

## Article

# Strengthening Tourists' Engagement in Guided Hiking and Trekking

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**Abstract:** Organised hiking and trekking tours are promoted by many providers in adventure travel. Such guided tours shall be engaging for the tourists and evoke positive attitudes towards enjoying nature. We present the Trekking Engagement Profile as a tool to evaluate engagement factors of such guided tours, based on engagement research performed in a different domain, namely evaluating engagement in museums and science centres. This tool shall strengthen guides' soft skills and enable them to increase engagement during an ongoing arrangement. For instance, the Trekking Engagement Profile can be applied when tourists indicate that the quality of a guided tour is not entirely to their liking. We show the viability of using the Trekking Engagement Profile in a small study with guides and participants of trekking tours offered by the Norwegian Trekking Association. Further, we offer guidance and charts to promote its practical use.

**Keywords:** hiking; trekking tours; engagement; outdoor leadership; soft skills; informal learning

## 1. Introduction

Hiking and trekking in nature is for many a great leisure time and experience with a variety of skills to be mastered. Outdoor travel organisations offer organised guided trekking arrangements with a standard setup including board and lodging. As skills and expectations of tourists may vary, a standardised setup might not satisfy all trekkers, and adjustments to the setup may be necessary. In practice, such adjustments might be done on-site during a guided tour. We are looking into factors that might strengthen the tourists' engagement, in the sense of growing their emotional involvement and commitment.

The Norwegian Trekking Association (Den Norske Turistforening, DNT) is Norway's largest organisation for outdoor activities. For over 150 years, the DNT has promoted trekking and worked to improve conditions for all who enjoy the country's broad range of outdoor activities. Over five hundred cabins across the country, over 20 000 km of marked foot trails, and 7 000 km of ski tracks, marked with twigs, are maintained by volunteers. The association has offered guided tours since 1932. These tours include often overnight accommodation, food, and companionship with other tourists as a package offer.

Guided tours last usually from some hours to some weeks and are designed for diverse target groups, such as adults, youth, children, seniors, singles, or groups defined by age. Some tours have a specific theme while others are generic trekking tours following a specified itinerary. Guided tours are led by one or more skilled guides, who accompany the tourists and moderate the tour. They are also responsible for logistics, assuring the tourists' safety, and solving all kinds of challenges that might occur underway. The guides shall also convey appreciation of nature to the tourists. Note that DNT uses voluntary guides that have undergone a certification programme.

Trekking tour operators commonly assess user satisfaction using questionnaires that record feedback from participants. Common questions include how much the tourists enjoyed a trip, whether they would recommend the experience to others, or whether they would like to participate in a similar trip again. However, such assessment does not give evidence of factors that have an impact on satisfaction.

In the following, we posit that user satisfaction is related to the tourists' engagement during guided trekking tours. Further, we argue that a modified version of the Engagement Profile [7], denoted as the Trekking Engagement Profile, is a suitable tool to characterise engagement in guided hiking and trekking. We intend to use the Trekking Engagement Profile as a tool for guides, to evaluate engagement factors, and to consider adjustments to potentially increase engagement.

Our contribution is to apply the concept of the Engagement Profile to a wide range of hiking and tracking arrangements. After presenting related work (Section 2), we present the Engagement Profile and modify it to characterise factors of engagement for guided trekking tours (Section 3). In Section 4, we present how the Trekking Engagement Profile can be used as a tool to evaluate guided tours. We report from a study performed with tourist participants and guides to show the viability of the Trekking Engagement Profile (Section 5) followed by a discussion (Section 6), before concluding (Section 7).

## 2. Background and Related Work

Metrics from marketing research are frequently used for the assessment of travel and leisure experiences. Hosany and Gilbert [3] give a comprehensive overview of relevant literature that includes the role of emotions for the assessment of travel experiences. They point out that the role of emotions in generic marketing and in the travel industry differ. There is a considerable body of research that deals with assessing the attractiveness of travel destinations, but less on assessing travel arrangements that are not bound to specific locations.

For travel destinations, assessment is usually performed pre- or post-experience rather than during the experience. Unlike factors such as accommodation, food or other travel arrangements, it is not viable to apply changes to a travel destination on a short term, in case there are indications of dissatisfaction among participants. Further, the result of such assessment does not give hints on what to change.

Guided hiking and trekking tours, as described here, consist of a variety of tangible and intangible ingredients that have an impact on the tourists' experience and satisfaction. These include a) the organisation of the guided trekking tour; b) the quality of the infrastructure (lodging, food, paths, transport); c) the attractiveness of the concrete itinerary (sights, attractions, area, difficulty, season); d) environmental conditions (weather, temperature, drought, moisture, flood) during the arrangement; e) information given to the tourists prior and during the guided tour; f) the skills and knowledge of the guides; and g) skills, context, and attitudes of the single participant. Infrastructure, attractiveness of the area, and weather conditions can usually not be influenced by an organiser there and then. Also skills, context, and attitudes of the single tourist and how participants behave in a group are normally beyond the control of the organiser.

