Motivation and Adventure Learning

Aaron Doering
Department of Curriculum and Instruction
University of Minnesota
United States
adoering@umn.edu

Eric Riedel
Center for Applied Research and Educational Improvement
University of Minnesota
United States
riedel@umn.edu

David Ernst
Department of Curriculum and Instruction
University of Minnesota
United States
dernst@umn.edu

Cassie Scharber
Department of Curriculum and Instruction
University of Minnesota
United States
scha0809@umn.edu

Abstract: This paper analyzes the adventure learning (AL) project, PolarHusky, which used motivational factors such as the polarhuskies (the sled dogs), the real-time delivery of far-away places, and the collaboration with educators, experts, and other students. The instructional designers of PolarHusky designed their AL project with Keller's motivational principles in mind. This study reports 1) how student motivation is related to the student and teacher characteristics of those who used this online adventure learning environment and 2) how motivation is related to the ways in which the adventure learning environment was used within the classroom. Surveys of 228 respondents who used the online curriculum in 300 separate courses, 21 interviews, and three classroom observations were analyzed.

Introduction

Jill, a middle school teacher using the adventure learning (AL) program, PolarHusky, commented:

I think it's probably one of the neatest things I've ever used. This is history in the making and that it's delivered to us daily --it's just a phenomenon…It's just mind-blowing that technology has come this far that we can actually do that.

It's real exciting for them [students]. We do it at the end of the day. And they know when they're getting on the computer that they're going to be seeing the videos with the pictures and that's really the best way for me to talk to the content. Something really hands-on like that. It's the visual. And the dogs are just incredible. You know for them to see it, to walk it, to hear. One of my students is visually impaired, he's legally blind, and to hear the dogs barking and stuff, he's real excited about that.

The 2004 PolarHusky AL project consisted of a 3,000 mile dog sled expedition across the Canadian Arctic. The program provided a free eighteen-week K-12 curriculum and online learning environment that began in February 2004 and concluded in June 2004. The website had two main portals, a public audience portal and a student and teacher portal or "The Online Classroom." The Online Classroom was a collaborative learning environment developed concomitant with the development of the online curriculum to create a seamless learning experience. Various multimedia tools within the online classroom enabled students and teachers to interact live with

explorers, educators, scientists, Inuit and fellow users. This gated online community included customized web offerings (thematically-based virtual tours and educational animated movies), multi-media (access to images, audio, video and data from the field is central to the learning experience), integration of geographic information systems technology, collaboration zones and moderated chats.

Jill shared that her students were very motivated to use the PolarHusky AL program. The students' passions for the online learning environment and the curriculum inspired this teacher to participate in the curriculum as "frequently as [she] possibly could." What was the source of the students' motivation?

Motivating students is a goal of every educator – we all strive for the magic ingredients to see our students get excited about learning. Educators struggle to design learning opportunities that will motivate learners by finding the most authentic content they believe will relate to the learner. According to Gagne & Driscoll (1999), the most important element in learner motivation is the "desire to enter into the learning situation." However, we also know that even the most motivated learner will find a classroom with extremely rich content boring if the instruction is not appealing. Krathwohl, Bloom & Masia (1964) note that interest and motivation are principal indicators of cognitive engagement and normally a task in and of itself is not sufficient for learning. Attributes such as attention and metacognition are required and cognitive engagement is an outcome of high levels of motivation (Carroll, 1989; Wittrock, 1983). Thus, the goal of an instructional designer is to create learning environments that are motivational.

Keller's (1984) ARCS model of motivational design states that attention, relevance, confidence, and satisfaction need to be met when designing learning environments. These principles of design can be applied to designing adventure learning projects such as PolarHusky. *Attention* can occur by providing an opportunity for learners to experience the unknown. *Relevance* can be obtained by relating subject matter to the learner's prior knowledge. *Confidence* can occur by providing scaffolding for the learner to succeed. *Satisfaction* can be acquired by providing experiences that are meaningful and relevant to the learner's life experiences. Furthermore, the questions that Keller poses such as, "What can I do to capture their [students'] interest?" and "How can I assist in building a positive expectation for success?' are questions that instructional designers of adventure learning projects must address within all phases of its design process.

