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Failing forward: the transformative power of writing in interdisciplinary ethnographic research

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Abstract

Purpose – To address complex societal challenges, particularly in the context of climate change, there is a growing interest in employing interdisciplinary ethnographic research (IER). This paper examines the experiences associated with participating in IER, drawing insights from a collaboration project that integrates organization studies with energy management research.

Design/methodology/approach – Within the context of a three-year interdisciplinary collaboration, the paper focuses on the performance of an interview and the analysis thereof. It draws from this example to highlight the difficulties in translating discipline-specific language and understanding failures in IER. Including an exploration of the process of recovery, involving analyzing research results and the subsequent collaborative writing of a paper.

Findings – The primary findings revolve around the challenges inherent in ethnography as an interdisciplinary method. These challenges include language barriers between disciplines and the complexities of comprehending and learning from failures in interdisciplinary research.

Originality/value – The contribution lies in its exploration of abductive reasoning in IER, shedding light on the complexities and opportunities associated with interdisciplinary collaboration in the making. By emphasizing the importance of going into the field before negotiating common ground, the approach presented provides a unique perspective that not only addresses challenges but also facilitates the development of involved disciplines and scholars through self-reflection.

Highlights

(1) The paper shows the importance of both expertise and experience knowledge in interdisciplinary ethnographic research.

(2) By using different writing styles, the importance of language and translations between disciplines is exemplified.

(3) The paper provides an example of how to engage in abductive reasoning in interdisciplinary ethnographic research.

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(4) The paper calls for a broad understanding of failure and success in interdisciplinary ethnographic research.

Keywords Interdisciplinary research, Failure, Energy management, Organization studies, Knowledge creation

Paper type Research paper

Introduction

Let us tell you a story, a story about ethnographic interdisciplinary work as it proceeds. We invite you to follow the process of two scholars from different academic disciplines, organization studies (OS) and an energy management (EM), trying to find a common ground on how to engage in a joint research project and develop a theory on energy management. We wish to tell this story in our own way, a way we consider fitting to the message. The aim is to explore the process of conducting interdisciplinary ethnographic research (IER) and the challenges encountered along the way. This means highlighting the struggle of wordings and dissimilar epistemological beliefs, which commonly are smoothed out in published papers. By writing in this way, we are hoping that our fellow scholars will recognize themselves in our struggles, as similar problems have occurred to them in their ethnographic and interdisciplinary endeavors. We draw from our own experiences in a three-year interdisciplinary research project (one might call it an autoethnography of sorts). We reflect on the process of conducting interdisciplinary research by delving into the research design process, the performance of an interview and the analysis thereof. More precisely, we evaluate the failures encountered in conducting IER. We do this by exploring the challenges arising from the application of ethnography as an interdisciplinary method. These challenges include difficulties in translating the specialized language of different disciplines, understanding failures in interdisciplinary research, and the knowledge that comes from these experiences. Our approach is based on the concepts of knowledge creation to increase an understanding of ethnographic interdisciplinary research projects.

Engaging in ethnography involves immersing oneself in the field and collecting unfiltered data shaped by the practitioners being studied (Czarniawska, 2014). In this case, those practitioners were us as researchers. To clarify, Silverman (2013) breaks down the term ethnography, connecting "ethno" (people) and "graph" (writing), emphasizing its essence. Ethnography simply means writing about a specific group or groups of people. In this way, Silverman (2013) linked the observations to the field notes, which serve as the raw material gathered, resulting in the finalized description known as ethnography. Within the field of ethnography, autoethnographies are commonly used by academics as a means to critically evaluate ourselves and communicate our experiences to others (Alvesson and Einola, 2018; Zawadzki and Jensen, 2020; Wright, 2024). This includes a discussion on the practice of writing (Essén and Värlander, 2013), an aspect whose importance increases when collaborating (Erickson and Stull, 1998).

To embrace the importance of writing this paper embraces an unconventional style, inspired by Pullen and Rhodes (2008) and Gilmore *et al.* (2019), who advocated "dirty writing" to illuminate interdisciplinary processes and unlock novel insights in science. Since the style of writing guides the type of knowledge identified, this paper disrupts the writing style to follow a path toward the search for the knowledge identified by different writing styles. By doing this, we aim to avoid what Helin (2023, p. 2) described as "a need to be strong and write texts in which all forms of weakness are edited out." Instead, we engage in describing our struggles and failures openly. Another motivation for writing in a simple and unconventional style is grounded in the experience of co-authoring, where polished writing may hinder the sensemaking of the other research discipline, its worldviews and definitions. This experience was also acknowledged by Grey and Sinclair (2006, p. 449) who claimed that by "[writing] more stylishly and accessibly and the writing becomes less exclusionary and more potentially influential." Further inspired by Grey and Sinclair's style of writing, it is written

with a mix of short stories and analysis, following the argument for writing that evokes feelings and gives the reader a new experience (another example of a similar writing style is Mol (2002)). A more thorough exploration of how we have interpreted and applied dirty writing in this study is presented in the section named "Analyzing a failure".