Education of the guides to increase their skills and knowledge [4] are of great importance. The guides need to exercise leadership which can be defined as to achieve goals through organising activities in a group of people [21]. Guides' leadership skills include hard skills (first aid, navigation, how to operate things, knowledge, physical abilities) and soft skills (communication, empathy, decisiveness, time management, flexibility). The classification into hard skills and soft skills is disputed [20]. A third category has been proposed under several names (such as conceptual, operational, meta-skills) and a classification into technical skills, interpersonal skills, and judgement and decision making has been proposed (ibid.). We note that the distinction between hard skills and soft skills is sufficient for the frame of our work.

Priest and Gass [16] present a comprehensive guide how to exercise leadership in outdoor arrangements, covering a variety of aspects. Martin et al. [13] define the following three goals for outdoor leadership as 1) to ensure safety of the tourists; 2) to ensure protection and preservation of the natural environment; and 3) to enhance the quality of the outdoor experiences for tourists.

There is some tool support for tour guides such as navigation aids (maps, charts, electronic devices), route planning tools, risk assessment charts, packing lists, instructions for mountain medicine,

checklists for safety-related issues (avalanche, river crossing, glaciers, climbing), emergency checklists, and leaflets for conveying nature (geology, botany, fauna). However, there is still a lack of tools that support soft skills, including how to increase tourists' engagement, experience, and satisfaction.

Mediating a subject to participants of guided tours has similarities to informal learning arenas, such as informal learning in science centres and museums [7]. In such arenas, participation is voluntary, and tourists cannot be forced to learn or experience more if they do not want to. Hofstein and Rosenfeld [2] distinguish between formal and informal learning; informal learning is characterised by attributes like voluntary, unstructured, unsequenced, non-assessed, open-ended, learner-led, non-curriculum-based, many unintended outcomes, less directly measurable outcomes, social intercourse, and so on. In informal learning arenas, the learning outcome is related to engagement: being engaged promises better learning outcome and increased willingness to learn.

Mårtensson and Roxå [12] presented a variety of definitions for engagement, such as the one by Reeve et al. [18]: "*Engagement refers to the behavioural intensity and emotional quality of a person's active involvement during a task.*" Lemke et al. [9] defined engagement as the "*Affective involvement in and commitment to an activity, goal, practice, group, or community that enhances the quality and quantity of participation despite obstacles, setbacks, or frustrations; distinguished from enjoyment.*"

The Engagement Profile [7] was developed as a structured way of quantifying the characteristics in exhibits along eight dimensions, each of which is given a value between 0 and 5 according to the descriptions in a table. Its dimensions represent the degrees of *competition* (C), *narrative elements* (N), *interaction* (I), *physical activity* (P), *visitor (user) control* (U), *social aspects* (S), *achievements* awareness (A), and *exploration* possibilities (E). The Engagement Profile was used as a tool in the design process to create and evaluate exhibits [5]. A modification of the Engagement Profile has been developed to characterise a robotic teaching assistant [1]. Our goal is to adapt the Engagement Profile, so it can be used as a tool for guided tours.

As common in the travel industry, we use in the charts the term *pax* for the participants of such trekking tours, although they have a more active role than bus or railroad passengers for which this term originally was created.

### 3. Characterising Factors for Engagement

The Trekking Engagement Profile was developed as an adaptation of the Engagement Profile. The number of dimensions was kept unaltered, but the table entries describing the eight dimensions were adjusted. Using the Trekking Engagement Profile implies that external influences are not taken into account. External factors that cannot be influenced, such as the environment, weather, temperature, or landscape need to be considered separately, as well as properties that belong to the context, such as social factors, institutional factors, or recent incidents personally or globally [7, p.55].

Note that the Trekking Engagement Profile is not designed to characterise tourists but the arrangement of guided tours. However, instances of a Trekking Engagement Profile chart can be developed to describe preferences of specific target groups, such as school classes, age-destined groups, visitors from abroad, families, or people with specific hobbies and interests.

#### 3.1. Modifying the Engagement Profile to Guided Trekking Tours

To be suitable for guided trekking tours, we modified the criteria for grading the eight dimensions by replacing exhibit-specific properties with characteristics that fit to typical trekking tours in a broad sense (Table 1). Some remarks about the single dimensions are in order.

**Competition:** There is a wide span, usually ranging from no competition element (e.g., senior walk in nearby woods), via arranging games, quizzes and competitions during the tour (this is quite common for arrangements with children or trips that last several days). On the extreme side, the range covers game and reality show concepts where tourists compete amongst each other, including the elimination of a losing participant from the arrangement.

**Table 1.** Explanation of the values used in the Trekking Engagement Profile, from participant's viewpoint (not: guides' viewpoint).