Purpose

The PolarHusky AL project uses motivational factors such as the polarhuskies (the sled dogs), the real-time delivery of foreign places, and the collaboration with experts in the field. In this study, we are looking to answer the following questions about PolarHusky:

- How is student motivation related to the student and teacher characteristics of those who used this online adventure learning environment?

- How is student motivation related to how the adventure learning environment was used within the classroom?

Methods

Educators who registered to use the PolarHusky program were asked to complete a pre- and post-implementation survey or a single, post-implementation survey. A sample of 109 users that had registered in December 2003 and January 2004 completed a pre-implementation survey. Of these users, 41 responded to a request to complete a post-implementation survey in April and May 2004 and described how they implemented the program in at least one course. A second sample of 339 users was recruited via email to respond to a one-time survey in April and May 2004 from lists of registered users who had not completed the pre-implementation survey. Of these, 187 users provided detailed information on how they implemented the program. A common set of questions made up both the panel and post-implementation only survey with the panel sample designed to test causal hypotheses generated from the larger combined survey sample. A combined data set was constructed from the two surveys yielding 228 respondents who described implementation activities in 300 separate courses.

The survey data was supplemented with two qualitative data sources. First, of the 109 users who responded to the initial pre-implementation online survey, 21 users took part in a 15-minute telephone interview in April 2004 on their use of and opinions toward polarhusky.com. This set of interviews included four teachers who taught special education students, one teacher who taught gifted students, five teachers who taught elementary students (K-5), seven teachers who taught junior high students (6-8), one high school teacher (9-12), two teachers who taught a

combination of grade levels, and one multi-district curriculum coordinator. Second, three observations were conducted on classrooms using the PolarHusky program which were paired with in-depth interviews of the teaching staff in those classrooms.

The phone interview and observation data were analyzed using a constant comparative method (Glaser & Strauss, 1967) to develop the salient categories and patterns. First, compiling the data that pertained to each interview developed an individual data set for each participant. Then, the data was read noting emerging patterns across individuals. The patterns were compiled and reread searching for confirming and disconfirming evidence for the patterns. A consensus on the salient patterns that emerged from the data was identified.

Results

Quantitative Analyses

The following analyses (Table 1) are presented using the class as the unit of analysis (n=300). The analyses investigated how levels in the student motivation scale were related to student and teacher characteristics as well as how the adventure learning (AL) site, polarhusky.com, was used in the classroom.

The motivational impact of the AL project data show that at the "slightly agree" level or higher, 88 percent of the teachers stated their students' academic motivation increased when using the AL program. Furthermore, 80 percent of the teachers, at the "slightly agree" level or higher stated their students were motivated to learn about environmental issues, the core theme of the AL curriculum. Lastly, the data show that, once again, 80 percent of the teachers, at the "slightly agree" level or higher stated their students were motivated to seek out more information in content areas subjects after using the AL program.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree	Number of Classes
Statement A	23.9%	36.0%	16.3%	15.2%	4.5%	4.2%	264
Statement B	3.4%	1.9%	6.4%	27.7%	37.1%	23.5%	264
Statement C	2.6%	11.3%	10.6%	24.5%	34.7%	16.2%	265
Statement D	3.0%	5.6%	10.9%	31.6%	31.6%	17.3%	266
Statement E	2.6%	5.3%	7.2%	27.2%	33.6%	24.2%	265
Statement F	3.4%	7.2%	9.5%	25.1%	35.0%	19.8%	263

Statement A:	Things like the movies and the dogs were fun for kids to see but they rarely led to deeper learning in content area subjects.
Statement B:	In general, my students' academic motivation increased when using Arctic Transect 2004 activities.
Statement C:	In working with Arctic Transect 2004, many of my students used technology more and/or learned how to use new technology.
Statement D:	My students were motivated to learn about environmental issues.
Statement E:	My students developed an appreciation for the Inuit culture and people.
Statement F:	The excitement of the Arctic Transect 2004 adventure motivated students to seek out more information in content area subjects.