The idea to engage in IER was driven by the conviction that incorporating diverse disciplines leads to a deeper understanding of critical issues through dialogue and the integration of varied perspectives (Eisenhardt *et al.*, 2016; George *et al.*, 2016). Our understanding of interdisciplinary research was based on Silvast and Foulds' (2022, p. 10) definition where interdisciplinary research is seen as "integrated perspectives from different disciplines that add up to more than the sum of their parts". For those who are considering embarking in IER endeavors, this paper may prove as a guide of what you may encounter on the way and gives you the possibility to prepare and avoid some of the pitfalls. Within Organization Studies (OS), the interest in IER projects stems from a desire to address complex societal challenges, known as "grand challenges" (George *et al.*, 2016; Ferraro *et al.*, 2015). To tackle issues such as climate change in OS, integrating energy systems and Energy Management (EM) perspectives has been proposed (Wittneben *et al.*, 2012; Wright *et al.*, 2018). Sovacool's (2014) call for more interdisciplinarity in energy research marked a significant shift, echoed by others emphasizing the necessity of interdisciplinary approaches to combat climate change (Roy *et al.*, 2019; Blondeel and Bradshaw, 2022; Baum and Bartkowski, 2020). Pellegrino and Musy (2017) highlight interdisciplinary energy research as not just a trendy term but a source of innovative methods and answers to unresolved questions. At the same time, OS scholars believe they can contribute to understanding challenges like climate change, with inductive methods deemed particularly valuable (Eisenhardt *et al.*, 2016; George *et al.*, 2016).

The paper continues by exploring the experiences of IER, using the performance of an interview and subsequent analysis conducted within our interdisciplinary project as an example to highlight perceived struggles. Furthermore, it concludes with lessons learned from what could be considered a failure in conducting IER, combining OS with EM research. Previous research on incorporating social science into energy systems or EM studies reveals a gap between expectations and actual contributions (Guy and Shove, 2014; Silvast *et al.*, 2020). While these studies offer valuable insights into interdisciplinary energy system research, they often observe from a distance, providing limited details on the workings of interdisciplinarity. Our paper dives deeper, drawing from jointly collected and analyzed field material across disciplines. This approach offers novel insights into interdisciplinary knowledge creation through ethnography.

The paper is presented in a chronological order, where each section starts with a short story in italics, which is discussed and related to relevant literature. The next section starts off by describing the complexities involved in conducting a joint interdisciplinary project.

Unveiling methodological complexities in IER

It is impossible for us to claim that we have been part of this story from its very beginning. We just stepped into the story as two Ph.D. students eager to learn and grateful for the opportunity to pursue our doctoral studies within our fields of interest. However, the story started much earlier, when our supervisors applied for funding in a call dedicated to interdisciplinary science in energy systems. And thus, our research project came into being. The aim of the project was to develop a theory that explains what EM is in practice for the shipping and manufacturing sectors, examining how it is being implemented, and the similarities and differences across industries. This was also how we perceived our aim as we embarked on a joint interdisciplinary study. As a mandatory part of our research project, we, as Ph.D. students, were required to participate in the Graduate School of Energy Systems, taught by our funding agency and focused on interdisciplinary energy system studies. This school comprised several interdisciplinary research projects carried out by Ph.D. students

from several universities, together with a support structure aimed at strengthening the interdisciplinary cooperation through joint doctoral courses and seminars. Thus, one might argue that we were expected from the beginning to adopt an interdisciplinary approach, even before fully comprehending what disciplinary research entailed.

A few months into our project, we decided to investigate how energy efficiency initiatives are organized at refineries, thereby connecting manufacturing and supply chain with our respective disciplines. We hoped to follow the flow of oil all the way from the factory (refinery) to the ship, adopting an ethnographic stance of following an object. Our first step in exploring this avenue involved arranging an interview at a refinery. The plan was to engage in observations at the same time with the interview, focusing on the interview site, and thereby start collecting ethnographic material. We anticipated expanding this further through observations, interviews and other sources, depending on access. In this way, we hoped that our joint interview would satisfy our need to collaborate and create interdisciplinary research output.

Engaging in IER creates two methodological complexities: interdisciplinarity and conducting team ethnography. For the methodological aspects of team ethnography, there is a growing body of literature. Even with the increased attention, following Jarzabkowski *et al.* (2015) acknowledgment of the lack of knowledge regarding the actual performance of team ethnography including performance and methods, there is still room for further explorations of this field. Team ethnography typically involves multiple individuals, engaged in joint ventures, collaborating closely on fieldwork, analysis and interpretation (Erickson and Stull, 1998).

Many studies in team ethnography utilize simultaneous observations at multiple sites, akin to multi-sited ethnography (Marcus, 1995; Parkin *et al.*, 2021). For example, Huising and Silbey (2011) researched laboratory regulations, while Smets *et al.* (2014) examined the coordination challenges of team-video ethnography, emphasizing the importance of diverse team member backgrounds for exploring varied descriptions and dismissing less convincing ones. However, their discussions on the joint writing process in team ethnography are limited, with suggestions often emphasizing monographic writing. This is also acknowledged by Evans *et al.*, (2016), who even recommend that each scholar write their own paper due to the difficulty of finding common interests for co-authorship (Smets *et al.*, 2014). They briefly mention the possibility of having an editor smooth out the writing to ensure a unified voice in the final text production. This is a context where our study brings new insights into the team ethnographic writing process, particularly within IER. Further, Creese and Blackledge (2012) discussed team ethnographies, focusing on the inclusion and negotiation of multiple voices and the importance of reflexive language. However, they do not address interdisciplinarity, which adds complexity. Another challenge in team ethnography relates to goal setting (Erickson and Stull, 1998), which becomes particularly prominent in this case due to the different interests in academic disciplines.