	0	1	2	3	4	5
<b>C</b> participation only; no competition element.	result must be achieved to proceed or succeed.	games; quizzes; competitions.	pax receive score; competition against high score.	competition with other pax in real-time.	team challenge; affect other pax; reality show.	<b>C</b>
<b>N</b> no narrative elements.	non-dramatised story; succession of non-correlated events.	limited use of narrative or scenographic elements; succession of correlated events.	rich use of narrative elements; scenographic setting; coherent story: "in the footsteps of ..."	dramatised story; narrative universe; scenographic setting; actors perform.	immersive environment with a strong dramatised narrative story; role play.	<b>N</b>
<b>I</b> no interaction; observe only.	little interaction; participation only; necessary communication.	some interaction, small-talk between participants.	moderate degree of interaction; choices influence outcome.	high degree of interaction; choices have consequences.	pax influences narrative heavily.	<b>I</b>
<b>P</b> no physical activity; observation only.	short walk; stroll; courses.	easy hiking tour.	normal hiking tour in mountains; cabin to cabin.	demanding hiking tour in mountains; climbing.	difficult hiking tour in mountains; climbing; expedition.	<b>P</b>
<b>U</b> controlled; participation only; linear structure.	controlled; linear structure or chronological succession of events.	tour is built up in sequences; activities can be chosen away.	pax can make choices between several alternatives.	pax controls flow, but limited choices only; group can be split up.	pax decide on content; creative process.	<b>U</b>
<b>S</b> single participant.	single participant, others observe.	many participants; social activity only when necessary.	many participants; moderated.	many participants; pax communicate freely.	many participants; pax must cooperate.	<b>S</b>
<b>A</b> no specific achievements given.	immediate feedback on failure or success, "well done".	achievement collected, only shown at the end.	current status constitutes achievement; achieving daily goal; progress indicator.	trophies; diploma; extra adventure performed; reached summit, etc.	achievements, results, consequences always presented; reality-show.	<b>A</b>
<b>E</b> no exploration activity; pre-defined views only.	stop up and look around.	explore when other activities are stopped (breaks, free time).	explore while trip is ongoing; explore new areas.	can follow alternative paths to explore more.	can explore following own intention; support from guides.	<b>E</b>
	0	1	2	3	4	5

**Narrative:** Although most of the guided trekking tours consist of a linear succession of events according to a programme or plan, there are concepts that offer scenographic settings with a story; e.g., an arrangement in the footsteps of a historical person or visiting an area where historical events took place. One could even go a step further and offer guided trekking tours involving role play, where each tourist is given a specific role.

**Interaction:** Interaction with the guides and other tourists can range from necessary interaction, via conversations between tourists, to discussions about the specific content of an arrangement. Such discussions can, for instance, result in alternative itineraries, additional activities, or changes in timing. In concepts with very high interaction, tourists interact with each other to design the content of an arrangement.

**Physical:** This dimension relates to how physically demanding a trekking tour is. We observed that for the physical factor there are relationships to the diverse hiking scales, such as the grading of the DNT [23], the Swiss Alpine Club (SAC) trekking scale [19], the Yosemite Decimal System (YDS), and others [25]. As a note, the lowest value describing “observation only” was included for completeness. One could consider watching episodes of the slow-television genre [10], popularised by the Norwegian Broadcasting Corporation (NRK) during the last decennial.

**User Control:** User control can range from no control (participation only), via selecting activities or adding content, to making considerable changes to its content. Note that a high degree of user control can have an impact to the safety, as unforeseen risks can occur in activities that are not planned beforehand. Therefore, safety considerations might limit user control.

**Social:** This dimension describes the number of tourists involved and the interaction in-between them. It ranges from one tourist with and without observers, via many tourists communicating, to many tourists cooperating and depending on each other. This highest class is most relevant for demanding activities (climbing, glacier tour) where tourists need to master specific tasks.

**Achievements:** To motivate tourists, the guides can make the tourists’ achievements noticeable. The scale ranges from no achievements, via immediate response (e.g., commenting something well done) and evaluation at the end to giving trophies, diplomas, or tokens. In an extreme variant the awarded tokens may have consequences. This is common in game concepts (e.g., withdrawing privileges from those who have not achieved sufficiently).

**Explore:** Exploring nature is a vital part of trekking tours, but might be limited, due to safety and organisational considerations. However, there are concepts where tourists might explore on their own hand and even define their own experience, supported by guides.

