarchical levels were included, from the top management of the subsidiary, sub-department leaders and normal design or testing engineers.

The study consisted of two parts: a two-week period of event logs and a two-week period of interviews. During the survey period, the participants of both headquarters and the R&D center were asked to record mistakable or conflictual situations in the project cooperation with the other team in a so-called event log. The event log used can be found in the appendix. The trigger condition was defined as interactions (personal or virtual; oral or written) with a member of the other location in which the participant perceives discrepancies about opinions on task fulfilment and the next project steps. Participants were asked to send the event logs to the researcher for analysis directly after filling it out.

The methodical literature suggests conducting the interviews shortly after the reported event, at the best the same day or a few days later (Roth, 2015, p. 341). Since the interviewer needed to travel to another continent, the interview period comprised the two weeks following the survey period. Interviewing started on the last day of the survey period. All but four interviews were conducted face-to-face in the German headquarters and the Chinese subsidiary. The other interviews were conducted on the phone. All interviews were recorded, transcribed and analyzed with help of line-by-line initial coding following Kreiner (2016) with help of the software MAXQDA. In total, approx. 18 hours of audio material were collected. The average interview length was 42 minutes.

In total, 22 event logs were recorded by 16 participants (eight from headquarters and eight from the Chinese subsidiary). Thus, the overall rate of participants that sent one or more event logs amounts to 64%. From the nine participants that had not sent any event log, four of them indicated that there had not been any special occurrences during the investigation period; two were on business trips or on holiday; one was the top manager of the Chinese subsidiary. Adjusted with the six participants that reported no occurrences or were out of office, the response rate goes up to 88%.

Challenges in the Application of ESM

The application of an event-sampling methodology is not without limitations. Especially the relatively high degree of necessary involvement compared to more traditional methods constitutes a threat for successful data collection (Uy et al., 2010, p. 37). The event-contingent protocol is particularly demanding because research participants must be able to identify on their own the situations that they are asked to record. To allow them to do so, the specific conditions of situations that trigger a diary entry have to be very clear. If it is unclear to the participants what exactly they have to record, there is a high risk that the reports are not accurate or do not fulfil the requirements defined by the research question (Rausch, Kögler, & Laireiter, 2012, p. 187).

In order to meet these challenges, a conscientious preparation and continuous support of the research participants is necessary (for best practice recommendations in the application of ESM see Fisher & To, 2012, p. 874; Kunz, 2016, pp. 185–192). First, we held several meetings with one company representative who is very well connected with the teams in both headquarters and the Chinese R&D center. This allowed us to understand the way the departments cooperate and to become familiar with the context under study. After this, we conceptualized an event-log template.

As a usability check, we performed several pre-tests with the event log template (Alaszewski, 2006, pp. 66–71; Christensen et al., 2003, pp. 69–72). First, the template underwent academic review with other social scientists in the field. Second, we tested it with internationally experienced engineers who had a similar profile as our research participants.

Following to the pre-tests, the wording of some items was slightly adapted. The overall feedback from the pre-test participants was that the template was well understandable and easy to use. Lastly, we discussed the event log with a German and a Chinese employee of the company who were familiar with the department under study. With these pre-tests, we assured that the diary template was pertinent for the studied context and that the wording was meaningful for participants (Charmaz, 2014, pp. 64–66).

After these preparations, we started the study with an *ex-ante* briefing of the participants. In the kick-off meeting, the researcher gave several examples of possible trigger situations and explained that they could consist in a meeting, a personal conversation, a phone call or an e-mail after which the participants felt confused about the behavior of the person on the other site. This confusion could concern divergent views on the next steps, unclear responsibilities, expectation mismatches or issues with information transfer. The participants gave examples of what they understood to be a trigger situation and they were discussed until all questions were answered. Furthermore, written instructions on the event log template explained the trigger condition.

