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## Planning for trips in avalanche terrain

How experience influences planning for backcountry trips  
and lift-accessed off-piste trips in avalanche terrain.

**Master Thesis**

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**Department of Physical Education  
Norwegian School of Sport Sciences, 2014  
in collaboration with**



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**Master thesis in Sport Sciences**

Department of Physical Education

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## Abstract

This Master of Arts is a qualitative study on how experience informs the planning phase for trips in avalanche terrain. By comparing two groups having different level of experience, this study is trying to reveal if persons in these groups are planning similarly to others in the group, if there are differences between the groups and also looking into the way they are planning for a trip in the backcountry and a lift-accessed off-piste trip in avalanche terrain.

Skiing in avalanche terrain has rapidly become more popular in Norway over the last decade, causing an increase in avalanche fatalities for recreationists. This study can help revealing how experienced skiers and avalanche educators in Norway are thinking prior to trips, and hopefully give insights to how people with less experience can adopt this to keep safe in avalanche terrain.

Through interviewing six informants, this research has been able to reveal a difference in how these persons with different experience plan for a trip in avalanche terrain, and also point out differences between planning for lift-accessed off-piste trips and trips in the backcountry.

Keywords: experience, expert, novice, avalanche, patterns, rule-based methods, lift-accessed off-piste, backcountry skiing, learning, friluftsliv.

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As the last phase of this two-year unbelievable journey is ending, I am left with thankfulness. Transcultural European Outdoor Studies (TEOS) has given me an opportunity to get to know people, places and knowledge that I could not imagine upfront. My wife Sara has joined me on the way and sharing this adventure with her has given it even more facets.

During the last six months, I have been able to use some of the knowledge gotten through TEOS and fuse it into the field of avalanche research. It has been an incredibly interesting process as things have changed along the way forcing actions to be taken.

I would like to thank my supervisor Kirsti Gurholt Pedersen, Dr. Scient. at Norwegian School of Sport Sciences, for inspiring conversations and swift, accurate and useful feedback. I would also like to thank all my informants, as their insights are essential to all processes in this work. I would also like to thank all those who have helped me on the way by either proof reading or giving insights.

Most of all I will thank my wife for helping me through this phase. She is always helpful and understanding, despite having a husband sitting in his office day in and day out.

Lastly, I will say that it feels like I have matured more over the last few months, but I am still relieved it is over. I am looking forward to many more first-hand experiences in nature in the near future, and especially I want to share more time with my wife and ten months old daughter Tuva.

Stjørdal, August 2014

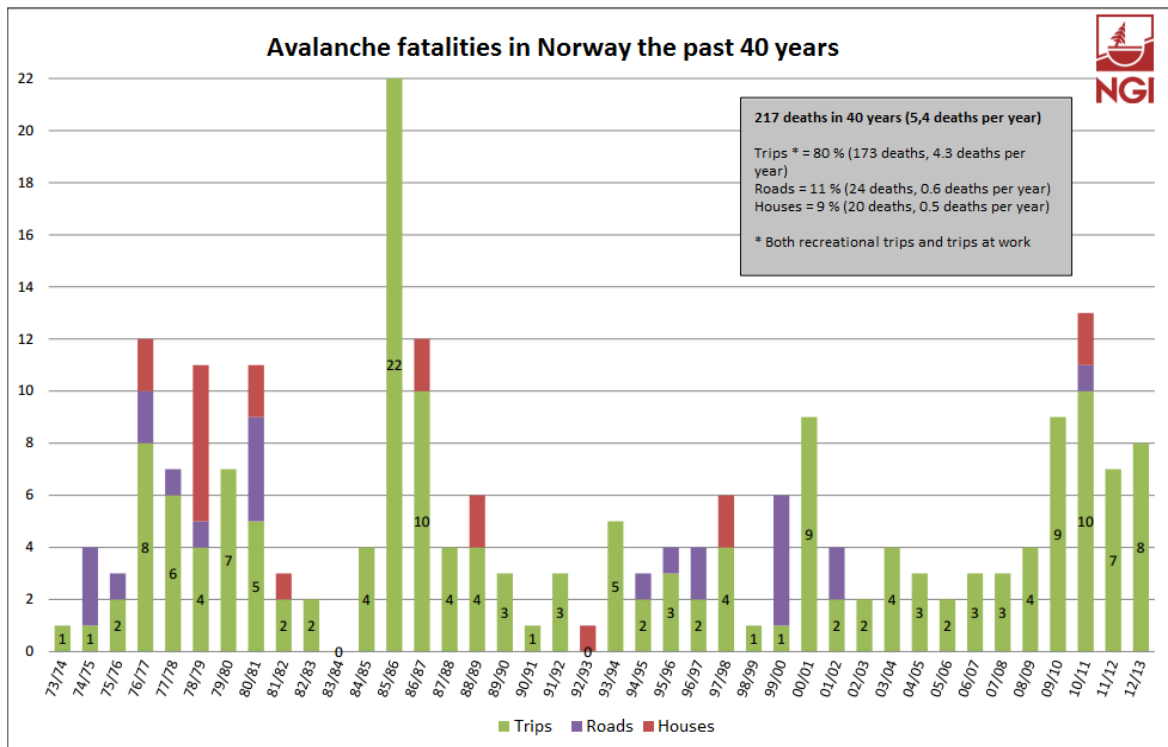
Magnus Berger Skjøstad

# 1. Introduction

Skiing in avalanche terrain has become more and more popular the last years in Norway, as well as in other Western countries (Odden, 2008). This is not only leading to growth in sales of ski and safety-equipment, but also creating new services such as the avalanche forecast and “powder-buses” run by ski resorts, bringing skiers back to the lift after skiing outside of the groomed pistes. The outcome of this might be an increase in the number of avalanche fatalities, when excluding years with single events that caused several deaths (Figure 1). One hot topic regarding these negative tendencies and concerning avalanche safety is that it seems like resort-based off-piste skiers tend to take more risks than a skier hiking the top (Tremper, 2008). This has been related to a looser group cohesion, feeling of safety due to closeness to the safe slopes, that one does not walk the same way up as one ski down and of course that one has the potential to take several runs. Because these subgroups seem to act differently when planning for and dealing with avalanche terrain, it would be interesting to investigate if there really is a difference; if so, why? And does the experience level play a big role in this? The main aim of this research is to investigate and compare how a selected sample of skiers representative for groups of different experience are planning prior to a trip in the backcountry and prior to lift-accessed off-piste skiing.

As avalanches cause harm to both people, animals and infrastructure, limiting the hazard is of public interest. Organisations and institutions like the Norwegian trekking association (DNT), the Norwegian Army, the Norwegian Red Cross, the Norwegian Geotechnical Institute (NGI), the Norwegian Water Resources and Energy Directorate Everyone (NVE) and others are constantly working with this topic, trying to make it safer for people to stay in avalanche terrain, either when they are at home, at work, on the road or during leisure time. Closed roads and railroads due to avalanches are forcing traffic to stop or take detours creating economic issues. This thesis is not directly addressing economic issues due to avalanche hazard, but is having a focus on recreational skiers. Through understanding more about how these skiers think and act prior to trips, the ultimate aim is to prevent avalanche fatalities.





**Figure 1:** *Avalanche fatalities in Norway the past 40 years* (Brattlien, 2013, p. 2). The spike in 85/86 is due to a horrendous accident in the Norwegian armed forces, the Vassdal accident, where 16 soldiers were killed.

### 1.1 Human factors in potentially deadly terrain

Avalanche awareness alone is not sufficient for safe travels in avalanche terrain. According to an estimate from Tremper (2008) two thirds of avalanche accidents happen to people ignorant to the avalanche risk. They simply do not know or understand that they are dealing with potentially deadly terrain. Hypothetically, this is easy to prevent through education. The last third knew about the risk, but skied on and were lost in the avalanche all the same. Most of these accidents are caused by something known as the “human factor” in avalanche research. The human factor includes competition, economic considerations, poor communication, familiarity, peer pressure, the herding instinct and the “sheep-“, “lion-“ and “horse-“syndrome. Tremper (2008) describe these as heuristic traps, mental shortcuts, that affect decisions often despite the rational. Both novices and avalanche-educated people stumble into these traps. This serves a question to this research: do we really know if people with experience plan better or different than those without experience? Or is it sheer luck that anyone survives trips in avalanche terrain? Tremper’s (2008) answer to this is that although experienced people make mistakes, at least they know about avalanche basics and decision making, and

state that then they are half-way to the goal. The rest has to come through systematic decision-making frameworks.

In Norway, the avalanche knowledge base has been widened a lot recently. Books, surveys, and research has been written about the topic. Specifically, introductory books as those from Landrø (2007), Brattlien (2008) and Nes (2013), a thesis on how to teach about avalanche safety gear by Hole (2013), stories from people taken by avalanches (Haugum, 2014), rule-based decision making (Hallandvik, Langeland, Skjøstad, Øvrebotten & van den Tillaar 2012) and more. The work laying closest to the theme in this research is a study done by Klokkehaug (2013) on what type of knowledge and learning that is understood as important for evaluating risk and route choices in backcountry skiing in avalanche terrain. The researcher used focus groups and in-depth interviews as methods to discover that learning about avalanches possibly can happen in both informal and formal settings e.g. a discussion on a trip with friends or a course situation. The response was that the content on courses and workshops was key to form good, realistic learning. Realistic learning was further connected with the more advanced types of courses including group situations and situations in actual avalanche terrain, close to what the participants would expect on an actual trip with friends. The study gives a good insight to what factors people with at least five years of experience skiing on winter snow think is important for traveling in the backcountry in all stages of a trip. This makes a good starting point for my research: investigating deeper into one stage of the trip, and bringing in lift-accessed off-piste and people with different experience level.

Internationally there is an even broader body of knowledge, and frequently new research is presented on *The international snow science workshop* trying to merge avalanche theory and praxis (International Snow Science Workshop, n.d.). Closest to the topic in this research are studies on the differences between avalanche experts and novices (Atkins & McCammon, 2004), the group most at risk (Gunn, Haegeli, & Haider, 2010) and a stated choice survey about amateur decision-making in avalanche terrain with and without a decision aid (Haegeli, Haider, Longland, & Beardmore, 2010). The last mentioned study was performed as an online survey where the respondents were given several questions such as choosing between three different hypothetical routes when getting information about the avalanche conditions from a

regional avalanche forecast. The end result was that the decision preferences varied significantly depending on the users' experience, relevant training and recreation preference.

Avalanche research was a natural choice for me when writing a master thesis as dealing with avalanche terrain has both been a hobby, main topic at school and part of my job for several years. Along with Stian Langeland and Vetle Øvrebotten (2011), I did my bachelor researching Norwegian avalanche fatalities, looking into if these could have been prevented using rule-based decision making methods. With this thesis, I will try to extend my knowledge about avalanches and look into how experience informs the planning phase and how the new avalanching forecast is interwoven into this.

My intent is not to critically investigate or develop the forecast itself, although it is a possible outcome. The aim is to look at in which way people plan for trips, how it is done by experienced and less experienced skiers and if it is done differently prior to a lift-accessed off-piste trip than a backcountry trip where they have hiked to the top. Are they using known planning tools? What tools? How? What role does the forecast play, if any? This can then point out if there is a connection between choice of terrain, level of the skier and the use of planning tools. Possibly, this can show what a specific group of skiers could be paying more attention to, or lead to a different focus in future avalanche courses and workshops.

## **2. Theory**

This chapter is divided into avalanche theory and theory about how experience is gained. The databases Quest, local research work databases at Norwegian School of Sport Sciences (NSSS) and Bibsys as well as other researchers have been used in the search for relevant literature for this study. The most central search tags have been trip/tour planning, avalanche forecast, avalanche danger rating/scale, avalanche accidents, lift-based off-piste, backcountry skiing, experience, learning and experience, skill acquisition, bildung, crisis and routine, becoming an expert, reflection in and on action and variations and Norwegian translations of these. In the following, the most central theory related to the research question in this thesis is presented, meaning that a lot of less relevant and general literature about avalanches and experience has been left out.

### **2.1 *Avalanche theory***

There is a huge body of knowledge laying within the field of avalanche research. Thousands of pages have been written about the well-known variable factors weather, terrain, snow and human, mutually known as the avalanche triangle, as they are seen as the key factors for creating avalanche hazard. Instead of recycling those, I will hereby forward readers interested in that topic to works by Tremper (2008, pp. 25-147 and 279-303), McClung & Schaerer (2006, pp. 21-143), Munter (2009, pp. 39-100 and 169-174), Kurzeder & Feist (2003, pp. 11-92 and 132-169), Landrø (2007, pp. 61-89), Brattlien (2008) Nes (2013) and Fredston & Fessler (1994). There is little variation in how these factors are emphasized in the above mentioned works, but lately there has been a hot debate in Norway regarding the terrain factor: more specifically if terrain steepness is as important for triggering avalanches as previously thought (Sande, 2013). This is brought into this research as it may inflict the pre-planning of a trip.

#### **2.1.1 Demographics in avalanche fatalities**

A key factor for this research is that based on historical avalanche fatalities, we know that a vast majority of them has happened with people low on avalanche skills (Tremper, 2008). Although there are many skilled skiers among the deaths, there are not very many avalanche professionals or people with a high level of formal avalanche course qualifications (Atkins & McCammon, 2004). This might be because they are

over-estimating their level of skill, simply because there are more people traveling in the backcountry with low level of avalanche education, or, as Haugum (2014) found; that they do not think that they themselves will be caught by an avalanche. Despite this, there must be a reason why people with much experience and skills in the avalanche sphere have a much lower death rate per ski day.

One need not look far to see that more experienced people die in avalanches. During this research, four young, experienced skiers were swept off their feet and died in a tragic event close to where this thesis is written. There is no desire to investigate the tragic event in Sunndalsfjella more in this research, but it shows a need for further research and awareness raising to prevent future events like that.

According to statistics from NGI, 65 people have died in avalanches during the years 2003 to 2014 (NGI, 2014). Kjetil Brattlien (2013) presented numbers on the Nordic avalanche conference in Sogndal showing that of the total 56 fatalities from 2003 to 2013, 95% of the victims were killed during *friluftsliv* (recreational) activities, which in this statistic also includes snowmobilers. All nine fatalities in 2013/14 also seem to have happened during recreational activities, although not all reports are available yet. 17% of the persons killed from 2003 to 2013 were female, and the average age was 39. Only 2% were under 20 years old, while 21% was the number both for the group between 20 and 29 years old and for the group aged between 50 and 59. 70% of the deaths happened on trips with recreational purpose in terrain with a steepness of 30 degrees or greater (in Norway known as *Bratt friluftsliv* [Eng: *Steep friluftsliv*]), and among these 70%, 24% happened during lift-based off-piste [Nor: *Heis-basert off-piste*] skiing and the rest during backcountry trips [Nor: *Topptur*]. Looking at avalanche danger rating, 28% of the victims were taken on a grade 2, 55% on grade 3 and 17% on grade 4. Human triggered avalanches killed 81% and 57% of the victims did not wear an avalanche transceiver.

### **2.1.2 Planning for trips in avalanche terrain in a Norwegian perspective**

Trip planning is in the backbone of Norwegian friluftsliv tradition. In the planning phase of a trip one has the opportunity to think ahead and foresee situations that might come up and mitigate the risk for potential accidents (Mytting & Bischoff, 2008). When Roald Amundsen beat Robert F. Scott in the race for the South Pole, it was among other

things Amundsen's organising and planning skills that were seen to be the key to his success (Orheim, 2011). Even though his expeditions are far from the same as a ski trip in avalanche terrain, Amundsen's planning skills are often brought forward in friluftsliv contexts. Another aspect of the trip planning tradition in Norway was formed after the Easter of 1967 known as the Accident-Easter in Norway. The accidents which occurred that Easter caused an emphasis on safety, and both the *Fjellvettreglene* [Eng: *The Norwegian Mountain Code*] (Lyngmoe, 2009) and the strong tradition for *Tur etter evne* [Eng: *Trip by ability*] sprung out of these events. A central person in Norwegian friluftsliv and safety debate, Nils Faarlund, was probably the one to coin the term "*tur etter evne*" in 1971 (Faarlund, 1971). DNT has written about this concept and elaborated the idea focusing on the person doing the trip's ability to handle nature given elements such as season of year, type of terrain, and length of the trip (DNT, 2006). Horgen (2010), a key source for schooling of friluftsliv professionals in Norway, also elaborates the use of trip by ability. *Ferdaråd/Ferdråd* [Eng: *Trip council*] is another concept of trip planning described by Horgen (2010) often used by Norwegian Mountain Guides, NORTIND<sup>1</sup>. At a ferdaråd one meets the people one is going for a trip with the evening before or the same morning as the trip. Trip planning is done on a ferdaråd by talking about the route, expectations, requirements, aims and other elements concerning the trip. For skiing trips the tradition in Norway has been to walk around places with potential avalanche risk or wait until the spring when the snow cover is without layers [Nor: *førefall*] to approach avalanche terrain. Avoiding avalanche terrain is the common rule when DNT is marking skiing trails (Blåsmo, 2010). This means following a rule-based method saying that an avalanche highly unlikely will get to a point three times further out in distance than the vertical drop from its triggerpoint (Landrø, 2007). This is known as the 1:3 rule and is based on statistics for the maximum runout for debris. It is a conservative method, which is rather easy to use both in the field and on a map, and a method that statistically will keep you alive. Cross-country ski trips in the backcountry using medium broad skis is in Norway known as *fjellskitur* and is seen as the traditional way of skiing. Using the thought of avoiding slopes with avalanche risk has been important for the work of the Norwegian Red Cross, the Norwegian armed forces and the community around Norges Høgfjellsskole [Norwegian

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<sup>1</sup> The only representative for IFMGA (International Federation of Mountain Guides Associations) in Norway.

High mountain school], - a cornerstone in Norwegian friluftsliv schooling with Nils Faarlund as a key figure (Landrø, 2007).

Better equipment led to a change in the use of the skis in the late 1980s and 90s. It was now possible for more people to ski in steep terrain and in Norway, this was exemplified with first descents in many steep gullies and runs in Hurrungane (Horgen, 2011), West Jotunheimen. Ski magazines such as Powder (first issued in the U.S. in 1971), Åka skidor (Sweden, 1975) and later Friflyt (Norway, 1998) also brought big lines and backcountry skiing in avalanche terrain home to the masses.