### 3.2. Use of the Trekking Engagement Profile

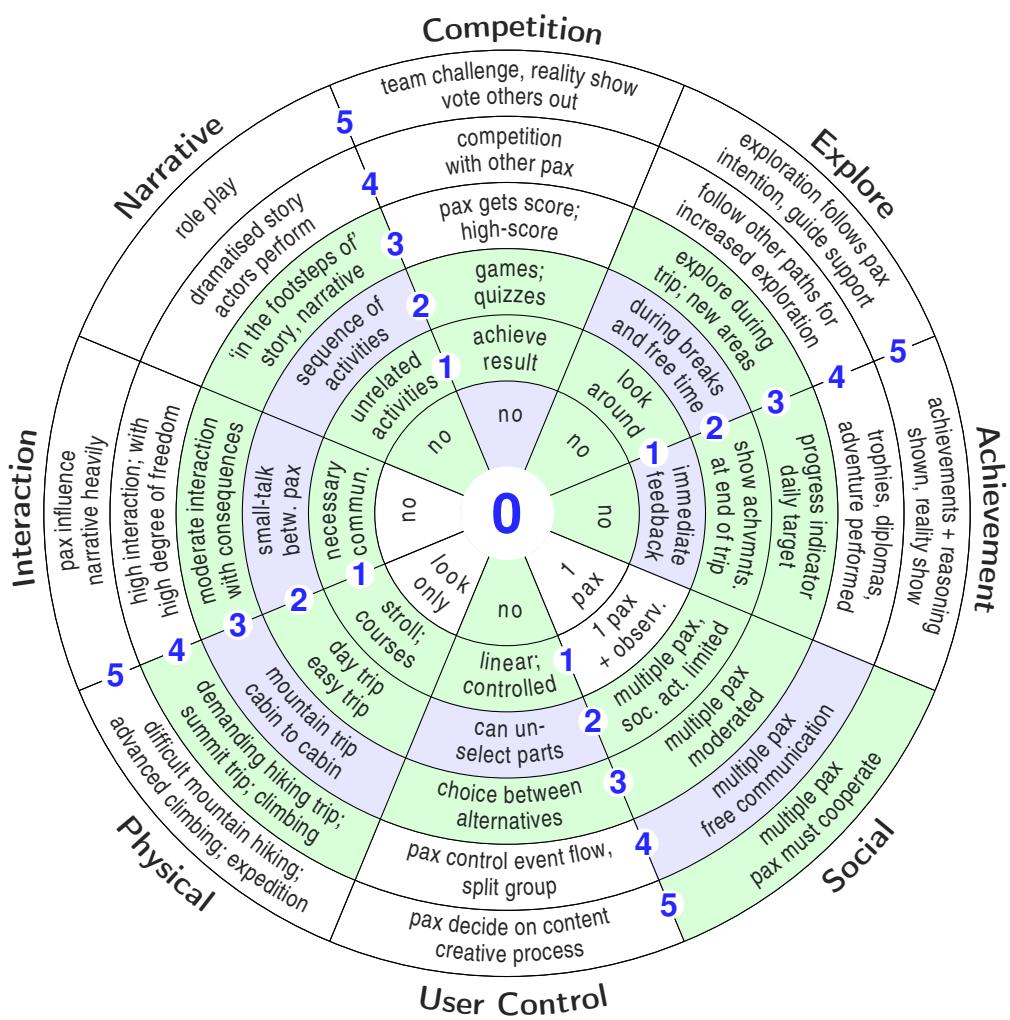
The Trekking Engagement Profile can be used a) to evaluate the overall concept of (existing or planned) guided trekking tours; and b) to make informed decisions when a guide becomes aware that (minor) changes could increase the tourists’ engagement and experience.

The Trekking Engagement Profile can be graphically presented in a chart, to be used as a tool to evaluate guided trekking tours. Further, it can be used to consider changes on-site when there are indications that the tourists’ engagement might become too low. We use similar graphical representations as for the original Engagement Profile [5], where coloured arcs and areas are placed in slices of a disk. Each slice represents one of the eight dimensions. Two types of charts are used: the engagement chart (to visualise values in the design of a guided tour) and the opinion chart.

### 3.3. The Engagement Chart

The engagement chart shows as the green areas the range of suitable characteristics for a category of tours. The blue areas indicate the characteristics for specific implementations of such tours. Figure 1 depicts, as an example, the characteristics for a several days guided trekking tour from cabin to cabin.

To determine the values in the engagement chart, an evaluator considers each of the eight dimensions and determines which phrase (or range of phrases) fits best. It is recommended that several evaluators discuss their set of characteristics and agree on an understanding.



**Figure 1.** Trekking Engagement Profile with annotation of the entries; the characteristics of typical guided trekking tours are visualised with green colour; blue fields represent the values for a typical one-week guided trekking tour from cabin to cabin.

**Table 2.** Formulation of the questions and scales for the tourist' opinion.

For each of the eight Trekking Engagement Profile dimensions, the following scale is used:  
 -2 (much less), -1 (less), 0 (as now), 1 (more), 2 (much more).

$Q_C$	Should there be more or less competition between groups or participants during the tour?
$Q_N$	Should progression of events and roles during the tour be more evident or less evident?
$Q_I$	Should there be more or less feedback on the choices you did during the tour?
$Q_P$	Should there be more or less physical activity during the tour?
$Q_U$	Should the progression of the tour be more or less influenced by you?
$Q_S$	Should there be more or less social activities during the tour?
$Q_A$	Should there be more or less visibility on your achievements during the tour?
$Q_E$	Should there be more or less possibilities to explore nature during the tour?

**Table 3.** Formulation of the satisfaction questions and scales.

$Q_1$  I liked the guided trekking tour. — Scale: 1 (disagree) to 5 (agree).  
 $Q_2$  The guided trekking tour gave me a positive challenge. — Scale: 1 (disagree) to 5 (agree).  
 $Q_3$  The guided trekking tour gave me a nice experience of nature. — Scale: 1 (disagree) to 5 (agree).  
 $Q_4$  I recommend others to participate in this guided trekking tour. — Scale: 1 (disagree) to 5 (agree).  
 $Q_5$  I intend to participate in a similar guided trekking tour again. — Scale: 1 (disagree) to 5 (agree).

The engagement chart can be used as follows: If a characteristic for specific guided tours appears outside the green area, this should trigger a reflection with the stakeholders, that is, the organisers or guides. There might be good reasons why one might accept characteristics outside the standard template, for instance facilitating a guided tour for a specific target group. For example, one might want to add more competition to trips developed for younger tourists or a more physical experience for tourists preparing for an expedition.