Interdisciplinary ethnography, particularly at the intersection of computer sciences and social sciences, was explored in studies by Rosenberg (2001) and Goulden *et al.* (2017). These studies integrated ethnography into interdisciplinary projects but did not fully engage two disciplines in a joint ethnographic endeavor as we do. Rosenberg (2001) highlighted the potential of ethnography to provide insights into work settings and design dialogues in technology development. Goulden *et al.* (2017) identified challenges such as the physical separation of social scientists and computer scientists, recommending the inclusion of a computer scientist in fieldwork. Our research design goes further by involving both involved disciplines in all aspects of ethnography, including analysis and writing.

Adding another perspective to interdisciplinary ethnographies is the study by Ilkjær and Madsen (2020), which highlighted the challenges of balancing roles in both the private sector and academia ethnographies through an auto-ethnography of a technology development team. However, they did not address disciplinary struggles. Piqueiras *et al.* (2023) discussed these struggles, referring to them as "collaborative science" and identified obstacles such as interpersonal dynamics, institutional structures and academic culture. They argued that

ethnographic methods can enhance collaborations by improving theoretical understandings. Our paper builds on this by focusing on institutional structures and academic culture in knowledge creation within interdisciplinary teams, drawing on Efstathiou and Mirmalek's (2014) framework, which categorizes these challenges into three main aspects.

The first aspect is the doctrine of the research conducted, in other words, the common understanding of the problem, described as what is being researched. The second aspect relates to the discipline and how to deal with the issue. The third aspect is ethos, the justification of why this research matters (Efstathiou and Mirmalek, 2014). To overcome these difficulties, Efstathiou and Mirmalek (2014) suggest that interdisciplinary scholars should be transparent about their disciplines, immerse themselves in each other's fields and reflect on their goals and motivations. However, they do not provide practical examples of implementing this in daily work. While this paper does not claim to offer a detailed plan applicable to all interdisciplinary projects, it does provide a more detailed description of the journey and relevant insights into the practicalities of interdisciplinary research, a topic seldom explored in the literature on interdisciplinary research.

To better understand the crossing of disciplinary boundaries and reflections on interdisciplinary knowledge creation, this paper explores different types of knowledge involved in knowledge creation, which is linked to the performance of interdisciplinary teams (e.g. Ma *et al.*, 2014). For example, Ma *et al.* (2014) created a model to explore how expertise and experience knowledge influence knowledge creation quality. Expertise knowledge, which is explicit and easily documented, relates to the doctrine issues highlighted by Efstathiou and Mirmalek (2014). Explicit knowledge is formal and systematic and is typically associated with expertise gained through formal education and training (Tranfield *et al.*, 2004). In contrast, experience knowledge is tacit, rooted in action, commitment and involvement (Ma *et al.*, 2014), and gained through years of experience and practice, enhancing a team's innovative capability (Mascitelli, 2000).

The traditional focus of interdisciplinary teams has been to connect discipline variety or balance between team members in terms of social integration and performance (Taylor and Greve, 2006; Gibson *et al.*, 2007; Ma *et al.*, 2014). In this way, expertise disparity among team members is supposed to provide access to different explicit knowledge (Ma *et al.*, 2014). We also recognize the mixture of expertise knowledge in the different types of theories and perspectives of our diverse disciplines. However, as work progressed, we found that the expertise knowledge we possessed was closely linked to the experience of how to conduct research.

This means that we initially anticipated that our interdisciplinary project would primarily benefit from the diverse explicit knowledge brought by each of us from our respective disciplines. However, as the project progressed, we came to realize that our expertise knowledge was not solely derived from our disciplinary backgrounds but was also deeply intertwined with our experiential knowledge of conducting research.

This insight implies that successful interdisciplinary research goes beyond leveraging diverse disciplinary expertise alone. It underscores the importance of recognizing and harnessing the collective experience knowledge within the team, which contributes significantly to the quality and efficacy of the research process. By acknowledging the role of experience knowledge in shaping research practices, interdisciplinary teams can better leverage their diverse backgrounds to innovate, solve complex problems and enhance the quality of knowledge creation. Knowledge creation depends on the combination and sharing of experience knowledge (Mcfadyen and Cannella, 2004). If a team possesses experience diversity, it can benefit from multiple sources of information, knowledge and perspectives in terms of innovation and solving complex problems (van Knippenberg and Schippers, 2007). Therefore, a variety of experience produces output with high average performance (Taylor and Greve, 2006). It entails a variety of skills and methods of doing things, resulting in diverse experience, which enhance the quality of knowledge creation (Ma *et al.*, 2014).

The body of literature on interdisciplinary teamwork in knowledge creation (e.g. Mcfadyen and Cannella, 2004; Taylor and Greve, 2006) underscores the importance of collaboration across disciplines to encompass a full range of perspectives and issues (Van Der Vegt and Bunderson, 2005). While interdisciplinary teams benefit from diverse perspectives, conflicts stemming from disciplinary differences and varying experience knowledge can impede performance (Van Der Vegt and Bunderson, 2005; Efstathiou and Mirmalek, 2014; Ma *et al.*, 2014). Our project uncovered challenges including differing timelines, geographic dispersal and difficulties in joint analysis discussions, with disciplinary differences being the most prominent obstacle.

