

'BACKCOUNTRY ASCENDER' AVALANCHE EDUCATOR - LEVERAGING INCENTIVE BASED LEARNING AND PEER ACCOUNTABILITY TO DRIVE AVALANCHE EDUCATION

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ABSTRACT: There is a growing divide between snowmobile technological capabilities and backcountry management skills. At the same time, the hashtag culture among snowmobilers is creating confusion in priorities while preying on already vulnerable human factors. Training is reactionary, not proactive, and annual proficiency is not the norm.

Developed in 2016, Backcountry Ascender (<https://BackcountryAscender.com>) is an incentive-based learning platform using an Avalanche Training Pedagogy. It was developed with support of the International Snowmobile Manufacturers Association using a curriculum reviewed by The American Avalanche Association and Avalanche Canada. It had a purpose of three overlying goals:

- Reach the most unaware demographic – those who travel once or twice a year from flatland areas without the necessary gear, experience or proficiency to safely navigate a dynamic avalanche environment.
- Ignite and motivate the avalanche education cycle – provide seed information while coaching that more education is necessary, create a desire and advancement path to take on-snow courses, and establish a culture of annual/recurring proficiency.
- Peer Accountability – create transparency among social circles as to who has what level of training and foster positive pressure for lagging individuals to advance.

The results have been promising. In the two seasons of operation, thousands of participants have advanced their education, regions of focus have created an un-precedented demand for on-snow courses, clubs/associations are competing to be the most educated, and corporate sponsors and Avalanche Centers around North America are becoming involved.

KEYWORDS: Avalanche Education, Gamification, Social Learning Theory, Predictive Learning.

1. INTRODUCTION

Every year backcountry users who have not taken education suitable for their environment are involved in preventable accidents – which begs the question: why are more users not taking a course that could save their life in the backcountry? The answer is simple: courses take time and money, there is no presented risk when it is time to enroll, and so priorities are assigned based on the knowledge an individual has at that particular moment in time. Albert Einstein said it best: “As our circle of knowledge expands, so does the circumference of darkness surrounding it.”; or as more commonly paraphrased, they don't know what they don't know.

Backcountry Ascender was developed not to provide avalanche training but to use innovative instructional design and gamification to motivate

training and instill a culture of continuous education. To reduce the circumference of darkness.

2. MOTIVATIONAL AND LEARNING THEORIES

In 1977, Albert Bandura established two important concepts that Backcountry Ascender has drawn on to motivate avalanche education: Social Learning Theory and Self-Efficacy.

Social Learning Theory is a theory of learning and social behavior which proposes that new behaviors can be acquired by observing and imitating others. It states that learning is a cognitive process that takes place in a social context and can occur purely through observation or direct instruction, even in the absence of motor reproduction or direct reinforcement. In addition to the observation of behavior, learning also occurs through the observation of rewards and punishments, a process known as vicarious reinforcement. When a

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particular behavior is rewarded regularly, it will most likely persist; conversely, if a particular behavior is constantly punished, it will most likely desist.

Bandura's Social Learning Theory posits that people learn from one another, via observation, imitation, and modeling. The theory has often been called a bridge between behaviorist and cognitive learning theories because it encompasses attention, memory, and motivation. [1]

Self-Efficacy is an individual's belief in his or her innate ability to achieve goals. Albert Bandura defines it as a personal judgement of "how well one can execute courses of action required to deal with prospective situations". Expectations of self-efficacy determine whether an individual will be able to exhibit coping behavior and how long effort will be sustained in the face of obstacles. Individuals who have high self-efficacy will exert sufficient effort that, if well executed, leads to successful outcomes, whereas those with low self-efficacy are likely to cease effort early and fail.

When developing Backcountry Ascender, Social Learning Theory suggested it was important to create transparency – a mechanism for users to see who around them is learning, what they are learning, and the rewards that are garnered from learning. Self-efficacy suggested that activities should be engaging and achievable for the audience, should build on each other, and create a clear objective path.