### 3.4. The Tourists' Opinion

After having participated in a guided tour, tourists are asked to answer a poll a) about desired modifications for each dimension and b) about their satisfaction. For each of the eight dimensions of the Trekking Engagement Profile, the tourists indicate whether they want the respective dimension unaltered in its intensity, or if they want it to be increased or decreased by one or two steps. The related questions for such assessment are presented in Table 2.

We use simple statistics for the evaluation, using the median value for each dimension that tells whether the tourists want to keep, increase or decrease a respective dimension. For detail analysis, we can also use mean values, the 10%-90% percentiles, and the percentage values of those who want to decrease, keep, or increase the respective domain. If over 50% of the participants in the poll indicate the same (no change, positive, negative), this is marked with a colour in the inner ring of the opinion chart (blue for no change, green for positive, red for negative).

When it happens that the tourists' opinion indicates an expected experience outside the green area or considerably deviating from the current implementation, this should trigger a consideration about possible changes to the design of a tour.

To assess the tourists' satisfaction, tour operators employ questionnaires that record feedback from participants. Our questionnaire reflects properties whether these participants liked, recommend, and intend to repeat participation of a tour. The related questions are given in Table 3. The responses are analysed using simple statistics (median, mean value, percentiles).

## 4. Applying the Trekking Engagement Profile to Trips from Cabin to Cabin

A typical guided trekking tour of several days from cabin to cabin organised by the DNT is as follows: The tourists meet one or two guides at Oslo Central Station at the announced time. After a train and bus ride of some few hours, the group arrives at the first cabin, possibly after a short trip on foot, in case the first cabin is not directly accessible from the road. The arrangements include all meals and accommodation.

A typical day starts with breakfast at 8 a.m.; the group is ready at 9 a.m. with rucksack including packed lunch. Trekking along the planned route follows with the group members ideally being at sight distance to each other; pauses and planned lunch underway until one reaches the next cabin; dinner at about 6 or 7 p.m.; thereafter information for the next day, and time on their own, followed by bedtime.

Minor variations from this schedule are possible, but itinerary and hours for the meals are fixed within a certain flexibility as unforeseen incidents can happen. Changes to other parameters from this standard setup are at the discretion of the guides.

#### 4.1. Characterising Guided Trekking Tours

Considering the eight dimensions of the Trekking Engagement Profile for a typical guided tour, there are no or few *competition* elements in this concept. The *narrative* is rather linear, and, usually, *interaction* does not have an impact on the outcome of the trip. While the tour is rather *physical*, the tourist has only limited *control*. In contrast, the *social* dimension is rather high. The dimensions *achievement* and *exploration* are rather low due to limitations given by the overall framework of the trip. Note that allowing free exploration would require more resources than envisaged. The Trekking Engagement Profile of a typical cabin-to-cabin trip is presented as blue coloured fields in Figure 1.

#### 4.2. How to Apply Changes

When becoming aware that the engagement level among the tourists is about to decrease, the guides can evaluate each of the eight dimensions of the Trekking Engagement Profile. There are various changes that can be applied to a trip without compromising the overall concept.

When applying adjustments to a guided trekking tour, the guides must be aware of limitations that are set by the organiser. First of all, the safety of the tourists is more important than other properties. Therefore, all activities that might set the tourist in danger are not compatible with the overall concept. Further, activities are incompatible when they may harm the organiser's reputation, breach environmental goals, are unethical or illegal.

**Competition:** The concept for cabin-to-cabin trips contains usually no or only few competition elements. To increase the competition element, one can consider to introduce quizzes, minor tasks to be performed in a competition (e.g., who is the best to build a cairn), or a bet to be the first to reach a given goal. This could also be applied to a sub-group of tourists as probably not all of the tourists would embrace such a competition element.

Note that a very high competition dimension would be in settings like reality shows where tourists would leave the trip if certain conditions apply. Such concepts are not compatible with the goals of the standard guided trekking tour.

**Narrative:** The narrative of a trip describes the succession of activities and events. It is rather fixed by the overall concept, such as trekking from cabin to cabin. However, one could consider adding activities that do not interfere with the concept, such as short presentations or activities during the free time in the evening.

**Interaction:** Guided trekking tours offer usually many opportunities for interaction; however, when the group is spread out, the possibility for interaction is reduced. Gathering the group or small-talk with tourists can trigger more interaction. Note, however, that some tourists might prefer not to interact more than necessary, which must be respected.

**Physical:** Guided trekking tours are rather physical. For tourists who want more physical activities one could consider to facilitate for extra activities or choices, as long as these do not interfere with the overall concept.

**User Control:** There are only few possibilities to give more user control. Giving freedom on the choice of activities on days with consecutive overnight stays at the same cabin or micro decisions can increase user control.

**Social:** The social profile is rather high. However, while the possibility for the social dimension is there, personality traits and preferences of tourists could restrict this.