Two opposing research streams have been identified regarding interdisciplinary collaboration. One, based on the cognitive resource view, claimed that interdisciplinary teams possessed broader cognitive resources, wider vision and more extensive external contacts compared to homogeneous teams (Miller *et al.*, 1998). The other, based on social identity and social categorization theory, argued that team diversity provoked conflicts, negatively affecting team performance (O'Reilly *et al.*, 1989; Zenger and Lawrence, 1989; Ancona and Caldwell, 1992; Gibson and Gibbs, 2006). Both perspectives could be valid: interdisciplinary research might offer new insights while also increasing the risk of conflict and negative team performance. Maybe we should not be so afraid of this conflict. If we are brave and dare to take some risks, we might even argue that the conflict could be the foundation to what Kuhn (1996) described as a crisis, which is then the foundation for paradigm shifts in science. Without conflict and having our minds and worldviews challenged, how could we then discover new problems to solve. Since the way science is done is imbedded in the different disciplines, this includes but is not limited to methodology. Other aspects are different timelines, patterns and work activities. In this project, it is possible to detect traces of the varying timelines and geographic dispersal and the inability to meet to discuss the different aspects of the joint analysis. However, the most prominent challenge lies in the disciplinary differences, which are described in the next section.

Our disciplinary backgrounds and their combination

Our study has been part of a broader context and academic environment, with a focus on interdisciplinary energy system research. Within this context, and for the project described in this paper, we applied the following definition of energy systems:

> Energy systems consist of technical artefacts and processes as well as actors, organizations and institutions which are linked together in the conversion, transmission, management and utilization of energy. The view of energy as a sociotechnical system implies that also knowledge, practices and values need to be taken into account to understand the on-going operations and processes of change in such systems. (Palm and Karlsson, 2007, p. 12)

Based on this understanding of energy systems, an interdisciplinary approach seems almost inevitable to encompass the wide variety of perspectives, from energy conversion to social values within the system. In our project, these requisites were met by combining OS and EM as the two disciplines forming our interdisciplinarity. However, while OS often includes aspects of management, which is the second word within the field of EM, the joint use of the word management seems to be the greatest disciplinary similarity. Nonetheless, we question whether we and other OS and EM scholars mean the same thing by it. Therefore, a more thorough elaboration on our disciplines is necessary to clarify our stance.

We base our understanding of EM on the perception that it serves as an effective means to achieve energy efficiency and sustainable competitiveness in industrial organizations (Monjurul Hasan *et al.*, 2022). The traditional model for improving energy efficiency is based on technology diffusion (Jaffe and Stavins, 1994), where energy efficiency is reached through

the diffusion of the best available technology. However, the model of technology diffusion has been criticized by social scientists; thus, it has become relevant to ask more "how" questions that delve into how companies are working with energy management and organizing their efforts. Therefore, a more grounded understanding of energy management practices is obtained, which is less dependent on the current model of technology diffusion and predetermined theoretical categories.

Within the field of EM, the perspective from OS is included when studying leadership, strategy, planning and organizational aspects related to industrial EM (Andrei *et al.*, 2022). The leadership perspective includes studies on models for implementing EM and discusses how to get EM accepted within organizations, integrating it into a company's business plan and production management (Solnørdal and Nilsen, 2020). Strategies for implementing EM in organizations often address everyday behavioral changes. For example, reduction of idle electricity use can be achieved by implementing strategies for to alter everyday behaviors of production personnel (Mahapatra *et al.*, 2018). A strategic and planning perspective is prevalent in studies analyzing EM, as the need to develop long-term energy strategies and having related energy target-setting are mandatory processes at the industrial company level (Thollander and Ottosson, 2010). Regarding organizational barriers and drivers, one example is the study conducted by Soepardi and Thollander (2018), where the managerial-organizational barriers to energy efficiency improvement were ranked, followed by identifying contextual relationships among them. This will help managers in manufacturing sectors in developing strategic plans to address these issues. Perspectives related to organizational aspects contribute to EM research by emphasizing the essential role and necessity of an accurate energy manager position. This was studied, for example, by Martin *et al.* (2012) who surveyed 190 manufacturing plants in the UK They found a strong empirical connection between climate-friendly management practices and organizational structure. It has been shown that organizations are more likely to adopt EM practices when an energy manager is in place, particularly if this manager is closely aligned with the CEO. Another perspective is culture, which provides contributions on education, training, staff motivation and internal communication as critical elements of EM. A study by Solnørdal and Thyholdt (2019) showed that highly educated staff are needed in order to reach a high level of energy efficiency implementation. Another empirical study by Suk *et al.* (2013) showed that internal factors, such as the willingness to save energy, support from top management and internal training on energy efficiency, significantly influence a company's practice level of energy efficiency. There are also studies that draw heavily on OS theories of institutions to develop a framework of decision-making (König, 2020).

From this, it is possible to detect not only the multitude of ways in which OS can contribute to EM, but also some of the richness within the field of OS. To understand the epistemological struggles encountered, it is therefore necessary to expand on which perspective of OS is adherent in the process of this project.

OS is understood as research that aims to increase the understanding of humans' joint coordinated action and organizing activities, i.e. studying organizing rather than organizations (Strannegård and Eriksson-Zetterquist, 2011). Within the project, OS perspectives have explored EM through theories such as sense-making combined with actor network theory, institutional theory and networked perceptions of decisions in shipping. Based on this understanding of the respective disciplines involved in the study, one can detect that EM research includes the OS perspective to a larger extent compared to the inclusion of EM perspectives in OS research. Although EM research touches upon similar issues (e.g. leadership) as OS, differences are noted in terms of the applied methods and theories. However, an increased inclusion of OS perspectives is an important part in EM research. Thus, through extensive collaboration, understanding how OS perspective can be applied will increase and develop the field. For OS research, the natural inclusion of technical artefacts in EM research, both tangible and non-tangible (energy), provide valuable

components to develop OS theories on materiality. At the same time, the field of energy systems, which is closely linked to EM studies, constitutes a valuable arena for OS scholars to engage in research to address grand challenges (George *et al.*, 2016; Ferraro *et al.*, 2015) of high societal value. Together, this provides a justification for why one should engage in a joint project at the core of energy systems, in a study drawing from the case of an oil company. The methodological approach we utilized is described in the next section.