Table 1: Analysis of motivational questions

These data are not useful unless we can identify what predicts teacher reported student motivation (Table 2). Within the study, the dependent variable is a motivation scale made up of items b, d, e, and f with a Cronbach's alpha reliability equal to .88, a mean of 18, a standard deviation of 4, and a range between 4 and 24. Students enrolled in grades K-6 rated significantly higher on the motivation scale with a mean of 18.4 versus 16.5 for classes with higher grade levels. Differences between course content areas were not observed.

The total number of years spent teaching correlated weakly with student motivation ($r=.18$, $p < .05$). Furthermore, a self-report measure of overall teacher skill with instructional technology was not associated with student motivation. A four-item teaching philosophy scale measuring emphasis on teaching "basic facts" was

negatively correlated with student motivation (r=-.19, p < .05). Therefore, teachers who were more "constructivist" in their teaching led to a significant increase in student motivation.

Student motivation was moderately correlated with a measure of how frequently the AL site was used in a course (r=.36, p < .05) Several methods of access were associated with higher levels of student motivation. These included individually using computers in a computer lab; sharing computers in a computer lab; and sharing computers within a classroom (each class using it in this condition had a statistically higher level on the motivation scale based on independent sample t-tests with p < .05). Interestingly, whether the students worked individually on computers in the classroom or at home was not associated with student motivation.

No differences in student motivation existed between classes depending on whether PolarHusky replaced the curriculum, was used as a supplement, used as an enrichment opportunity, or played another role (based on one-way ANOVA).

Finally, student motivation was correlated with the frequency with which a class read about the environment, read about the Inuit, read about the dogs, accessed videos and audios, used the curriculum guide, read weekly updates, and accessed the photo journal on the AL website.

	Statement B	Statement D	Statement E	Statement F	Motivation Scale (b + d + e + f)
a. Participated in an online chat	.041	-.020	-.027	.136(*)	.057
b. Posted something in one of the website zones	.046	.096	-.030	.088	.084
c. Read about the environment	.087	.300(**)	.236(**)	.270(**)	.263(**)
d. Read about the Inuit	.305(**)	.315(**)	.497(**)	.365(**)	.444(**)
e. Read about the dogs	.207(**)	.199(**)	.198(**)	.259(**)	.256(**)
f. Accessed videos and audios	.188(**)	.160(**)	.172(**)	.173(**)	.211(**)
g. Used activity from the curriculum guide	.240(**)	.352(**)	.282(**)	.311(**)	.358(**)
h. Read weekly updates (trail reports)	.268(**)	.314(**)	.314(**)	.297(**)	.358(**)
i. Looked at the photo journal	.281(**)	.291(**)	.270(**)	.273(**)	.335(**)
j. Took a quiz about the expedition	-.050	.066	-.015	-.015	.001
k. Raised money for the expedition	.143(*)	.052	.041	.147(*)	.113
l. Used GIS	.004	.076	.082	.001	.047

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Statement B: In general, my students' academic motivation increased when using Arctic Transect 2004 activities.
Statement D: My students were motivated to learn about environmental issues.
Statement E: My students developed an appreciation for the Inuit culture and people.
Statement F: The excitement of the Arctic Transect 2004 adventure motivated students to seek out more information in content area subjects.

Table 2: Correlation of AL online learning environment and motivation

Qualitative Analyses

The semi-structured phone interviews were analyzed to elicit the teachers' perspectives on student motivation as it related to teacher and student characteristics and the use of the online learning environment. Teachers' responses gleamed specific insights into a classroom using the adventure learning environment.

Student Reactions to Adventure Learning

The teachers explained in detail the students' reactions to the adventure learning program. The reactions most commonly expressed were related to the online learning environment. Susan described her students' reactions

to PolarHusky, specifically to Timber Tales, a daily update from the educators on the trail from the perspective of one of the dogs, Timber.

> They love the trail updates and they love the pictures. They especially loved the Timber Tales. They were like, I asked them in getting ready to talk with you, is there anything that you'd like me to tell them that maybe you would like more or less of or something different? The students said 'more Timber Tales.' We would go in on a daily basis and update them with any pictures or movies…we would use the map to map out the team. . . They love the site, there were just so many things on the site that we used throughout the time. Like I said, it was just really good. They liked seeing pictures of the team. They talk about them as if they know them. Oh and they actually participated in some of the chats as well.