### **2.1.3 Planning tools**

As more people have started traveling into avalanche terrain either by taking the lift or skiing with skins to the top (Odden, 2008), different forms of tools have been invented both to help people plan better and to help making better decisions. An oversimplification of nature in the simplest rule-based methods has been up for discussion in Norway lately as a linear combination of steepness and danger level is by many regarded insufficient (Langeland, Skjøstad, & Øvrebotten, 2011). As this research focuses on general pre-trip planning, only a few tools will be presented briefly. Planning tools are used to reduce the risk of getting caught in avalanches or simply to inform people about the risk. Different forms of checklists are available for the pre-trip planning and some of these are made in combination or as a part of a decision-making frameworks or aids. For some of those tools you need to gather information before the trip, some of them you can either do it before or while on the trip, and for some you need to gather information on the trip.

# 3x3 Avalanche Assessment Process & Reduction Method

Werner Mütter Institut für Schnee und Lawinenforschung, Davos, Switzerland

## 3x3 Assessment Process

3 x 3 Assessment Table and Reduction Method are to be used together to obtain acceptable avalanche risk. Do not use this system without a thorough knowledge of avalanches. This system is designed and intended for use inside Europe.

3 Criteria / 3 Filters	Snow/Weather	Terrain	People	
<b>Regional:</b> Tour Planning Including Alternatives (at home)	Avalanche report, weather forecast, information from locals, etc.	Use 1:25,000 map, guidebooks, photos, own knowledge	Who's coming? Skill level? Knowledge of group? Who's responsible?	Researchable information & Expectations
<b>Local:</b> Visible Area & Route Selection (in the area, as far as your eye can see)	General snow conditions, wind direction and loading New snow amounts, oddities, visibility, temperature How many and when made?	Check info previously received (relief, slope angle, steepness, ski tracks, etc.) Are there existing ski tracks?	Who's in my group? Equipment and transceivers with? Time plan for tour? Itinerary left with someone? How many groups are around group?	Personal Observations on-site before setting out. Continuous reassessment en route.
<b>Zonal:</b> Exact Location of Questionable Slope (every single slope as you set your track)	Check new snow amounts, visibility, solar radiation Assess possible slab potential What's keeping the snow together? <b>Snowpack structure is characterized by its irregularity.</b>	What's above and below me? Steepest part of slope? Near the ridge? Any wind pockets? Relief? Aspect?	How often has slope been skied? Communication? Tiredness? Discipline? Technique? Distance between each other? How wide a track? Spacing? Corridor? Single file? Safe zones? Alternate routes? <b>Think! Important!</b>	Last Check: Go or No Go?

## Danger Potential Intermediate Sliding Scale (Hazard Levels of the Avalanche Report (AR))



## Reduction Method\*

Danger Potential	Reduction Factors (RF) Pick one reduction factor from each	RF value	Avalanche Report (AR)	Danger Potential (DP)
	<b>1<sup>st</sup> CLASS</b>		1 Green	2
	No. 1 or No. 2 or No. 3	2, 3, 4	2 Yellow	4
	<b>A 1<sup>st</sup> class factor is required at Considerable Danger!</b>		3 Orange	8
	<b>2<sup>nd</sup> CLASS</b>		4 Red	16
	No. 4 or No. 5 or No. 6 or No. 7	2, 3, 4, 2	5 Red with black border	32
	<b>All 2<sup>nd</sup> class reduction factors are invalid with wet snow conditions! Important Notes: <a href="http://www.brooks-range.com/3x3">www.brooks-range.com/3x3</a></b>		<b>Reduction Method Formula (Not applicable for snowmobilers)</b>	
	<b>3<sup>rd</sup> CLASS</b>		<b>Acceptable Residual Risk Formula (ARR)</b> Most reliable in Northern Hemisphere between 40° and 50° latitude.	
	No. 8 or No. 9 or No. 10	2, 3, 2	Ideally the acceptable risk factor (ARR) will be less than 1. Equal to 1 is questionable! The risk level in mountain environments can never be reduced to zero.	
	<b>The minimum safe distance when ascending is 30 feet (10 meters). A very large distance is required when descending.</b>		<b>Example:</b> You're skiing with one other person in a new area with no visible tracks.	
	<b>* This Reduction Method should be used in conjunction with other factors such as, but not limited to, aspect and solar heating. Important Notes: <a href="http://www.brooks-range.com/3x3">www.brooks-range.com/3x3</a></b>		<ul style="list-style-type: none"> <li>AR is 4 = DP 16</li> <li>Steepest Slope angle is 38° = RF 2</li> <li>Slope is in Northern Section = RF 2</li> <li>Small group (2-4 persons) = RF 2</li> </ul>	
	<b>The best working way to assess the avalanche danger level is to use the 3x3 Filter Method complemented by intuition and observation and double-checked with the Reduction Method.</b>		<b>Formula:</b> $\frac{DP}{(RF \times RF \times RF)} = ARR$ <b>Example:</b> $\frac{16}{(2 \times 2 \times 2)} = \frac{16}{8} = 2$ The result is greater than 1 so <b>No Go!</b>	

Rev. 2 05-07



See Overset Danger Factors on Rutsch/BoardblockTests card. WARNING: PROPER USE OF THIS INFORMATION REQUIRES EXPERT TRAINING. THE PUBLISHER CANNOT AND DOES NOT GUARANTEE THE EFFECTIVENESS OF THE INFORMATION CONTAINED HEREIN. THE USER OF THIS GUIDE ACKNOWLEDGES THAT HE/SHE USES THE CONTENT AT HIS/HER OWN RISK. ©2007 BROOKS-RANGE MOUNTAINEERING EQUIPMENT CO. [www.brooks-range.com](http://www.brooks-range.com) [info@brooks-range.com](mailto:info@brooks-range.com)

Figure 2: English version of 3 x 3 filter and the Reduction method (Brooks-Range Mountaineering Equipment Co., 2007).



One tool which includes two components is *Formel 3x3* (in English referred to as 3x3 filter, figure 2), developed by the Swiss avalanche researcher Werner Munter (1992). 3x3 filter is a model formed like a matrix where one is supposed to go through each of the factors in the avalanche triangle snow/weather, terrain and people in three zoomlevels/filters: regional (pre-trip), local (pre and during trip, visible area) and zonal (during trip, every single slope). Along with this filter, Munter presented the Reduction method (Rm, also referred to as Professional Reduction Method (PRm), figure 2) which is a decision making aid that is supposed to give the skier the same statistical possibility to survive as if you drive a car in Suisse (1997-numbers). This possibility forms “acceptable risk” in the Rm equation (see figure 2). 3x3 filter and the Reduction method forms this way both a planning tool and a decision-making aid (Munter, 2009). The 3x3 filter itself forms a good starting point for planning and is included in various other decision-making aids like NGI filter-assessment, Engler’s Factorencheck and Landrø’s filter assessment (Landrø, 2007).

Examples of other frameworks that both combine info gathered before and during a trip are the Avaluator (both v1.0 (Haegeli, McCammon, Jamieson, Israelson, & Statham, 2006) and v2.0 (Haegeli, 2010)) and NivoTest (Bolognesi, 2000). All these work as a checklist where different conditions give a specific number. Briefly, one can say that adding the numbers give a total sum and advice about what to do. The Avaluator 2.0 is developed and used in courses in Canada and goes hand in hand with the recently developed Avalanche Terrain Exposure Scale (ATES) (Canadian Avalanche Centre, n.d.). Tools like the Elementary reduction method (ERm) (Munter, 2009) and the Afterski method (Brattlien, 2008) can be used before or during the trip, as the information needed is limited to terrain steepness and avalanche danger rating.

From a Norwegian perspective, much has happened over the last years. Since the NVE got the task to develop specific avalanche forecasts they have introduced an “avalanche school” online with a lot of information about avalanche problems, planning and the forecast itself. They have also produced at least three different avalanche cards in which the latest version (figure 3) offer some information on how to use the forecast, a scale to measure angles on maps, some safe-travel tips and a type of planning and decision making aid based on the principles of 3x3 filter and a set of crucial questions (NVE, 2014a). NVE informs that the card should not be used without training.

VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

**FILTER 1 – TURPLANLEGGING – FØR TUREN**

**Sjå skredvarselet på varsom.no**

- **Kva er varsla faregrad?** Sjå baksida for meir informasjon om faregradene.
- **Kva er gitt som skredproblem** og kor i terrenget er problemet mest framtrødande?
- **Korleis er vèrmeldinga** (sikt, vind, nedbør og temp. – påverkar vèret skredfaren)?

**Kva gjer du?**

- **Planlegg turen på kartet, både tur og retur.**  
Bruk tilgjengelege guidebøker. Vurder alternative ruter.
- **Marker kritiske område på kartet**  
(der du kan vente å treffe på skredproblem). Ute i terrenget er det framfor dei kritiske områda de må vurdere om det er forsvarleg å fortsette.
- **Ver ei lita gruppe (< 4) på tur.**  
Då er det mykje lettare å kommunisere, ta gode val og å halde auge med kvarandre.

**KONTROLLSPØRSMÅL FØR TUR:**  
Passar denne turen for deg og di turgruppe – under dei varsla forholda – i dette terrenget?

På [varsom.no](http://varsom.no) får du tips til tryggare ferdsle og korleis skredfaren kan vurderast.

VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

**FILTER 2 – OMRÅDEVURDERING – VED TURSTART**

**Kva gjer du?**

- **Ser du noko som er annleis enn du trudde ved turplanlegginga?**  
Er sikten god slik at du klarer å vurdere terrenget rundt deg? Observerer du varsla skredproblem? Finst det andre skredproblem? Er det andre turgåarar i nærleiken, slik at dei kan komme over eller under dykk i terrenget? Hugs å stoppe og vurdere for kritiske område!

**KONTROLLSPØRSMÅL:** Let turen seg gjennomføre? Er alle einige? Viss ikkje, følg alternativ rute eller snu!

**FILTER 3 – ENKELTHENGVURDERING – KRITISKE VAL**

**Kva gjer du?**

- **Ser du noko som er annleis enn du trudde ved turplanlegginga?**  
Er skredproblemet til stades i dette hengen? Dersom ja, kva er sjansen for naturleg utløyst skred eller at di turgruppe kan utløse skred? Finst det terrengfeller (tre, stup eller søkk i terrenget som kan fyllast opp)? Finst det trygge stoppestader slik at berre ein om gangen kan eksponere seg?

**KONTROLLSPØRSMÅL:** Let det seg gjere å gå opp, køyre, krysse eller gå under hengen? Er alle einige? Viss ikkje, følg alternativ rute eller snu!

VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

**FAREGRADSKALA FOR SNØSKRED**

**SKALAEN FORTEL OM:** Sjansen for naturleg utløyste og menneskeutløyste skred

- Kor mykje av terrenget som er potensielt skredfarleg
- Kor store skreda er venta å bli.

**NB! Skredfarekalaen er eksponentiell.**  
Sjansen for snøskred aukar til det dobbelte for kvar grad skalaen aukar.

<b>4</b>	<b>STOR</b> – Utløysing er sannsynleg sjølv ved lita tilleggsbelastning. Fjernutløysing sannsynleg. Ved spesielle tilhøve er det venta mange middels store og nokre store naturleg utløyste skred.
<b>3</b>	<b>BETYDELEG*</b> – Utløysing muleg, sjølv ved lita tilleggsbelastning. Fjernutløysing muleg. Under spesielle tilhøve kan det forekomme nokre middels store og enkelte store naturleg utløyste skred.
<b>2</b>	<b>MODERAT*</b> – Utløysing muleg, spesielt ved stor tilleggsbelastning. Store naturleg utløyste skred er ikkje venta.
<b>1</b>	<b>LITEN</b> – Utløysing generelt berre muleg ved stor tilleggsbelastning i nokre få heng. Berre små naturleg utløyste skred er muleg.

**\*DEI FLESTE FATALE SKREDULUKKENE SKJER VED FAREGRAD 2 OG 3, OG DET ER OFTAST OFFERET SJØLV SOM UTLOYSER SKREDET.**

**Faregrad 5 førekjem sær seldan** – Ved faregrad 5 vert all ferdsle fråråda

Ferdsle i skredterreng krev at du kan identifisere mulege skredproblem og at du har evne til å handtere desse.      **Skredterreng:** Utløysingsområde > 30°  
Utløysingsområde ≈ 3 × høgda av hengen

VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

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Er sikten god slik at du klarer å vurdere terrenget rundt deg? Observerer du varsla skredproblem? Finst det andre skredproblem? Er det andre turgåarar i nærleiken, slik at dei kan komme over eller under dykk i terrenget? Hugs å stoppe og vurdere for kritiske område!

**KONTROLLSPØRSMÅL:** Let turen seg gjennomføre? Er alle einige? Viss ikkje, følg alternativ rute eller snu!

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VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

**FAREGRADSKALA FOR SNØSKRED**

**SKALAEN FORTEL OM:** Sjansen for naturleg utløyste og menneskeutløyste skred

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**NB! Skredfarekalaen er eksponentiell.**  
Sjansen for snøskred aukar til det dobbelte for kvar grad skalaen aukar.

<b>4</b>	<b>STOR</b> – Utløysing er sannsynleg sjølv ved lita tilleggsbelastning. Fjernutløysing sannsynleg. Ved spesielle tilhøve er det venta mange middels store og nokre store naturleg utløyste skred.
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<b>1</b>	<b>LITEN</b> – Utløysing generelt berre muleg ved stor tilleggsbelastning i nokre få heng. Berre små naturleg utløyste skred er muleg.

**\*DEI FLESTE FATALE SKREDULUKKENE SKJER VED FAREGRAD 2 OG 3, OG DET ER OFTAST OFFERET SJØLV SOM UTLOYSER SKREDET.**

**Faregrad 5 førekjem sær seldan** – Ved faregrad 5 vert all ferdsle fråråda

Ferdsle i skredterreng krev at du kan identifisere mulege skredproblem og at du har evne til å handtere desse.      **Skredterreng:** Utløysingsområde > 30°  
Utløysingsområde ≈ 3 × høgda av hengen

VARSM.NO > SNØSKRED > SKREDSKOLEN > SKREDKORT

**Reduser risiko – vurder turen gjennom tre filter**

**FAREGRADSKALA FOR SNØSKRED**

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- Kor mykje av terrenget som er potensielt skredfarleg
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**NB! Skredfarekalaen er eksponentiell.**  
Sjansen for snøskred aukar til det dobbelte for kvar grad skalaen aukar.

<b>4</b>	<b>STOR</b> – Utløysing er sannsynleg sjølv ved lita tilleggsbelastning. Fjernutløysing sannsynleg. Ved spesielle tilhøve er det venta mange middels store og nokre store naturleg utløyste skred.
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**\*DEI FLESTE FATALE SKREDULUKKENE SKJER VED FAREGRAD 2 OG 3, OG DET ER OFTAST OFFERET SJØLV SOM UTLOYSER SKREDET.**

**Faregrad 5 førekjem sær seldan** – Ved faregrad 5 vert all ferdsle fråråda

Ferdsle i skredterreng krev at du kan identifisere mulege skredproblem og at du har evne til å handtere desse.      **Skredterreng:** Utløysingsområde > 30°  
Utløysingsområde ≈ 3 × høgda av hengen

Figure 3: The latest version of the NVE avalanche card (Norwegian only) (NVE, 2014a).

## 2.1.4 Avalanche hazard and risk

Risk is something that plays a role for actions and reactions in various outdoor disciplines. There is no universally accepted risk definition as it is related to what there is at risk. There might be a financial risk in investing money in a company, health risk for smoking or a risk of losing your life if you drive a car. Ropeik & Gray (2002, p. 4) state that “*risk is the probability that exposure to a hazard will lead to a negative consequence*”. Risk is connected to hazard (synonymous with danger), as hazard is a source of potential harm. In an avalanche setting the hazard is understood as the probability of triggering an avalanche and the size of it (Statham, 2008). Another component in risk is that a specific object needs to be exposed for the hazard and how vulnerable this object is. This research is dealing with humans as the vulnerable object, so more specifically it will be dealing with the chance of one or many persons getting caught in an avalanche with the possible outcome of injury or death. Avalanches are not only a risk for humans, but also animals, various installations and vegetation, but these

are not highlighted in this project. Humans are generally vulnerable to any kind of avalanche size, as debris from even a small sized avalanche can kick you off your feet.






The exposure component is easiest to adjust in the avalanche risk equation (Statham, 2008). Avalanches need a certain steepness to trigger and by avoiding avalanche terrain one will avoid being caught in an avalanche. As long as one is exposing oneself to avalanche terrain winter time, one is at the risk of getting caught. It all boils down to minimizing the exposure time by making good route decisions both up and down, choosing the right moment for the specific trip, taking precautions in the way of skinning/skiing, choosing right terrain for the group and so on and so forth. There are numerous ways of fitting the exposure to the right avalanche hazard, and doing this correctly might lead to many successful trips without incident.

### **2.1.5 Avalanche danger scale and forecasting in Norway**

A five level avalanche danger scale (figure 4) introduced in the Alps in 1993/94 is, accounting for regional variation, the way most countries communicate the avalanche danger level. In Norway, the danger rating and descriptions have been used since it was introduced, although later translated into Norwegian and named the international avalanche danger scale (NGI, n.d.; NGI, 2007). The avalanche hazard increases exponentially from one level to the next. This means that both the snow stability decreases and that the amount of potential avalanche areas increases. The rating includes information about snow stability, probability for triggering and the size of it. Additionally, the website [www.varsom.no](http://www.varsom.no), where the avalanche forecast is presented, has added advice for traveling in avalanche terrain at a certain danger level (NVE, 2013a).

While extensive avalanche forecasting has been done in the Alps and North America for decades, there was no such national service in Norway before 2009. In 2009 NVE got this task and brought it public as The Norwegian Avalanche Centre the 14<sup>th</sup> January 2013 (NVE, 2013b). The forecast is presented by NVE in cooperation with Norwegian Meteorological Institute, the Norwegian Public Roads Administration and the Norwegian National Rail Administration at the website [varsom.no](http://varsom.no). It has constantly been developing since the release and is now including 24 regions (NVE, 2013c).