Performing an interview

When we had overcome the issues of gaining access, we encountered our first interdisciplinary struggle. How should we write the interview guideline? This reflected our different approaches to research in general and interviews in particular. When we exchanged suggestions for the interview guideline Hanna Varvne had five open questions and Mariana Andrei had 19 survey-like questions. For Hanna Varvne, one of the first questions was on a general note:

> How do you work with energy management today? (Excerpt from discussion on interview guide, 2019-11-18)

She wished for this open question to result in a discussion of matters such as: Internal work distribution, i.e. if they worked in a department or were part of a larger group's work? If the company engaged in collaborations with any suppliers, customers, researchers or other external contacts? What type of information gathering was used? Which factors were important to the company, as well as if they saw any additional benefits, in addition to fuel savings, of working with energy management? By asking the questions openly, she hoped to learn what the interviewee considered was most important without interference. For Mariana Andrei, the suggested questions were more precise:

> (1) Please specify the types of chemical processes performed in the company.
>
> (2) What is the energy balance per production process? Please specify the processes.
>
> (3) What are the annual greenhouse gas emissions?
>
> (Excerpt from discussion on interview guide, 2019-11-18)

It was possible to detect that we differed both in the preciseness or openness of the question and in the matter of enquiry, where Mariana Andrei was more focused on the technical process and Hanna Varvne on how the tasks were organized among people. This was the beginning of a smooth negotiation. By sorting and grouping the questions, an interview guide was developed with three main groups: a general group, a group focusing on EM in manufacturing and a group focusing on shipping. Combined, the groups comprised 6 overarching questions and sub-questions, with a total of 13 points that we wished to discuss, as follows:

> How do you work with energy management?
>
> (1) People
>
> (2) Department
>
> (3) Strategy/saving goals
>
> (Excerpt from interview guide, 2019-11-18)

The interview, performed in combination with the related material such as notes from access gaining, interview guide preparation and the joint analysis process, provides a solid foundation for making claims about IER projects. The interview was conducted as part of a

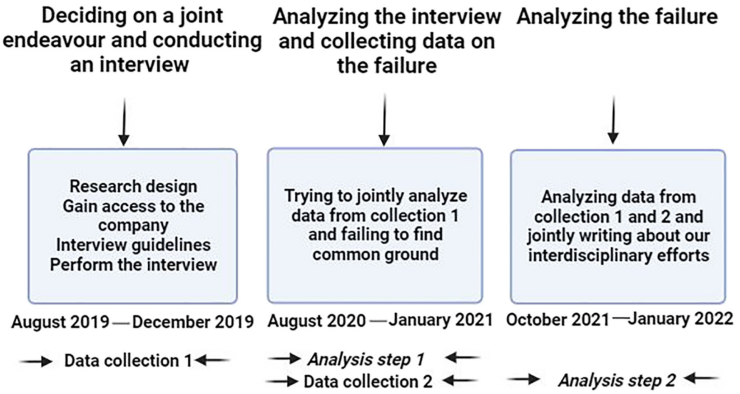
three-year participation in an interdisciplinary project, involving monthly meetings with Ph.D. students, quarterly sessions with the entire project team (inclusive of senior scholars), email communications, informal discussions on courses and conferences and efforts to engage with other disciplines through research articles and textbooks.

Within the context of this interdisciplinary project, the decision to engage in a joint ethnographic exploration was made in August 2019. Negotiations for access took place during the fall, leading to the actual interview. The project faced disruptions due to the outbreak of Covid-19 in spring 2020, and it remained on hold until August 2020. The analysis of the interview occurred between August 2020 and January 2021. Unfortunately, the anticipated increased understanding did not materialize from this analysis, leading to the characterization of these initial results as a failure in the context of this paper. Nevertheless, the experiences accumulated during this period laid the foundation for the material used in analyzing the failure, essentially turning the failure into a second collection (or experience) of material.

In spring 2021, with the ongoing challenges posed by the Covid situation, the decision was made to abandon the idea of the joint project. However, over time, it became evident that the insights gained from the failed attempt at analyzing the interview were substantial enough to warrant a separate analysis. Thereby, it contained two phases of material collection and two analyses – one focused on the interview and the other on the failure (see Figure 1).

The interview was conducted on site at a fuel producing (oil) company, wherein the energy leader and a development engineer participated. The interview was recorded and transcribed word-for-word, as this was considered sufficiently precise based on the intended level of analysis. Regardless of the method used to record and the exactness of the transcript, information will be transformed when written down, and it will therefore only be a partial representation of the interaction (Czarniawska, 2014). To capture more aspects of the interaction that occurred during the interview, both researchers took notes as if the interview was an observation.

