

PROFESSIONAL VISION IN AVALANCHE TERRAIN. AN ETHNOGRAPHIC STUDY OF PROFESSIONAL NORWEGIAN SKI AND MOUNTAIN GUIDE EDUCATORS.

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ABSTRACT: Despite growing interest and advancements in research on human factors in avalanche terrain over the last decade, there remains a need for deeper understanding of how professional guides conduct risk assessments and develop decision-making strategies. To examine specific professional practices in a real-life setting, we conducted a participant observation study, following guide educators during ski and mountain guide courses organized by the Norwegian Mountain Guide Association (NORTIND). We introduce Goodwin's (1994) concept of *professional vision* as a new theoretical framework to explore how guide educators make decisions based on how they see and understand events.

Our results reveal that guide educators employ various discursive practices, including coding, highlighting, organizing, and communicating, to make safe decisions. These practices are integral to their professional vision and play a crucial role in how they interpret and respond to the complex and dynamic conditions in avalanche terrain. Our findings deepen the understanding of human factors, particularly regarding professionals' unique ways of seeing and understanding events and their decision-making strategies. Moreover, the study offers practical implications for improving safety in such a high-risk environment.

KEYWORDS: Ethnography, professional vision, discursive practices, guide education, decision-making in avalanche terrain.

1. INTRODUCTION

Natural risks, such as avalanches, present life-threatening challenges for human activity in the mountains. Each year, about 140 people die in avalanche accidents (CAIC, 2021; Techel et al., 2016). More than 90% of fatal avalanche accidents are related to recreational activity and are triggered by the victim or someone in their party (Engeset et al., 2018; Schweizer & Lütschg, 2001; Techel & Zweifel, 2013). Therefore, research must consider the trigger factor – the human factor (Fredston & Fesler, 1994; LaChapelle, 1980).

There has been an increase of papers focusing on human factors, especially since 2012. Most of the existing research has been quantitative, concentrating on the individual decision-making strategies of recreationalists (Hetland et al., 2023). However, this focus overlooks the increasing importance of professional guides as a safety factor in the growing sector of alpine ski touring. As a result, some recent studies have shifted their focus to experts. They reveal that professional guides consciously process clues in avalanche terrain and relate them to prior knowledge (Løland et al., 2023). Their expertise leads them to adopt an analytic and knowledge-based approach,

basing their decisions on the analysis of specific factors observed in nature and within their group (Landrø et al., 2020). This contrasts with a positivistic and probabilistic approach, which calculates avalanche risk based on statistically relevant factors (Bolognesi, 2000; Brattlien, 2017; Haegeli & McCammon, 2006; McCammon, 2009; Munter, 1997).

To further develop knowledge on professionals' decision-making strategies in avalanche terrain, we introduce the concept of *professional vision* (Goodwin, 1994) as a new theoretical framework to explore how guide educators make decisions based on *how they see and understand events* (i.e. professional vision). Specifically, we studied guide educators from the Norwegian Mountain Guide Association (NORTIND), who are likely among the most distinguished experts in the field of guiding in avalanche terrain in Norway. To analyze concrete professional practices in a real-life setting, we conducted a participant observation study, following ski and mountain guide courses organized by NORTIND. Our aim is to gain deeper insights into the professional vision of guide educators, focusing on how they see and understand events in order to make safe decisions in avalanche terrain.

2. THEORETICAL FRAMEWORK

Building on recent research focused on guide practices (Landrø et al., 2020; Løland & Hällgren, 2023) we introduce the concept of professional vision (Goodwin, 1994) as a new theoretical framework to explore how guide educators make decisions based

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on how they see and understand events. Professional vision, developed by the anthropologist Charles Goodwin (1994), has been widely used to study how professionals in various fields perceive and interpret aspects of their work domains (Bassetti, 2021; Steinwachs & Martens, 2022; Styhre, 2010). Consistent with these studies, we assume that guide educators possess unique “ways of seeing and understanding events” (Goodwin, 1994, 606), which differ significantly from those of non-experts. Exploring these unique perspectives is crucial for a deeper understanding of professionals’ decision-making in avalanche terrain.