While considering each of these two important theories, four factors were given the highest priority due to their application as it pertains to the user audience and avalanche education:

1. Attention - The extent to which we are exposed/notice the behavior. For a behavior to be imitated, it has to grab our attention. We observe many behaviors on a daily basis, and many of these are not noteworthy. [2] For Backcountry Ascender to be successful, it had to show industry support, and industry mentors demonstrating desired behavior traits. We achieved this by launching with full support of the International Snowmobiling Manufacturers Association (ISMA), the American Avalanche Association and Avalanche Canada. Furthermore, each of the ISMA manufacturing brands committed participation from their brand ambassadors, providing demonstrated behavior traits from recognizable names.

2. Social Modeling - Witnessing other people successfully completing a task is another important source of self-efficacy. According to Bandura, "Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities to master comparable activities to succeed." [3] Building a support model

that was transparent within the Backcountry Ascender dashboards, but also within the social media orbit, such as supporting Facebook pages, allowed users to witness peers succeeding, achieving results, and garnering awards.

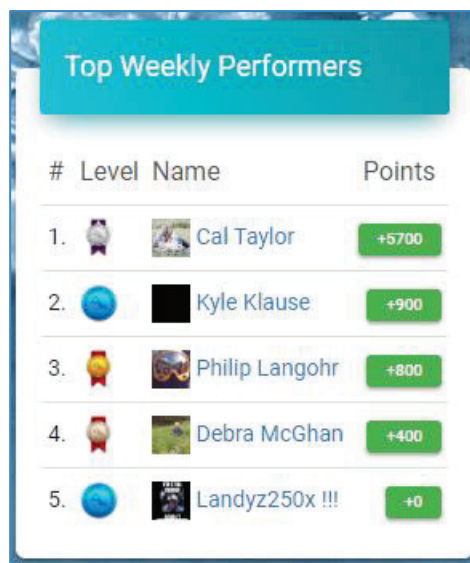


Figure 1: The Top Weekly Performers dashboard in Backcountry Ascender

3. Social Persuasion - Bandura also asserted that people could be persuaded to believe that they have the skills and capabilities to succeed. Consider a time when someone said something positive and encouraging that helped you achieve a goal. Getting verbal encouragement from others helps people overcome self-doubt and instead focus on giving their best effort to the task at hand. [3] By granting admission to a rank based on a user's level of completion, there is a perceived value to the accomplishment. This value is heightened when shared publicly, building a community among those of shared rank – a sense of inclusion. This applies motivation to those on the outside of the community to join. Additionally, the activity approval cycle provides direct and immediate human interaction, feedback, and encouragement.

4. Motivation - The will to perform the behavior. The rewards and punishment that follow a behavior will be considered by the observer. If the perceived rewards outweigh the perceived costs (if there are any), then the behavior will be more likely to be imitated by the observer. If the vicarious reinforcement is not seen to be important enough to the observer, then they will not imitate the behavior. [2] This plays directly to the Incentive Based Learning foundation on which Backcountry Ascender was built. Rewards are offered not only in the form of points, badges, rank, transparent achievement, and social inclusion, but also in the tangible form such as offered prizes and discounts from participating product companies.

3. GAMIFICATION INSTRUCTIONAL DESIGN

3.1 Gamification Definition

The application of typical elements of game playing (e.g., point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service.

3.2 Instructional Design

Backcountry Ascender's instructional design is comprised of 5 different levels, each with 4 or 5 consistent missions made up of several activities. Each of the levels is designed with a consistent acceleration: activities to provide a base line of knowledge for a user at his/her respective level, activities to participate and gain proficiency, activities to challenge their knowledge and abilities and activities to motivate enrollment to a course at the respective level.

Each activity should take about 10 minutes to complete, except those that are required training courses.

5 Signs of Instability ✓

200 Points

To get full credit for this sortie, read the text and answer this question:

What is one sign of instability?

5 signs of instability:

- Significant snowfall** in the last 48 hours (1"-2" per hour for more than 6 hours or 30cm over 48 hours)
- Recent natural avalanches** on the same aspect
- Recent wind drifted snow**
- Cracking or collapsing snow** and listen for hollow "whumping" sounds
- Rapid rise or **change in temperature**.