**Table 4.** Means to decrease and increase engagement during guided trekking tours.

	Decrease	Increase	Caveats
C	reduce competition elements; act as one group	quizzes, first-to-achieve, counting achievements	avoid much competition; conformity with agenda
N	follow linear event schedule	add activities, extra tasks, add story	conformity with agenda and schedule
I	only necessary communication	collect group for discussions; small-talk; discuss	personality and personal preferences
P	choose easier alternative	extra activities	health, safety
U	more control, less choices	freedom to choose activities	conformity with agenda and schedule
S	reduce social activities	increase social activities	personality and personal preferences
A	–	tokens, counting achievements	avoid too much visibility of achievements; avoid bragging
E	–	extra activities in spare time; add breaks to let pax explore	safety, conformity with schedule

**Achievements:** Experiencing nature can be considered as a reward; thus, increasing the achievement dimension might strictly not be necessary. However, distributing tokens when a tourist has achieved something could be viable. However, one should be careful when selecting tokens and conditions when tokens are given, as this involuntarily could create attention to issues that tourists might want to keep private.

**Explore:** Due to limited resources and for safety reasons, the possibilities for extra exploration are limited. Exploration is usually an individual activity. The tourists can explore in their spare time and at their own risk, as long as the safety conditions are met (e.g., tourists are not supposed to be left alone in free nature).

Table 4 summarises modifications that can be applied to ongoing trekking tours. We also show caveats for unfortunate modifications, as the impact on health, safety, and enjoyment must be considered before these changes are engaged. In a concrete setting, the guides must use their soft-skills and probe the tourists' opinion.

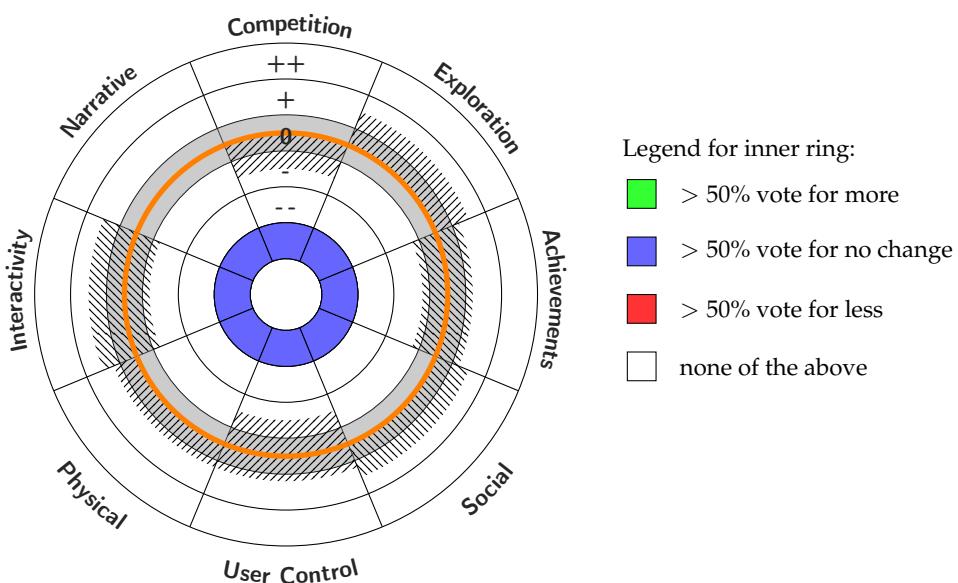
## 5. The Trekking Engagement Profile in Practice

To explore how the Trekking Engagement Profile works in practice, we performed a study in Autumn 2017 among voluntary guides and participants of guided trekking tours organised by DNT Oslo. The participants in the study were invited through a community facebook group for guides and by email. Using on-line questionnaires implemented with Google Forms, we asked the participants to answer the questions shown in Tables 2 and 3 for the trekking tour they last participated in. Additionally, we asked for gender and age group, but no sensitive personal data were queried. Guides were allowed to answer what they assume the participants of the tour they guided would have answered.

A total of 24 persons answered the poll; nine of them answered as participants and the others as tour guides. The participants (11 female, 13 male) were adults in the age groups of 25-39 (4), 40-59 (9), and 60-75 (11). The results from the analysis are shown in Table 5 and are visualised in Figure 2. Due to the low number of responses, we abstained to analyse the results along gender or age group.

As shown in Table 6, the trekking tours have a very high satisfaction rate. Note, however, that Q<sub>2</sub> scored lower than the others; the reasons might be that participants might have had negative experiences during such tours, such as a fall or other physical or medical problems. Q<sub>5</sub> was not part of our questionnaire as we did not expect unbiased answers from participating guides who answered on behalf of participants.

The analysis indicated that the participants of the poll generally did not want to alter the setup of trekking tours. The category for exploration showed the most positive value with a mean value of 0.13,



**Figure 2.** Trekking Engagement Opinion chart; 24 participants; tour guides and participants. Hatches represent the area between the 10% and 90% percentiles; orange lines represent the median.