Our theoretical framework posits that “discursive practices” (Goodwin, 1994, 606 ff.) play a critical role in this process. Discursive practices refer to ways in which language, frameworks, technological tools, maps, snow profiles, and other approaches and methods are employed by professional guides to structure and interpret events, ultimately enabling them to make informed and safe decisions in avalanche terrain (Landrø et al., 2020).

In this paper, we focus on four discursive practices:

1. *Coding*: We examine how professional guides categorize their observations (Goodwin, 1994, p. 608 f.).
2. *Highlighting*: We analyze which aspects professional guides emphasize while simultaneously ignoring others (Goodwin, 1994, p. 609 f.).
3. *Organizing*: We focus on how professional guides structure their day to gather necessary information.
4. *Communicating*: We explore how professional guides discuss observations and decisions with their group.

3. METHODOLOGY

For data collection, we conducted participant observations of ski and mountain guide courses. Participant observation is the preferred method for investigating human practices as they naturally occur (Hammersley & Atkinson, 2019). Recent research on decision-making in avalanche terrain has emphasized the need for more naturalistic data (Haegeli et al., 2023; Mannberg et al., 2018) resulting in an increase in studies that successfully employ ethnographic approaches in this area (Løland & Hällgren, 2023; Løland et al., 2023; Michaelsen et al., 2022). In our study, focusing on professional vision, participant observation allows us to observe how guide educators see and understand concrete events in avalanche terrain to make safe decisions.

We purposively sampled ski and mountain guide courses run by the Norwegian Mountain Guide Association (NORTIND). NORTIND is arguably the most

important “community of competent practitioners” (Goodwin, 1994, 615) in ski and mountain guiding in Norway. Moreover, the guide educators responsible for the educational program are all internationally certified mountain guides through the International Federation of Mountain Guides Associations (IFMGA). Consequently, NORTIND guides are in a position to define what is considered “professional” within the field.

From January to June 2024, the first author followed four different ski courses, spending a total of 35 days in the Norwegian mountains, including some preparation days with the guide educators. He observed seven different guide educators, each with extensive work experience not only as educators but also as active ski and mountain guides for the past 10 to 20 years. As the first author is also an IFMGA-certified guide and has been an educator in the NORTIND qualification program for the past eight years, he is familiar with the field and knew all the guide educators beforehand. Given that these participant observations took place in a high-risk environment, requiring advanced skills and knowledge as well as considerable trust between the guide educators, guide candidates, and the participant observer, we leveraged the first author’s expertise and existing network to access a field that is difficult to research as an “outsider” lacking this cultural and social capital. Moreover, the first author’s insider status and close collaboration with the guide educators provided access not only to their practices on the “frontstage” (Goffman, 1956) during the courses but also on the “backstage” during phases of individual preparation and reflection. In sum, our data include field notes from situations in nature and avalanche terrain, reflection talks with all participants at the end of a day, and intense dialogues with the guide educators before, during, and after the courses.

For the analysis of the field notes, we employed a two-step coding process, including initial and focused coding, consistent with the constructivist variant of grounded theory (Charmaz, 2014). The findings of this study, like that of any research, are shaped by the researchers’ backgrounds and involvement in the culture under investigation, thus requiring reflection (Hammersley & Atkinson, 2019). As outlined above, the first author’s insider status facilitated access to the field and provided a deep understanding of the guide educators’ specialized practices. However, being an insider also carries the risk of becoming overly familiar with the field, potentially leading to the oversight of “obvious” and “ordinary” aspects. To mitigate this risk, we combined the advantages of both insider and outsider perspectives by forming a team of researchers with diverse backgrounds. Like the first author, the third author is also closely familiar with avalanche decision-making but does not have a close connection to NORTIND. The second author, in con-

trast to the other two, is a novice in the area. We argue that this form of “investigator triangulation” (Flick, 2007, 312) allows us to benefit from the deep familiarity and understanding of insiders while incorporating the fresh and critical perspectives of an outsider.

4. RESULTS

In this results chapter, we focus on four key discursive practices: coding, highlighting, organizing, and communicating. These practices are crucial in shaping professionals' decision-making strategies in avalanche terrain.

Coding

Goodwin (1994, p. 608) defines coding as “processes of classification” in which professionals transform various aspects of the world into categories relevant to their work. By using professional terminology and grouping objects and events under specific labels, professionals achieve a systematic understanding in a particular area that non-professionals, lacking the ability to make these classifications, are unable to attain.