Susan also expressed that she had not used anything that was so "comprehensive." "You could just go to one site and capture so many different things and allow them to interact with so many different things. The students loved it. For my students, it was wonderful. They could see it, they could interact with it. It was just very postive for them." Debbie and nine other teachers explained how the chats between the experts and explorers in the field and their students motivated them. Debbie said, "They like that it's interactive. It's fascinating for them. They are so pumped about it. They will do anything for the chats."

The most common theme occurring in more than 90 percent of the responses were comments relating to the dogs. Sue, an elementary teacher stated:

> Anything about the dogs. That was a really good idea to get the little ones interested. For the little ones, the dogs are like people to them. So you know, they are as equally interested in what's going on with the dogs as they with what's going on with the team and they were really excited about uploading pictures of their dogs to that Dog Zone area. They thought that was really exciting. They have certain dogs that the follow. They try to pick their dog out, you know, if there are any QuickTime^{TM} movies or anything, they try and pick out their dog from the group.

Other teachers described how the dogs were the common strand that the students would discuss outside of the classroom. The students would consistently refer to a favorite dog and how they were wondering how he or she was doing. The dogs were easy for the students to love and be motivated to seek out on the site as they "know dogs and can relate to them."

Teachers also identified certain movies that "motivated" students to go to the online classroom. Sue said, "They really like the one called the Young Musher. It was that movie that had Annika Olsen. They loved that because she's their age." A second-grade teacher said her students would "view [the] video clips and check out the scrapbook. The kids really liked that." Debbie said her students "enjoyed the "Culture" zone" and followed along as they viewed the pictures, read about the team, and participated in the online chats. She said the students enjoyed working with the vocabulary, "They really liked that. That was a lot of fun. I was glad to see finally that there were ways to pronounce the words (laughter). That was…because if there had been some, like "monuck-nuck"…the thank you, was really hard to understand. How exactly do you pronounce this? We had a lot of fun with that."

Motivation and Exceptional Classrooms

Although the adventure learning environment was used the majority of the time in elementary classrooms, student motivation was mentioned 40 percent of the time in interviews conducted with teachers of exceptional classrooms. These classrooms included gifted and talented, learning and emotionally disabled, and classrooms where students are teenage mothers or fathers.

Gifted and talented teachers reported their students would read the entire trail report and interact with the daily and weekly updates. They would use all levels of the curriculum, but would utilize the "Explore" level most often. (The "Explore" level is the most advanced level of the curriculum.) Katie, a gifted teacher, said this adventure learning program was "an online learning curriculum replacement." Students were motivated to read the entire trail report, "the whole length version of it." Many of the students would "write back and forth, some of them chose to explore further, of course, things like polar bears, and some of them chose to focus on cultures or vocabulary keeping a vocabulary log." The learning environment and curriculum provided "so many learning opportunities that each student found an area to explore and engage in."

Learning disabled students enjoyed "listening to the report and looking at the pictures." Martha said, "We have done a lot of sensory activities to go along with the project that are in the curriculum." She described an activity where the students would be motivated. The students would "use communication devices to talk to other people. So they use the communication devices to go around and interview classes [about the arctic]." When referring to the online learning environment, she said, "We could use it all, pretty much every part of our day." Susan, another learning disabled teacher said, "Communication is one of our biggest goals that we're working on. Getting them to communicate in any way and do things with communication devices such as listening to stories and letting them find things that are interesting to them." She continued, "It has been interesting for them which helps us to get them motivated to do different activities."

Brad, a high school teacher said, "We have teen moms and teen dads, just different situations. Kids that are sick and so, you can't really have a group that you can take through an experience like this. Our group only comes sporadically. We seem to run into this with everything we do. But in this case, this is an adventure, and they started and they are progressing, and you are not even there with them." Five of the teachers stated they liked the curriculum and it was motivating for the students because a teacher could "adapt it for students with special needs." They could use the curriculum for all ranges of students within their classroom.

