

PERCEIVED VALUES, MOTIVATORS, AND BARRIERS ASSOCIATED WITH A POPULAR FIELD-BASED DECISION-MAKING TOOL FOR BACKCOUNTRY TRAVEL IN THE U.S.

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ABSTRACT: In this paper, we report the results of a non-random survey of recreationalists and snow professionals familiar with a common, yet empirically unstudied (U.S.-based) decision support tool distributed by the American Institute for Avalanche Research and Education (AIARE), the largest provider of avalanche education curriculum in the U.S. Using a variety of quantitative and qualitative questions, we assessed the values, motivators, and barriers users ascribe to the tool. In total, 758 individuals started the survey and 622 completed it. On the whole, the sample appreciated the tool more for its planning and debriefing attributes than for its use while touring. Respondents were also motivated to use it for its aid in decision-making, risk management, and interpersonal relationships, even at the expense of time. Results suggest the primary barriers to use may be related to the tool's design and its lack of use by users' backcountry partners.

KEYWORDS: Decision-making, avalanche education, risk management, decision support tool, risk assessment, avalanche safety.

1. INTRODUCTION

Empirical studies on decision support tools meant to reduce backcountry travelers' exposure to avalanche hazards benefit outdoor professionals and recreationalists alike. Evaluation research – "a form of disciplined and systematic inquiry that is carried out to arrive at an assessment of an object, program, practice, or activity ... with the purpose of providing information that will be of use" (Kellaghan, 2010, p. 150) – is especially important to ensuring updates to decision tools draw on sound evidence, such as the experiences of actual users.

The purpose of this study was to assess value, motivations, and barriers users ascribe to the *Backcountry Decision-Making Guide* – a field notebook published by the American Institute for Avalanche Research and Education (AIARE), the largest provider of avalanche education curriculum in the U.S. Devised to assist travelers' decisions in avalanche terrain, this notebook is known informally as the "AIARE field book" or "AIARE blue book." Although the field book has been revised several times since its inception almost 20 years ago in consultation with industry experts and users, a systematic evaluation has never been conducted.

The current version, which is 65 pages long and contains checklist-based prompts and templates with room to take notes, is designed to encourage thorough trip planning, promote safe travel, nudge users to make and record field-based observations of snowpack and weather conditions, and prompt a thorough debrief at the end of a field day.

Underpinned by AIARE's "Risk Management Framework," which is inspired by the International Organization for Standardization's (2018) 31000 guidelines and introduced on the first page, the field book's checklist-based processes are central to AIARE's recreational avalanche courses, which urge students to use them as a part of daily routine anytime they go into the field. All told, the framework is comprised of five checklists: One meant for users to reference seasonally called "Prepare," and four intended for daily reference called "Plan Your Trip," "Ride Safely," "Debrief," and "Teamwork."

The field book begins with a five-page introduction to AIARE's framework and its checklists, including detailed descriptions of how to use three: Plan Your Trip, Ride Safely, and Debrief. Examples are provided for what an ideal trip plan and daily debrief may include. The book then segues into 38 pages of these three checklists in fillable template form, providing 19 days' worth of use. AIARE's intent, in other words, is that users refer to these three checklists/templates any day they go into avalanche terrain, and, just as importantly, fill them out before, during, and after travel.

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Rounding out the field book are pages for recording test profile observations and additional references such as the North American Public Avalanche Danger Scale; common U.S.-based observing and recording guidelines for snowpack, weather, and avalanche phenomena; as well as a step-by-step guide to conducting an avalanche rescue.

2. METHODS

This study targeted individuals, 18 years or older, acquainted with the field book and employed a 44-item online survey distributed in English. Participants were recruited using convenience and snowball sampling. The survey was sent to almost 50,000 email addresses provided by AIARE, advertised on AIARE's and Backcountry Access's social media sites, and shared with eight avalanche forecast centers in the U.S. for distribution over two rounds of data collection in May-June 2021 and March-April 2022.

Questions gauged what respondents value most/least about the field book, and what motivates or prevents them from using it, while demographic questions surveyed age, gender, race/ethnicity, education level, avalanche education level, whether they worked in avalanche terrain, outdoor activities in which they had taken part over the last 12 months in avalanche terrain, and which U.S. snow climate they had traveled in most often over the last 12 months. Though the survey consisted primarily of quantitative survey questions, some qualitative questions were also included.