Note: There are not always visible signs so that's why we check

Figure 2: A sample activity from the Terrain & Travel mission of the Plains Level.

The successful completion of each activity earns users points. The points add value in several ways; the first is ranking on the dashboards, either as individual rankings, or rollup into associations.

The second is in conversion of points to commerce. Corporate participants can provide incentives and discounts to educated users by allowing them to exchange points.

Preparation & Planning
Training
Terrain & Travel
Rescue
Community

Table 1: Each level is broken up in to these consistent missions

Plains
Forest: <i>Avalanche Awareness, CPR</i>
Treeline: <i>Avalanche Rescue, First Aid</i>
Alpine: <i>Recreation /Skills Level 1</i>
Peak: <i>Recreation/Skills Level 2</i>

Table 2: The 5 levels with the respective course that is required to complete the level. CPR and First Aid are not required to complete the level but available for extra points.

✓ Plains	2800	▼
✓ Forest	6000	▼
✓ Tree Line	9400	▼
✓ Alpine	19600	▼
✓ Peak	19700	▲
✓ - Preparation & Planning	2000	▲
✓ Read an Accident Report*	REQUIRED	1000
✓ Snow Crystals*	REQUIRED	500

Figure 3: The 5 levels in Backcountry Ascender with level 5 expanded.

3.3 Badge Levels

Completion of each level will earn a user a new badge. This badge level, is universally mapped across accrediting organizations; for example, a Treeline badge can be earned by completing an

Avalanche Canada Avalanche Skills 1 Course, or an American Avalanche Association Recreation Level 1 Course. Badge levels provide rank within Backcountry Ascender via the dashboards, they are “open badge” compatible so can be used in the electronic world, or simply can be displayed as stickers or patches.



Figure 4: The badge awarded to users for completing the first level.

4. EVIDENCE BASED LEARNING

Each activity that is submitted requires evidence which then is approved by a more experienced person, at a minimum, someone who is two levels higher. The evidence can be a text answer, or photographic proof of task completion. This accomplishes several things. First it ensures consistency among completed tasks. Second, it provides an interactive feedback cycle, and builds on that community. Third, it motivates users to increase their rate and quality of evidence, knowing there is an actual human to review their work. Finally, it motivates users themselves to achieve rank and become reviewers themselves

Chris Acres - Introduction To Avalanches* ×

Evidence

As the conditions and associated dangers change, the group needs to re-do a risk assessment related to the snow conditions, weather, terrain, and group objectives. If the risk is unacceptable, the group must adjust their objectives and terrain choices accordingly. If anyone person in the group feels the risk is unacceptable then that person's opinion is too be respected and the group shall change their objectives/terrain choices such that that person is again comfortable with the risk. The Avaluator is a good tool to guide the group through the risk assessment but human factors must also be consider using the acronym FACETS to guide the group through that portion of the evaluation.

This is a great answer, thank you for being so thorough!

Figure 5: Actual evidence submitted with approver feedback.

5. CONTINUING EDUCATION AND ANNUAL PROFICIENCIES

Core avalanche education is crucial for the backcountry user, but we are also consistently seeing users who take a course and assume they are now complete and competent. Seasonal refresh, annual rescue proficiencies and continuing education is as important as foundational education. To address this specific concern, Backcountry Ascender has new activities added every season, and is built with expiring activities – that is, activities that must be repeated seasonally. Every user, retains their points, but loses their rank until they complete the newly added activities and prove proficiency by completing the expiring activities.

6. USAGE STATISTICS

Backcountry Ascender was launched in the fall of 2016. Here is a summary of the usage statistics gathered over the last two seasons.

Total Number of Users	14,196
Total Individual Page Views	255,588
Total Sessions	49,037
Average Session Duration	00:04:09
Total time users spent on activities	3,127
Number of messages exchanged between approvers and users	59,767
Total activities completed	19, 841

Table 3: Usage metrics for the 16/17 and 17/18 seasons.