Three classrooms of exceptional students were also observed. The AL program was used in a variety of ways in different classrooms, depending on the age and academic level of the students, the technical circumstances in the classroom and the desired outcomes set by the classroom teacher. One factor that was exhibited in all observed classrooms, however, was that the curriculum and website were motivating factors in students' learning.

Exceptional Classroom – Jane

Jane is a teacher in a large Midwest urban public school district. She teaches in a school for children and young adults, ages 5-21, who display a variety of developmental disabilities. Jane taught five severely disabled students using the AL curriculum and website. Sitting in a small circle around the classroom computer, Jane played the audio trail reports from website in class, and used them to motivate her students.

> … one of the main things that we work on is communication … learning to communicate helps them have some say in what they want and what they want to do, and finding things that are interesting to them to interact with … getting them interested in communicating, giving them a purpose to communicate, and then responding to that helps them learn. There were a lot of things built into the curriculum that really helped us build in a reason for them to communicate…

The audio and video clips on the website are particularly motivating for her students.

> … a lot of the other programs out there are written, and you have to read it to them … none of these guys can read, so it's me reading it to them and me talking, which is what they get to do all the time, listen to me talk. This is listening to a variety of people talk and listening to the different sounds and different things like that was a big part of it because it keeps their interest …

Jane mixed her own classroom materials and objectives with the AL curriculum. She used the website materials to motivate her students, and then mixed in a related activity that got students to meet her objectives, such as decision making and communication. For instance, the class listened to the audio trail report about the arctic weather to engage the students in a discussion about seasons, and then choose, cut and pasted paper icons of favorite seasonal activities onto poster paper.

Exceptional Classroom – Susan

Susan teaches elementary gifted and talented students. Her school is in a small Midwestern suburban public school district. Susan sees her students for one hour, twice a week. Her role as the gifted and talented teacher is to guide her students into more in-depth study of all subject areas.

Again, the website materials, particularly the audio and video components, motivated her students. "They are immediately drawn to the video. They want to be able to see the movies. That's the first place that they'll go. Either that or they love going into the dog yard…"

In addition to the audiovisual media, the students were also motivated by the excitement of the adventure. When Susan asked about their favorite parts of the site, students listed pictures, the dog yard, the interactive map, audio trail updates, but they also mentioned "reading about what's happening."

The 17 third graders in one of Susan's classes took a few moments to discuss the day's activities, then movde to the school library where they each sat at one of the 21 computers. They opened a browser window, navigated to the polarhusky.com website, and read the most recent trail report.

> … they have to read the trail update first, then they can go to different sites, or different areas within that particular day that we're reading, and then if they finish that then they can go back and explore some of the other pieces.

The students were then instructed to find one or two "fun facts" to share at the end of class. The students read the trail reports with interest, and then moved on to the audiovisual components of the site if they had time. At the end of class, they gathered in a circle on the carpet in the library and shared their "fun facts" with Susan and each other.

Susan will usually connect a larger project to a series of lessons. For example, students did a research project on a specific dog, they experimented with the density and melting point of snow, and they studied the Inuit flag and then designed their own family flag (all the flags were later made into one large quilt).

Susan used the curriculum because she feels "… it would provide enrichment and a challenge for the type of students that I serve, which are the gifted population of kids, and that it would be enriching enough that it would hook them."

Exceptional Classroom – Julie

Julie is a parent volunteer at a private school in a large metropolitan area. Julie volunteered to start a "Polar Husky" club in the school. The club included students in kindergarten through grade six, and met every other week in the school computer lab. Students come when they can, but generally a core group of about 25 students showed up for each meeting. Julie's objective in starting this club was to give the students a global perspective, an appreciation for cultures, and a love of the outdoors.

Julie described her technical skills as "I can barely read my email" so she convinced another parent, Paul, who she described as "a computer wiz," to help with the club.

At the observed meeting, students sat at a computer, then turned to watch the video screen. Paul turned out the lights and projected videos from polarhusky.com onto the screen. They all watched the videos, then projected the text trail report. Students took turns reading the trail report for the whole group. They stop periodically when questions arise or vocabulary explanations are needed.