Above and foremost, building a close and collaborative relationship and maintaining contact with the research participants is crucial. Researchers have to ensure that participants feel comfortable and show them that their cooperation is valuable for the results of the study as well as for their teamwork. This helps to sustain motivation and commitment and has positive impact on data quality (Alaszewski, 2006, p. 71; Christensen et al., 2003, p. 67; Fisher & To, 2012, p. 874; Roth, 2015, p. 344).

Given the geographical distance, building a close relationship with all participants was particularly challenging. The study therefore started with a kick-off in which all participants were informed about the research project. The purpose of the study, the procedure as well as the event log template were explained in detail. Furthermore, the researcher highlighted the fact that she was external to the company and that neither the event logs nor the interviews would be transferred to the company. Because of the time lag, two separated kick-offs were held for the two teams. The kick-off for the Chinese participants was done via Skype.

In order to prevent misunderstandings because of the language barrier, a bilingual Chinese colleague supported during the presentation. Beforehand, the researcher discussed the event log template and the kick-off presentation with the same Chinese colleague in order to detect possible cultural differences in understanding the method or the wording.

During the two-week event log phase, several e-mail reminders were sent to the participants. As far as possible, the researcher made a telephone follow-up after one week for those participants who had not sent any event logs so far. The follow-up measures ensured that the participants had understood the method and did not forget about recording event logs. Most participants not having sent any event logs indicated that they had not forgotten about the event logs but that nothing had happened so far.

A two-week period was chosen based on literature suggesting that this constitutes a long enough period to identify irregular events and at the same time short enough to maintain high commitment from the participants (Christensen et al., 2003, p. 61; Kunz, 2016, pp. 189–190; Reis & Wheeler, 1991, p. 286). Nevertheless, several participants indicated that no events occurred and that they found the investigation period quite short. Prolonging the event-sampling phase, e.g. to four weeks, could allow the recording of more events that are interrelated with one another. However, this would require further measures in order to ensure data quality. Physical presence of the researchers would be highly recommendable, serving as constant "reminder" to the participants on the one hand, and allowing the conduction of interviews shortly after the recorded events on the other hand. Thus, the application method is limited through (a) the availability of the researchers and (b) the willingness of the company to allow the presence of externals.

Event Logs: Conversation openers and Tracers of Key Misunderstandings

Methodically, the event logs brought several advantages: First, it served as introduction to the study for the participants. Thanks to the two-week event-log period, the participants could reflect the cooperation with the colleagues of the other site before the interviews. Several participants had prepared notes; one person even brought a slide presentation. During the interviews, participants often mentioned the event logs without being asked. Second, participants generally well understood the method and found it easier to recall details of the situation with the help of the event logs. Table 1 shows a selection of quotes that underline these advantages.

Table 1
Evidence of the Applicability of the Method

Interview quote	Evidence showing the applicability of the method
<p>I: So you were one month in the headquarters. X: Yes. One month. But this I put here [pointing to the event logs], it's not the special cases, it's just like the common. I think very common, because the culture is very different. Sometimes we have different culture, we have different ways to do the same thing. So we have different [incomprehensible willing?]] how to solve the problem. [after 8 minutes of explaining the situation] I: So you said, things like this often happen. X: Yeah, yeah, yeah.</p>	<p>Participant talking about the event logs without being asked Recorded event represents a typical situation Recorded event represents a typical situation</p>
<p>I: If you had had a situation, what kind of situations would you have recorded? Do you have anything from the past in mind where you say: "This would have been an event log situation." X: It probably would have maybe involve a misunderstanding related to an expectation or a goal. Perhaps a misunderstanding on a timeline, which can frequently be an issue that is experienced on a project. Again, I would say, a lot of our relationships [...], it's usually, I would say, related to not well defined expectations.</p>	<p>Participant well understands the trigger condition. Situations include characteristics of representational gaps (different goals and assumptions, e.g. timeline, unclear expectations).</p>
<p>X: [talking about event logs without being asked] So, I haven't filled out any such logs, yeah? Because I didn't have anything bad during the last two weeks. This is too short for me. If you had asked me a few weeks earlier, I would have had a great situation. Directly about my product that concerns me. But now I was ill for a few days last week. But there wouldn't have happened anything anyway. The last two weeks worked out fine. [25 minutes later, at the end of the interview]</p>	<p>Participant is talking about event logs without being asked. Reasons for not sending any event logs are: - time period quite short, - no occurrences, - illness.</p>