To enhance survey reliability, some questions also contained images taken directly from the field book.

3. RESULTS

3.1 *Survey respondents*

Seven hundred fifty-eight individuals started the survey and 622 completed it. With respect to gender, 68.8% and 29.7% identified as male or female, respectively, while the rest identified as non-binary or chose not to respond. Most respondents identified as white (82.6%), while the remaining identified as Asian or Asian American (5.6%), Hispanic, Latino, or Latinx (2.9%), bi-racial (2%), Black or African American (1%), American Indian or Native Alaskan (0.8%), Middle Eastern or North African (0.8%), Native Hawaiian

or Other Pacific Islander (0.3%), or preferred not to report (2.9%). The mean age for the sample was 39, while the range was 77 to 18.

Most respondents said they were either extremely familiar (33.5% / 253) or moderately familiar (41.9% / 316) with the AIARE field book, while a small percentage (3.7% / 28) said they were unfamiliar with it.

During the preceding 12 months, the average number of days participants reported spending in avalanche terrain was 25. Referring to the same period, most respondents indicated that they had spent most of their time traveling in continental (37% / 230) or maritime (38% / 235) U.S. snow climates, while the remainder indicated that they had traveled primarily in the transitional snow climate of the intermountain U.S. (17% / 104) or Eastern maritime climate of New England (7% / 41).

A high percentage (83% / 530) of respondents reported having completed an AIARE 1 avalanche course, while 43% (267) and 34% (210) reported completing an AIARE avalanche rescue course and AIARE 2 course, respectively.¹

Some participants also indicated having taken at least one professional-level course from AIARE, such as the Pro 1 (11% / 68), Pro 2 (3% / 17), or AIARE 3 course (5% / 33), which is no longer offered.

In a forced-choice question, most participants identified as recreationalists (67% / 415). The remainder identified as a snow, ice, or avalanche professional (19% / 119) or as a "trained volunteer with leadership ... responsibilities" (14% / 88). In a follow-up question directed at professionals and trained volunteers designed to elicit the kinds of paid or volunteer positions people hold, which allowed respondents to "check all that apply," 19% checked that they worked as an educator, instructor, or trainer; 11% checked ice or mountaineering guides; 10% checked ski guide; 10% indicated ski patroller; and 9% checked search and rescue. Moreover, 4% identified as program administrators, 3% as avalanche forecasters, 3% as mechanized travel guides, and 1% as park rangers.

When asked what activities participants had taken part in while traveling in avalanche terrain over the preceding 12 months, the top five

¹ AIARE 1 and AIARE 2 are equivalent to other recreational Level 1 and Level 2 avalanche courses in the U.S.

responses included AT or alpine skiing (74%), mountain-climbing/mountaineering (36%), hiking (33%), backpacking (29%), and cross-country skiing (19%).

3.2 *Perceived value of the field book*

The survey asked several questions about the field book's perceived value, the first of which asked participants (n=756) about its value during various stages of a backcountry tour. In this question, participants were provided three endings to the statement, "The AIARE Field Book is valuable ...," to which they were asked to respond with their level of agreement on a 5-point Likert scale (see Figure 1). Here, participants said the field book was significantly more valuable ($p=0.04$) when planning and preparing to travel in avalanche terrain versus during or after travel. For instance, 84% agreed or strongly agreed that the field book is valuable, "when planning and preparing to travel in avalanche terrain," while only 56% agreed or strongly agreed that the field book was valuable "when actually traveling in avalanche terrain." Still, participants said they valued the field book more after a tour had ended than during a tour, with 71% indicating that they agreed or strongly agreed with the statement indicating this.

The AIARE field book is valuable...

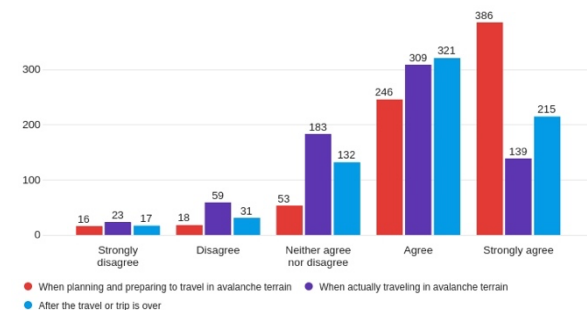


Figure 1: Perceived value of field book over the arc of a backcountry tour.

