PLAY TO LEARN – BREAKING THE AVALANCHE TRAINING MOLD

Developing effective training methods for reaching backcountry travelers

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ABSTRACT: On average 28 individuals die every year in North America as a result of avalanches.[1] Evidence has proven that avalanches can generally be avoided when approached with relevant data, proper protocols, and diligent decision making practices. Avalanche instructors across the globe are continually challenged with finding effective training methods to reach those that venture into mountain terrain to live, work, and play. To stop the trend of deaths, training must be ongoing, provide continual skills practice, and keep attracting greater numbers. A key target demographic is young males between 14 and 35 years. Because this particular group of individuals is also fueling the explosive growth in the computer and video game industry, an interactive technology game that offers a unique opportunity to learn, practice and challenge mountain travel skills could help solve this problem. The right educational training tool should be: produced with support from the entertainment industry, universities and avalanche professionals; distributed through state agencies, education centers, ski resorts, schools, retail shops, clubs, groups and by friends; captivate students of all ages and user types; utilize real case studies; include significant data; require critical thinking skills; provide multiple practice opportunities and challenge students in multiple scenarios. The time has come for *Avalanche*, a free mobile digital game that especially appeals to youth ages 12-18 years and motivates players of all ages to learn and practice skills for safe mountain travel in avalanche terrain.

KEYWORDS: mobile game application * avalanche game * snowmobile * education * avalanche * snow safety

Methods

Between January 2005 and September 2013, as the Executive Director of the North America Outdoor Institute, I helped coordinate and host 445 events and requested feedback data from 66,475 individuals to find out what training techniques they liked most. More than 28,000 people responded and approximately 70% said they preferred interactive training that included games. To test this theory we held training programs with identical curriculum objectives and overall content but marketed them in different ways. When we stated in our marketing materials that this was an educational training seminar, attendance would typically average between 10 and 20 people. But when marketed as a 'game,' numbers quadrupled attracting as many as 98 people to one session. This data indicated that interactive training methods, especially when delivered in a game format, attract more participants, yield greater feedback and show greater positive impact and retention than traditional seminar or lecture based training. Following game events we saw an increase of up to 25% in repeat attendance from participants than traditional training methods. Working with D.B. Palmer, EdD, at the University of Alaska Prince William Sound Community College, we are now using this data to help develop a series of interactive games (mobile game applications) for use as avalanche awareness educational tools.

Results

As a result of this project we determined that producing a video game or mobile game app designed to deliver the necessary content in a quality educational training format that is simple to access and use, enticing, graphically realistic, interactive, challenging and fun has the potential to effectively reach thousands across the United States and around the world resulting in a reduction in the number of avalanche related fatalities. Proceeds from the sponsorship or sale of the game will support the educational efforts of the Alaska Avalanche Information Center (AAIC,) University of Alaska Prince William

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Sound Community College (PWSCC) and other educational institutions delivering avalanche awareness training.

1. INTRODUCTION

Jace Columbe was a 15-year-old sophomore in Alaska when he and a friend went to Hatcher Pass to play on their snowboards. Columbe got buried in an avalanche but lucky for him, a friend saw where he went under and was able to find him and dig him out in time to save his life. They had no training or safety equipment and both said they had no idea that avalanches were a problem in this area before their experience; this despite numerous opportunities for training that had been offered at their school that winter by avalanche educators from the Backcountry Avalanche Awareness Response Team (BAART) and the North America Outdoor Institute (NAOI.)

How do you teach a 15-year old that if they ride their snowmobile up a 35 degree slope that is hiding a weak, faceted layer of snow, there is a good likelihood it could slide? Most often it will occur on a beautiful, sunny day with warming temperatures and a foot of fresh snow on top of that lurking beast. How do you explain that if the slope does rip out, they could get buried under that mountain of snow? How do you get them to understand that if they are not wearing an avalanche transceiver and their friends don't see where they are buried, they will likely never walk away from that experience? There will be no – 'Game Over – Try again.' Instead their parents will get that call that is every parent's worst nightmare. They will be forced to live with the gut wrenching reality that their child is dead; gone forever.