Avalanche bulletins were also broadcasted in Norway before 2013, but only on occasions with high danger level and during winter break and Easter. This forecast was given as an addition to the weather forecast on radio and TV. It was a regional and rather general notice, based on weather forecast from Norwegian Meteorological Institute and calculations from NGI, and forecasted avalanches at least the following days (Røeggen, 2010).

Danger level	Icon	Snowpack stability	Avalanche triggering probability
5 - Very high		The snowpack is poorly bonded and largely unstable in general.	Numerous large-sized and often very large-sized natural avalanches can be expected, even in moderately steep terrain.
4 - High		The snowpack is poorly bonded on most steep slopes.	Triggering is likely even from low additional loads** on many steep slopes. In some cases, numerous medium-sized and often large-sized natural avalanches can be expected.
3 - Considerable		The snowpack is moderately to poorly bonded on many steep slopes*.	Triggering is possible, even from low additional loads** particularly on the indicated steep slopes*. In some cases medium-sized, in isolated cases large-sized natural avalanches are possible.
2 - Moderate		The snowpack is only moderately well bonded on some steep slopes*, otherwise well bonded in general.	Triggering is possible primarily from high additional loads**, particularly on the indicated steep slopes*. Large-sized natural avalanches are unlikely.
1 - Low		The snowpack is well bonded and stable in general.	Triggering is generally possible only from high additional loads** in isolated areas of very steep, extreme terrain. Only sluffs and small-sized natural avalanches are possible.

**Figure 4:** The European avalanche danger scale (EAWS, n.d.).

The aim for the new forecasting service (also referred to as avalanche notice or bulletin) is to “prevent loss of life and property caused by avalanches” (NVE, 2013d). As the forecast itself cannot prevent accidents, NVE states that every user of potential avalanche terrain has to do their own consideration based on the actual situation. There have been various discussions about the need for such a forecast, and how it should be practically made. Forecasting is the art of predicting and foreseeing future events and can be held in three rough categories: natural systems’ forecasting (e.g. weather forecasting), human systems’ forecasting (e.g. stock forecasting) and a combination of those two (e.g. avalanche forecasting) (McClung & Schaerer, 2006). Avalanche forecasting separates from weather forecasting as the human factor plays a bigger role; research shows that most fatalities are caused by human triggered avalanches (Landrø, 2007). At the end of the day, it is the user who says “go” or “no go”, and this is not something that NVE or any other forecaster directly is able to affect just by providing a

danger rating. This research will investigate if the forecast is significant to the users' planning and decision making procedures.



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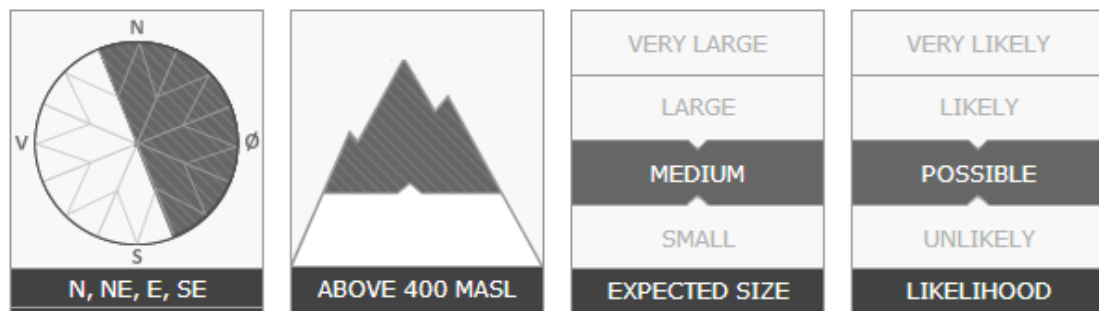
**Lofoten**

Avoid wind slabs at high elevations. Wet avalanches can release in steep terrain in lower areas.

**Avalanche problem**

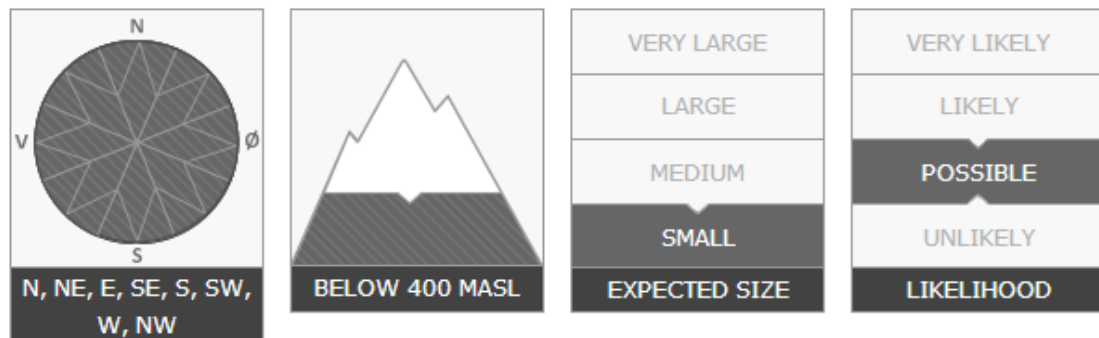
**Dry slab avalanche**

Buried weak layer of new snow  
Small additional load



**Loose wet avalanche**

Wet snow on the surface  
Naturally released



**Figure 5:** A part of a randomly chosen forecast found at [www.varsom.no](http://www.varsom.no). It is showing the danger rating and the most prominent avalanche problems found (NVE, 2014b).

### **2.1.6 Systematic snow cover diagnosis**

Terrain steepness has been seen as a central factor for triggering an avalanche (Munter, 2009). This has led to some simple rule based methods (e.g. the Basic reduction method and Afterski-method) having a cut and dry advice of go or no-go, depending on avalanche danger level and terrain steepness. These methods were made by looking at what steepness and danger levels historically triggered avalanches. This is despite the fact that the danger rating tells nothing about how likely avalanche triggering is at different slope angles, it only refers to how stable/unstable the slopes are likely to be, the probability of triggering (how much additional load there is needed to trigger) and how large they are likely to be. Systematic snow cover diagnosis brought up a massive debate in Norway when one of the method's creators visited the Nordic Conference about Avalanches and Friluftsliv in Sogndal 2013 (Sande, 2013). The method is based on the premise that an avalanche can be triggered at any steepness (above 30 degrees) almost regardless of danger level (Harvey, 2002); it is the avalanche problem that is important to understand in order to have a safe excursion. The idea is that when knowing what the avalanche problem is in the certain area the certain day, one can transfer this to other slopes in the same aspect, height above sea level and steepness (Kronthaler, 2013). Avalanche problems refer to the main danger in the current snowpack. Is it the newly windblown snow creating a slab with much tension and poor bindings to the snow underneath? Is there a weak layer created by surface hoar some months ago or is there a potential for wet slabs due to high solar radiation? This idea is also easily accessible in the forecast from varsom.no showing the most prominent avalanche problem (figure 5). One can also read about other kinds of avalanche problems on a section on NVE's varsom.no web page, *Skredskolen* [Eng: The avalanche school].

## **2.2 Experience**

Experience, skill or knowledge level is hard to measure. How many years does it take to become an expert, how heavily should formal education like avalanche courses be weighted and what constitutes an avalanche expert? Both to inform how subjects were selected for this study and as a framework to return to in the discussion part, I will now briefly bring forward some theories regarding those questions.

### 2.2.1 Becoming an expert

Rule based methods, pattern thinking and intuition is well known terminology in the discourse about decision-making processes in avalanche terrain, and this research might give insights to in which the same concepts are present in the planning phase. Hogarth (2008) argues that quality and quantity of feedback is critical in the development of intuition. The relevance of the feedback, and seriousness of the consequences, is creating different settings that in their extreme conditions cause either a *kind* (hospitable) or a *wicked* (inhospitable) environment. Steward-Patterson (2008) point out the importance the variety of experiences in these different environments have, especially when facing avalanche terrain. Bad decisions in avalanche terrain might masquerade as good ones (Steward-Patterson, 2008) for example when intuition tells you that it is safe to ski an unstable slope and it does not trigger. Steward-Patterson's (2008) study deals with intuition in decision making on trips, where each single decision a skier makes is leading to some kind of reaction.

This research deals with people of different experience level both in skiing and in knowledge about avalanches. Being an expert skier is not the same as being an expert in knowing how to plan for a trip. According to Vick (2002), expertise depends on two elements: the quality and quantity of the knowledge base and the speed with which this knowledge base can be accessed. Thomas and Thomas (1994) found that skill acquisition for an athlete differs from an activity where motor skills are not included. The knowledge part of knowing what and how to do something might be similar, but the part where it comes to the actual action is lacking. This way, it is understood that skiing or taking practical decisions on a trip might fit to the ladder of skill acquisition for an athlete. On the other hand, the planning phase, which is a cognitive phase, cannot directly be compared with the ladder. Based on empirical studies on sensory-motoric and cognitive skills, Dreyfus & Dreyfus (1980) made a five stage model of skill acquisition. They found that their model could be used as an overlay for both athletic disciplines like sports, and cognitive disciplines like chess. The five stages range from a beginners' adherence to rules of thumb to a masters' intuition. The stages are named: novice, competent, proficient, expert and master. Table 1 shows the mental function connected to each of the stages according to Dreyfus and Dreyfus (1980).

**Table 1:** Skill level and mental function (Dreyfus & Dreyfus, 1980, p. 15).

Skill level					
Mental-function	Novice	Competent	Proficient	Expert	Master
<b>Recollection</b>	Non-situational	Situational	Situational	Situational	Situational
<b>Recognition</b>	Decomposed	Decomposed	Holistic	Holistic	Holistic
<b>Decision</b>	Analytical	Analytical	Analytical	Analytical	Intuitive
<b>Awareness</b>	Monitoring	Monitoring	Monitoring	Monitoring	Absorbed

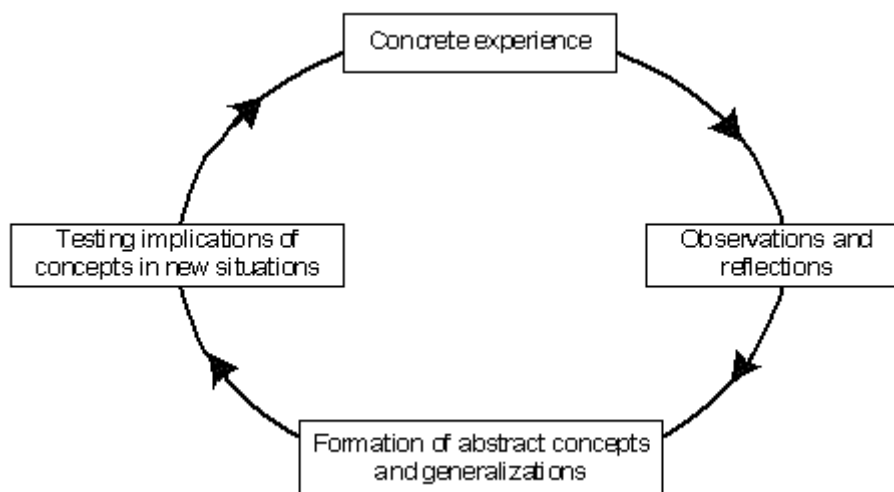
The process of becoming an expert has been extensively researched. For disciplines like musicians (Ericsson, Krampe, & Tesch-Romer, 1993), medicine (Patel, Kaufman, & Magder, 1996) and various athletes (Starkes, Deakin, Allard, Hodges, & Hayes, 1996), there is a notion that 10 000 hours of practice over a 10 year period is what it takes to become an expert. Experiences can be full or empty, where the full maximise the inherent learning potential in a situation. Weick (2001) underpins this by saying that replicating the same experiences repeatedly without elaborating those experiences is no guarantee for expertise.

### 2.2.2 Experiential learning

Making meaning out of direct experience was even a topic for the ancient Greek philosophers. Aristotle and Plato distinguished between five different forms of knowledge; theoretical, poetical, practical, user and passive-received, where the three types listed first are the most explicitly articulated by the philosophers (Eikeland, 2001). The practical knowledge distinguishes from the others, as it does not include any external object to observe nor manipulate. In practical knowledge, the aim is to perfect an act by enhancing skills and technique. This process go from the stage of a rule-following novice to an expert’s liberated mastery, similar to the Dreyfus & Dreyfus (1980) model of skill aquisition. Continuous development and change, movement, is an aim in itself in the praxis, as if something is regarded perfect, it might become a routine. Movement in terms of change and development is important for this type of knowledge, and opens for implementation of theoretical knowledge (Eikeland, 2001). Movement in experiential learning is brought forward by Neuman (2004) as a way of changing ones purposes along the way, so that the end goal is not coherent with the goal one first set off with.



Kolb (1984) brings forward the models of Dewey’s philosophical pragmatism, Levin’s social psychology and Piaget’s cognitive development, when developing his own model and understanding of experiential learning. Neuman (2004) also holds the Czech pedagogue Komensky and Outward Bound founder Kurt Hahn’s thoughts as being central for experiential learning. Learning is described by Kolb (1984, p. 38) as being “*the process whereby knowledge is created through transformation of experience*”. Further, Kolb (1984, p. 38) emphasizes four key aspects of experiential learning; “*the process of adaptation and learning as opposed to content or outcomes*”, the continuous creation and recreation of knowledge, the transformation of experience both in a subjective and objective way, and that one has to understand the nature of knowledge to understand learning. Alongside this, Kolb made a learning cycle (figure 6), influenced by Lewin, showing how four phases of the process in experiential education informs each other. Looking at figure 6, one can see how concrete experience is followed up by observations collected about the experience and reflections on these observations. Further, this first forms abstract knowledge leading to a possible change in behaviour before the cycle starts over again.



**Figure 6:** Kolb's learning Cycle (Kolb, 1984, p. 21).

The reason for bringing up experiential learning into this research, is that various providers of avalanche courses in Norway use a practical, experiential approach (DNT, 2013; Norgesguidene, n.d.; Bre og Fjell, n.d.) as well as that Klokkehaug (2013) found that a lot of the learning about avalanches is happens on trips with friends or associates in a socio-cultural community of practice. This can also be connected with

apprenticeship learning, a type of learning that happen through copying and getting feedback from a “master”, a person with more experience than the learner (Ronglan, 2008). One type of apprenticeship learning is centered around one specific master, while another type, de-centered, is more pointed towards the learner, as using a community of practice is more central (Ronglan, 2008). In both ways, the learner can seek out the zone of proximal development, the point where one can achieve knowledge or skills by oneself and where one need a “master” or peer to guide or help on the way, made famous by Lev Vygotsky (1997).

### **2.2.3 Bildung**

*Bildung* is a German term coined in the 16<sup>th</sup> century that one might translate into *forming* [Norwegian: *danning*] or *self-cultivation*. It was in the beginning both used in theology as a concept for cultivating talents after God’s “will” and in natural philosophy in terms of unfolding the potential in an organism (Gadamer, 2012). It was also identified with enlightenment itself before it was brought into the pedagogical sphere in which we are nowadays familiar with it, as a type of education or formation process. The German philosopher Georg Wilhelm Friedrich Hegel has a special influence on how *Bildung* is understood. Dialectics are according to Hegel the thriving forces for *Bildung* to happen as learning only happens through negation of a thesis, an antithesis. Growing out of, but also towards and into a community or fellowship is inherent in the *Bildung*process. This sort of maturation enforces both belonging and independency as one get knowledge about one own society’s practice that is strong enough to critique it (Good, 2007).

To be able to unfold ones potential through *Bildung*, then it would be wise to know how one can enhance this life philosophy. Peter Becker (2004) has the understanding that a good way of achieving *Bildung* is through adventures. Adventures offers the participant a way of escaping from the routines in life to venture into unfamiliar settings full of surprises. Becker (2013) refer to this as *crisis and routine* where the crisis or resistance is something that come up and calls for an action, and even a non-action is a form of action. This is the same when a skier enters a new place that he or she never has visited before. Although some things might be similar, there is always a uniqueness to the new situation and place. Therefore, this new setting offers a potential for making new decisions and possible risk taking. In this chain of thought, one can state that any kind

of skier regardless of experience level is having an adventure each time when skiing an unfamiliar place or a familiar place in other conditions, group size, etc. If the same type of terrain and snow condition is skied many times, the settings can become a routine for the skier, and this knowledge might form into patterns of unawareness if the skier is not aware of it.

#### **2.2.4 Reflection in action, reflection on action**

Validation and evaluation are important parts of becoming better in a practice. Schön (1983) stated that reflection in action, on action, and for action becomes possible when critical thinking and critical practice is combined. As some activities becomes routine, they are reflected on differently than actions that occurs more occasionally. How one is making coffee in the morning is not so much reflected upon after doing it every morning for many years, and such actions form patterns that are reproduced time after time. This is how a professional ski guide forms patterns for avalanche recognition. This is known by Schön (1983) as tacit knowing-in-action or know-how. Although we often think before acting, sometimes we act spontaneously without any intellectual operation prior to it (Schön, 1987). These intuitive actions are to be found among those who are on the higher steps of Dreyfus & Dreyfus' ladder of skill level. When something out of the ordinary happens, just like the crisis in the crisis and routing model, one has to attempt to adapt to the new situation. Attempting to adapt as a new situation occurs is known as reflection in action, while if one has to stop and think through the new situation and evaluate the outcomes one is reflecting on action.

### **2.3 Research question**

Based on the theory outlined above, the following research question will be addressed through an empirical study:

*How do experience and skill level affect trip planning and way of thinking among backcountry skiers and lift-accessed off-piste skiers in avalanche terrain?*

This question both includes the components of experience and skill and the differences when persons are doing lift-accessed off-piste [Nor: *heisbasert off-piste*] and when using skis with skins to walk up before skiing down [Nor: *topptur*]. The topic also leads

to sub-questions revealing details of what the differences are: what kind of information and tools each person emphasizes in their planning for a trip, and how they have been learning along the way.

Clarifying term: In Norwegian and German there are two meanings of the word experience. By using the word experience in this research, I mean the Norwegian word *erfaring* [Ger: *Erfahrung*] and not *opplevelse* [Ger: *Erlebnis*]. The term has several facets in Norwegian as well, but the understanding of *erfaring*, experience, used in this thesis is that *erfaring* is a sort of knowledge base formed by the experiences one has.