I: Okay. Are there any other aspects I haven't mentioned yet and you would like to talk about?	Participants has good understanding of the method and commitment to record event logs.
X: I can't think of anything. As I said, at the moment it works pretty well. I also haven't find anything. I just thought whether I should have recorded something from the past. But this was not the point, was it? The recording was supposed to be during the last two weeks.	Event logs served as preparation for the interview to the participants.
I: Yes, exactly [...].	[Note: This sub-group reported few events and during the interviews, the participants stated that in general, the cooperation was working fine.]
X: I find it good. I didn't forget. I wanted to do it. This was not the reason. Several times, I sat with my colleague and asked: "What shall we write today?"	
X: As a whole, it really is a complex topic and ten years... I must say, of course I cannot remember everything and the memory is always a little bit more positive than what you think here.	Event logs counteract memory bias.
X: [Having been asked about an event log] Oh yeah, well, I need to think about what exactly it was... [Looking at the event log] But now I remember again.	Event logs counteract memory bias.
X: Anyway, it doesn't take too much time. It's not like everybody is spending the whole day on the phone. Apart from [Mister Y]. He probably sent twenty event logs. [...] No, it was relatively quick. It doesn't take more than five, ten minutes, and then it's done. That's ok.	Method is not perceived as time consuming.

Third, the event logs were a door opener as well as a thematic anchor for the conversation. Talking about concrete situations helped participants to talk about the cooperation with the other site. Often, the participants raised important issues on their own during the explanation of the event log situations. Without the interviewer asking for it, participants addressed topics included in the interview guide like task understanding, expectations towards the colleagues in the other location as well as the own role understanding. Thus, the aim of eliciting the task representations and of sensitizing the participants for their own point of view was reached.

The overall goal of the event logs was to identify situations pointing at the existence of representational gaps. Indeed, the event log data allowed to better understand the type of situations that the participant perceived as misunderstanding.

When comparing the answers of the headquarters and the subsidiary colleagues, some interesting differences appeared. In general, the participants in the headquarters rated the answers more moderately. The biggest discrepancies were visible in the two main reasons indicated above: "There was some missing information." (mostly perceived from the Chinese side) and "We had different views on how the task is supposed to be done." (mostly perceived mostly from the Chinese side).