That's what happened to Alex and Natalia Dodov of Truckee, California. In March 2012 their 26-year old son Nicolay, after saving his money for years to fulfill his lifelong dream of riding his snowboard in Alaska, flew with a friend to the small coastal town of Haines to ride with a Heli access adventure company. Tragically Dodov and one of the guides with the group were caught in an avalanche and never came home.[2]

Had Dodov been given the opportunity to play a game that drilled in the critical lessons about snowpack, terrain management, weather, slope aspect…etc. there is a chance he would have recognized the dangers and made different choices that day resulting in a different outcome.

One of the greatest challenges facing all avalanche educators around the globe is how to effectively teach others about the potential dangers of avalanches and proven methods to avoid getting caught. This challenge doesn't apply to just 15-year-olds but to everyone traveling the backcountry; even those with years of training and experience who believe they know how to beat the odds. The guide with Nickolay Dodov and five snowboarders in Colorado (who lost their lives in a single slide)[3] proved that. They all had training, experience and the necessary equipment yet were still buried because they failed to recognize a few simple yet critical elements.

1.1 Target Audience

Any time you hear an avalanche instructor talk about 'Who is getting caught?' they typically describe males between 15 and 35 years of age.[4] This is the same demographic fueling the video gaming industry.

According to Wikipedia, as of 2013 the average age for a video game player is 30.[5] And this number is slowly increasing as people who were children when playing the first arcade, console and home computer games continue playing now on current systems.[6] A 2011 study conducted by the Entertainment Software Association (ESA) showed that 58% of gamers are male and 42% female.[7] As of 2011, ESA reported that 71% of people age six to forty-nine in the U.S. played video games, with 55% of gamers playing on their phones or mobile devices.

Many gamers start playing as children. According to TechCrunch, 91% of children between the ages of 2 and 17 play video games on a regular basis.[8]

In the United States alone, an estimated 99 percent of boys and 94 percent of girls play video games. Of these players, 97 percent play at least one hour per day. In 2010 revenue in the US from the video game industry topped $25 billion dollars compared to Hollywood's box office sales of $10.8 billion for the U.S. and Canada. Video games have also become an important part of popular culture.[9]

In a separate study conducted by Pew Internet in 2008, they determined that 97% of teens play video games almost every day.[10]

Because video games appeal to children as young as two and are often played by both men and women well into their 30's, 40's and beyond, building a multi-media avalanche awareness educational game targeted to this audience makes sense as a highly viable means of providing effective, ongoing training.

1.2 Making a difference with education

We know from years of research that education can and does make a difference in reducing the number of avalanche victims. According to the Colorado Avalanche Information Center in a 2006 report, avalanche accidents and deaths were reduced in their state by 50% after they instituted comprehensive education programs. [11] This shows that when people have the proper information and take diligent measures to follow critical protocols, they are less likely to be caught and killed.

Crafting video games to impart this knowledge, as well as ongoing opportunities for skills practice, will provide educational opportunities 24/7 for those that need it most. This game is in no way designed to replace live instructor training, but rather to enhance and reinforce the lessons in a virtual practice format.

An article which appeared in the *Journal of Educational Psychology*, points to new ways in which computer, console, or mobile educational games may yield learning benefits.[12] The article highlighted a study of Middle School age children conducted by researchers at New York University and the City University of New York, stating 'video games can enhance students' motivation to learn.'[13]

"We found support for claims that well-designed games can motivate students to learn less popular subjects, such as math, and that game-based learning can actually get students interested in the subject matter—and can broaden their focus beyond just collecting stars or points," says Jan Plass, a professor in NYU's Steinhardt School of Culture, Education, and Human Development and one of the study's lead authors.[14]

"Educational games may be able to help circumvent major problems by placing students in a frame of mind that is conducive to learning," said co-lead author Paul O'Keefe, an NYU postdoctoral fellow at the time of the study and now at Stanford University's Department of Psychology.

I'm convinced that building a digital game application to teach safe backcountry travel with a mastery goal orientation will provide ongoing practice and learning opportunities to effectively deliver critical training skills for all backcountry travelers.