### **3. Conduct of research**

This chapter includes the conceptual framework for how this research was conducted. The theoretical and philosophical framework for the work will be put forward as well as the methods used to collect, analyse and interpret data. Ethical issues and methodological weaknesses are also part of this chapter, and finally the selection process for the participants in this study will be emphasized.

#### **3.1 *Hermeneutic and phenomenological approach***

This study is formed in the light of social science where one is seeking the understanding of human behaviour. More specifically the study has a hermeneutic and phenomenological stance where revealing the structure and essence in people's understanding and ways of thinking about their practical use of trip planning for trips in avalanche terrain is key. Understanding this hermeneutically includes an understanding of the phenomenon in a broader sense, and the analysis is not so much done through trying to understand the actors own understanding of the field as it is in phenomenology (Grønmo, 2011). The hermeneutical approach includes more mine, the researcher's, understanding of the respondents' insights, because a central thought in hermeneutics is that one do not meet the world without preconceptions. This means that any researcher will have a prejudice or a pre-understanding of the field one is working with, and that this prejudice informs what text one study, how it is studied and the questions asked (Gadamer, 2012). Gadamer (2012) states that objectivity is impossible because everyone are prejudicing on behalf of one owns historical consciousness.

Hermeneutic is relevant in social sciences as much of the data material in this field consists of meaningful phenomena such as actions, oral statements and texts. Interpretations and deeper understandings are key to this type of research process, and fundamental in hermeneutics is that something always stand in relation to something else and must be understood in that context (Grønmo, 2011). Hermeneutic analyses are pending between the pre-understandings and understandings, between partial understanding and understanding of the whole. This creates a *hermeneutical circle* where the researcher jumps between different bodies of interpretation and means of understanding (Grønmo, 2011). When interviewing people about how they act and reflect upon acting prior to trips in avalanche terrain, I will both be looking at the

informant's interpretation, but also do an interpretation based on my pre-understanding and an understanding of the whole on these reflected thoughts myself. This creates what Giddens (1984) refer to as double hermeneutics. There are although more facets in hermeneutics, and to simplify, there are two dominant sides to it; the philosophic and the practical (Grønmo, 2011). What is understanding? What is an interpretation? How can we really understand a phenomenon? These are questions brought forward in the philosophical part of hermeneutics. On the other hand, the practical part deals more with the methodological, - how to proceed when seeking understanding.

On the contrary, when looking at something phenomenologically, one is trying to reveal the informant's background and understanding to see why someone is doing something (Grønmo, 2011). It is more the individual lived experience that is brought forward, and the individual's consciousness is more important. Understanding more of the informant's background makes it possible to get a deeper understanding of the meaning different actions really have for the informants (Grønmo, 2011). Researching lived experience give insight in how the informants have dealt with their experiences and learned along the way. What is consistent and what has changed over time are two aspects one can bring forward through lived experience (Gurholt, 2005).

As I have done previous research work and have practical experience in the field myself, I will be researching my own culture in this work. My own experiences with skiing started when I was a small kid, just as it does for many children in Norway. Almost two decades of off-piste skiing has formed my views of looking at and acting in snow-covered terrain, which implies that I have tacit knowledge about elements of this research prior to it. This can both be a strength and a weakness, something one need to be aware of before starting. The weakness this can give when looking at it in a phenomenological way, is that my own, and not the respondent's, background and understanding might colour the interpretation and analysis. On the other hand, I have been in discussions and seen actions of others coming from other backgrounds than me after being in the practical and theoretical field for years. This way I was already aware of that there are different practices around in Norway. It would be interesting to investigate if the difference in practice is coherent within subcultures in different parts of Norway, but this is not an aim for this research. The awareness of different practices

both within Norway and in other countries facing similar avalanche problems is a good backdrop for looking at the phenomenon hermeneutically.

When researching own culture one might have a lot of what the English sociologist Anthony Giddens (1976) call mutual knowledge. In practical matters, this will help a lot because the researcher might be using the same terminology as the informants. On the other hand, things might be forgotten and taken for granted as the researcher have a tacit knowledge from own experiences. This is nicely described in a quote from the philosopher Alfred North Whitehead (1962, p. 825) when he stated that “*familiar things happen, and mankind does not bother about them. It requires a very unusual mind to undertake the analysis of the obvious.*”

## **3.2 Conduct of research by qualitative interviews**

### **3.2.1 Interview as the chosen method**

Interviews were conducted at the respondent’s home or a place we could talk freely and without much interruption. The data was gathered through semi-structured interviews and we talked until both agreed there was nothing more that could cover the specific topic. The interview guide (appendix 3) was formed as open questions, and the informants could not see the list prior to or during the interviews. The sub-questions were used as a tool for me to bring up talking points if it was needed. As one side to this research is trying to grasp the respondent’s life world phenomenologically, I wanted to be as open and uninformed by my pre understandings as possible. This is why I formed questions like “*tell me about your background when it comes to skiing in avalanche terrain*” and “*how do you plan for a trip in avalanche terrain?*” After the informant felt that he or she had covered one topic and did not have more to say, I often asked follow up questions within the same topic. Those were questions either from the interview guide (appendix 3), from what the informant just said or from my pre-understanding of the topic. Using my pre-understanding and understanding given by previous interviews is part of the hermeneutic circle, and was used trying to get more relevant data to illuminate the research question. According to Cresswell (2007) it is natural that the interview guide and questions asked are changing during the process in a qualitative research, and as long as the main themes reflecting the research question stay the same, it is regarded as methodically correct.

If the informant wanted to, he or she were told that they could use maps or other accessories used for trip planning on trips to show more exactly how the planning was done. Such practical instruments were not brought up at any point. The interviews were recorded with an audio recorder and afterwards the interviews were fully transcribed on a computer.

A pilot interview was performed prior to the six interviews both to give me some practice in interviewing and to see if they worked the intended way.

### **3.2.2 Procedure of selecting informants**

This study is looking at differences in behaviour for persons with different skill and experience level. I am also looking into differences between skiers that mainly either do backcountry trips or lift-accessed off-piste trips. To get respondents within the specified groups it was necessary to do an informed selection. The informants were strategically selected within my own expanded network, because this made it possible to pick respondents with the level of experience wanted for the two groups in this study. This is a type of quota selection that may be used when the number of participants from one certain category is set (Grønmo, 2011). In this research work, the number of participants from the two groups most experienced and least experienced were set to three each. Selecting informants based on their experience requires some knowledge about the informant prior to the interviews. The criteria to be selected in the group with most experience was that the informants either had worked professionally or recreating extensively throughout several of the recent years. I also selected informants with intermediate to top level avalanche schooling as this is helping to prove that these persons have an understanding of the field higher than the common user. For the other group, I selected persons in the other end of the scale, with fewer skiing in avalanche terrain experiences, some with avalanche introductory courses and one without any courses. I wanted informants in both groups to have recent experiences, as this might inflict their knowledge and use of the avalanche forecast. One informant in each group has mostly a background in lift-accessed skiing, although they all claimed that they did both types of trips. As the avalanche community in Norway is quite limited, the persons will not be described in detail. If this was done, it would be easy to trace both who the informants are and link it to quotations, especially for the group with most experience.



The persons agreed to be part of the research on terms that they should stay anonymous, and this way the terms are complied with the best way possible.

### **3.3 Analysis: Systematic text condensation**

Systematic Text Condensation (STC) is used for the practical analysis of the data material. This is a method developed by Giorgis and moderated by Malterud (2012). In my work I am inspired by Malterud who describes phenomenological analysis as an approach to grasp and develop knowledge about the respondent's life world and experience in a field. Although the researcher is coloured by own presumptions, this method admits this and allow the researcher to reflect on it. The goal is to retell the respondents' story in the best way possible without being overshadowed by the researcher's assumptions. STC is enabling a thematic analysis across cases and a condensation of the essence or the most significant characteristics in a phenomenon. This is done in the following four steps: 1 Getting an overview, 2 Identifying meaning bearing units and coding them, 3 Condensation – getting meaning out of the codes, 4 Synthesising – bringing the condensed meanings into descriptions and concepts.

#### **3.3.1 Getting an overview**

In this phase of the research, it wis important to get the total impression of the data and look for general themes in the material. This is done by reading the transcribed interviews several times looking for reoccurring themes, and specifically the ones interesting for illuminating the research question. Even though it might be tempting to start systemize the data, it is important not to do at the reading phase of this stage according to STC. When reading the transcripts I highlighted themes that occurred, and at this time I did not bother if I saw them as important for the research question or not. The themes I found reoccurring in all interviews were “experience”, “planning”, “conditions for decision making“, “evaluation”, “outcome/aim/risk”, and “future”. As the interview guide and the interviews are made by myself, another researcher looked over the material for themes. She is not into avalanche research and I wanted to see if she saw the same themes as I did. The themes mentioned above came out of a discussion between the two of us.

The themes were not equally interesting for this research, and according to Malterud (2012), the most interesting ones can be used as starting point for more critical

reflection. This might be done in several different ways depending on the aim for the research. Much of the data can be put under several of the containers, and then they were mark it with the colour for which theme it was the most representative.

### **3.3.2 Decontextualizing - Identifying meaning units**

The second step in STC includes identifying and sorting meaning bearing units that might be interesting for the research. According to Malterud's (2012) version of STC only parts of the text are seen as meaning units and not the whole text as it was in Giorgi's original procedure. Decontextualizing in STC refers to taking meaning bearing units out of the context they originally were found, and bound to themes and codegroups. After meaning units are identified and extracted it is time to start coding them. At this stage, the units are identified and potentially bound to the themes made in the first phase of STC. The themes made up there seemed to fit for this phase too, and the following subgroups were made during phase 2:

The theme "experience" contains both the respondent's experience and background, when they talked about the importance of experience and when they talked about learning. Practical planning, tools and thoughts of how to plan is within "planning". "Conditions for decision" contains gathered information while on a trip as well as equipment used. "Evaluation" goes more into how the decisions are made based on the information they have and within this lays the use of decision-making frameworks. The container "outcome/aim/risk" contain what they get from a trip, what their aim is and thoughts about risky situations. Lastly, the tag "future" is used for sections including future thoughts for how people can take better decisions and for tools and thoughts that in the future can be implemented in the Norwegian avalanche research and practice field.

Practically I used one colour for each theme and marked the text when reading it on my computer. I went through the text several times and coded with only one colour each time creating groups consisting of meaning bearing units. Then sections of text (the meaning bearing units) were copied into another file on the computer where they were organised under a subgroup. This created a well of text quotes bound to each section. The initial subgroups changed a few times as the meaning units brought up new and different topics that was not so easy to see initially. According to Malterud (2012) this

is normal, and actually a good sign as it shows that the researcher is open to the data material. Meaning units could in the beginning often be placed in two or more of the groups. This led to a refining and altering of some of the themes to create distinction. After the second part of STC the data material was transformed into decontextualized meaning bearing units sorted into groups.

Some of the themes were not so interesting for this research question, but still they were organised and meaning bearing units copied as they could be interesting for further research. The list of themes and subgroups are presented in appendix 6, where the subgroups of most importance are highlighted green those of some importance in white and those of little or none importance with a line through the text.

### **3.3.3 Condensation**

The analysis continues with retrieving knowledge and meaning that lays within each code group through a series of steps. First, the code groups from step two were split into subgroups. Each subgroup consisted of several meaning bearing units that in this step were condensed to an artificial quotation, an artefact that represent the data material in the code group. To do this, I reorganised and split the meaning bearing units from each group of codes into subgroups that seemed to representative. Then each subgroup were condensed into one or a few sentences representing the data. The artefacts are not a direct quotation from the respondents, but are the meaning put forward through several meaning bearing units from a number of respondents. It is important for the researcher to remember that the artefact actually should represent the data material from the interviews in a best way possible.

### **3.3.4 Synthesising**

The final step in the analysis is to sow together the condensates from each group and subgroup to retell the stories from the informants. Practically the condensates from step 3 were elaborated into stories including theme-specific ideas and concepts, stitching those together forming stories close to the original transcripts, but at this point interwoven across case when the analysis gave reason to say that the respondent's meanings are similar. Each code group should form a section including the synthesised version of the data material and a direct quotation taken from the transcripts is included to underpin and validate the synthesise. The newly formed stories are then validated

against the original context (recontextualizing) the theoretical frame. If the synthesised material deviate from or has an altered meaning from the transcripts, there has been an error in the analysing process.

The result after the process are credible, straight to the point and anonymous paragraphs that represent an individual or a cluster of respondents.

### **3.4 Ethics**

It might seem that it would be easier to go and plan ski trips with the informants rather than interviewing them about the planning. Participating in the group might interfere with the planning processes and appearance of a stranger can push the group to take other actions than their natural choices. This would not be a problem in some cases, but as this research is about skiing in hazardous terrain, it could cause dangerous situations and would have formed a major ethical issue. Another part of this, is that one do not know if people will be planning or not, and if a researcher asks someone if he can come along and plan a trip with them, one has possibly already made the skiers take a different action than the skier would have done in a normal setting.

In this research I have sought to follow the norms for ethical research given in Grønmo (2011). He brings forward being transparent to give the public insight to all facets in the research, being sceptical to the findings, being independent from motives and interests and doing the research based on academic, subject specific criterions as the main principles for ethical research.

A project plan was sent to and approved by The Norwegian Social Science Data Services (NSD) prior to the interviews. The letter of approval is attached as appendix 4.

The audiofiles were, according to common norms of NSSS and NSD, anonymised and the recorded data was kept separate from the list of informants. Both were encrypted with TrueCrypt and will be deleted when the project is ending in the end of July 2014.

### **3.5 Data quality, reliability and validity**

The data in this study is gathered, as for most other social science researches (Grønmo, 2011), with the purpose of illuminating the research question. As the research question

is framed the way it is, trying to grasp if there is a difference in the planning phase for a trip in avalanche terrain between groups of different experience, the data is gathered to describe this, and not to explain it. One might draw conclusions explaining *why* there is a difference too, but the main intent is investigating *how* the two parameters experience and planning stay in relation to each other within this topic.

Gathering relevant and valid data for a study is connected to validity. If the result of the research frame and data gathering is relevant data, the validity of the study is seen to be high (Grønmo, 2011). Polkinghorne (1989) presented five criterions to a valid study. First, the researcher should ask oneself if the results actually representing the informant's view. The transcription's accuracy is the second criteria, underpinning that the transcription must take in the meanings of the oral presentation in the interview. Third, one should look for other conclusions than the researcher came to in the first time analysing the data. It should be possible to trace back general conclusions to the original transcription. Lastly, one should investigate if the general, structural conclusions are bound by situation or if they could be generalised in a broader context.

All data was gathered and analysed in Norwegian, the spoken language among the respondents. This might inflict the final conclusions as I both have to analyse and translate the data. Using STC has helped me to appraise some of Polkinghorne's five criterions. Through the stages of STC I got really close to the material and the actual method emphasise of checking the validity in the analytical text through checking the statements against the original transcripts. That only one researcher has done the analysis is a weakness that within the time and economical frame of this research is hard to come around. I have tried to be transparent in my research by having actual quotations in the result chapter and having an example of how the actual analysis is done (Appendix 6). It is likely that my understanding and analysis of the interviews, transcriptions and final results are different from other researchers. Using own pre-understanding is an aspect of the hermeneutic circle, although I have by all means tried to bring forward the informants' views both through understanding it through their own background, relevant theory and my own understanding of the field.

## 4. Results

The research question, theoretical and methodological frame make the backdrop for the results. In each section of this chapter central quotes from each group is presented, looking at the informants' subjective experiences and life worlds. This is mainly a phenomenological approach where the life worlds and experiences need to be seen in light of where one is coming from, the informant's background and cultural and social backpack. It is mainly phenomenological as the informant can talk freely, but it is also in a way informed by me as a researcher as I used opening questions possibly forming the response from the informant. For each section for each group, I will also be using a hermeneutic approach with my interpretations presenting a common representation of what each of the two groups brought forward for each subgroup unfolding from the analysis. As the groups are not homogenous, especially the group with the least experience, it was difficult to get a multivocal synthesis for all subgroups. Where the informants from one group have given significantly different answers, this is shown by using direct quotations from each respective informant. According to Malterud (2012) analytic text based on the final synthesis coming from the analysis should communicate the results of STC. As transparency is one of the cornerstones of ethical research (Grønmo, 2011), I will also bring in the most essential quotes that covers the research topic from the transcripts as well as give an example of how the analysis is done (appendix 6). Experience is the first element both of the research question and in the interviews, and will be presented first in this chapter. Connected to experience is the respondent's backgrounds and the way they have come to the place they are at now, - how they have gathered the experience and been learning along the way. Next, I will present the way they plan and uses information prior to trips in the two different trip settings. Finally the informants' thoughts about how the best way of learning for beginners are put forward.

To make the following chapters easier to follow, I will introduce the abbreviation ME for the group of people with most experience and LE for the group with least experience. Each informant is given a fictive name and background info that is slightly altered to keep him or her anonymous.

### **Group with most experience (ME)**

Christopher (40) has been working in the mountains for decades. He started skiing in a local hill at home, and then wanted new challenges and started doing more backcountry trips. Christopher has the most formal experience among all respondents, and is often teaching novices and intermediates how to approach avalanche terrain both close to the lift and in the backcountry.

Preben (30) grew up skiing in a local ski lift. After some years in ski racing, he got more eager to try out off-piste skiing close to the lift with friends. He was mostly skiing close to lifts, but the last few years he has also done many backcountry trips. Preben is recognized as a top skier in Norway.

Harald (25) has had the shortest time to build experience among the persons in ME, but has despite this been able to make a name in the Norwegian avalanche scene, both as an instructor, researcher and in his current job. He is mostly doing backcountry trips.

### **Group with least experience (LE)**

Joakim (35) did not ski much when he was young. He has had most of his skiing experiences during the last ten years, and it was a year at a *folkehøyskole* that really kicked it off. There he had his first avalanche course too, and later he has had some more formal education. His last course was taken in 2010. Joakim likes skiing both lift accessed off-piste and in the backcountry.