**Table 5.** Results from the opinion of 24 participants, showing mean, std.dev., 10% percentile, median, 90% percentile, and percentages for each of the five alternatives

	C	N	I	P	U	S	A	E	mean
mean	-0.50	-0.04	0.08	0.08	-0.13	0.08	-0.04	0.13	-0.04
$\sigma^2$	0.43	0.22	0.51	0.17	0.38	0.25	0.39	0.38	0.04
90%	0.0	0.0	1.0	1.7	1.7	1.0	0.7	1.0	
median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
10%	-1.0	0.0	-0.7	0.0	-1.0	0.0	-0.7	0.0	
++	0%	0%	0%	0%	0%	0%	0%	4%	
+	0%	4%	25%	13%	13%	17%	13%	13%	
0	58%	92%	63%	83%	63%	75%	75%	75%	
-	33%	0%	8%	4%	25%	8%	8%	8%	
--	8%	4%	4%	0%	0%	0%	4%	0%	

**Table 6.** Results from the questions  $Q_1 \dots Q_4$ , showing mean, standard deviation, 10% percentile, median, 90% percentile, and percentages for the respective values of the Likert-scale

	$Q_1$	$Q_2$	$Q_3$	$Q_4$	$Q_5$
mean	4.58	4.13	4.58	4.83	n/a
$\sigma^2$	0.34	0.64	0.43	0.15	-
10%	4.0	3.0	4.0	4.1	-
median	5.0	4.0	5.0	5.0	-
90%	5.0	5.0	5.0	5.0	-
5	63%	33%	67%	83%	-
4	33%	50%	25%	17%	-
3	4%	13%	8%	0%	-
2	0%	4%	0%	0%	-
1	0%	0%	0%	0%	-

while interaction, physical activity, and social were at 0.08, each. However, the categories competition, user control, and achievements were on the negative side with mean values of -0.50, -0.13, and -0.04, respectively. We interpreted this that the participants neither embrace competition nor user control.

For the questions  $Q_1$  to  $Q_4$ , the responses showed 95%, 81%, 90%, and 100% on the positive side, respectively. We interpreted this that the participants generally liked their trekking tour.

The mean value of the mean values for all eight categories was -0.04, which is close to zero. As a comparison, similar studies that have been performed in science centres and museums [5], gave a positive value of about 0.4. From this, we inferred that the participants did not expect modification of the trekking tour setup.

Notice that the number of participants in the poll was too low to draw a strong conclusion. Further, we are unaware of the impact of asking a mixture of guides and participants, instead of participants only. We did not have the funding to ask a broader representation of participants at that time. We recognise this as a clear limitation in our study, why its results only can give indications. However, the study is able to show how the Trekking Engagement Profile is supposed to be used in practice.

## 6. Discussion

The objective of the Trekking Engagement Profile has been to provide an evaluation tool for guided hiking and trekking tours and to strengthen the soft skills of the guides by giving them a practical tool. We discuss its suitability for these application areas.

### 6.1. Suitability of the Trekking Engagement Profile

The transition from the Engagement Profile for exhibits to the Trekking Engagement Profile was rather straight forward, as was the formulation of the questionnaires for the new application area. The eight dimensions seem relevant, and changes to each dimension can be evoked by concrete means, as shown in Table 4.

After having tried the Trekking Engagement Profile out in practice while guiding tours, we did not find an obvious gap that would suggest that a dimension would be missing. When considering new dimensions that potentially could be added, we need to ensure that these are not already sufficiently covered by a combination of other dimensions or by frameworks and tools that are already in use. For instance, charts covering safety, navigation, or mountain medicine are already available, and there is no need to integrate these into our work.

### 6.2. Use of the Trekking Engagement Profile on-site

For the guides on-site it would be unrealistic to perform analyses of engagement using questionnaires during a guided trekking tour. However, when talking to the tourists the guides could ask them indirectly how satisfied they are. They could probe the opinion guided by the Trekking Engagement Profile chart and the questionnaire in Table 2 to find out which dimension would need an adjustment. For example, a guide could ask “Would you like to participate in a quiz game in the evening?” to find out whether tourists would be in favour of more competition elements. If there should be indications that point in a negative direction, guides could use countermeasures informed by Table 4.

Note that applying the Trekking Engagement Profile to increase engagement will not always be successful, as the tourists participate on their own will and with their own personal preferences. Therefore, tourists might not wish to participate in “extra” activities if they do not want to. Personality, abilities, skills, and other characteristics can have an impact when choosing means to increase engagement. Further, we request the guides to respect the personal preferences of each single tourist.

When considering means to increase engagement, these need to conform with the preferences of members in the target group, and be within the limitations given by the context. For example, safety, extra costs, timing, compatibility with the framework, and values must be carefully considered before actions are engaged.

As noted above, using the questionnaire to gather the tourists' opinion is considered intrusive and not viable on-site. Instead, one could consider to use sensors of some kind to recognise engagement. There is a variety of attempts to retrieve emotion by using cameras [15,22], sensors such as electro-cardiograph (ECG), electro-encephalograph (EEG), or electro-oculograph (EOG) [26], motion sensors (inertial, gyroscope, magnetometer), positioning devices [14], or combinations of these. However, most of these sensor technologies work sufficiently only in controlled settings, as experiments in museums and science centres have shown [8, p.69]. Further, it is questionable whether engagement-scanning activities would be non-intrusive enough and socially acceptable. Thus, the soft-skill of the guides to sense the tourists' engagement level is still the right choice.

To be used in practice, we present a pocket version of the Trekking Engagement Profile in Appendix A and as supplementary material. A printed copy of this chart can be laminated and be used as a handy tool on-site, to support making considerations about tourists' engagement factors.