Several participants also commented on the field book's value to the planning stage of a trip in an optional open-ended question. For example, as one respondent said:

"It establishes ... a framework that works based on expert opinion ... while checking in with [your] own biases and risk assessment before meeting in a larger group where everyone's opinions can be heard."

While another person said, "My favorite part about using this book is writing in it before a tour and tightening up a plan. [It is] very good at getting my mindset dialed in before I go out."

On the other hand, some comments were less favorable. As one person wrote, "It's good for starting a fire, but not much else."

Another question concerning the field book's value asked participants (n=756) to respond with their level of agreement to various endings to the statement, "The AIARE Field Book is valuable because it" Again, responses were captured on a 5-point Likert scale from strongly agree to strongly disagree and asked about the field book's value to everything from whether it "saves time" and "helps mitigate conflict with other people (in my group)" to whether it "helps manage risk" and "ensures important details are covered."

From a planning perspective, respondents indicated that the field book helps (82% agreement) ensure "that important details are covered" (Figure 2). One person, commenting on this, wrote, "It helps me be complete and thorough with my backcountry trips." Another person commented "[I want] to be systematic in my approach to backcountry skiing. It helps me not miss things. I want a checklist before and ... a thoughtful debrief after to improve for next time."

Participants did not agree that the process of using the field book saved time. Here, in fact, a nearly equal number of respondents agreed (28%) and disagreed (26%), with 40% neither agreeing or disagreeing. However, one person commented in an open-ended question that the "extra time to invest in a safe trip and think things through fully" was worth it.

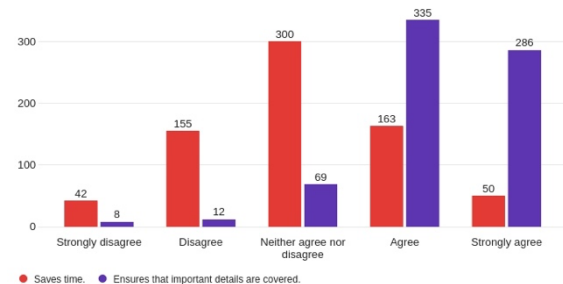


Figure 2: Perceived value of field book for saving time and ensuring details are covered.

Respondents also valued the notebook for judgment and decision-making reasons. As illustrated in Figure 3, 83% agreed or strongly agreed that the field book guided them through a decision-making process; 76% agreed or strongly agreed that it provided clarity for making decisions; 85% agreed or strongly agreed that it provides a common process for colleagues; and 72% agreed or strongly agreed that the book helped mitigate unconscious biases. In exploring differences between professionals and

recreationalists, those who identified as recreationalists were more likely to indicate that the field book was valuable for guiding them through the decision-making process and mitigating unconscious biases than the typical professional.

In a question about the field book's value to managing risk, participants' responses mirrored that of judgment and decision-making. Indeed, 80% agreed or strongly agreed that the field book "helps manage risk." However, fewer expressed value in the field book as a "paper trail in case of litigation," with only 31% expressing agreement (Figure 4).

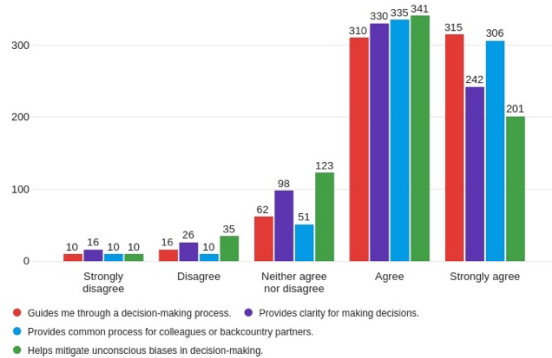


Figure 3: Perceived value for judgment and decision-making.