In the context of decision-making in avalanche terrain, one significant area of coding is the classification of snow. One of the guide educators identified nine “main forms of snow that you must know” and emphasized that “it is a good way to systematize what we find”. Establishing a common use of terms and language plays an important role in the practice of transforming natural elements, such as snow, into categories relevant for guides' decisions. Throughout the courses, guide educators consistently stressed the importance of using established professional terminology, not only for classifying snow but also in other areas, to articulate their observations and relate them to the decision-making process. The accurate application of professional terminology functions as a discursive practice that heightens awareness of the relevant factors for making safe decisions in avalanche terrain.

It was interesting to observe that guide educators do not use complex technological or scientific measurement tools, nor do they rely exclusively on visual assessment to make classifications. Instead, they use multiple senses, combining sight with touch and hearing. For example, on one occasion, a guide educator gently kicked the fresh top layer of snow with his ski boot to gain deeper insights into how to classify the snow:

“Listen to the sound! It's a real rattle sound. This is not only ordinary loose new snow, but there is also a build-up of facets. And it's no wonder. Since it has been so cold last night. There is a high temperature gradient in the top layer of the snow cover.”

This statement also illustrates how the guide educator integrates his immediate assessment of the snow with broader knowledge of recent weather conditions, enabling him to draw consistent conclusions about the processes that led to the current snow conditions.

Guide educators were very aware that making such classifications is a highly trained skill that “takes time to learn” (guide educator). This is why they constantly encouraged participants to articulate and put into words what they observed. Furthermore, it was notable that all ski- and mountain guide educators – and some of the participants as well – had a thorough education in snow science, with several years of experience as snow observers for the Norwegian Avalanche Warning Service (NVE). The practices for understanding snow and avalanches are in many ways similar for guides and snow observers, allowing guides to significantly benefit from their previously gained knowledge and socialization.

Highlighting

To highlight, according to Goodwin (1994, p. 609 f.), means making information salient by emphasizing certain aspects while simultaneously neglecting others. Throughout our fieldwork, we observed that guides were trained to highlight what is important while disregarding what can be neglected.

Guide educators provide guide candidates with decision-making patterns to emphasize the most relevant aspects in a specific situation. For example, one guide educator summarized the most important questions to consider when entering different zones in avalanche terrain:

“We ask ourselves three questions every time we enter a runout zone:

- 1. Could there be natural avalanches here today.*
- 2. Could we remotely trigger avalanches here today.*
- 3. Are there other people above us in the slope.*

Next, we enter the release zone. Here, we must ask ourselves whether there is an avalanche problem present on this slope. Today, we found facets, but we observe that they are not currently active. Therefore, we can proceed into the release zone area. We must ask ourselves these questions every time we enter avalanche terrain.”

However, the provision of decision-making patterns does not imply that guide educators approach avalanche terrain with “fixed and final” frameworks that highlight what is “always” relevant. Instead, highlighting is best understood as a practice where various factors are evaluated in relation to each other. In other words, the relevance of one specific factor in a given situation varies depending on other factors, such as previous weather conditions or characteristics of the terrain. For example, it was not always the

layers in the snow that were considered most important. In one of the courses, the snowpack solidified with clear nights and days following a week of rain. Consequently, the guide educators identified falling and gliding as the highest risks. They highlighted terrain and sun exposure during the day as crucial factors in their decision-making. This example illustrates that guide educators make risk assessments based on the interrelation of factors and their relevance in a given situation.

Due to guide educators' complex analytic and knowledge-based approach, probabilistic decision-making frameworks hold little value for them (Landrø et al., 2020). For example, although NVE is used as part of their professional decision-making strategies, the actual danger level for the day and region is not very important to a professional guide – unlike non-professionals who extensively rely on this indicator in their decision-making. Professionals are hesitant to use the actual danger level because it provides an assessment for an entire region, whereas conditions can vary locally, requiring the guide to conduct a specific assessment for each avalanche-prone slope they plan to ski. This example illustrates that professionals highlight different factors than non-professionals, as their expertise enables them to assess details and nuances that non-professionals may not be able to consider.