Mette (25) ski every now and then when she has got time for it. Her first experience came from skiing and snowboarding in the local ski lifts, but later she has been skiing different places in Norway, both in the lift and in the backcountry. She took an 3-day introductory course in 2013.

Per Kristian (25) has both been skiing and snowboarding. When he was younger it was only in ski lifts, but now also in the backcountry. He has no formal education about avalanches, but much experience with being in the mountains, even as a group leader. Lately he has been skiing and snowboarding more in avalanche terrain both by using lifts and skins to get to the top.

## 4.1 Experience level

The avalanche skill and experience level seemed to vary vastly among the informants. In ME there are people who fits into the expert category as they have worked in the professional field or been skiing for recreational means for more than a decade, but also one, Harald, that has climbed the ladder of experience over just some years. The reason the last mentioned was selected is that the body of knowledge is changing and new tools and thoughts are brought into the field. It is also of interest how this person has been able to get his position and experience despite the short timeframe. Three men are included in this group.

As they start out presenting their own background, the first thing that strike is that they have skied a lot up through their upbringing. Preben and Christopher have competed in alpine skiing, but both stopped because they found it in a way boring compared to the challenges off-piste skiing gave them. The person with the least formal background in this group, Preben, sums up his story prior to his real indulgence into the off-piste skiing and avalanche field like this:

*I was never doing any cross country skiing insofar, but I was sort of skiing then, ehh, and it was alpine skiing throughout elementary school. And it was, yes, I skied in the forest pistes then, much, and a bit like that, yes, skiing in the woods. I was not doing any backcountry skiing or something really like off-piste, it was more like skiing in the woods. So I had practiced a lot of skiing skills both like alpine race training and skiing technique, but also by having very much fun and games with buddies and such stimuli as motor stimuli while skiing, with skiing various terrain in a way. Ehh, and no relation to the steepness or other terrain formations, in a way at that time, other than that I remember in my upbringing it was a magazine called Skisport that really was a racing magazine, and they had an article about travelling to Vail in Colorado and something about powder skiing and mogul skiing. Powder skiing that became mogul skiing, but I can recall that it was some theme about avalanches. It was mentioned in a way. That one had to be careful, so I remember I was in a way ... Became a bit scared of it as I realised that this thing could be dangerous, but I really had no clue about it.*

When asking Preben for his background and experience, he was the most eager to tell me about it among the informants. His story is quite similar to the two others in ME with a lot of informal play while skiing in early age. Harald's story about approaching avalanche terrain is different from the two others in this group. His story really started as he started studying:



*My personal background is both through the university college and through a program at a folkehøyskole and much own experiences. Ehh. In a way mostly as a skier and taking decisions in relation with being a skier in the mountain. That's what I've worked the most with.*

Although some of the informants in ME fit into the characteristics of an expert/master, they are reluctant to use that term about themselves. They all claim that they have more to learn and that they do not see themselves as experts. A synthesise from STC give a brief overview over the backgrounds of the informants and thoughts about how people might become better at dealing with avalanche terrain.

They have been skiing a lot since they were young, first in the pistes and later off-piste. They say that there are no real shortcuts to become really good at handling avalanche terrain, but there are things you can do to earn knowledge and skills better. One might climb the ladder faster if one is going together with more experienced people and ask them good questions. The best way to earn experience, they say, is to be in the mountain and deal with different types of terrain, snow- and weather conditions and different people.

There are three respondents with less experience. This group is both including someone that have taken various avalanche courses, and one that has not. The age vary from 25-35 years, both sexes are included and one of them was primarily a snowboarder. Joakim has skied in avalanche terrain for several years and has taken courses, but has not been able to ski much over the last years. He tells me that it feels like he has lost knowledge because of few trips recently. The formal avalanche background Joakim has is from some years ago, before the avalanche forecasting service in Norway was introduced. About his formal background he says:

*I started doing backcountry trips while taking a year on a folkehøyskole. There we had an avalanche course at the start of the school year, but it was nothing like, I don't feel that I learnt anything in particular. I felt it was mostly a focus on rescuing, more than how to interpret different signals.*

Mette skied and snowboarded a lot when she was younger, mostly in a local ski hill, both on and off-piste, but started approaching more avalanche terrain as she started studying: *"I started doing backcountry trips when I started studying. Then I started*

*doing backcountry hikes with my brother, his girlfriend and some friends. Then I took a course as I wanted to learn more about this.”*

Per Kristian and Joakim say that the age is making them more confident when skiing. They both use the term maturation when talking about their learning process to where they are at now. A quote from Per Kristian underpins this: *“When time goes by, my knowledge increases too. And also in a way...The X and Y axis has got different elements. It has in a way time and knowledge, experience and maturation too.”*

Per Kristian says that he follow other people that seem to have more knowledge than he does, but also limit himself when he sees that the terrain is too hard to ski for his skill level. Joakim says that he wish he did not just follow people, but also asked questions when he had less experience. Joakim shows this by saying:

*Ehh, I wish that I had done more trips with more experienced people and asked those lots of questions, and not just gone along not asking anything. I just went along getting a green light saying that I could ski there without any answer about why.*

Synthesising the meanings from the persons in LE give more insight about how these persons look at experience and how they have been learning. Those who have taken an avalanche course feel that it has given a new way of approaching avalanche terrain. Practicing both theoretically and in praxis is seen as the best way of getting better at the process of approaching avalanche terrain. They have all been skiing up and through, but not to a wide extent, and in hindsight Joakim feels that he should have asked more critical questions to those he held as leaders in the group when skiing. Skiing close to lift areas generally feels safer than being in the backcountry, and through the interviews they got more aware of that they might have some flaws in their praxis prior to both kinds of trips.

Two persons in LE and one in ME bring forward thoughts about experience and risk, forming quite different views on how the level of risk, not mentioning if it is subjective or objective risk, relates to experience and knowledge. This is seen in the following quotes, starting with the one from Christopher who thinks that the level of risk stays more or less the same:

*The level of risk, I think, as a natural part of getting older does not necessarily drop, but when knowledge and skill gets better, one is going to limit somewhat to. That one is in total at the same risk level. If one is aware of it in the beginning.*

Mette talks about her own experiences when asked if there is any situation in particular that has changed her praxis, and says that she is taking less risk now than before:

*“Maybe not single events, but maybe that the more trips I have done, I have almost, or the more I am out on trips, the more insecure I get. And take less risk.”* Per Kristian thinks that people with more experience tend to take more risk as he says: *“I have the impression that the more experience you have, you get better at seeing if something is dangerous or not. But at the same time, ehh, many take more risks then.”*

## **4.2 Planning**

Bringing up questions about planning leads to very different responses from the informants. Per Kristian replied with telling which items he is bringing on his trips. Map, compass, avalanche safety equipment and perhaps a GPS. When asked what more he do, the answer is nothing. Some trips he follow someone with more experience, and then those set the goal for the trip. Per Kristian reflect upon some specific trips done recently:

*Actually, I was just going along for those trips there. It was experienced people who had skied a lot before and then we had already been with them a few trips, so I knew they were competent skiers. But true, you can be damn good at skiing without having to know a heck about what it's like to walk in the mountains. But I got the impression that they were talking about snow and avalanches and danger and where they were going, so I got a good impression of them. So I really just follow them then.*

And further, when asked if a map was used prior to the trip:

*Hmmm, but I find it hard to look at the map where an avalanche can go, I'm not so good at interpreting contour lines and some gullies and stuff and see that “this place it will trigger.” I've always kind of travelled in the mountains in fairly safe environment, although it has mainly been in the summer, when there are fewer things that can go wrong.*

The persons with most experience in LE, Joakim and Mette, have different answers than Per Kristian. Joakim tells me that decision making aids sometimes are used during the trip, but he does not seem to have any specific model or pattern to gather data before the

trip. The name on the method he uses during the trip is forgotten, but it is later revealed that the he is talking about ALPTRUTH. Joakim says this when asking him about how he is planning for a trip in avalanche terrain:

*I usually look online to see how the weather has been. So that I can get some insight in how it has been at the place I want to ski. And if I still don't know how it is, I usually ask people there has been there the same day or the day before about how it has been. And recently, I have usually been on trips I have done before, so I don't look that much on maps and look, yes, steepness and stuff. I know how it is already. Unfortunately, I have not been on many new trips this year, so I have had no need to look at maps and stuff.*

When I ask if he uses a specific method, list or pattern to gather the information, he responds: “Hehe, it's more like, yes... No, I don't use any particular method. No...What is the name for it? Arc... No, What is the name?”

I try helping him by mentioning 3x3 filter, but the response is negative. I then mention ALPTRUTH. Joakim says “Yes, ALPTRUTH.” I say that I am still thinking about methods in the planning phase and it bring up a different response from Joakim: “No, I don't do that. I have not done that this winter.” The last sentence might imply that he has used such methods earlier years, but he do not mention anything more than what is revealed here.

Mette takes in more factors when she is talking about how she is planning for trips in avalanche terrain:

*Then I first plan doing the trip with someone I trust, then one know that one will enjoy, have the same goal and have the type of knowledge that is necessary to reduce risk. It is the first thing I do when I plan for a trip. Then we agree on a place. And plan, look a bit on a map together and then we will find out how it has been, check weather data and maybe ask someone that has been there earlier that season or someone who knows the area. Because then you have more overview relative to the weather forecast too. And then one plan a little how one want to do things. That one is not too many, use the correct equipment and check weather data. Now I know it has become popular to use the avalanche forecast too and that can give lots of good information, but I have not used it any particular.*

Mette is the only person in LE that bring in the avalanche forecast by herself, and I ask her why she has not used it any particular. She responds: “Because I haven't been on

many new trips this season.” Mette also says that she uses methods to check if things she has done prior to the trips still are present:

*When going on a trip one should check if the things one has done in advance is correct. One should really maybe dig a bit and check if it really is like that. It is much one can do to prevent accidents. And then I use... The one I like so much...?*

I try to help her bringing up the Column Test, Avaluator and ALPTRUTH. She says: “Yes, that one, you should have these test both in the group and also have it in the back of your head for yourself.”

Mette and Joakim in LE says that they are not doing the same prior to a lift-accessed off-piste trip as they do for a backcountry trip. When asked if Mette plan similarly prior to a lift-accessed off-piste trip as a backcountry trip she reply:

*No, but one should definitely have done that, but of course, one is evaluating and look how things are going. One follow the development the whole winter and have some knowledge at the bottom, but it is rare that one dig a and check the snow profile and so on.*

On the same question, Joakim state:

*I would most likely not have prepared in the same way. Because I had, I believe I had not asked people the day before, or, I had certainly not asked people how it was. Or which conditions there were. But if it snows the day before. I had not seen on a map either. And I had probably not either... I had maybe seen how the weather had been, possibly. But maybe most to see if it was worth it. Going to the lift and ski. But most often I had maybe known of people that had been there before that know if it had been good skiing or not. If it was good. Yes. Even though, when I think about it, I am out in terrain there is just as dangerous for avalanche triggering as the terrain I stay in when out in the mountain.*

Per Kristian first say that he do not know if he has been in avalanche terrain close to lifts: “Maybe without knowing it, but... I have always been with people that are much better than me.” Later in the interview on a similar question, whether he has skied avalanche terrain either when he was younger or more recently, he says: “It is hard to answer, I do not know really.” I follow up by asking about a specific slope where avalanches has been triggered in the past and I have first-hand information that Per

Kristian has snowboarded, he replies: *“I have actually not thought of that before just now.”*

While none in LE brought up the word avalanche problem, the term was reoccurring in all interviews with the informants in ME. The term was brought up by all respondents in ME themselves. An aspect of this can be seen in the quote from Harald:

*Getting an overview of the frame for the trip, regarding skiing skills and what persons, that is the first. And I use, use very often avalanche problem in the way of thinking when planning for a trip. One thing is trying to keep it safe, but I use it a lot to find good snow. Because that is strongly connected to the type of terrain you choose.*

The respondents in ME emphasized avalanche problem being a part of the avalanche forecast as well. Looking at digital or paper maps for what terrain they were going to ski, looking at different sources for weather and snow history, looking up what people that were going on the trip, seeing where and what type of preventive actions they could take were also brought up by all the informants in this group when talking about backcountry trips. A quote from Christopher shows how he plan for trips in the backcountry as a professional ski guide with a group:

*Yes, that is, most often I follow, I travel a lot, most often is it start following the weather. Before the avalanche forecasting service came it was mostly based on own evaluations. Now I have a good starting point in the avalanche forecasting service, ehh, plus I have many colleagues around and then it is seeking information about yes, mainly persistent weak layers and avalanche problem in the area. And further I follow the weather development the days prior to the trip. The last decision is maybe taken the same morning as the trip. Because of huge local variations. And besides finding safe terrain or safe skiing, we also act in the balance point between the outreaching, - we ski steeper things in avalanche hazardous terrain that the conditions allow. But maybe the biggest focus is finding good snow. And then, then one must be quick to turn around and think of protected terrain and leeward formations and this way we stay in what very often is the worst sector. Because we seek out the leeward sides. But, the unbound snow that has not made a slab yet. So, a lot of going looking at the weather, map, guidebooks, local knowledge and so on. And on places I am not that familiar, I like having some trips ahead in the area. Become familiar with the snow cover and the terrain. And then it may be that I have an opinion based on weather and avalanche problem that I have followed and I will run some tests and check if my assumptions are correct. That's the way I seek out information.*

I then ask him how he approach a trip if he is doing it for leisure:

*I am damaged by my profession, so I don't have better fantasy than doing the same when I have time off. Here at home it is very local, so often I know the snowpack really well and follow it throughout the winter, but if I have been away for a long time, I need some days staying as close to it as I possible. When I have been away for the most of a winter, I lose the overview fast and the local snowpack history I have in my head and that I am able to carry with me, that I lose if something has happened with the weather and I have been away for a week. Then I need a conservative approach for some days to get familiar with it again.*

Preben says that two things that he picked up early in his career in avalanche terrain was being aware of what terrain they were going to ski and to follow a set of skiing guidelines [Nor: *kjøremønster*]. He reflects about what he was doing early in his career:

*Ehh, but we didn't have anything, we didn't have the right equipment, and we didn't have any, yes, any ... Ehh, good evaluation pattern so to speak, or, we didn't have, we didn't have any good trip plan apart from having skiing guidelines and knowledge about the terrain.*

I continued asking him whether he used any rule-based methods when he was younger: “No, I have been learning about that over the last years really. No, it was really far out then, but I have learnt it well now, through studying it.”

Different sources were mentioned for gathering this type of information prior to a backcountry trip, and varsom.no (the avalanche forecast), regobs.no (the database with all observations for the forecast), various weather-forecast, xgeo.no (weather and weather station info), maps, different kinds of guidebooks and asking persons with local knowledge were all mentioned at least by two of the informants in the group of three. Harald talks about what kind of information he is seeking out:

*What I do more specifically is to go in and check what the general avalanche problem is right now, where in the terrain I expect to find it. Based on the weather that has been. And then I form some thoughts about what type of terrain I want to seek out based on the situation in the mountain right now. So it is very rare that I say okay: I have that mountain, that mountain and that mountain and now I shall ski one of those. Because then you get very fixed, it gets very static, but if I think that I should seek out this type of terrain formation in that type of terrain because of the wind that has been and such things, then I can first picture what type of terrain that has the type of snow I want to seek out. And then look at the map and find that terrain. This way it is much easier to find good snow than doing it the other way around.*

I ask him where he “... go in and check the general avalanche problem ...”, and he responds:

*Yes, we are so lucky that we finally have got a good avalanche forecast in Norway. That has a big focus on avalanche problem. And has very good info about the avalanche problem. On top of this, I like RegOBS very much, the observation database for Varsom. Because there you can read directly the observations from the observers. That give more specific information. And I also use a tool called xgeo very much. There they have lots of data collected in one place. I use it especially for finding weather stations and look at weather data.*

The same sources of information were not always mentioned when asking for how the informants in ME planned for a lift-accessed off-piste. Although emphasizing factors differently, they all say that the risk when skiing is similar in the two settings, but all three of them bring up the obvious difference that one do not hike to the top as the key difference. Preben and Harald mentions the avalanche forecast specifically prior to such trips as well, and Harald still emphasize the importance of avalanche problem:

*A thing that is good about working with avalanche problems is that I won't necessarily plan that I'm going there and there, but it affords to think “where is the good snow?” That is something I am interested in as a natural part of being a freeskiier; – the lust for good snow. And then it is the exact same way of thinking. What avalanche problem is present in this area? Where has the wind been in the different terrain that is here? So, I see it actually as quite similar.*

Preben's answer when I ask him if he approaches backcountry trips the same way as lift-accessed off piste trips underpins this: “Not when skiing down, but you have this hike up that is a big part of the trip. That require a lot of assessment. On lift-accessed you are ... There you get fast to the top. And then you have sort of cut of that part of the hike then.” Further, I ask him what type of information he seek out prior to such trips:

*Yes, I look at. Now I would try to seek out some avalanche forecast. Locally. It doesn't exist everywhere. But it is a way of starting prior to getting to the lift. And when you are at the ski resort, look for natural alarm signs. Especially naturally triggered avalanches. And you can think about temperature rise. And also ski tracks is an indication. On stability. There isn't in a way that approved in the avalanche sphere. But it is in a way in a lift where you have a piste. You have lots of off-piste terrain. Some there is avalanche hazardous, some there isn't. So you think that it will stick. To some extent of course. But it will be in a way a slope there is ripped apart with ski tracks and only have the new layer upon. Then you will have a break in the transition between those layers. If it cracks. But that is a sort of awareness I have gotten over time.*



Also the piste map was seen as a good source of information by Preben.