The story and field-note above show several nuances in the performance of an interview. First, in the negotiation of how many questions to ask, and which questions to ask, this relates to the different styles and ideas of what an interview should be like. The structure of an interview can span from highly structured forms where the interviewer almost seems to be reading out a survey, and the interviewee's answers can even be guided by pre-chosen alternatives (Yin, 2015; Qu and Dumay, 2011). On the other end of the spectrum are open



Source(s): Authors' work

Figure 1.
The process of our study

interviews where the interviewee can elaborate on what he or she finds interesting within the free frames of the research topic (Qu and Dumay, 2011). The different forms of interviews build on diverse understandings of what one can learn from an interview and the underlying epistemic assumptions of what science is. Hence, interview styles are accepted and appreciated differently in different academic disciplines.

By engaging in a joint endeavor, there was a need to come to a decision on a mutual view of interviews and what they represent, enhancing the idea that interviews are a mutual dialogic creation of understanding (Kvale, 2006). The idea of mutuality could be applied in relation to both the interviewees and the interviewers, as well as between the interviewers, for further perspectives of analysis. Interviews are further understood as manufactured data (Silverman, 2013). Therefore, it is important not to take the accounts from the interviewees too literally, without interpretation and analysis. The goal with this view of interviews was to reduce the risk of an overreliance on the verbal report presented. Interviews do not provide a true history of an event (what happened); they only tell how people account for the event (Czarniawska, 2014). It also means to extend the view, namely that interviews should be seen as an observation of an interaction between two people, i.e. the interviewer and the person interviewed. This negotiation on the interview interpretation turned out to be useful in the attempts to conduct a joint analysis of the interview content, but even more so when used as an example of IER in the making.

Analyzing an interview

After months of unsuccessful attempts to analyze our interview jointly and numerous online meetings, we finally got somewhere. The breakthrough came when we had the opportunity to meet and sit down with our paper copies of the transcripts with coding. Then, we discovered that we had assigned different codes to the same paragraphs or words. From the following transcript of the interview:

> [We] compiled a lot of different KPIs [1], and we can compare the refineries globally and in north-west Europe. Similar configurations. We can measure ourselves against a variety of different peers. From that, we know we are quite good at energy and very efficient in CO_2. (Interview transcript 2019-11-22)

Hanna Varvne coded: Competition, status (?), being best. Whereas Mariana Andrei coded: KPIs, benchmarking, good ranking in CO_2 efficiency and energy. No wonder we had such a hard time progressing during our online meetings. After numerous hours of discussions and negotiations, we decided to continue coding in parallel and then merge our coding. Unfortunately, we were a bit naive when we thought it would be easier to negotiate and reflect on what had taken place during the interview on a higher, more abstract level than on the detailed one where we had just failed.

The first analysis was performed as parallel discipline-specific analyses, with interactions occurring through e-mails and online meetings to monitor progress and discuss thoughts on coding. Hence, this first analysis revolved around the doctrine of the research conducted, or the common understanding of the problem, as highlighted by Efstathiou and Mirmalek (2014).

In this phase, we used the same literature to grasp the concept of grounded theory methods and analysis, supporting our process of theory development. This led to an understanding of grounded theory as a method for constructing theory from systematically obtained and analyzed data, using comparative analysis. Grounded theory is described as a "qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon" (Strauss and Corbin, 1990, p. 24). Grounded theory was introduced as a systematic, inductive, iterative and comparative method for data analysis with the aim of theory construction.

The use of grounded theory in our project was motivated by the belief that theories built inductively from empirical grounds are more useful and interesting than those deduced solely from existing theories. Furthermore, it was argued that it is more important to build new theories than to verify existing ones, as social reality changes constantly, and every social scientist should aim for a "reality-fit." This perspective is now taken for granted, and grounded theory can be understood to align with the percepts of abduction (Charmaz, 2006), also called "the logic of discovery," and it does a "set of double-back steps." This means that it moves from the field to the desk and back, step-by-step, refining the "emerging theory."

When the two analyses were complete, the text documents were shared and a search for common ground started, with the ambition of merging the two analyses into one. However, the analyses were so different from each other that it was impossible to find a common middle ground. A second challenge was identified, i.e. the understanding of each other's discipline and how to deal with the issue (also described by Efstathiou and Mirmalek (2014)). Perhaps this was due to the different paths of analysis. One being positive, in search of an objective explanation which could result in the formulation of universal laws, and the other being hermeneutic, looking for a subjective interpretation ending with a celebration of the particular and the unique (Czarniawska and Joerges, 1996). Differences between the disciplines resulting in the two different paths could provide one explanation for the failure.

In other papers on interdisciplinary methods (Tobi and Kampen, 2018; Cohen *et al.*, 2021), the discussion on the method seems polished, and the same can be said for discussions on team ethnography (Jarzabkowski *et al.*, 2015; Parkin *et al.*, 2021). However, this level of refinement may not help to develop the reality of IER methods. Even when applying methods for developing a common project vocabulary and framework for planning and conducting effective structured discussions during project meetings (Cohen *et al.*, 2021), this does not exclude the different epistemological beliefs of disciplines and the different interpretations of the same interview transcript. Compared to the reality experienced in this project, it is possible to read how they suggest, i.e. agreeing on why and what matters, such as what problem to study and why difficulties (Efstathiou and Mirmalek, 2014; Tobi and Kampen, 2018).

Even though one might think there is an agreement upon what matters to study and investigate, there are still two problems with the previously suggested methods (Tobi and Kampen, 2018; Cohen *et al.*, 2021) First, one might agree and then still realize that one has different interpretations of the agreement. Second, their suggested research methods seem unsuitable for abductive reasoning, which we used. Abductive reasoning is useful when there is little or no pre-existing theory, and one wishes to explore a puzzling phenomenon from reality by new theory development (Bamberger, 2018). For this project, explorative abduction was used as the material was collected first and then used to try to identify or develop a theory to explain it. A final point related to previously suggested methods for interdisciplinary research is that our real struggle came after what they described as their final stage. Analyzing and jointly writing seems to us to be a stage which is seldom addressed.