Organizing

As previously discussed, guides base their decisions on extensive information. However, gathering the necessary information takes time. For example, before guiding in a new area, guides often “spend a day or two getting to know the snow cover in the area” (guide educator) and assess the avalanche situation through initial trips on their own.

Furthermore, guides' analytic and knowledge-based approach to decision-making requires them to maintain a *consistent* yet *flexible* and *adaptive* approach to organization. They continuously assess and reassess where to ski in order to gather the most relevant information and organize the day accordingly. For example, in one of the courses, it had rained up to 1200 meter above sea level the week before, followed by a significant drop in temperature, some precipitation, and wind. Drawing on knowledge and understanding of snow dynamics, the guide educator used the weather history to discuss with the group what they could expect the snowpack to look like. They first created an indoor profile of the snowpack, identifying the different layers and estimating which layer would be most relevant for avalanche decision-making. They then discussed where it would most likely be found, and planned a route where they would gather as much information as possible. They specifically looked for areas with varied formations and angles rather than smooth slopes or bowls, where the entire terrain could be uniformly affected by the wind, as

these varied areas reveal more nuances and provide richer information. This example illustrates how the group conducted a targeted search for, planned and carried out an assessment day through terrain that would provide the critical information needed for the next day's decision-making out in the field.

On the way up the next day, the guide educator gathered the group in a circle, asked them about the snow they had observed so far, and discussed a thin crust resulting from the previous mild weather. Later, behind a small ridge, the group found a field of fresh wind slab. The guide educator stopped again, dug out a small piece of the slab, and discussed the different layers with the participants. They identified an ongoing faceting of the new snow layer buried under the fresh wind slab indicated by color, softness and estimation of temperature gradient. These observations were systematically connected with the recent weather conditions. Similar issues were discussed higher up the mountain when the guide educator made a ski track over a field of fresh wind slab where the group experienced shooting cracks. These instances illustrate how the group used the chosen route to systematically gather information, assess the snow for signs of instability, and connect their observations with their knowledge of snow processes in relation to recent weather conditions.

The following day, the group gathered additional information through various techniques, including digging a snow profile and conducting stability tests, to make a final decision about where to ski. The initial plan was to ski a steeper line in potentially sheltered and good snow for skiing. However, the starting point was in a formation that could contain a fresh wind slab. At the designated decision point in the field, one of the guide candidates made a statement, articulating the connection between earlier practices of information gathering and the final decision:

“If this digging and the mapping we did yesterday and today on the way up is to have any value, then this finding of the buried faceted layer must have a consequence. And the only consequence it can have when we have found a faceted layer that can be affected by us is that we decide not to ski that slope.”

Communicating

Professional guides need to communicate intensively with their group of participants. A widely established communication practice in the Norwegian guiding context, which we also observed in the daily practices of all courses, is the so-called *Ferdråd*. *Ferdråd* is the term the guide educators use for their multi-way communication with their group. It is a fundamental part of the guide educator's safety and quality system. The purpose of the *ferdråd* is to provide participants with the opportunity to express, reconcile, or clarify their expectations, and to involve them in the entire process, making them co-responsible. The initial *ferdråd* takes place at the start of the trip. Before

meeting with participants, the guide must prepare by assessing conditions and understanding the group's dynamics. Ferdråd serves as a summary of these preparations, allowing the guide to focus on the most central aspects of the trip. However, guide educators emphasized that ferdråd is not just a one-time event at the beginning but an ongoing process that must be applied continuously throughout the day to maintain communication and discussion at key decision points or when new crucial events are observed.

In the courses, we observed some communicative challenges between the guide educators and the candidates. These challenges often stem from the candidates' previous experiences, which have accustomed them to a "positivistic approach" to risk management and decision-making. This positivistic approach is grounded in the belief that reality is precisely measurable and can be clearly understood through the application of strict methodologies and technological tools. As a result, initially some guide candidates tend to seek "clear" answers and prefer to learn concrete methods or "recipes". However, professional decision-making in avalanche terrain is fundamentally different. It is process-oriented, analytic, and knowledge-based, requiring flexibility and adaptability to incorporate new information as it becomes available. This approach does not always yield clear answers and often requires "postponing" (Løland et al., 2023, 7) decisions, which can be challenging for those who are used to more rigid methods. Given the significant respect and support that positivistic views have garnered in modern societies, it is not surprising that professional guides also face similar challenges when communicating with guests in a commercial setting or when cooperating with professionals from other fields.