Christopher underpins the preventive effect frequent skiing can give that Preben is talking about by saying that: *“The free skiing close to lifts are often skied many times, and this has a preventive value for avalanches, but this is not a certainty.”* When I bring in this effect for Harald, he agrees that there is an effect, but also say that: *“At the same time there are so many people that you cannot keep track of. Ehh, so it is easy to just go along if there is a bunch of friends and you are going to ski some run.”*

The informants talked about how they gathered weather and snow condition data to some extent before going, but instead of gathering all info prior to the trip, they described a way of getting info from some more conservative route choices often close to the lift before accessing more exposed terrain. Christopher shows this by saying:

*So, in example to ski some, to get familiar is important, but also to ski some test runs in different aspects and heights before I start choosing. So, a more conservative approach where I seek the most information possible in the fastest way possible.*

*“Finding good snow”* was a reoccurring phrase when I asked the informants in both groups what they were looking for when skiing in avalanche terrain. Taking little risk was also brought forward by all persons, while the word *“conservative”* only was used by persons in ME talking about routefinding. Mastering was also a word brought up by Christopher. A comment that stood out when asking for the aim for the trip came from Per Kristian when he first talk about that everything is being documented as he once saw a person bringing a quadcopter (drone-helicopter with four propellers) into the mountain to film a friend:

*One went on trips before that too. How good the trip is, is not depending on the number of “likes”. But I have been bitten by that bug too. I found myself being disappointed because I did not get so many “likes” on a photo from a trip.*

### **4.3 Learning**

Across the two groups, there is a common understanding that seeking knowledge and experience both practically and theoretically is the best way to become better. Some emphasize the practical side more, but the overall view that both aspects are needed seems to be the similar in both group. Per Kristian has the least experience among the

informants, and I ask him if and how he wants to learn more about approaching avalanche terrain. His answer is:

*It is that one need to start slowly and build on with some theory as a starter, and then one need to test in practice and then one need some theory again. You cannot just fill up with lots of theory, climb the ladder theoretically and then start to ski. It is like time then ... One need, yes, I don't know, it is hard. It is taking a course then. But there is probably not so much theory on those, but i don't know. A little bit then. The key is to get out and ski then.*

The respondents in ME all bring forward the importance of filtering out the most important information. Systemising and concretising the thoughts were seen as the best way of taking faster and better decisions. Christopher tells me that in the planning phase, he do this by filtering out the most important factors, but say that this needs a lot of experience, because a novice will not be able to figure it as they might have harder to figure out what variables that are the most important for the current situation. Using the avalanche problem in the forecast is considered a good place to start when sorting this information. When asked how beginners can adopt this method there is more variation in the answers. I ask Harald if he uses any sort of planning tools such as 3x3 filter or the planning card from NVE in his planning phase. He replies: *“They are in a way forming a base for how I work, but I am not writing anything nor go through them, but they are in a way the way of thinking there is always there.”* He continue by saying that *“For example, if it is an area I am familiar with, I do not need to use the map that much.”* When he talks about how he approached avalanche terrain when he had less experience, he says:

*I was probably more systematic in a way, going through each thing. I used the thoughts regarding the avalanche triangle a lot. To remember all the this you have to consider each time. So systemizing that way has been very beneficial. And I have learnt a lot.*

Systemising data by using some sort of rule based method is mentioned by Preben and Harald when talking about how a beginner can become better faster. Christopher says that the current focus in the avalanche forecasting service might make it harder to use the simplest rule based methods, but do not say anything more about such methods. Harald is more specific as he says that he like using some specific methods when teaching beginners:

*Ehhm, I am very found of the way they are working in Canada. Because there is the approach nearly bound to the info there is in the forecast and the actual avalanche problems. And then you achieve many things simultaneously. One thing is that the user get an understanding for the decision one must take, because it says something about the actual conditions on the place you are. So one is helping the user to do a single slope evaluation, something which is quite difficult and the other thing is that one teach the user how to use the information there is available in the forecast in a good way. So those are two aspects that I think are really good.*

Understanding the avalanche problem and what they lead to, is seen as a key factor to become better by the informants in ME.

Both Preben, Mette and Joakim underpin how formal education like a course made them think differently. Joakim says that:

*After I took a, or during I took that course I was really into it and it revised the way I act in the mountain, I mean both according to planning and execution and so on. But then all this knowledge disappeared in a way.*

The last sentence in this quotation is explained more explicitly later in the interview, where Joakim talks about less trips due to an injury. Both Mette and Joakim says that looking at it in hindsight they should have asked more critical questions to more experienced people when they were on previous trips to learn more.

Asking the informants about essential elements needed to become better at planning for and handling with avalanche terrain, experience is a word that all informants bring up. Christopher says that:

*I think it's really hard to teach beginners how to travel safely in avalanche terrain. It is a process that takes long time. And many take one of these weekend stuntcourses where they expect a recipe for how to ski steep in any condition. It is impossible to give. It affords a high grade of both knowledge and experience. I think there are several levels, I don't like those two day courses that much, but I have also experienced through many years that it's easy to want to teach too much. So I think it is about ... say three short key concepts that are important to understand. To recognize avalanche terrain; deposition zones, convexes and trigger areas for avalanches. And to recognize weak layers in the snowpack; both signs of weak layers but also to understand the snow and the weather. What type of weather create dangerous conditions. If you can recognize avalanche terrain and avalanche conditions you can stay away the worst days and from the worst terrain. Then much is done. But there is no simple recipe. But I also think that with our forecasting service, with focusing like Norway has chosen to do, on avalanche problem and less on the danger level, more on avalanche problem*

*and possible probability of triggering avalanches, I think this is the correct path to choose. Because many will experience a small avalanche, by the international classification, as a big avalanche as a skier, while a big avalanche really is something else.*

Another word that is brought up in both groups is skiing skills, although the informants in ME are explicit about this.

In Preben's interview a question about shortcuts to get experienced lead to an answer about how he sees experience:

*You can probably take some shortcuts with rule, learn some rule-thinking and precautions. Can take shortcuts, but to get more... I do not know everything either, but I have come much further than where I was at. So one must. Yes, you need time then. Hours in the mountain. To become an expert you need 10 000 hours, right, then you are an expert in a sports context. So one think 10 000 hours in avalanche terrain then you are close to being an expert maybe. But that is a lot. I did some calculations. If one take 100 days of skiing, five hours of skiing. One skiing day is five hours. Times 100 days a season give 500 hours on skis. And then in ten years you have 5000 hours. 20 years then. Then you are ... 20 years of skiing with 100 skiing days of five hours skiing in avalanche terrain, then you are an expert. So, haha ... And then you will have experienced so much that one could, could see patterns. You won't have only good experiences. You have in a way used all your luck then.*

I ask him if someone do like this, but just walk on the same mountain each time.

*Yes, but then you also will have different experiences. It's about doing it for a long time. So that is experience, totally. But it is good to have some knobs or ... Not just try, one need to systemize the experience in a way. Yes, this is about patterns thinking. To see patterns in what you experience.*

Seeing patterns was also brought forward both by Christopher and Harald, but they were not bringing up an exact amount of hours needed to become an expert.

## 5. Discussion

This study is a qualitative study about how six persons plan for skiing or snowboarding in avalanche terrain. This chapter will unfold a discussion based on their experiences and thoughts presented in the result chapter and relevant theory, starting with the main findings according to the research question. All sections in this chapter will be pointed towards the research question; how do experience and skill level affect trip planning for backcountry skiers and lift-accessed off-piste skiers in avalanche terrain?

### 5.1 Planning

The main research question regards experience and planning for two different types of trips. The findings in this study shows that there is a difference in how the informants plan. The three persons in ME say that they have a dynamic approach to the planning phase, both when they are planning for a lift-accessed off-piste trip and a backcountry trip. They all bring forward that they use various variables that they value individually for each trip, depending on the conditions for the trip. The two informants in LE that have some formal avalanche education, Mette and Joakim say that they to some extent use ALPTRUTH during trips, and mention the factors in the avalanche triangle, weather/snow, terrain and human. By ALPTRUTH they mean a part of the Avaluator 1.0 known as obvious clues, where each of the letter in ALPTRUTH is short for one clue. When they ski in avalanche terrain close to lifts, they say that they are aware of that it might be dangerous, but they do not plan the same way as for a backcountry trip, although they say that they should do so. The last person, Per Kristian, say that he brings avalanche safety gear, a map and sometimes a GPS and then lean on the planning done by others in the group. The persons in ME emphasize variable use of parameters, the two persons in LE with most experience use a decision making aid and the person with the least experience only look at planning as bringing the correct equipment and following the group. This indicates that these persons fit into the table of Dreyfus & Dreyfus' (1980) skill level and mental function and that they assimilate the findings in Atkins & McCammon (2004). Avalanche experts and novices think about and perceive avalanches differently, an expert can rely on feeling, intuition and perception based on their experiences, while people with less experience are either not aware of elements in the hazard might be in need of utilizing tools to systemize their thinking (Atkins & McCammon, 2004).

The informants in this study allocate in different levels of experience. Is it really necessary that one have to be an avalanche expert to be skiing in avalanche terrain? The two informants in LE that have some formal education in the field said that they were using a decision making aid, specified as ALPTRUTH to help in planning and taking decisions. Research works by McCammon & Haegeli (2004) suggests using ALPTRUTH as a simple and good decision making framework based on obvious clues. The same was found in Hallandvik et al. (2012) for Norwegian conditions. Although ALPTRUTH/obvious clues are not included the same way in the new version of the Avaluator, I will use it as an example as two informants in this study mentioned it. Two of the informants having most experience, Harald and Preben suggests that less experienced could use some kind of rule-based method to systemize their thinking, but they also say that they are not using such methods much themselves anymore. Harald emphasize "*the way they are working in Canada*", which most likely means that he is thinking of Avaluator 2.0 and ATEs. Atkins & McCammon (2004) found that novices got their knowledge through training whereas experts got their knowledge through own experiences. Both groups recognised and prioritized variables similarly, although they were not thinking the same way. Klein (1998) states that novices do not have the same field-specific knowledge as experts, and therefore they cannot think the way an expert do. Instead of thinking like experts, they should learn like experts. Similarly, Atkins & McCammon (2004) suggests the same as Harald and Preben, that a guiding agent, as a decision aid might be seen as, both can help novices in the actual situation and be a good agent for learning. Mette and Joakim state that they sometimes uses ALPTRUTH. Many of the factors in ALPTRUTH one might be able to access from home during the planning stage, and some of the others on the trip to the parking or on the parking prior to starting the trip (the regional and local filters of 3x3 filter). Going through all variables in ALPTRUTH, one can look at what type of information one can put into the checklist at what point. A – *Avalanches* is possible to get information about both through people that have skied the same area the two days before a trip or just by looking around from the parking lot. L – *Loading* is possible to get information about both through the avalanche forecast at varsom.no, its database RegOBS, on Xgeo or through looking at weather history. It is quite easy to get data about P – *Path* and T – *Terrain trap* using conventional maps, digital maps or avalanche maps such as on [www.skredkart.ngi.no](http://www.skredkart.ngi.no). R – *Rating of considerable or higher* can be looked up in the avalanche forecast at varsom.no. U – *Unstable snow* is a bit harder to access data about, but some information about this might be given in the forecast, for example if the

avalanche problem is a weak layer in the snowpack. Th – *Thaw instability* is also often easy to see in weather data, but it depends on the aspect (which orientation the slope is facing) has. By using ALPTRUTH or similar decision-making aids, one might actually skip the dangers of overconfidence or letting out elements that even to an expert seem not to be present the certain day, or that the expert has not experienced. Comparing avalanche deaths in Canada in 2006-2007 and 2007-2008 Steward-Patterson (2008) found that more deaths than normal was caused to people on commercial trips (43% among the deaths) the first mentioned season. That was a winter with many storms and no persistent weak layers in the snowpack but many storms, while the season of 2007-2008 was a season with many persistent weak layers. The last mentioned is seen as very difficult conditions, and despite this, no deaths were caused to people on commercial trips that year. Steward-Patterson (2008) found confidence in intuition among the professionals as a probable reason for this. If the conditions in 2007-2008 could be classified as wicked, hence Hogarth (2008), it is possible that the avalanche professionals knew this and had to be more thorough in their planning, forming new intuitive patterns. This shows how confidence or over-confidence in intuition might cause dangerous situations for experts, although what Steward-Patterson do not mention is that the low rate of deaths in 2007-2008 might also be connected to a probable increase in awareness among avalanche professionals due to the previous season.

On the other hand, using rule-based methods such as ALPTRUTH is criticised for being an over-simplification of nature. In the Norwegian debate, Nils Faarlund is time after time speaking up against the rule thinking and speaks of the dangers of using rules to make decisions in a complex nature. Both Albert Einstein and the snow scientist André Roch have influenced Faarlund in his view stating that thorough knowledge comes through experience filled with involvement from the actor (Faarlund, 2006). This way, he claims, a proficient user of the mountain can base the intuition or pattern thinking on both own and others' experiences. If one should get to this point of proficiency, one need to have many experiences in avalanche terrain or at least on snow to understand the mechanisms of an avalanche and the nature of snow.

Not knowing if you have been in avalanche terrain close to a lift, like Per Kristian, implies either that the person a) not been there or b) not known that he has been there. Another side to this is that the respondents in LE have a lot fewer trips per year, so the

amount of times that one is in potentially dangerous terrain might vary a lot from persons in ME. One parameter for the selection in this research, was that the respondent had to have experienced avalanche terrain. As these persons are from my own extended network, I was able to gather some information about this prior to the interviews. This way I knew with a fair bit of certainty that these persons had been dealing with avalanche terrain both close to lifts and in the backcountry, potentially without knowing it themselves.

When asking the informants to tell me about how they plan for a trip in avalanche terrain, all of them except Preben responded with how they were planning for a backcountry trip. This might have to do with linguistics, their background or for other reasons. Preben had been skiing mostly lift-accessed off-piste until a few years ago, and when he starts talking, he says that he will start out with talking about planning such situation. Preben tells me that he has been skiing a lot in the Alps and says that he is using a similar approach when he is there as when he is in Norway. He says that he started using some rule-based decision-making aids after studying, and that this formed a more systematic approach for him, but he also says that he is not using them anymore. From his background, it seems like he is the person in ME who had the most experience before using rule-based methods, and it is therefore interesting that he says that novices could be introduced to rules to take shortcuts to know more.

All informants in ME stated that they saw the risk while skiing as similar for trips in lift-accessed off-piste areas as for backcountry trips. When I dug more into this by asking more detailed questions it was evident that they maybe were thinking similar about the risk, but not doing the same. Although using the same factors, they were skiing test runs when skiing lift-accessed off-piste to check out the conditions. This affords a reflection in and on action instead of the reflection for action, which is more used when pre-planning a trip. The aspect that skiing a hill there is skied by many each snowfall discussed by all informants in ME is a well-known element i.e. described in (Kürzeder & Feist, 2003), and actually is a reduction factor in  $R_m$  (look at figure 2 and see Reduction Factor No. 7). Another aspect is that one has less exposure time when skiing close to a lift, as one is not walking the way up. The informants in ME mention this, and they are cautious of this as they say that they are putting up the most conservative route choice when hiking up. The two persons in LE that said that they had



a form of trip plan prior to the trip, Joakim and Mette, both said that they were not planning the same way for both trips, and said that they really should do it similarly. Taking into consideration that Joakim and Mette do not have the same amount of experience as the persons in ME, it seems to be a wise choice to have a similar approach to the different trip settings, as they do not have the same skill level as the persons in ME. Intuitive reflection in action will therefore be harder and probably less precise as according to Vick (2002) it is the speed one can access and the quality and quantity of the knowledge base that expertise depends on. Using a more systematic approach prior to a trip to skiing lift-accessed off-piste skiing in avalanche terrain seems therefore to be the wiser choice for novices and intermediates.

### **5.1.1 Forecasting service**

Five out of six informants knew about the forecasting service at varsom.no given by NVE. Three persons, all in ME, were using the forecasting regularly, especially focusing on the avalanche problem given in the forecast. NVE (2013d) give an introduction in how to use and understand the forecast. They write that the forecast is made for big regions, and one have to do own local assessments due to big variations inside each region. They also state that it gives insight in the general avalanche hazard in the region. Lastly, they emphasise that it consists of several elements including avalanche danger rating and avalanche problem. Further on the same page they give a brief introduction in how to use the forecast. There is a lot of data to process if one want to use the forecast effectively, although I suspect that novice users tend to only look at the danger rating. This is a suspicion both gotten from the material in this study, where the two persons in LE who knew about the forecast only focused on the avalanche danger level, but also a suspicion I have through being in the field. The forecasting service is rather new, and if the courses implement more about how to use the forecast in the future, it will probably help the users with less experience in how to understand it.

As Harald in ME mentioned, it is also probable that the less experienced users focus more on the actual rating number as that is the first thing you see when you enter varsom.no. As he is using the information about the avalanche problem the most, he would like to see a different layout on the webpage. Given the fact that there are several methods to keep safe in avalanche terrain, it is impossible to find one solution that will fit the best for all, but a change in layout might help finding a solution to fit the best for

most. Currently Thor Espen Fugelsøy is doing a study that is expected to end in 2015 on the actual use of the forecast. NVE (2014c) is also currently asking users for feedback on their service.

The forecast is not solely for recreational skiers, snowboarders and hikers, but also for important infrastructure such as roads, railroads and buildings. It is also a tool for companies with workers situated in avalanche terrain, such as engineers working with hydropower stations. On *The Avalanche school* at varsom.no there are published differentiated advices for travel for these six categories: friluftsliv, steep friluftsliv, snowmobilers, rescue service, standby personnel (such as municipalities, power companies etc.) and for people traveling on road and railroad (NVE, 2013e). The Norwegian Public Roads Administration and The Norwegian National Rail Administration are in charge of the last mentioned category. For steep friluftsliv varsom.no show the whole danger scale from 1 to 5 pitched to the user group as the actual activity is used in the description of each grade on the scale. Reading more about the danger rating, NVE (2013a) has decided to use a way of presenting the avalanche danger scale the same way I was thought to use it by Bjørn Michaelsen at the avalanche workshop in Sogndal 2012. Instead of presenting the scale starting at 5 and ending at 1, they have presented it from 4 to 1 and put the 5 at the bottom after stating that a level 5 occur rarely and is especially for use by persons in other categories, such as rescue and infrastructure. They do not write why they have done this, but I suspect it is for the same reasons discussed at the avalanche workshop in Sogndal 2012. Since a level 5 rating occur so rarely and no one should be out recreating in such conditions, it might be useful to simply let it out of the actual scale when using the scale for skiing. As most people are killed on a level 3 and many at level 2 (Hallandvik, et al., 2012), presenting the scale to top at 4, the level 3 probably will seem more intimidating. Visually the level 3 is in the middle on a scale from 1 to 5, while it is the second highest on a scale that goes to number 4. If one introduc this thought, the importance of avalanche problems and focus on how to use the regional forecast for people taking an introductory course, one could possibly see a more extensive and better use of the forecast in the future, even by less experienced people. The forecast could then serve the society in a good way and both be a valuable tool for people working in hazardous terrain and recreationists and ski guides.