Analyzing a failure

After the first attempt to analyze our interdisciplinary work, it took us almost a year to find the motivation to revisit our shortcomings (to be clear, at that point, we stopped our analysis at the third step, as described in Figure 1). How could we make sense of our material when the comparison between our two analyses revealed several notable differences? First, in the overview section, the OS analysis employed a figure to illustrate connections and interactions, while the EM analysis presented information in a bullet-point format, focusing on describing the theory's starting point. These differences likely stem from our

distinct academic disciplinary perspectives. The EM analysis emphasized tools, methods, KPIs and platforms throughout the analysis, whereas the OS analysis included insights from interviews at the beginning, focusing on the company's vision and employee divisions. The analyses also differed in their treatment of technical details. The EM analysis provided rich descriptions of production processes and technologies, while the OS analysis offered fewer technical specifications. The use of quotations varied, with the EM analysis interpreting quotes extensively, while the OS analysis utilized more extensive quotes to illustrate points, reflecting our different methodologies and disciplinary traditions. Lastly, the EM analysis included a section on leadership skills, which was absent in the OS analysis, indicating that personal interests and individual research views influenced the analysis, as well as disciplinary belonging.

As time passed, the stress and aversion associated with our initial failure diminished. As in all academic life, both of us were exposed to new learnings and insights. The most profound moment came when Hanna Varvne was exposed to the concept of dirty writing. As if a revelation, [2] she suddenly knew what they could do with their failure. She called Mariana Andrei to share her crazy idea. With approval from both, we initiated the second analysis.

The second analysis, the analysis of the failure, was more fluent and guided less by control and pre-planned ideas of what to discover. Instead, this paper was written together, and by writing and sending the text back and forth, a co-creation was developed to understand the failure.

Thus, we adopted this approach as our means of co-creating meaning from the material, an important aspect of team ethnography (previously discussed by Jarzabkowski *et al.* (2015), Parkin *et al.* (2021), Piqueiras *et al.* (2023) to mention some). Our stylistic choice, inspired by dirty writing, was primarily from Grey and Sinclair (2006), who mixed vignettes and reflections. Hence, the first writing step in our second analysis became to write the vignettes based on what we had experienced as fundamental moments in our collaboration. The field of dirty and different writing provides opportunities to engage in a wide variety of styles and author perspectives, incorporating texts featuring non-human beings, such as animals and insects (Sayers *et al.*, 2019; Davies and Riach, 2019; Valtonen *et al.*, 2020), other earth compounds such as compost, rocks and rivers (Kalonaityte, 2018; Valtonen and Pullen, 2021). Despite the wide array of possibilities included in this writing style, we decided to keep it simple and focused on our own story, written in a way that our family and friends outside academia would understand. This was our way to grasp and make sense of the simplistic wording we chose. We wrote a few vignettes each and sent them to each other. Subsequently, we edited the received texts to match our own interpretations of the situations and discussed any potential differences during online meetings.

When conducting team ethnographies with an autoethnographic approach, collaborative writing is one of the major obstacles, as previously discussed. There are numerous ways to overcome this obstacle. For example, Zawadzki and Jensen (2020) approached it by writing separate stories and engaging in joint discussions, while Essén and Värlander (2013) combined their own experiences with discussions with other scholars and wrote as one voice giving voice to the others. We have chosen to write as one voice. We motivate this choice by emphasizing the joint sense-making process involved in the writing process, as well as the notion that even "dirty writing" styles (Pullen and Rhodes, 2008) can be co-authored as one voice. We also believe that the use of one voice makes the text more interdisciplinary, as it requires the integration and merging of our discipline-specific languages.

Following the writing of the vignettes, we sorted them in chronological order and started to explore their themes by reading texts relating to the issues they raised from different angles and re-visiting old notes and e-mail conversations. This created our body of text at the same time as it developed our understanding of the progress made. Writing together without thinking too much of the polished form became a tool for overcoming challenges related to

each other's doctrines and disciplines. Throughout this process, the vignettes and their related body of text were re-evaluated, expanded and removed in the process of telling a coherent and interesting story for the reader. These improvements and reflections were further reinforced by presenting the text at seminars and conferences, where we received feedback, and finally, through anonymous reviews after submission to journals, we received additional insights and critiques (for further discussion on this part of scientific processes see, for example, Rowley-Jolivet (2002) and (Seibert, 2006)). In contrast to Pullen and Rhodes (2008), who added an additional chapter at the end of their text replying to address these reviews while keeping their original dirty text intact, we decided to integrate the feedback directly into our text, making it our own. We consider this yet another aspect of our joint voice and the process of co-creating meaning in our IER.

A reflection on IER through abductive reasoning is that one might not always discover what was initially sought. This project failed to do a joint study on EM in practice at a refinery, drawing from the respective disciplines to engage in novel theory development. A failure, in this sense, can be classified in many ways. For example, failure can be classified as conceptually bound to something negative or value-destroying (Kjeldgaard *et al.*, 2021). This particular failure is something else; it must have some value (O'Gorman and Werry, 2012). It could also be considered a failure that has resulted in a productive outcome through "competent recovery" (Kjeldgaard *et al.*, 2021, p. 279). Perhaps this is the classification or type of failure that best suits this example because, instead of the intended outcome, it discovered something else. Specifically, the project revealed a need for discussing different scientific perspectives within the respective disciplines and the implications for joint research projects.