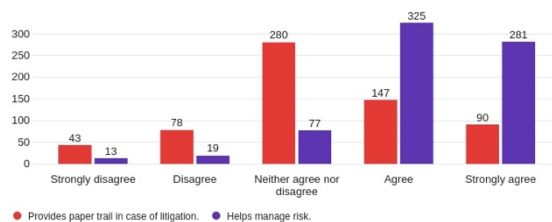


Figure 4: Perceived value of field book for risk management and liability reasons.

When inquiring about the field book's value to interpersonal relationships, participants largely agreed that it aids communication (75% agreement), but there was weaker agreement on whether it lessened group conflict (Figure 5). In fact, only 52% said they agree or strongly agree with the statement that it "helps mitigate conflict with other people I'm with (in my group)." Underscoring these results, one participant said they valued the field book for "the process [it] allows [for a] conversation to take place without the sense that one person is being too controlling or neurotic, and it helps pace the conversation."

Similarly, someone else wrote that they appreciate the field book for how it "provides a structure for initiating conversations about risk assessment."

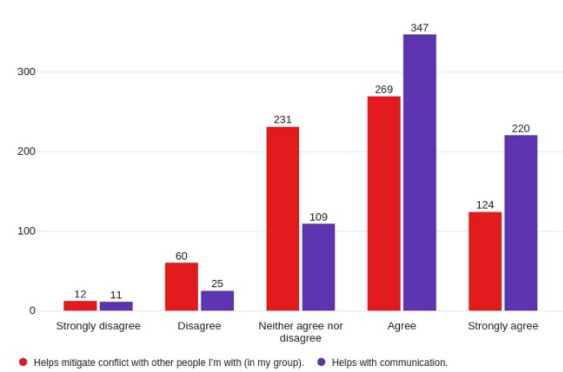


Figure 5: Perceived value to interpersonal relationships (conflict and communication).

Lastly, when examining value through a gender lens, more female respondents on average felt the book was valuable to creating a common process for colleagues, helping mitigate conflict with people in their group, and communication ($p < .05$).

3.3 *Perceived motivators to field book use*

In a matrix question about what motivates individuals to use the field book, we asked survey participants how much they agreed with a list of potential motivators ranging from confidence and goal-achievement to a desire to avoid bad decisions and prevent accidents. Here, responses were again captured using a 5-point Likert scale from strongly agree to strongly disagree.

First, many respondents ($n=687$) said they were motivated to use the field book because it helps them "be more objective" (78% agreed or strongly agreed), "avoid bad decisions" (80%), and "reduce or mitigate hidden biases" (77%) (see Figure 6). Many also agreed that their motivation was driven by the desire to "prevent an accident or incident" (80%) and "reduce or manage uncertainty" (81%) (see Figure 6). As one person said in response to an open-ended question asking what else motivates or influences their motivation to use the field book, "I don't want to die in the backcountry, and . . . have to dig up my friends."

Another motivator around which there was fairly widespread agreement pertains to the field book's role in organization, planning, and goal achievement (Figure 7). In fact, a nearly equal number of participants responded that their use of the book was motivated by the desire "to have a clear plan for the day" (76%) and for "keep[ing them] organized" (75%), but the motivation was not strongly driven by the need to achieve goals (46%).

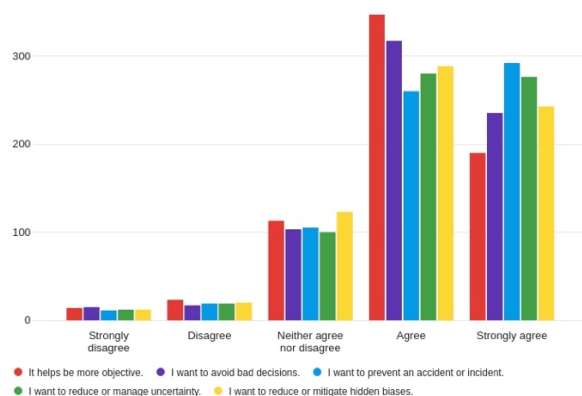


Figure 6: Motivated by judgment, decision-making, and risk management.

As three people separately remarked, the field book "is a good resource when planning," "helps chart [a] plan in writing based on what the forecast is so you can't 'fudge it,'" and "enforces a process for planning and info gathering."