After the lights came back on, the students were split into groups of three or four. The older children were matched with younger children to help them with the task of doing some online research and answering a few questions. Each group went to a third party web site and answered the following questions: "Why should polar bears be worried about global warming? Why should Polar Huskies (you guys) be worried about global warming? Whaddaya gonna do about it?" The last several minutes of the club meeting were devoted to the small groups sharing their answers to these questions with the large group.

Julie saw her role as supplying the "candy" and keeping the students "hooked." She defined the "candy" as the movies, Timber Tales, the trail reports, the audio, and "… the big hook, surprise, surprise, is the dogs. And everybody who came the first time was just crazy about the dogs."

Conclusions

Although the overall technology skill of a teacher did not influence student motivation, student motivation was correlated with teachers who taught with a more constructivist pedagogy, visited the AL web site with increased frequency and received support from their colleagues. Student motivation was correlated with many features of the AL online learning environment. Student motivation was also correlated with students who read about the environment, Inuit and dogs; accessed videos and audios; used the curriculum guide; read weekly updates; and accessed the photo journal, These students were more motivated to learn and use the environment.

Teachers reported that students' reactions to the website were postive and "motivating." They identified that the real-time and frequent updates to the website were motivating to the students as they were looking forward to the new photos, videos, and trail reports on a daily and weekly basis. They also participated in the online chat environment whenever they possibly could. Students commented frequently on Timber Tales, a trail update from the perspective of the dog, Timber. Students requested to their teachers and Education Basecamp that they would like to see Timber Tales on a daily basis throughout the entire AL experience. Students were motivated to use the AL site and learn the content as they could relate to the dogs and their experiences. Over 90 percent of the teachers mentioned that their students "loved" the dogs and it kept them returning to the web site.

Although K-6 students used the AL environment most frequently, teachers of exceptional students commented that the interactive nature of the environment motivated their students. The images, sounds, movies, and constant updates kept the students "interested" and "attentive." The "communication" that took place from the experts and explorers in the field to the classroom and between classmates was noted as a major success. Teachers also reported that the curriculum, with three levels of learning they could choose from, gave them the opportunity to adjust the learning experiences to meet the needs of the students.

Keller's ARCS model became apparent throughout this project and this study. *Attention* was achieved by numerous features of the online learning environment depending upon the learner; the movies, audio updates, chats, and trail reports gained the student's attention and the frequent updates kept the attention level constant. *Relevance* was achieved by tailoring the curriculum to meet the needs of the students and most predominantly, the polarhuskies. Teachers described their students' strong connection to the dogs on the trail and how they would become just as acquainted with them as they would their best friend. The students could relate to the dogs and thus, the dogs provided the relevance and motivation. *Confidence* occurred through the use of the online learning environment and the students' interactions with their peers. The students could "control" the movies, audio, and trail reports on their own and they could also "post" their own pictures and stories while reading other students stories. Lastly, *satisfaction* occurred through success with the curriculum activities and because of the fact that the updates were always on time and the students "could look forward to them on Monday mornings."

References

Carroll, J.B. (1989). A model of school learning. Teachers College Record, 64: 723-733.

Gagne, R. & Driscoll, M. (1999). Learner Motivation. [Online]. Available:
http://www.courses.psu.edu/trdev/trdev518_bow100/gagne4present/sld001.htm

Glaser, Barney & Strauss, Anselm L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Chicago: Aldine De Gruyter.

Keller, J. M. (1983). The use of the ARCS model of motivation in teacher training. In K. Shaw & A. J. Trott (Eds.), *Aspect of educational technology; Vol. XVII. Staff Development and career updating*. London: Kogan Page.

Krathwohl, D.R., Bloom, B.S., & Masia B.B. (1964). Taxonomy of educational objectives. The classification of educational goals. Handbook II: affective domain. New York: David McKay Company, Inc.

Wittrock, M.C. (1986). Learning science by generating new conceptions from old ideas. In L.H.T. West & A.L. Pines (Eds.), Cognitive structure and conceptual change. Orlando: Academic Press.