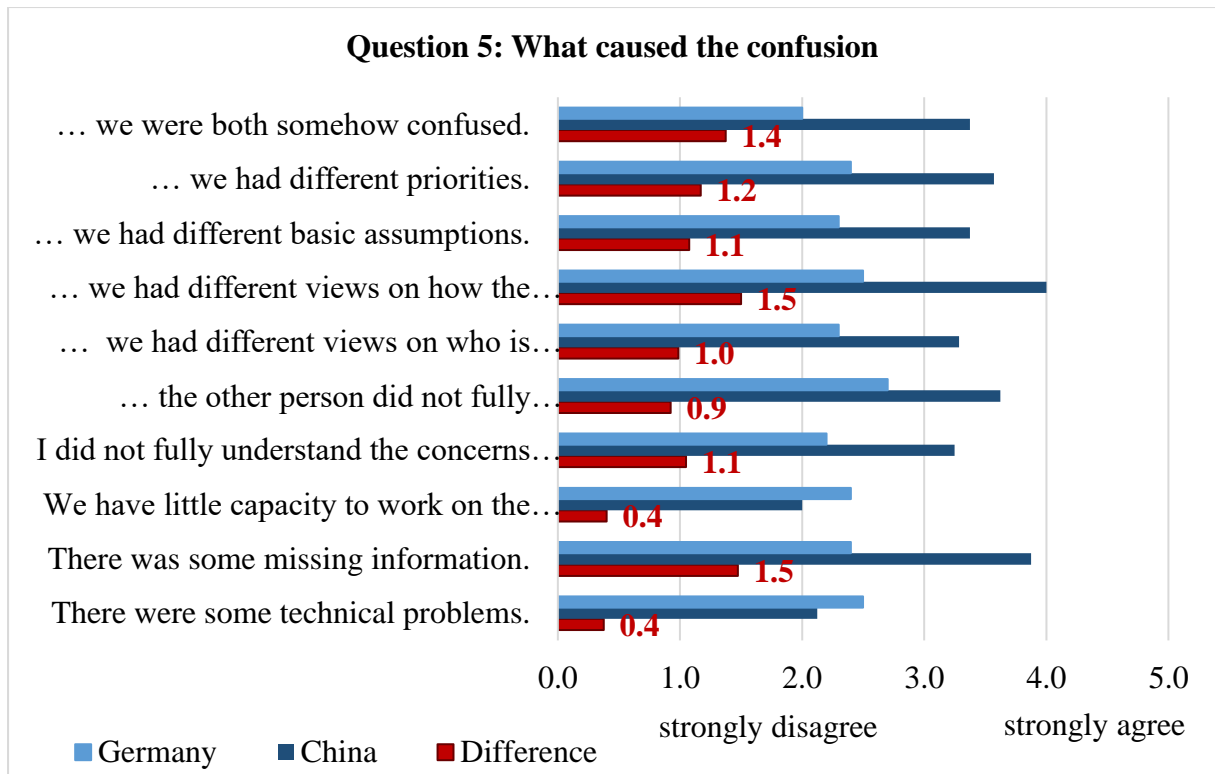


Figure 1. Differences in the perception of misunderstandings.

The high rating of the item "missing information" can be explained by the fact that most R&D knowhow and strategic information lies in the headquarters. Therefore, the Chinese R&D center depends on the information flow from headquarters. The other issues (task understanding, priorities, basic assumptions and responsibilities) relate to the subject of shared understanding. The Chinese participants' perception of different understandings in the cooperation are a first indicator of the presence of representational gaps. The existence of inconsistent goals and goal hierarchy as well as differing approaches in product development become even clearer during the interviews. One of the participants formulated it as follows:

We have different ways to do the same thing. So, we have different [incomprehensible] how to solve the problem.

The interviews show that the teams have different perspectives on product development (see Table 2). A main point of disagreement were the different priorities of the headquarters and the R&D center. While in headquarters, the colleagues follow the process and emphasize precision, the colleagues in the R&D center prioritize speed. Thus, a very frequent complaint from the Chinese subsidiary was "Headquarters is too slow." Meeting the timetable is a top priority in the Chinese R&D center. In contrast to this, the headquarters' colleagues emphasize precision and the process rules that need to be followed. Thus, the two teams have divergent priorities: speed on the one hand, quality and process rules on the other.

X: [Something that always occurs] is maybe the behavior. The different behavior for China and headquarters. In China, we always want it - even the boss - fast. The schedule, we must meet the schedule. But headquarters'

colleague maybe don't care about the schedule, they always focus on their product. This is my feeling.