Calgary	3.70%
Seattle	3.64%
Salt Lake City	3.24%
Denver	2.19%
Vancouver	2.11%
Chicago	1.75%
Minneapolis	1.65%

Table 4: Top usage by city. This is useful for planning where course demand will be. Calgary, Seattle, and Utah Avalanche all individually had

pockets of competition among local member organizations.

35-44	28.85%
45-54	26.78%
25-34	26.68%
18-24	9.00%
55-64	6.83%
65+	1.87%

Table 5: Usage by age for the 16/17 and 17/18 seasons.

Mobile	61.46%
Desktop	30.94%
Tablet	7.60%

Table 6: Usage by device for the 16/17 and 17/18 seasons.

7. CASE STUDY: WASHINGTON STATE SNOWMOBILE CLUB

With the launch of Backcountry Ascender in 2016, a Washington State Snowmobile club was used as a beta test group. Within this group, we created attention and transparency which included sharing progressions, publishing achievements, and publicizing awards. We paid particular attention to the three goals stated in the short abstract: reach the most unaware demographic, ignite and motivate the avalanche education cycle, and peer accountability.

The net result was that over the course of two seasons, the club has had over 180 people go through formal avalanche training. Many new members to the club and sport, previously unaware of the training they should have, participated in upper level courses because it was set as a priority by seasoned members. Additionally, the start of last season included planning for renewing the expired Backcountry Ascender activities.

The number of people who have taken courses has led to a “minimum requirements” culture. That is, EVERY club ride requires every member to have a transceiver, shovel and probe. Additionally, the minimum level of training is required to match the conditions and terrain. For example, a ride in complex terrain in considerable conditions may only be open to members that have a Level 1 certification or higher.

An unanticipated effect was that club membership grew at the same time, from about 200 members to 350 over the same two seasons. The attraction being the shift to an education and training-based culture.

130 Companion Rescue/Avalanche Awareness courses.

51 Recreation Level 1 courses.

11 CPR courses.

8 First Aid courses.

3 Recreation Level 2 courses.

Table 7: Total number of courses taken within the Snowmobile Club over the 16/17 and 17/18 seasons.

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Backcountry Ascender is built on the Alludo Learning platform: <https://www.alludolearning.com/>.

Alludo offers K12 districts and organizations an alternative to traditional instruction with a gamified, online and blended learning platform.

Alludo leverages gamification to encourage teachers, administrators, staff or students to acquire new skills and experience. By providing a fun, competitive, self-paced environment, players are empowered to own their learning, choose topics aligned with their goals while collaborating with peers, earning badges, and gaining knowledge.

For more information or questions, contact the author chris@sled360.net.

REFERENCES

- Bandura, A. (1994). Self-efficacy. In V. S. Ramachandran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).
- [3] Cherry, K (2018, Aug 08). Self Efficacy: Why Believing in Yourself Matters. Retrieved from <https://www.verywellmind.com/what-is-self-efficacy-2795954>
- [1] David L, "Social Learning Theory (Bandura)," in *Learning Theories*, June 19, 2015, <https://www.learning-theories.com/social-learning-theory-bandura.html>.
- “Gamification” Google Dictionary, Google Inc. (2018, Aug 17), From <https://www.google.com/search?q=Dictionary#dobs=gamification>
- [2] McLeod, S. A. (2016, Feb 05). *Bandura - social learning theory*. Retrieved from <https://www.simplypsychology.org/bandura.html>
- Wikipedia contributors. (2018, July 4). Social learning theory. In *Wikipedia, The Free Encyclopedia*. Retrieved 01:55, August 18, 2018, from https://en.wikipedia.org/w/index.php?title=Social_learning_theory&oldid=848765807
- Wikipedia contributors. (2018, August 2). Self-efficacy. In *Wikipedia, The Free Encyclopedia*. Retrieved 02:00, August 18, 2018, from <https://en.wikipedia.org/w/index.php?title=Self-efficacy&oldid=853058233>