5. DISCUSSION AND CONCLUSION

Drawing on professional vision as a theoretical framework and employing ethnographic observations as a methodological approach, we studied how guide educators see and understand situations in avalanche terrain. Our focus is on four key discursive practices that they use when preparing for and engaging in analytic decision-making within this high-risk environment.

1. Coding: Professional guides systematically transform complex natural elements into manageable categories through the use of specialized terminology. This classification process enables guides to achieve a nuanced understanding that is essential for safe touring. Interestingly, this process does not rely on advanced technology or purely visual assessment but involves a multisensory approach integrating touch, sound, and sight. By emphasizing the importance of established professional language and encouraging the articulation of observations, guide

educators foster the development of these skills among guide candidates.

2. Highlighting: Guide educators highlight the most pertinent information while selectively neglecting less relevant factors, and train guide candidates to do the same. They adopt a flexible approach that allows them to highlight based on the unique circumstances and constellation of factors – a skill that sets professionals apart from non-professionals who may rely more heavily on general indicators like avalanche danger level. Professionals are often critical of a probabilistic approach to decision-making, arguing that it oversimplifies the complex realities encountered in avalanche terrain. Instead, they favor a knowledge-based and analytical approach. By integrating context-specific assessments with broader knowledge, professionals effectively navigate the complexities of avalanche terrain, demonstrating that professional decision-making is a dynamic process that requires the ability to highlight critical information as it emerges.

3. Organizing: Professionals use time, choose routes, and organize their days to gather what they consider the most relevant information for making safe decisions. Their approach is both consistent and adaptive, balancing structured organisation with the flexibility needed to respond to dynamic conditions and emerging information. They systematically connect various observations in the field with their deep knowledge of weather conditions and snow dynamics, thereby "updating" (Løland et al., 2023) and refining their initial plan. This process enables them to arrive at well-informed and consistent information crucial for their decision-making strategies in avalanche terrain.

4. Communicating: Our analysis highlights the central role of communication in professional guiding, particularly focusing on the practice of ferdråd, which is integral to Norwegian guiding culture and ensures ongoing dialogue between guides and participants.

Some practical implications of our research for both professionals and recreationalists can be shortly summarized as follows:

Speak out: Encourage open communication within the group by expressing observations, feelings and thoughts. This practice not only enhances individual awareness and knowledge but also ensures transparency. By sharing insights, all group members become co-responsible in the decision-making process.

Take time: Allocate sufficient time to thoroughly understand snow conditions and terrain. Organize skiing from familiar areas to the more unknown and potentially risky zones. This gradual approach helps in building a comprehensive understanding of the environment.

Choose terrain with options: Select routes that give you ample information, provide multiple options, and

allow you to postpone the final decision. This flexibility can be crucial in adapting to changing conditions.

Respect the complexity of nature: Recognize that decision-making involving both natural elements and human factors is inherently complex. Many aspects can't be precisely measured or calculated, making uncertainty an unavoidable aspect of assessing risks in avalanche terrain.

Highlight critical factors: Focus on identifying and assessing critical factors that influence safety. Continuously evaluate whether these factors are present or absent in the areas where you are skiing. Adapt decisions accordingly.

Use ferdråd before and during touring: Implement ferdråd as a practice to foster a transparent, co-responsible, and multiway dialog within the group. Especially in recreational groups, which often lack a clear leader, establishing a systematic pattern for communication can improve decision-making processes.

In that sense, ferdråd serves as a practice that addresses some of the critiques and limitations of an analytic approach to decision-making, particularly those observed among the guide candidates we followed. Sometimes candidates, having been socialized and educated within a positivistic approach, struggle when they do not receive "quick and clear" answers on how to make decisions as professional guides. However, the discursive practices of guide educators indicate that thoroughly understanding and mastering decision-making in avalanche terrain requires time, experience and practice. Professional vision in avalanche terrain is also an educational topic that warrants further research to better understand how guides develop their competencies and how educational strategies can be refined to support this complex learning journey.

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