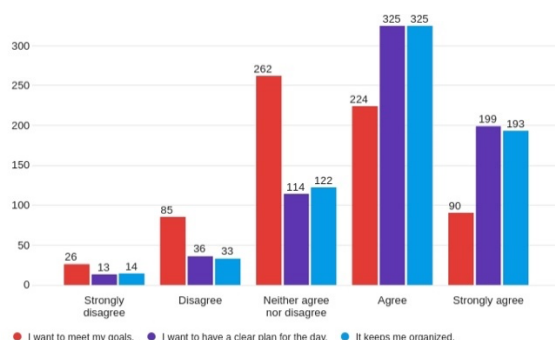


Figure 7: Motivated by organization, planning, and goal achievement.

Participants were also motivated to use the field book for intrapersonal reasons, but not as strongly skewed towards agreement. While 69% stated that their motivation was partly driven by the desire "to be a better leader" in their group, fewer (58%) indicated that their motivation to use it was driven by the need to feel more confident (Figure 8). When asked to respond whether they were motivated to use the field book because it complemented their field experience, 65% agreed or strongly agreed. Speaking to this last theme, one person wrote, "When combined with my current evaluation process and risk management skill[s] the field book "[helps] me reduce the level of risk I already accept when accessing avalanche prone terrain."

In the case of social motivators (Figure 9), 68% of participants agreed or strongly agreed that someone's encouragement motivated them to use the field book, while only 24% agreed or strongly agreed with the notion that they used the field book because their peers did. In fact, more

respondents disagreed (38%) with the statement that they were motivated to use the field because "their peers use it" than agreed.

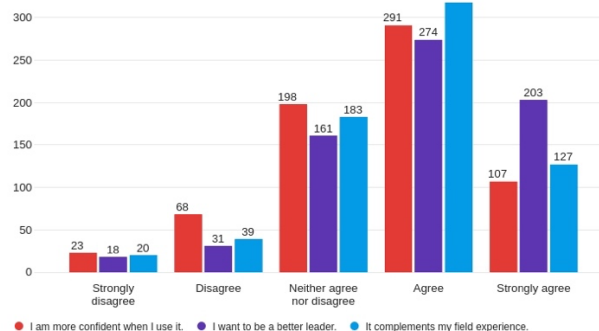


Figure 8: Intrapersonal motivators.

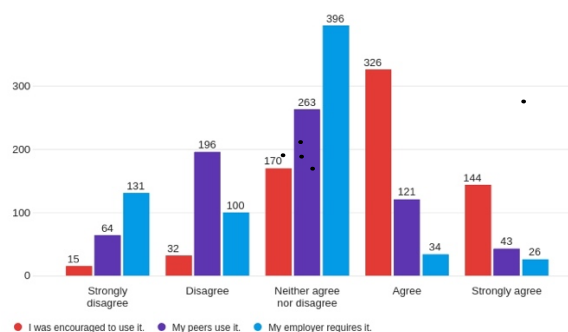


Figure 9: Social and extrinsic motivators.

Lastly, when exploring differences between males and females, female respondents were more likely to agree that encouragement, a desire to meet goals, wanting to avoid bad decisions, and wanting to prevent an accident or incident motivated them to use the field book ($p < .05$).

3.4 Perceived barriers to field book use

To understand the perceived barriers to using the AIARE field book, participants ($n=707$) were asked to respond to several potential obstacles, again using a 5-point Likert scale. More specifically, they were asked to indicate their level of agreement with 11 endings (potential variables) to the statement: "I am prevented or impeded from using the AIARE field book because ..." Endings/variables ranged from "it takes too much time" and "the format doesn't flow well" to "I lack experience using it" and "my backcountry partners or colleagues don't use it."

On the whole, respondents disagreed or strongly disagreed with the barriers listed in the survey. A few responses to a follow-up question also captured this. As one person wrote, "Absolutely nothing prevents me from using [the field book], and I will not travel with someone that doesn't use it or an equivalent." Another person said, "I have not yet found any reason I could not take the time in the field to use my book."

However, that is not to say this sentiment was unanimous. In fact, several responses to the follow-up question were fairly critical about the field book and spoke to potential barriers. "It is a limited resource and does not provide an approachable, real-world way of doing things," as one person wrote.