This is in line with one of the challenges identified by Mallaband *et al.* (2017) for interdisciplinary energy-related projects, in particular comprehension between disciplines. Furthermore, Mallaband *et al.* (2017) defined what success is in interdisciplinary energy research, starting with external success (e.g. project results are presented in the academic circle in plain language), internal project success (e.g. all team members feel valued, respected and equal) and personal success (e.g. researchers have opportunities for medium- and long-term career development). In a similar manner, failures in ethnographic research were recently acknowledged by Verbuyst and Galazka (2023) as a great teacher, helping researchers develop a reflexive approach. Thus, it is possible to see that even a failed attempt can be viewed as a success story. However, one needs to be careful in how success and failures are defined and interpreted.

Continuing the discussion on classification and order, it might be worth mentioning that these concepts are not only relevant for classifying failure but also play a significant role in the daily work within academic disciplines. The different academic disciplines of order and classification of reality were discussed thoroughly by Knorr-Cetina (1999). She argued that the meaning of the same words, such as laboratory, varies across different disciplines (high energy physics and molecular biology in her study). These different meanings to the same word can also be discovered while engaging in interdisciplinary projects. The misalignment between disciplines can perhaps be easily explained by the concepts of epistemic and academic cultures (Knorr-Cetina, 1999; Piqueiras *et al.*, 2023). However, to move beyond the comparison of disciplines and delve into the discussion of interdisciplinarity, there is a need to incorporate other perspectives. One scholar who previously addressed many aspects of interdisciplinary research is Haythornthwaite (2008), who approached learning from a social network perspective.

From a social network perspective, the transfer of information involved in learning, feedback and questioning are important aspects of meaning creation and negotiation. Within the academic community, scholars "... learn academic and professional norms, and disciplinary and local norms for appropriate use of language, writing styles, equipment, and procedures" (Haythornthwaite, 2008, p. 141). Communication is a key issue and is an essential

ingredient for translating our disciplines (Mallaband *et al.*, 2017). In this context, the concept of translation relates to the definition provided by Czarniawska and Joerges (1996), referring to translation as a means to communicate knowledge and ideas. This understanding also meant that we understand language within this context to represent particular disciplines, rather than adhering strictly to linguistic norms (for a further elaboration on different views of translation between knowledge and linguistics, see, for example, Zwischenberger (2023)). This understanding highlights how language becomes an integral part of disciplinary-specific learning, which in our context, made it hard to agree on a joint language and writing style. To address this, inspiration was drawn from scholars who have argued for different and sometimes even dirty writing styles (e.g. Grey and Sinclair, 2006; Pullen and Rhodes, 2008). By adhering to a different and dirty writing style, it might become easier to navigate the inherent language differences between disciplines. However, there is still a need to negotiate which aspects of language are important to maintain the integrity of each discipline.

To know when to give in

Studies of failures are rare and perhaps even more so when it comes to critically examining one's own shortfalls. In our context, interdisciplinary projects are thought of as something great; they shall provide new perspectives and interesting discussions. The only negative aspects of interdisciplinary research which we find to be socially accepted to discuss are those of publications and funding difficulties. So, how do we come to a discussion on the difficulty of doing IER, the method or craft, as we might call it? Can we as scholars be as self-reflexive about our own work that we can compare these findings to those who have spent years observing how science is performed?

This paper contributes to the discussion on the actual implementation of ethnography in interdisciplinary science, focusing, in particular, on the process of performing an interview, analysis and writing. It explores what could be considered as a failure in conducting IER. However, by utilizing the knowledge gained from it, rather than dismissing this failure, it offers new perspectives on failures and success in IER. Specifically, it draws insights from three years of interdisciplinary collaboration, resulting in one interview, to explore the challenges associated with designing IER, from method to analysis, interpretation of results and writing. The main challenges relate to the doctrine of the research and with crossing the disciplinary boundaries to understand each other's discipline. This was approached in a truly interdisciplinary agenda, drawing from the idea that interdisciplinary research results in something greater than the sum of its parts; in this case, the parts were made up of OS and EM.

This paper contextualizes the notions of knowledge creation as a mixture of expertise and experience knowledge to provide new perspectives on IER projects. One important aspect of this combination is the notion of discipline and language. To cross disciplinary boundaries, scholars need to be aware of and adopt navigation strategies, such as learning from each other, learning from the other field as well as developing new language skills and interpretation skills between disciplines. Language is imbedded in both expertise and experience knowledge creation.

There is a pressing need to explore new ways of proceeding with IER projects, particularly when employing abductive reasoning. In such settings, it is a necessity to venture into the field and collect data before engaging in negotiations to establish common ground. This approach differs from the advice provided in previous literature on the structure of interdisciplinary research projects, which suggests that you should have discussed and negotiated the troublesome aspects of the joint research project before it starts. This approach is surely tricky, and the "failure" used as an example in this paper should illustrate nothing less. However, the learning that can arise from such an approach paves the path for

new knowledge creation within each other's disciplines and fosters reflective scholarship among those involved. Consequently, we suggest that our approach not only offers the opportunity to develop the disciplines involved but also promotes self-reflection among participating scholars.

Notes

1. Key Performance Indicators'
2. More likely, the idea was already "out there"; it just needed to be objectified to be acted upon (see: Czarniawska and Joerges, 1996).

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