Table 2

Evidence of Representational Gaps

Interview quote	Evidence showing the suitability of event logs for identifying representational gaps
<p>Quote from the Chinese R&D center</p> <p>X: [Something that always occurs] is maybe the behavior. The different behavior for China and headquarters. In China, we always want it - even the boss - fast. The schedule, we must meet the schedule. But headquarters' colleague maybe don't care about the schedule, they always focus on their product. This is my feeling. And... Oh, I didn't give an event for this, but it is really an example [...]. In my opinion, I made a decision that we can ask the supplier to change the module immediately. But headquarters' colleague were like: "Wait, change a little bit, a little bit." Maybe they needed the ten steps, but I only wanted (one step?) or two steps like this. Maybe the different behavior.</p>	<p>In the Chinese subsidiary, the engineers emphasize speed. In contrast to the HQ, meeting the schedule is a top priority for the subsidiary.</p>
<p>Quote from the Chinese R&D center</p> <p>X: But this I put here [showing the event logs], it's not the special cases, it's just like the common. I think very common, because the culture is very different. Sometimes we have different culture, we have different ways to do the same thing. So we have different [?] how to solve the problem.</p> <p>I: So, in there [the event log] you said you wanted to do the rough mesh and first get to talk to the designer. And headquarters wanted you to make it slowly...</p> <p>X: Yes, more precise. [...] From my side, we just wanted to do roughly the simulation and roughly simulation and I showed the results to the designer, they can get a reaction how to organize the design.</p> <p>Uhm, also here the designers learn a lot of knowledge, material process and some costs of some things, not only the simulation. So from my side, we consider the thing as a whole. But you know at headquarters, they do the simulation, they have graduated from university and they do the simulation. They don't do the design. They don't have so [much] design experience. But from my side, I think, the final mesh, high accuracy [the?] better. But here we are more focused on the project, you know. I think the Chinese, it's another... Like when the Germans do something, you make a very detailed and everything planned, planned, and maybe several years ago you have the plan... [laughs]</p>	<p>Divergent assumptions and approaches to solve the problem</p> <p>Engineers in the subsidiary want to move quickly to the design phase. Headquarters' colleagues want precise simulation beforehand.</p> <p>Different approaches of viewing the product (details, quality and low risk vs. quick delivery to the customer)</p>

I: And you follow the plan...

X: [Laughs] Yeah, yeah, yes, you follow the plan. But in China, we don't do, you know. **China is developing and changes so quickly. One product for three years, it's very long.** Also the customer need maybe one month or two months to say [one/want?] to the product. **If we get a finer mesh, you need a longer simulation time.** Also need one week or two weeks. But the designer should always hold in here and waiting for the results. So that's maybe not a so good way.

I: So then, you do a first simulation and then give it to the designer, and then you make another one and make it more precise?

X: Uhm, sometimes we didn't make it more precise because the designer changes something. If you use the older model, the simulation result is not good. So from our [work here?] it should have been the designer and ask [way?] approve together. He has a rough 3D-model, we have a rough result, he gets a better 3D-model and have higher accuracy and in the final product, we will test it. If sometimes for the final product, we will do some higher accuracy.

I: But headquarters says: "Please do it differently."? And what do you do then?

X: They just say: Every simulation result should be really well. [laughs] Should be higher accuracy. Because [incomprehensible] in headquarters, people like it more if you are expert in simulation, if you show the raw result, people will follow you. Result may be [to] have some damage in peoples' lives, you need a response for this. [laughs] But always say that actually...

I have also worked here for almost five years. I think a lot of the German people. A lot of people are experts in one area, like simulation. A lot of colleagues have worked for more than ten years or their whole life to do the simulation. But in China, we more like see the whole system. We have this design or this simulation, I see the thing as not in this area, but the whole system.

I: And does headquarter often control your work?

X: No, no, no, they are just guiding this. Because we are just this year communicating a lot, so we are matched together.

I: So they are supporting you and try to do give a common...

X: Yes, yes, **try to understand where we follow this or this...** We also feel the headquarters concerns.

[...]

I: When this happened, headquarters said: "Please do it more precisely." [X: Ah], did you do another simulation?

X: Yeah, yes. We also did another simulation. [...] I think **both of us we have our considerations.** So we just work for the company, not for [person]. They said also right; from our side, we think also right. **But we need to match the two**

In the Chinese subsidiary, the engineers focus more on getting the product to the customer.

Different priorities: speed vs. quality.

Pressures from the fast changing Chinese market requires quicker development process.

In order to advance quickly in the development process, Chinese engineers want to start with some rough approaches and save the accurate testing for the final product.

Headquarters' colleagues emphasize accuracy and quality.

Product responsibility includes safety issues.

In HQ, people specialize in one area and focus on its details, in contrast to the Chinese R&D center where you consider the system as a whole.

together because, you know, we are at a long distance. Also the language, a lot of times we have misunderstandings.