Turning back to the Likert-scale question, 80% of respondents disagreed or strongly disagreed with the statement, "I lack the knowledge or skills required to use it" (Figure 10). That said, when asked about whether their experience using the field book was an impediment, fewer disagreed (66%).

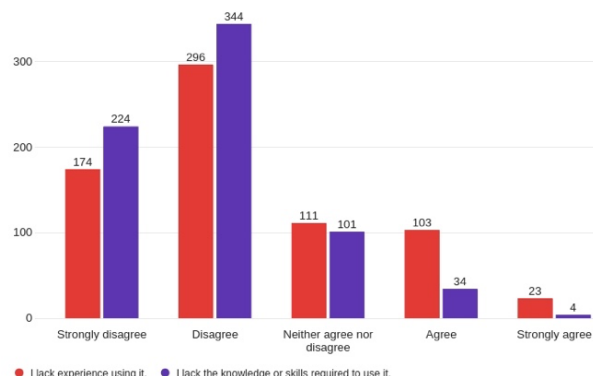


Figure 10: Inhibited by familiarity and skill.

In questions about potential barriers stemming from the design and layout of the field book, a slim majority of participants disagreed with statements ending in these descriptors: that "its cumbersome" (50.5%), "the format doesn't flow well" (53%), and "that it's not intuitive" (60%) (Figure 11).

Again, disagreement with possible design-related barriers was not unanimous. In fact, we received a number of critical comments about the field book's layout and design. As one person put it, "There isn't enough room to write things. [I have] to write small and really cram stuff in, which [makes] it hard to read later."

Another person said that the, "ride [safely] section wastes a ton of space and doesn't seem to help much."

Moreover, multiple people said they wish the field book was available in a digital format. Echoing this sentiment, one person said, "It's a book. An electronic format would be 10,000% better."

A number of people also said they find the field book difficult to use during a tour. For example, some find the size of the book too big to store in a jacket or pant pocket. Others said it is impractical to reference during inclement winter weather or find its design difficult for taking notes on the go. Speaking to all three themes, one

person stated, "If it's windy or extra cold, the last thing I want to do is stop, take off my gloves, and rummage through my pack to get it out." Another person said they would use the field book more often if these things were not an issue, writing that, "I don't use it in the field because my hands get cold, and I don't have a good pocket to keep it accessible, but I think it's valuable and know that I should use it more."

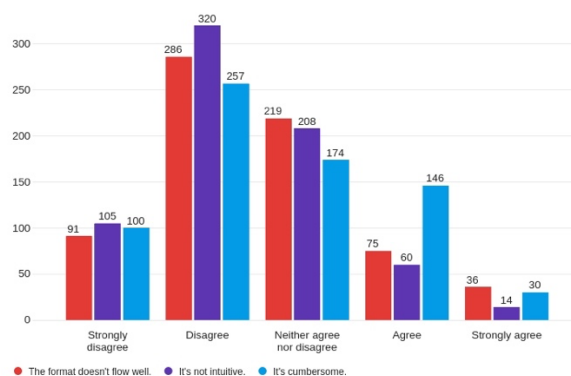


Figure 11: Potential design-related barriers.

Relating to the survey's previous questions concerning the field book's perceived value, over three-quarters (76%) disagreed or strongly disagreed that their use of the field book was inhibited by the value they ascribed to it. Only slightly fewer (70%) disagreed or strongly disagreed that they did not need the field book, and even fewer (62%) disagreed or strongly disagreed that it was not better than the current practice they use for the same purpose (Figure 12). Numerous participants commented that, due to their level of experience, they do not use the field book much anymore. For instance, one person said that they had "internalized the checklists and risk assessment rubrics to be used on nearly every outing."

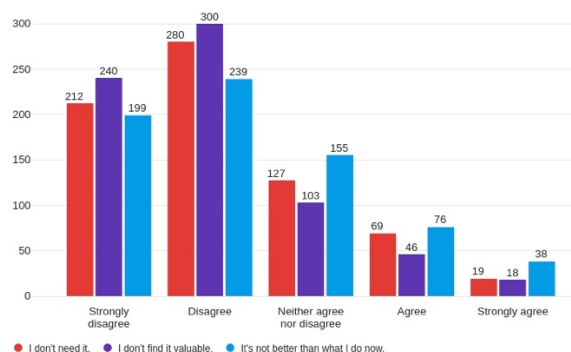


Figure 12: Prevented from using field book due to perceived value and need.