1.3 Benefits of play

Research in developmental and evolutionary psychology has long shown the benefits of play as children grow and develop. But recent studies conducted by numerous institutions including the Office of Naval Research, U.S. Department of Defense, have proven that video games also benefit teens and adults. Their research indicates that video games can help adults' process information much faster and improve their fundamental abilities to reason and solve problems in unusual or challenging situations.[15]

"We have discovered that video game players perform 10 to 20 percent higher in terms of perceptual and cognitive ability than normal people that are non-game players," said Ray Perez, a program officer at the ONR's warfighter performance department in a Jan. 20, 2014 interview on Pentagon Web Radio's audio webcast "Armed with Science: Research and Applications for the Modern Military."[16]

During a nine-year study at the North America Outdoor Institute, we developed interactive training programs designed as games to reach backcountry travelers of all ages and types. The 'Be Snow Smart' curriculum was originally funded by the Alaska Department of Natural Resources, Division of Parks in 2005 under a SnowTrac grant. This program was subsequently supported through annual community grants and contracts from the Alaska Division of Parks and the Alaska Department of Public Safety – *State Troopers.* This statewide awareness campaign promoted and focused on game play received 60-70% more participation and feedback than traditional seminar or lecture based courses. Everyone wanted to learn when information was presented in a game format.

2. BUILDING THE GAME

When the theory of an avalanche game was first presented to professionals, the general opinion I received was that avalanches are NOT a game and this idea would spread the WRONG message. For several years I put the avalanche game concept aside and our team focused on interactive training curriculum projects. This

resulted in the 'Wilderness Safety Challenge' where students learn backcountry preparedness by completing challenges presented through scenarios in a game format. This program proved successful and is currently being delivered by the North America Outdoor Institute across Alaska from Southeast to the Arctic Slope. But the challenge is sustaining this effort. The cost of instructors, travel, materials, supplies… is daunting and finding reliable streams of revenue to support these expenses massive. A digital game that can be downloaded to a phone, tablet or computer and played anytime, anywhere could potentially support the live instructor lead courses through sponsorship sales and incentives and reinforce the lessons taught by these instructors.

We carefully considered how to build the game and discovered that researchers consistently found games with a mastery goal orientation versus a performance orientation[17] actually facilitated learning because students were focused on accruing knowledge and developing abilities over doing well and looking good. In a mastery goal type of game, students stated they viewed mistakes and difficulties as part of the learning process—rather than a sign of their lack of ability. In contrast, performance goal driven games seemed to have the opposite effect, especially for students who did not feel competent in the subject and feared they would look less intelligent than their peers. Performance goals seek to demonstrate ability to others. People who set performance goals are often focused on winning, looking good, looking smart, and being evaluated well (getting good grades). Mastery goals, on the other hand, seek to improve and learn, no matter how awkward the participant might look to others. People who set mastery goals usually seek out challenges and persist in the face of difficulties.[18]

DB Palmer, EdD, along with other staff and students at the University of Alaska Prince William Sound College, are working in collaboration with myself, Debra McGhan, and the Alaska Avalanche information Center to develop the psychological components that will help motivate players to strive toward mastering skills in order to unlock rewards and receive upgrades. The curriculum and skills behind the game will focus on utilizing the mastery goal orientation and key avalanche training elements delivered by professional snow safety instructors from the American Institute for Avalanche Research and Education and recognized by the American Avalanche Association.

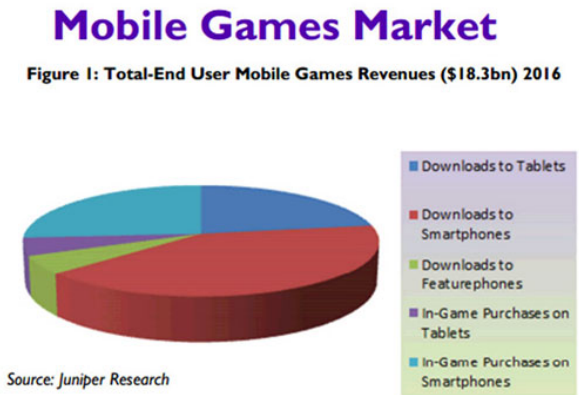
2.1 Game Design and Platform

In an effort to determine the best method for reaching mass populations with an ongoing practice and training tool, we reviewed and considered numerous popular video game engines and platforms. A game engine is a software framework designed for the creation and development of video games. Video game developers use them to create games for video game consoles, mobile devices and personal computers.[19]

Console Games like X-Box, Wii, Play Station and Ouya[20] require specific hardware, software and massive budgets to produce. The end result is a game that retails for about $50 and has a limited demographic and market segment.