### 6.3. The Trekking Engagement Profile as a Measuring Tool

The Trekking Engagement Profile can be useful as an evaluation tool after a trekking experience has taken place. As shown, engagement factors from past hiking tours can be retrieved to modify elements of the tour setup, for the benefit of future guided hiking and trekking tours. To achieve this, tour organisers need to assess their guided tours using the chart given in Figure 1, before asking tourists about their opinion. The data assessment including the questionnaires (see Tables 2 and 3) is best performed as part of evaluation questionnaires sent out to each participant.

The data collection will usually happen days after an experience. Thus, an evaluator needs to take into account that memory biases can occur in such a setting [11], and post-hoc experiences can have an impact when assessing subjective engagement factors.

## 7. Conclusion

The Trekking Engagement Profile was designed to be a practical tool for guides to evaluate trekking experiences, both on-site and for evaluation purposes after a tour. This tool consists of a graphical chart that allows stakeholders to characterise hiking and trekking tours. To adjust such tours on-site, tourists are asked informally alongside the eight dimensions of the Trekking Engagement Profile. We have outlined concrete modifications for each of the engagement factors. Further, we presented a set of questionnaires that allow the post-hoc evaluation of engagement factors.

The Trekking Engagement Profile was derived from a similar tool to evaluate engagement in exhibits. While keeping the number of factors that describe engagement unaltered, the model was adjusted to its new domain. After having used the Trekking Engagement Profile in practice, we conclude that it is suitable to support the soft-skills of the guides. The Trekking Engagement Profile can describe concretely which potential modifications to apply, such as adding quizzes as extra competition elements or allowing for more exploration.

We studied the Trekking Engagement Profile for trekking trips from cabin to cabin, using the questionnaires presented in this essay. We did not find any evident need for changes to be applied to the trekking tours of DNT Oslo. However, we could find hints that the participants of the study neither welcome increased competition nor increased user control. On the other hand, they wish slightly more interactivity and social factors. However, the evidence for this is weak.

The use of the Trekking Engagement Profile for guided hiking and trekking tours is promising. To promote its use, we have made the Trekking Engagement Profile charts available in handy pocket format as a tool to be used on-site.

While we could demonstrate the applicability of the Trekking Engagement Profile, a larger study with more participants needs to be performed for stronger evidence. A study covering diverse arrangement types and stakeholders (e.g., trip from cabin to cabin, day trip with seniors, arrangements for families with children) could give evidence whether there are differences from the engagement perspective. The participants in our study were adults, for whom this type of trekking

tours was designed. However, other clientele such as children, youth, seniors, or persons with specific interests (e.g., glacier, climbing) might have different opinions. As participation is voluntary, possible dissatisfaction must be caught early, particularly regarding the young generation, as they can choose among a variety of competing offers. It is well-known that once clients have decided to abandon an alternative, it is difficult to convince them to return back. Thus, the Trekking Engagement Profile can be used as a tool to early detect changes in tourists' participation behaviour.

### Conflict of Interest Statement

The author acts as voluntary tour guide for DNT. Although guided trekking tours of DNT have been used as examples, this research has not been commissioned by them. Beyond these facts, the author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### Data Protection Statement

No sensitive data were queried in the anonymous poll among voluntary guides at DNT Oslo and participants of guided trekking tours. We consider it not viable to track back the responses to single participants.

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### Project Information

The objective for the VISITORENGAGEMENT project was to measure the degree of engagement and user experience in science centres and museums. This was done by means of sensor and camera technology and the registration of user behaviour, in combination with short surveys. Project partners were Expology AS, Norsk Regnesentral (Norwegian Computing Centre), The Norwegian Museum of Science and Technology, The Norwegian Maritime Museum, Engineerium, and the Department of Education at the University of Oslo. For information about the project, we refer to the project base entry at the Research Council of Norway [17] and previous publications [1,5-8,24].

### Supplementary Materials

The Trekking Engagement Profile is meant to be a tool that can be used in practice. For this purpose, we offer the Trekking Engagement Profile chart in a supplementary file, to be printed and laminated as a handy card. This laminated card can be used as a reference while guiding tours. Further, by drawing with a text marker on the chart, specific values can be emphasised.

The Engagement Profile is available as an app for the Android platform under the name "VeiApp". This app has originally been developed by Expology AS to support the design of exhibits in museums and science centres. Since the layout of the Engagement Profile is similar to the Trekking Engagement Profile, the app can also be used as a tool for guided hiking and trekking tours. The app is available in Google Play with the following id: [no.expology.veiapp](https://play.google.com/store/apps/details?id=no.expology.veiapp).

The data received from the poll among voluntary guides at DNT Oslo and participants of guided trekking tours, including the formulae for its analysis, are made available as a spreadsheet in OpenDocument Spreadsheet (ods) format in the collection of supplementary material. Note that the textual data are in Norwegian language.

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## Abbreviations

The following abbreviations and names are used in this manuscript:

DNT	Den Norske Turistforening (The Norwegian Trekking Association)
ECG	electro-cardiograph
EEG	electro-encephalograph
EOG	electro-oculograph
EP	Engagement Profile
NRK	Norsk Riksringkasting (Norwegian Broadcasting Corporation)
ods	OpenDocument Spreadsheet
pax	participants (of a travel package)
RCN	Research Council of Norway
SAC	Swiss Alpine Club
YDS	Yosemite Decimal System

## Appendix A Supplementary material: Trekking Engagement Profile Chart