I: But the person from the other side, do you think he or she did understand what you wanted? And he understood why you wanted it roughly?

X: Yeah, yes. I mean, for two months **we have had meetings every day. So we are changing.** Most of us are changing. I think maybe because of this [less, lack?] of communication, maybe half year later we can both consider each other.

Alignment of task understanding is needed

Frequent communication is needed for establishing a shared understanding.

Quote from HQ

X: So, as I said, [Person Y] is a colleague who right now is working in the panel design, which is pretty much a mechanical part of the electronic development if we said this way. He is a very nice and proactive guy. But I think there is also kind of -.

From time to time, we have communication problems because he, for example, this day, I saw it again. He is a practical person, which would like to **get the fastest way to a solution, but it is not always the best solution**, I say it this way.

Different understanding about how to proceed
Speed vs. Quality.

In this precise case, it was because he started designing a panel and doing it in a computer and before gathering all of the information that you might need for this task. Okay. So, it is my preference before I start anything, I try to **gather the whole information** that I need and afterwards, I do. Because if I do and I gather then afterwards the information and then, how to make changes and then gather more information and changes again, this means for me more work in the end and that is what I told him at that time. Because he reported the new project we are starting and finished already with the panel design and I asked :”Okay, how is it possible that you are already finished with that, with the panel design if you have not gathered the information from quality, production, other colleagues, et cetera?” And he said: “Yeah, well. I got an idea here which kind of works this way.” And he might be right. I am not saying it is wrong. It might be that the design stays the same. Nevertheless, **for me it is the wrong order** in the following-.

I: This colleague, does he have a lot of experience, or is he new?

X: No. He is an experienced person. I mean, he is I think by now over 45 definitely maybe. Maybe, over 50 years old. He has also worked there, I think, at least for the last five years, maybe more.

Different understanding is not linked to missing experience.

I: Okay, yeah. So, do you have the impression that - You said something like a practical solution. So, it is more different priorities about quality, about doing or what do you think?

X: I think he is really interested in the task and he wants to **prove that he advanced in the velocity faster as we expected**. But I do not think they have to provide anything at all. I mean, in any case making it slowly is maybe even better, yeah. Almost always in development part, **taking time to do things right is better than doing it twice**.

Speed vs. quality,
Prove that it can go faster
than HQ expects.

Quote from German expat in the Chinese R&D center

In Germany, we have a little bit lost the ability of stepping out of our comfort zone. So, I **hide behind the process** and say "Nope, I need this and that. Then I will do this." And to say: "Okay, I got you. This is how far I can go. Then I will need that information." And in the meantime, the other one can start. This is what I miss from the German perspective. That's why they say: "**Headquarters is too slow.**" **Yes and no. It's a grey zone. If they strictly follow the process, they are not too slow.** Because they are not allowed to start. But in the end, if they started and got the information from here, they would reach the target on time. But they only start once they have everything. But that's when half of the time is already up. And then they will finish it late.

The teams have different perspectives on how to run product development. The R&D center in China emphasizes speed because it is market-driven. HQ colleagues are more process-oriented because they are product safety- and quality-driven.

There are several origins of these different perspectives on the task: some are externals, and others are internals. The externals relate to the market perspective. First, the point of reference for the head office is the European market, far more conservative than the Chinese one. In China, the market is short-term-oriented and requires fast product delivery. Moreover, Chinese customers order not only one component, but whole system solutions, and this in high quantities.

In addition to these market-related aspects, the headquarters has the final product responsibility and thus a different risk perception. ALPHA has a strong tradition in delivering high quality and the head office aims at maintaining this reputation worldwide.

X: They just say: "Every simulation result should be really well." [laughs] Should be higher accuracy. Because [incomprehensible] in headquarters, people like it more if you are expert in simulation. If you show the raw result, people will follow you. Result may be [to] have some damage in peoples' lives.