Related to an earlier question on whether the field book saves time, 48% of respondents disagreed or strongly disagreed with the statement that "It takes too much time" (Figure 13). Additionally, around 50% disagreed or strongly disagreed with the statement that "It doesn't fit with the flow of my

day.” Nevertheless, 25% agreed or strongly agreed with the same statement. Reflecting this, one person stated, “It’s an extra step that is not necessary if you have a system you already follow and works for you.”

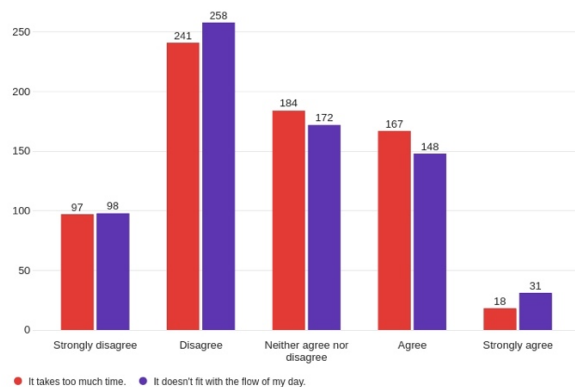


Figure 13: Prevented from using field book due to time and daily flow.

Perhaps the greatest impediment to the field book’s use, according to study respondents, stems from colleagues and travel partners. After all, 42% agreed or strongly agreed that their use of the field book is hindered because “[their] backcountry partners and colleagues don’t use it” (Figure 14). One person wrote about this in a follow-up question, stating that their “partners wanting to go ... and worried about feeling judged by my peers” were impediments. Another person alluded to this as well, noting that it is a barrier when “partners want ... to just get out into the backcountry quickly and not taking the time to do a serious prep talk, ... plan, ... post-talk, and assess.”

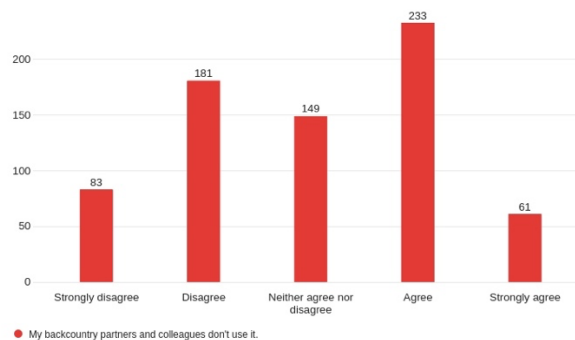


Figure 14: Backcountry partners as potential barriers to use.

4. CONCLUSIONS

The purpose of this study was to explore what users value about the AIARE field book in addition to what might motivate and prevent them from using it. Though survey participants’ responses varied widely, the field book seemed valuable to much of the sample. We also posit that the values, motivators, and barriers users ascribe to the field book affect how frequently they use it.

In brief, most survey participants reported that the field book is valuable for planning a trip, keeping track of important details, assisting group communication, and reducing errors in judgment, among other things. These findings suggest that continued integration of the field book in educational and real-world settings is warranted.

Likewise, most participants, in questions about what motivates them to use the field book, are inspired by reasons pertaining to risk management, decision-making, and interpersonal relationships. These influencers should be considered when developing educational strategies for encouraging and ensuring its use.

In uncovering some of the barriers to the field book’s use, design-related issues rose to the top. This suggests that the field book’s format and content organization should be reexamined in upcoming revisions.

Lastly, when results were examined through the lens of gender, females and males appear to perceive the field book differently, which should be considered in educational settings where the tool is presented and used.

The findings in this paper are subject to some limitations. In particular, survey respondents represent a convenience sample; thus, results are not generalizable to all field book users. Nevertheless, the findings from this study contain implications for improvements to the field book and future research. For example, research on the role users’ backcountry partners play, if any, in impeding the field book’s use might be instructive.

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