## 5.2 Experience

Without a human in the picture, there is no avalanche hazard. This is true if talking about avalanche hazard seen from a skier's point of view. Another element that adds to this is that, when a human is part of the equation, it is not only at risk, it is actually the main cause of making a situation riskier, as most avalanche fatalities are caused by avalanches triggered by the skier or someone in its group. The human factor is therefore often seen as the primary factor for avalanche fatalities, and is even mentioned to be “the joker” factor by Brattlien (2008). All respondents mentioned the words experience and knowledge when asked about how they can get better at trip planning and making both the route up and down safer. It seems to be common sense among these informants that these two properties are beneficial for a long and safe life in the mountains. On the other hand, the most experienced of all among the informants brought up that this also can trick you. He named it *the expert trap*, which is described by Tremper (2008) as heuristic traps that including several different mental shortcuts that even someone with a lot of experience can take. Even a person with much experience might over estimate one's own knowledge and skiing skills and under estimate the objective risk. Tremper (2008) writes about the risk homeostasis and the “raise of the stupid line”. The stupid line is described as the threshold between acceptable and unacceptable risk, and often people are trying to make a buffer, redundancies, by taking mitigating measures like getting educated or using rule based methods like the Afterski method (Brattlien, 2008). What might happen next is that the same person take riskier actions and re-raise the stupid line, because they feel safe when taking precautions like using avalanche safety gear (Tremper, 2008). Awareness of this, even before setting out on a trip, is one of the things that might lead to fewer avalanche fatalities in the future. The quote where Christopher says that the risk level does not necessarily drop when one gets older and get more experience, might be an indication that he means one is raising the stupid line. Alongside this, one can look at the different perception of risk taking Christopher, Mette and Per Kristian brought forward. According to a graph in Tremper (Tremper, 2008, p. 292) the confidence level go up and down depending on situations like courses, accidents and when you feel that you have done well. The difference in perception of risk among the three respondents might be underpinning this.

Taking own decisions when travelling in avalanche terrain might be a good choice if one want to improve avalanche skills. It might be different if one has paid a professional

guide to do the route-finding, but otherwise one should have a clue about what one is doing. Asking questions to those leading the group was brought forward as a key for learning by several of the informants in this study, both in LE and ME. This is a way of apprenticeship learning that also was emphasised by informants in Klokkehaug (2013). Following a person that has taken a leading role in a group might be the first step to trouble, as this person might have gotten the role on false premises. From the interviews, it seems like all three in LE has fallen into this mental trap called expert halo (Tremper, 2008), being aware of it or not. This is clear when going back to a part of a quote from Per Kristian in the results:

*But true, you can be damn good at skiing without having to know a heck about what it's like to walk in the mountains. But I got the impression that they were talking about snow and avalanches and danger and where they were going, so I got a good impression of them. So I really just follow them then.*

An interesting thing with this is that it shows that the person seem to be aware of that those who have gotten the leading role in the group might just be good skiers and might know nothing about skiing in avalanche terrain. It is not evident from the interview if this was found in hindsight or if it was an actual thought before or during the trip. Having this said, it was often that the respondents said that the interview setting made them rethink the way they were thinking about avalanches and trip planning.

As mentioned earlier, all informants in ME have had many skiing experiences during their upbringing, and two of them exposed themselves for avalanche terrain more extensively in an earlier age than those in LE. Looking to bildung and the crisis and routine model, it is probable that the persons in ME have had more crises forcing an action or decision than those in LE, as they have had a wider range of variation in their experiences. Preben talks about how many hours one need to become an expert, and that one might become an expert just by skiing one single mountain many times. He state that “... then you also will have different experiences. It's about doing it for a long time.” Analysing this might give different interpretations, and one of them is that the different experiences one has had is due to the different frame of weather, snow, group, time of year, skiing a different slope and so on. That the context is not the same even though the mountain is. Further, he talks about the importance of systemizing those data and says that this is about pattern thinking. Situational recollection and holistic

recognition are two of the parameters for the higher end of the Dreyfus and Dreyfus' (1980) table of skill and mental function, and this research might be underpinning the importance of practical experience to get to those higher levels of skill. Patterns thinking is found to be used by many skiing experts and seen by many to be the superior way of thinking when traveling in avalanche terrain.

Researching solely the planning phase has sometimes been difficult, especially when interviewing some persons in LE that did not do any particular planning. The planning and decision-making processes are interconnected as one is using earlier experiences to inform and adjust the way one is taking action in both phases. I often asked questions specifically about planning, but ended up getting answers about planning and decision-making or anecdotes from recent trips. Interestingly all respondents were eager to talk about this, it was clear that, regardless of experience level, skiing in avalanche terrain was something that moved them and that they had reflected upon, although all the informants had a negative answer when asking them if they did an evaluation of each trip regardless of outcome. When it had been some kind of situation out of the ordinary, like an accident, close call or unforeseen event, all respondents in ME said that they then had had a sort of evaluation or talk through. This type of evaluation of a surprising situation might be a very fruitful setting for *bildung* to happen. The environment one is skiing might seem familiar, but suddenly something out of the ordinary comes up, and there is a crisis. The crisis needs to be addressed by some sort of action, and the action taken leads to new crises. Harald pointed out the importance of such evaluation for future trip planning, but also said that evaluation is not widely used by beginners and would be hard to introduce. The two phases *reflective observation* and *assimilation into concepts* are parts of Kolb's learning cycle. Active reflection on action and evaluation that changes the way of doing the planning prior to trips might be helpful to avoid avalanches, although this process might already be happening among skiers without being emphasized by the persons in this study. A possible way of implementing more active evaluation, either for finding reasons why the snow was good/bad the particular day or understanding what happened in a certain situation, is to introduce this way of thinking into courses. As all persons in ME had finding good snow and safety as an aim, one can more actively evaluate earlier experiences to create patterns even before starting to think about planning for future trips. On the other hand, learning cycles such as Kolb's has received critiques for being part of what Ringer (1999) and Loynes (2007)

refers to as the algorithmic paradigm in outdoor programs. Programs sequenced to a conceptual framework and/or with predetermined outcomes are potentially problematic as they might bring forward aspects of the algorithmic paradigm. Loynes (2007) point out several aspects of the algorithmic paradigm as unsuited to experiential education, such as elements of mass production, hierarchy, science and technology. Although a course setting or a workshop for learning about avalanches not is the same as all other outdoor programs, they are one type of program. One special side to it that makes it different from many other outdoor learning settings is that safety and risk management plays such a big role for each action one take. Hole (2013) found evidence that even with learning about transceivers in a search and rescue setting there was not a significant difference between a group of learners descriptively being taught and a group doing it experientially. If the outcome would be the same if one tested different approaches in the planning phase for avalanche courses is not known, as teaching how to pinpoint simulated avalanche victims using a specific tool is very different from planning and taking action based on a large amount of variables. Hole's (2013) research might although indicate that using an implicit way of teaching might be just as good as being explicit, as the learner has the central spot in the teaching and can try to understand and grasp how things are put together at the level and speed of oneself. The beginner's chance to discover and learn more about avalanche safety in praxis was also an important factor when the Canadian Avaluator was made in the first place, and also the reason that this method (in a slightly altered Norwegian version) was seen as the one with potentially best learning effect in Norway by Hallandvik et al. (2012).

One key difference between the persons in LE is that one of the person has not taken any avalanche course, while the two others have. Mette and Joakim, the two that have some formal educational background give similar answers about planning and decision making on trips. They both bring in weather- and snow-history and human as key factors, and talk about using maps for checking the terrain on new trips they are going to do. Per Kristian, who has no formal educational background about avalanches do not bring up these factors when talking about the planning phase. He talks about equipment in the planning phase and briefly about snow and skiing skills when taking decisions on a trip. If this insight has come to Mette and Joakim just through introductory/intermediate level courses, the organisations, schools and companies holding courses in Norway can be proud. Another question is if these factors are

evaluated in a good way by Mette and Joakim, especially when keeping in mind that both of them had forgotten the name of the method they said they liked to use, but at least they are aware of what factors that play a role when planning for trips in avalanche terrain. How the actual decision is taken has not been researched in this thesis.

### **5.3 Culture**

Being in avalanche terrain might be dangerous regardless of experience level. Although research shows that there are more fatalities among persons with less experience, there are also incidents including people who should know what they were dealing with (Atkins & McCammon, 2004). This brings up the question why people should travel in avalanche terrain. The main motivations for this, found in this research, is finding good snow, fun skiing and mastering. The persons in ME instructing most people, Christopher and Harald, said that they found it difficult to teach beginners how to plan and act in avalanche terrain. Harald later said that a good method for novice skiers is first taking a skiing course, and then avoiding avalanche terrain until the person have some more knowledge about snow conditions and decision making.

The long tradition and cultural heritage for skiing has traditionally given little reason for travelling in avalanche terrain for leisure in Norway. Trip by ability has a strong stance in the everyday friluftsliv, but despite this, I have until now heard little about the concept in the context of dealing with avalanche terrain. It is although emphasised in the book *Skikompis [Skibuddy]* by Nes (2013) and maybe this is introducing the concept more to this group of recreationists. While the term trip by ability might not be so widespread, the concept might still have a key position in the field. As all respondents mentioned experience and knowledge as key for travelling in avalanche terrain, it might be a way of implicitly indicating that they can access more complex terrain with more experience and knowledge. This is certain in the case for Harald as he says that one need some skiing skills, abilities, to access avalanche terrain. Per Kristian says that he is limiting himself due to skiing abilities, and not so much because of avalanche hazard. It seems like trip by ability plays a role for the informants, although it could be more concrete and maybe more reflected upon as being similar to the way of planning for other types of trips.

An aspect mentioned by Preben forming his approach to avalanche terrain is that he read ski magazines when he was younger. This shows the appearance of influence from a broader meta-culture (media and society) that might play a role for Preben's behaviour. In a study done on seven different focus groups with all together 34 participants, McCammon, Haegeli & Gunn (2008) found that media role modelling was mentioned by more than two thirds of the respondents as a behavioural moderator. If one look at modern freeski movies there seem to be a segment with avalanches in almost any movie one pick. Often the avalanche is "overcome" by the skier and wrapped up in footage and music showing "stoked" skiers who fought nature and their fear. When seeing skiers in such terrain one have to remember that they are often professional skiers, they often have helicopters to support a rescue, they have mountain guides with local knowledge to do some of the snow assessment for them and give them the best conditions possible in the area (Naalsund, 2011). This is not always brought forward in these movie segments, and it might look like they randomly picking a slope. They have done many mitigating measures, but still sometimes get into avalanche situations, showing how hard it is to deal with avalanches, even for professionals. Risk-glorification in media is found to have a strong relation to increases in "*real-life risk-taking, risk-positive cognitions and attitudes, and risk-promoting emotions*" (Fischer, Greitemeyer, Kastenmüller, Vogrincic, & Sauer, 2011, p. 385), and there is no reason to think that this is dissimilar for ski magazines and movies. Per Kristian brings up a similar element of social pressure when he is talking about that everything is getting documented and that he was disappointed when he got few "likes". The "likes" refer to social media, and it seems that he is not happy with the fact that he got this feeling when he got few "likes". Social media can this way be a type of popularity contest, creating pressure to people and making them do things they would not have done without the pressure.



## 6. Conclusion and future research

The findings in this research is that experience affects the way of planning both for skiing trips in the backcountry and for lift-accessed off-piste skiing in a similar way to the way experience affects decisions made in avalanche terrain. The three persons in this study with the most experience in handling avalanche terrain had a more dynamic approach in their planning phase than the persons with less experience. The person with the least experience among the informants did only talk about what type of equipment he brought when he was asked about his planning phase, and said that he was skiing with others that had more experience and let those do the planning. He was not aware of that he had been in avalanche terrain when doing lift-accessed off-piste. Two persons in the group of informants with the least experience had some formal avalanche education, and both these mentioned factors that are essential in the planning phase according to planning tools like 3x3 filter and the planning card from NVE. They mentioned many of the same variables that the persons with the most experience, although they did not mention the term avalanche problem. The person with the least experience was the only one not to bring up the Norwegian avalanche forecast found at [varsom.no](http://varsom.no). The emphasis on the forecast varied from being brought up as a primary source of information especially focusing on the avalanche problem by the three with the most experience to being seen as a source for getting the avalanche danger level by the two others who mentioned it.

Through this research I was not able to find any particular difference in the planning between skiers that had their background mainly in one of the types of skiing. This might be due to that all informants said that they were doing both activities. Another result might have been found if the informants were more polarized in their choice of activity. Having this said, all the informants had one approach for each activity. Interestingly enough, the approach was similar among persons of similar experience. The persons with the most experience emphasised the avalanche forecasting service in planning for both activities, but emphasised evaluation on scene and less at home when dealing with avalanche terrain close to lifts. This was said to be done by doing test runs close to the lift prior to accessing more exposed terrain. The two persons with some formal education among the group with less experience did not do much planning in front of doing lift-accessed off-piste. One of them was most interested in good skiing

conditions, the other did follow the weather history to some extent and both of them said that they actually should plan the same way as for a backcountry trip. The last person was not aware of if he had been in avalanche terrain close to lifts, and his planning for such activity was therefore not emphasised.

As this research indicate a difference in how people with more experience and less experience perceive the avalanche hazard as they emphasize the factors of the hazard differently, one can say that they do not have the same requirements for skiing in avalanche terrain. An interesting aspect is therefore that two of the persons with most experience in this research say that less experienced would benefit from using a rule-based method. Two persons in this research with less experience say that they are using such methods when doing backcountry trips, and state that they should do the same when skiing lift-accessed off-piste. Thinking and acting like an expert is hard for a person with different requirements, and therefore one could benefit from learning by experiences made in terrain one has the ability to handle. By using checklists or rule-based methods one can over and over again make sure that one has taken all variables into consideration until one has the knowledge to understand more of the mechanisms and patterns oneself, and then have a more dynamical approach like the most experienced in this research are using.

This research indicates that persons with some formal avalanche knowledge are aware of key elements to the planning phase according to factors in 3x3 filter, but have a lack of knowledge about avalanche problems and practical use of the forecast. The forecast is still a new service, and maybe it is not so much known among persons with some experience in avalanche terrain. If this is culturally bound, it is probable that it will change over time with a change in focus in media, avalanche courses and peer groups. The focus is, as this research shows, changed among the more experienced people, but it will take longer time for persons not so much into the field to come after. Future research could therefore look more specifically into the use of the forecast and emphasis on avalanche problems among less experienced skiers to see if this has changed when the forecast has had some years to mature and when the focus on avalanche problem has been more elaborated in Norwegian avalanche courses.

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## 10. Abbreviations

ALPTRUTH	Avalanches, Loading, Path, Terrain, Rating of considerable or higher, Unstable snow, Thaw instability.
ATES	Avalanche Terrain Exposure Scale.
DNT	The Norwegian Trekking Association.
ERm	Elementary reduction method.
IFMGA	International Federation of Mountain Guides Associations.
LE	Group of persons having Least Experience.
ME	Group of persons having Most Experience.
NGI	Norwegian Geotechnical Institute.
NORTIND	Norske tindevegledere [Norwegian Mountain guides].
NSD	The Norwegian Social Science Data Services.
NSSS	Norwegian School of Sport Sciences.
NVE	Norwegian Water Resources and Energy Directorate.
Rm/PRm	Reduction method/Professional reduction method. The two abbreviations are used interchangeably.
STC	Systematic Text Condensation.
TEOS	Transcultural European Outdoor Studies.

## **11. Appendices**

Appendix 1: Forespørsel om deltakelse i forskningsprosjektet [Request for participation in the research project]

Appendix 2: Samtykke til deltakelse i studien [Consent to join study]

Appendix 3: Interview guide

Appendix 4: Response from NSD

Appendix 5: Project evaluation from NSD

Appendix 6: Example of analysis

**Forespørsel om deltakelse i forskningsprosjektet [Request for participation in the research project]**

***«Turplanlegging og avgjørelser på tur i snøskredterreng hos personer med ulikt erfaringsgrunnlag»***

**Bakgrunn og formål**

I dette masterstudiet ønskes det å undersøke hvordan turer i skredterreng planlegges og gjennomføres hos grupper med ulikt erfaringsgrunnlag.

Ved å undersøke hvordan personer med mye erfaring og personer med lite erfaring planlegger og tar avgjørelser på tur, kan man muligens finne forskjeller som videre kan utledes til hva som er hensiktsmessig å fokusere på i kurssammenheng eller på private turer. Slik kan din informasjon forhåpentligvis bidra til at turfolk kan ferdes enda tryggere på tur i skredterreng.

Studiet skrives gjennom Norges Idrettshøgskole som en del av masterstudiet Transcultural European Outdoor studies og vil bli skrevet på engelsk, men intervjuene vil foregå på norsk.

Grunnen til at du er forespurt om å være med på denne studien er at din erfaringsbakgrunn tilsier at du faller innenfor de kriteriene som er satt for det ønskede utvalget i oppgaven. Jeg fikk kjennskap til dette gjennom mitt eget utvidede nettverk.

**Hva innebærer deltakelse i studien?**

Datainnsamlingen vil foregå som et åpent intervju/samtale med lengde på omtrent en time. Samtalen vil omhandle din erfaringsbakgrunn med ferdsel i skredterreng og hvordan du planlegger og gjennomfører turer. Data vil registreres som lydopptak og notater underveis i intervjuet.

Alle personopplysninger vil bli behandlet konfidensielt. Det er kun jeg, Magnus Berger Skjøstad, som vil ha tilgang på opptakene. Lydfilene vil oppbevares på bærbar data med brukernavn og passordbeskyttelse, samt krypteres ved bruk av TrueCrypt.

Prosjektet skal etter planen avsluttes 31.07.2014. Datamaterialet vil anonymiseres og informasjonen du gir vil av andre ikke kunne kobles til deg ved bruk i masteroppgaven. Lydfilene vil slettes etter analysering, senest ved prosjektets slutt.