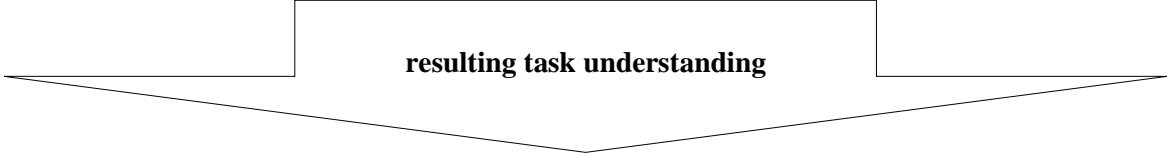
Internal origins for the development of disparate task understanding lie in the team organization. The teams in headquarters are more clearly subdivided into functional areas. Being experts in their specific field, they emphasize every detail in their work. In contrast to this, the designers in the Chinese R&D center perform many different tasks. They tend to "consider the thing as a whole." Therefore, the different organizational structures in HQ and the R&D center reinforce the development of differing task understanding.

X: A lot of the German people are experts in one area, like simulation. A lot of colleagues have worked for more than ten years or their whole life to do the

simulation. But in China, we more like see the whole system. We have this design or this simulation, I see the thing as not in this area, but the whole system.

As the interviews show, the teams have developed partly incompatible task understandings. Distinct site characteristics result in differing goals, priorities and assumptions. Table 3 summarizes the influence of the site characteristics on the development of team task understanding.

Table 3
Site Characteristics and the Resulting Task Understanding

Site characteristics	HQ	R&D Center
Team organization	Separated teams for simulation and design Engineers specialize in one domain and remain in the same function for years.	Teams carry out several tasks, from simulation to design. High turnover and change of responsibilities
Market view	Conservative European market as point of reference: small quantities and moderate speed Focus on individual components Product responsibility and ALPHA quality promise	Chinese market as point of reference: high quantities and high speed Focus on system solutions which are sold as a whole to customers
		
	Understanding HQ	Understanding R&D Center
Goal	Product delivery to Chinese market following high ALPHA quality standards	Quick product delivery to Chinese market
Priorities	Quality over speed.	Speed above all.
Assumptions	Process rules must be followed. Processes take time because many functions need to be involved in HQ.	Customer timeline must be met. Risk of running late must be minimized. Processes should not take too much time.

Overall, the event logs fulfilled the role of identifying and recording typical problems in the project cooperation between the two sites. The interviews then allowed eliciting the underlying task understanding and the divergent expectations of the participants. Furthermore,

we received three event logs that were related to one another. Thus, the method was helpful in order to compare three perspectives of one same event.

In general, the majority of participants understood the method well and easily integrated it into their daily work. However, several situations were recorded that did not meet the trigger conditions. First, some events that had taken place outside the survey period were recorded. Most participants had been aware of this fact and explained that they had recorded the situation anyway because they thought it was a good example or because nothing else had happened. Second, some event logs related to china-internal issues in cooperation with the production although cross-functional misunderstandings had been excluded from the study. It can be assumed that this is primarily due to the language barrier with the Chinese participants. Also, some participants did not attend the kick-off. Since it took place via Skype, the researchers could not make sure that everybody was present.

Conclusion

The measurement of shared understanding and the consideration of different expectations of team members in headquarters-subsiary cooperation is methodically challenging. In order to elicit the role understanding and the expectations of team members, an interpretative approach is necessary. Therefore, we developed in this paper a methodical approach that combines self-reporting methodology with in-depth-interviews.

This case study investigated misunderstandings in headquarters-subsiary R&D cooperation with the help of an event-contingent ESM-protocol followed by in-depth interviews. Allowing the identification of mistakable situations as well as the thorough understanding of these situations, this procedure provided valuable insights in day-to-day project cooperation. Useful for analyzing team collaboration, this method could be transferred to other contexts than multinational companies. Despite the difficulties of applying self-reporting methods, this study shows that event logs are a pertinent tool to enrich interview data. In contrast to so far prevalent quantitative approaches, it allows a better understanding of team interactions in the context of shared cognition.