Our goal is to develop a game that is easily accessible, (mobile phone, tablet, laptop…) simple to play, challenging enough to motivate ongoing play (practice) and loaded with rewards that can be translated from digital to real life. And we want this game to be free to the end user; that means supported by the retail industry through sponsorships and product donations and by state and public agencies.

Through our research we discovered that free game apps like Subway Surfer© ™and Hill Climb Racing©™ are extremely popular and downloaded and played thousands of times a day.[21] Despite being free to the end user, these games and other mobile applications are generating billions in annual revenue. And the trend is expected to continue.[22]



Our goal is to build the Avalanche game using a multiplatform game engine such as Unity[23] which enables the finished game to be

customized for a dozen different platforms. We plan to ultimately develop a series of games that help backcountry travelers pack and prepare for adventures and then experience skiing, snowboarding, sledding, hiking, snowmobiling or other mechanized access scenarios. The avalanche training portfolio of games will begin with a snowmobile hill racer in a similar format to Hill Climb Racing.©™

2.2 Funding and Distribution

In order to fund the development and initial distribution phase of the game, we have applied to the Entertainment Software Association Foundation (ESAF,) and plan to partner with the retail industry such as snowmobile manufacturers and those that build and sell skis, snowboards, snowshoes, sleds…etc. We will reach out to mountain recreational areas such as ski resorts and remote lodges, and partner with state and local agencies (parks, public safety, health and human services…,) schools, clubs and organizations across the US for further distribution. We anticipate funding the discovery and testing phase of the project with grants from ESAF, the National Endowment for Humanities (NEH) Digital Projects for the Public and Kickstarter.

It is our intention to launch a social media campaign to raise awareness about the project and solicit partnerships from sponsors, educators and individuals interested in funding, testing, and providing feedback (to determine overall effectiveness.)

Revenue from grants, sponsorships, contracts and donations will be used to develop, distribute and continually improve this product with added components, challenges, scenarios and upgrades to enhance the overall educational experience. A percentage of the proceeds will support ongoing avalanche awareness education and forecasting.

2.3 Evaluation

Thorough evaluation is critical to ensure that those that utilize this tool receive the RIGHT messages including: Avalanches can kill you for real; there are simple things you can do to ensure you don't get caught; you must always be vigilant, in-tune with and aware of your surroundings; carry the right gear and know how to use it; understand the impact of weather, terrain and people when it comes to avalanches… these things can save your life.

In order to determine if the game achieves the desired outcome it will require participation from thousands of volunteers willing to play and then provide feedback on their individual experience.

We will incorporate a strategy of including a reporting mechanism that players are automatically presented with at the end of their game session.

Participants will be motivated to submit feedback by the opportunity to earn more coins for deeper access and to win real prizes such as airbags, beacons, shovels and probes thanks to industry sponsors.

This feedback will provide critical information to help refine future versions of the game to ensure continual advancement in player skill mastery.

3. CONCLUSION

In order to achieve an effective method for changing the attitude, culture and practices of those that live, work, and play in the mountains requires a new way of delivering this vital information.

After careful research and reviewing thousands of student feedback forms, I am convinced *Avalanche! the mobile game,* has the necessary elements to accomplish this outcome.

We know that everyone loves to play games and we know that teens and adults are using mobile apps for gaming more than ever before. By providing a fun, interactive avalanche game that requires critical thinking and mastery of skills, I believe we can alter the trend and reduce the incidents of avalanche related injuries and deaths.

If proceeds from the sale and distribution of the game earned through community and industry sponsorship are used to host field events with live instructors, we will further reinforce the lessons and expand the impact. Instead of just learning about avalanches, people will be using their minds and bodies to actively experience and practice the skills under the trained eye of a professional who can ensure they are performing the skills to complete mastery.

I, and all the people on my team who have helped make this project possible, hope this game will become a moving force in changing the culture and attitude about mountain recreation and travel by teaching critical skills and raising awareness of the potential dangers of avalanches. In addition we believe this could be a motivating factor for getting people outdoors to experience life to the fullest in safe, fun ways.

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