### **Frivillig deltakelse**

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du ønsker å delta eller har spørsmål til studien, ta gjerne kontakt med meg eller min veileder Kirsti Pedersen Gurholt.

Håper på din deltagelse!  
Med vennlig hilsen

Magnus Berger Skjøstad

Kirsti Pedersen Gurholt

Masterstudent

Professor Dr.Scient og veileder.

Seksjon for kroppsøving og pedagogikk

Seksjon for kroppsøving og pedagogikk

Norges Idrettshøgskole

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E-post: [kirsti.gurholt@nih.no](mailto:kirsti.gurholt@nih.no)

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

**Samtykke til deltakelse i studien [Consent to join study]**

Jeg har mottatt informasjon om studien, og er villig til å delta

-----  
(Signert av prosjektdeltaker, dato)



### Interview guide

As the original interview guide was in Norwegian, some of the content might be lost in translation:

The thought behind these questions is to form as open questions as possible and that way give the informant more freedom in their response. Sub-questions are made to create talking points that can be put forward to create answers that are more detailed.

#### Personal info

- Background
- Sex
- Age
- Profession

For how long have you travelled in avalanche terrain?

- How often?

Do you have courses/certificates/education in this field, or are you self-taught?

How do you prepare for a trip in avalanche terrain during wintertime?

- Weather and avalanche forecast? Human factor, snow, terrain
- Maps, digital maps? Evaluation of terrain?
- Guidebooks for backcountry trips
- Equipment? Both in terms of choice of skis etc., but also in terms of safety gear (transceiver, shovel, probe, inflatable backpack, pole-straps, snow study kit and more)
- Snow history
- Is there similarities in between all your trip planning? (example: use of tools such as 3x3 filter, use of varsom.no etc.)

Do you plan the same way when you ski out of bounds close to a ski lift as you do for a backcountry trip?

- Why/why not?
- Does it feel safer?
- IS it safer? ← Higher level of risk acceptance?

Is there any particular situations or events that have led to a change in your praxis?

- Courses
- Taken by avalanche

What role do you think experience play for the planning phase?

- Do you act differently now than earlier?
  - o Why
- Is there any shortcuts to gain knowledge in this field faster?

Do you know the avalanche forecasting service varsom.no?

- How do you use the service? – Trip planning, during (adjust danger rating up or down or quality check, look at type of avalanche problem, details as m.a.s.l., report
- What role does it play for the decisions you take on a trip?
- To what extent do the rating in the forecast simulate the actual condition?
  - o What tests or signals do you weight when saying this?

How do you take the actual decision in a single slope whether to go/not go when you are on a trip?

- Trip plan as background
- Alarm signs
- Rule based methods
- Group mechanisms – are you often on trips alone? How do you take decisions then?

Do you have any form of evaluation after your trips?

- Under which circumstances?

What type of aids could be helpful in planning for and during trips in avalanche terrain?

- Digital trip planning tools?
- Experiences from other countries as in example Avalanche Terrain Exposure Scale (ATES) in Canada

### Response from NSD

(e-mail March 17<sup>th</sup> 2014)

**Norsk samfunnsvitenskapelig datatjeneste AS**  
NORWEGIAN SOCIAL SCIENCE DATA SERVICES



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Kirsti Pedersen Gurholt  
Seksjon for kroppsøving og pedagogikk Norges idrettshøgskole  
Postboks 4042, Ullevål stadion  
0806 OSLO

Vår dato: 13.03.2014

Vår ref: 38014 / 3 / LT

Deres dato:

Deres ref:

#### TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 06.03.2014. Meldingen gjelder prosjektet:

<i>38014</i>	<i>Turplanlegging og avgjørelser på tur i snøskredterreng hos personer med ulikt erfaringsgrunnlag</i>
<i>Behandlingsansvarlig</i>	<i>Norges idrettshøgskole, ved institusjonens øverste leder</i>
<i>Daglig ansvarlig</i>	<i>Kirsti Pedersen Gurholt</i>
<i>Student</i>	<i>Magnus Berger Skjøstad</i>

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, <http://www.nsd.uib.no/personvern/meldeplikt/skjema.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://pvo.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 29.07.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77

Vedlegg: Prosjektvurdering

*Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

*Avdelingskontorer / District Offices*

*OSLO: NSD, Universitetet i Oslo, Postboks 1055 Blindern, 0316 Oslo. Tel: +47 22 85 52 11. nsd@uio.no*  
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*TROMSØ: NSD, SVF, Universitetet i Tromsø, 9037 Tromsø. Tel: +47-77 64 43 36. nsdmaa@svt.uio.no*

### Project evaluation from NSD

(e-mail March 17<sup>th</sup> 2014)

#### Personvernombudet for forskning



#### Prosjektvurdering - Kommentar

---

Prosjektnr: 38014

Utvalget informeres skriftlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er godt utformet.

Personvernombudet legger til grunn at forsker etterfølger Norges idrettshøgskole sine interne rutiner for datasikkerhet. Dersom personopplysninger skal lagres på privat pc/mobile enheter, bør opplysningene krypteres tilstrekkelig.

Forventet prosjektslutt er 29.07.2014. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å slette direkte personopplysninger (som navn/koblingsnøkkel) og og slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn) samt slette lydopptak

### Example of analysis

Through this example I will show how one specific element of analytical text has been developed from the stages of STC. The specific element of analytical text and underpinning quote is this, seen in the results chapter on page 46:

*“While none in LE brought up the word avalanche problem, the term was reoccurring in all interviews with the informants in ME. The term was brought up by all respondents in ME themselves. An aspect of this can be seen in the quote from Harald:”*

*Getting an overview of the frame for the trip, regarding skiing skills and what persons, that is the first. And I use, use very often avalanche problem in the way of thinking when planning for a trip. One thing is trying to keep it safe, but I use it a lot to find good snow. Because that is strongly connected to the type of terrain you choose.*

**Starting off with a section of the transcription, it looked like this:**

*Ja, og så vi kan videre på det som er hovedtema i intervjuet. Det er da om hvordan du, du kan si litt om hvordan du planlegger før du skal på tur. Sånn rent praktisk*

*Sånn rent praktisk*

*Du kan både få snakk om når du er leder for en gruppe og når du er på tur med likesinnede.*

*Jeg tenker det første er å få*

*(telefonen ringer)*

*Ja, da var vi på hvordan du planlegger for tur*

*Det første som er viktig er å se hva som er rammene for turen. Hvilke folk er med. Er det noen venner som jeg kjenner godt og som jeg vet hva kan. Eller er det for eksempel en kurssituasjon der jeg har ansvar for en gruppe som ikke nødvendigvis har stor kompetanse. Så det å få avklart hvilke rammer som er rundt skiferdigheter og hvilke personer, det er på en måte det første da. Så bruker jeg, bruker veldig mye tankegangen rundt dette med skredproblem i turplanleggingen. En ting er i forhold til å gjøre ting trygt, men jeg bruker det veldig mye til å finne god snø. For det henger veldig mye sammen med hvilket terreng du velger. Og dra dit skredproblemet er fremtredende. Så det jeg sånn*

*konkret gjør det er å gå inn og se hva er det generelle skredproblemet nå, hvor i terrenget forventer jeg å finne det. På bakgrunn av det været som har vært. Så gjør jeg meg noen tanker om hva type terreng jeg ønsker å oppsøke på bakgrunn av den situasjonen som er i fjellet nå. Så at det er veldig sjeldent jeg sier at okay, jeg har liksom det fjellet, det fjellet, det fjellet og så skal jeg på ett av de. for da blir man veldig låst, det blir veldig statisk, men hvis jeg tenker at jeg skal oppsøke en sånn terrengformasjon i den type himmelretningen på grunn av den vinden som har vært og sånn så kan jeg først se for meg hva type terreng som har den snøen jeg ønsker å oppsøke. Og så gå på kartet og finne det terrenget. Da er det mye lettere å finne god snø enn hvis du gjør det motsatt vei.*

*Mhm. Du sier at du «går inn» og finner info om skredproblemet*

*Mhm da er vi jo så heldig at vi endelig har fått på plass et godt snøskredvarsel i Norge. Som har veldig stort fokus på skredproblem. Som har veldig god info om skredproblemet. I tillegg så liker jeg veldig godt regobs som er observasjonsdatabasen til varsom. For da kan du lese direkte observasjonene til observatørene. Som gir mer helt spesifikk informasjon. Så bruker jeg også veldig mye et verktøy som heter xgeo. Der veldig mye data samlet på samme sted. Det bruker jeg spesielt til å finne værstasjoner og ser på værdata*

**Phase 1: The first step was to highlight with different colours according to what theme this part belonged to. As this whole section has to do with planning, it was all highlighted in red, - the colour I used for the planning theme for all interviews.**

*Ja, og så vi kan videre på det som er hovedtema i intervjuet. Det er da om hvordan du, du kan si litt om hvordan du planlegger før du skal på tur. Sånn rent praktisk*

*Sånn rent praktisk*

*Du kan både få snakk om når du er leder for en gruppe og når du er på tur med likesinnede.*

*Jeg tenker det første er å få*

*(telefonen ringer)*

*Ja, da var vi på hvordan du planlegger for tur*

*Det første som er viktig er å se hva som er rammene for turen. Hvilke folk er med. Er det noen venner som jeg kjenner godt og som jeg vet hva kan. Eller er det for eksempel en kurssituasjon der jeg har ansvar for en gruppe som ikke nødvendigvis har stor kompetanse. Så det å få avklart hvilke rammer som er rundt skiferdigheter og hvilke personer, det er på en måte det første da. Så*

*bruker jeg, bruker veldig mye tankegangen rundt dette med skredproblem i turplanleggingen. En ting er i forhold til å gjøre ting trygt, men jeg bruker det veldig mye til å finne god snø. For det henger veldig mye sammen med hvilket terreng du velger. Og dra dit skredproblemet er fremtredende. Så det jeg sånn konkret gjør det er å gå inn og se hva er det generelle skredproblemet nå, hvor i terrenget forventer jeg å finne det. På bakgrunn av det været som har vært. Så gjør jeg meg noen tanker om hva type terreng jeg ønsker å oppsøke på bakgrunn av den situasjonen som er i fjellet nå. Så at det er veldig sjeldent jeg sier at okay, jeg har liksom det fjellet, det fjellet, det fjellet og så skal jeg på ett av de. for da blir man veldig låst, det blir veldig statisk, men hvis jeg tenker at jeg skal oppsøke en sånn terrengformasjon i den type himmelretningen pga den vinden som har vært og sånn så kan jeg først se for meg hva type terreng som har den snøen jeg ønsker å oppsøke. Og så gå på kartet og finne det terrenget. Da er det mye lettere å finne god snø enn hvis du gjør det motsatt vei.*

*Mhm. Du sier at du «går inn» og finner info om skredproblemet*

*Mhm da er vi jo så heldig at vi endelig har fått på plass et godt snøskredvarsel i Norge. Som har veldig stort fokus på skredproblem. Som har veldig god info om skredproblemet. I tillegg så liker jeg veldig godt regobs som er observasjonsdatabasen til varsom. For da kan du lese direkte observasjonene til observatørene. Som gir mer helt spesifikk informasjon. Så bruker jeg også veldig mye et verktøy som heter xgeo. Der veldig mye data samlet på samme sted. Det bruker jeg spesielt til å finne værstasjoner og ser på værdata*

**Phase 2: The next phase includes dividing main themes into subgroups. I often encountered meaning bearing units that fit into other themes than the colour they were highlighted with in phase 1. During this stage, both the main and subgroups were changed several times to make them fit the best for most meaning bearing units from all respondents. As this specific section was seen to have many meaning bearing units as almost all of it is pointing towards the research topic, I pasted the whole section in under the subgroup “Planning, general/unknown”.**

*Experience:*

- Respondent's background
- Importance of experience
- Learning

*Planning*

- Planning, general/unknown

*Det første som er viktig er å se hva som er rammene for turen. Hvilke folk er med. Er det noen venner som jeg kjenner godt og som jeg vet hva kan. Eller er det for eksempel en kurssituasjon der jeg har ansvar for en gruppe som ikke nødvendigvis har stor kompetanse. Så det å få avklart hvilke rammer som er rundt skiferdigheter*



og hvilke personer, det er på en måte det første da. Så bruker jeg. Bruker veldig mye tankegangen rundt dette med skredproblem i turplanleggingen. En ting er i forhold til å gjøre ting trygt, men jeg bruker det veldig mye til å finne god snø. For det henger veldig mye sammen med hvilket terreng du velger. Og dra dit skredproblemet er fremtredende. Så det jeg sånn konkret gjør det er å gå inn og se hva er det generelle skredproblemet nå, hvor i terrenget forventer jeg å finne det. På bakgrunn av det været som har vært. Så gjør jeg meg noen tanker om hva type terreng jeg ønsker å oppsøke på bakgrunn av den situasjonen som er i fjellet nå. Så at det er veldig sjeldent jeg sier at okay, jeg har liksom det fjellet, det fjellet, det fjellet og så skal jeg på ett av de. for da blir man veldig låst, det blir veldig statisk, men hvis jeg tenker at jeg skal oppsøke en sånn terrengformasjon i den type himmelretningen pga den vinden som har vært og sånn så kan jeg først se for meg hva type terreng som har den snøen jeg ønsker å oppsøke. Og så gå på kartet og finne det terrenget. Da er det mye lettere å finne god snø enn hvis du gjør det motsatt vei.

Mhm da er vi jo så heldig at vi endelig har fått på plass et godt snøskredvarsel i Norge. Som har veldig stort fokus på skredproblem. Som har veldig god info om skredproblemet. I tillegg så liker jeg veldig godt regobs som er observasjon databasen til varsom. For da kan du lese direkte observasjonene til observatørene. Som gir mer helt spesifikk informasjon. Så bruker jeg også veldig mye et verktøy som heter xgeo. Der veldig mye data samlet på samme sted. Det bruker jeg spesielt til å finne værstasjoner og ser på værdata

- Planning for trips, lift
- Planning for tips, backcountry
- Information gathered before trips

#### *Conditions for decisions*

- ~~Equipment~~
- ~~Weather/snow/human/terrain factors~~

#### *Outcome/aim/risk*

- What is the outcome?
- What is the aim?
- What is risk?
- Is it risky?

#### *Evaluation*

- ~~Evaluation of the factors weather, snow, human, terrain (how the practical decisions are made)~~
- Evaluation after trips

#### *Future*

- New inventions
- Course structure

**Phase 3: At this stage I had similar data from the other interviews. The following is all condensed data found in the subgroup “Planning, general/unknown” for the group ME. Remember that more info from each respondent about planning (more specifically about lift-accessed off-piste and backcountry trips) were found in other subgroups, and that the subgroup includes more than the meaning bearing units shown in phase 1 and 2 for the informant we are following in this example.**

- Lite turplanlegging blant folk i frikjøringskonk, litt på lykke og fromme, fokus på skredproblem i planleggingen, Varsom kan være litt fjernt for nybegynnere, kun for spesielt interesserte, se etter vanskelige punkter på ruta i planleggingen, systematisert tankegang, se muligheter på kart og i terreng
- Snødekkehistorikk, varselet gir en pekepinn om hva man bør holde seg unna, men en enkelthengavgjørelse er noe helt annet, digitale kart kan være en ekstra sikkerhet (kanskje objektet mener GPS, mens spm var rettet mot digikart på forhånd?), Vær og skredvarslingstjeneste, info fra kolleger, hovedsakelig info om vedvarende svake lag og skredproblem, værutvikling nærmeste dager før tur, balanse mellom trygg skikjøring, trygt terreng og det oppsøkende = kjører hvor forholdene tillater, siste avgjørelse blir tatt turdagen (dynamisk), lettere å vurdere når du går opp, må tenke på eksponeringstid, lettere å ta en god avgjørelse fordi på veg ned er det lett å tenke at det går så fort, lettere å oppsøke noe som er på et bilde i en guidebok fordi det oppleves som "trygt", all info er tilgjengelig hele tiden for den som leter, folk velger selv, terreng er viktig i guideboka
- Rammer for turen, hvem er med mtp erfaringen og (ski)ferdigheten til disse, skredproblem i TP, skal være trygt, men også god snø, hva er det generelle skredproblemet? Vær, snø, = hvilket terreng kan jeg oppsøke med bakgrunn i dette og gruppa?, dynamisk, finne mulig hengretning og høyde for god snø først, og så lete på kartet, ikke bestemme seg for fjell først, snøskredvarsel, regobs, xgeo (værstasjoner og værdata), skredvarselet er for et stort område, defensiv tilnærming, oppsøke ulikt terreng for å få overblikk, ikke alle kjentfolk, - kun de dyktige, forskjell på å ha vært mye i fjellet og det å være flink med skred, lokalkunnskap om vind etc fra kjentfolk, alltid skredproblem, prosessen og tankene bak planleggingen er lik, men

**The condensate for the meaning bearing units we are following looked like the following:**

Rammene for turen er det første jeg ser på. Hvilken erfaring og skiferdighet har de som er med på turen. Videre ser jeg på hva som er skredproblemet. Turen skal være trygg, og jeg vil finne god snø. Hvor finnes skredproblemet sett ut fra værhistorikk, og hvilket terreng kan jeg oppsøke på bakgrunn av dette. Jeg er dynamisk i tankegangen ved at jeg ikke er fast bestemt på å gå på et fjell, men ønsker å gå dit jeg finner den riktige snøen.

Jeg bruker kartet for å finne den type terreng som har den ønskede snøen. Vi har et godt snøskredvarsel i Norge, med fokus på skredproblem. Mer spesifikk informasjon om observasjoner, værstasjoner og værdata henter jeg fra RegOBS og XGeo.

**Some information about where the informants gathered information were also found under the subcategory “Information gathered before trips”. As the condensates of the meaning bearing units for the other respondents included “avalanche problem” too, I came up with a synthesise in phase 4 that all respondents used this in their planning phase. Then I could check this statement up against the original transcript and see if this was correct. After looking for the term avalanche problem or similar terms in LE and not finding it, it was possible to sum up that “While none in LE brought up the word avalanche problem, the term was reoccurring in all interviews with the informants in ME. The term was brought up by all respondents in ME themselves.”**