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Appendix - Event Log

Provided to the participants as a fillable PDF form with 2 pages + 1 page explanation

The event-log allows you to record interactions with the other site in which you perceive a misunderstanding has happened. This can be a meeting, a personal conversation, a phone call or an e-mail after which you feel confused about the situation or the behaviour of the person of the other site.

Please fill out the event-log as soon as possible after the event and send it to me.

Please use a separate event-log for every event.

Feel free to fill it out in German or English.

Your answers are only accessible to me. No personal data will be published or shared with the company.

Name:	<input type="text"/>
Date and time of the event:	<input type="text"/>

1. Please describe briefly the context of the event.

- Nature of the contact (phone, e-mail, in person, ...)
- Who initiated the contact?
- Involved persons (Name or pseudonym, function, department)
- Duration
- Project status (if relevant)

2. What was the content of the event?

e.g. clarification on technical issues; approaching deadline; a task in progress...

- | | | |
|--|--------------------------|--------------------------|
| | yes | no |
| 3. Did you try to clarify the situation? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3a. If no, do you intend to do so later on? | <input type="checkbox"/> | <input type="checkbox"/> |

3b. If yes, how did you (try to) clarify the situation?

e.g. questions, explanation, escalation...

4. What was the result of the situation?

	strongly disagree	disagree	partly agree	agree	strongly agree
In my point of view, we could clarify the situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had the impression that everybody agreed on how to proceed next.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I escalated the situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. What caused the confusion?

	strongly disagree	disagree	partly agree	agree	strongly agree
There were some technical problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was some missing information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have little capacity to work on the issue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not fully understand the concerns of the other person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had the impression that...					
... the other person did not fully understand my concerns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... we had different views on who is responsible for the matter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... we had different views on how the task is supposed to be done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... we had different basic assumptions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... we had different priorities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... we were both somehow confused.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other:

6. What different views did you have?

Where did you perceive a misunderstanding?

Thank you! [Click here to send the event log.](#)

Explanations on the event-log

The study is part of a project at the [name of university].

I work on communication and coordination problems between distributed R&D teams. I am particularly interested in the relationship between cooperating sites and their role and task understanding.

What kind of events shall I record with an event log?

The event-log allows you to record interactions with the other site in which you perceive a misunderstanding has happened. This can be a meeting, a personal conversation, a phone call or an e-mail after which you feel confused about the situation or the behaviour of the person of the other site.

Such a situation could concern for example things like:

- different views concerning the next steps
- unclear responsibilities
- issues with information transfer
- divergent expectations about task fulfilment
- ...

When am I supposed to fill out an event log?

Please fill out the event log as shortly after the event as possible. If you have little time during the day, write a short memo and finish the event log at the end of the day. The memo ensures that you will not leave out any details when filling out the event log later on.

How should I fill out the event log?

Please fill out the event log as honestly and completely as possible. This is very important for the scientific analysis of the data. Of course you are free to decide at any time, what kind of information you want to give.

Do I have to provide information about involved persons?

The more detailed the information, the better the analysis of the data. Information about involved persons helps me to relate events that happen with the same people to one another. If you rather not give names, you can use abbreviations or code names.

How are the event logs analysed?

The event logs you fill in stay with me and will not be sent to anyone in the company. No personal information will be disclosed. The analysis follows high standards of scientific research and generalized results are used as findings for my dissertation.

For any questions, please free to contact me at any time.

Your participating in my study makes a valuable contribution to my research project. I thank you in advance for your support!

Kind regards,

Author Note

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Acknowledgements: An earlier version of this paper was presented at the EURAM'18, Conference of the European Academy of Management, on 19-22 June 2018 in Reykjavík. The authors would like to thank all the participants and the managers of the company who made this study possible.

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Article Citation

Seus, F., & Weissenberger-Eibl, M. A. (2020). Using event diaries and in-depth interviews for understanding shared understanding in headquarters-subsiidiary cooperation. *The Qualitative Report*, 25(8), 3085-3110. <https://nsuworks.nova.edu/tqr/vol25/iss8/15>
