CHALLENGE COURSE - RESEARCH, DESIGN, AND PLAN

A CREATIVE PROJECT (3 CREDITS)

SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL

FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS

BY

JESSICA M. EDENFIELD

DR. AMY GREGG – ADVISOR

BALL STATE UNIVERSITY

MUNCIE, INDIANA

MAY 2013
TABLE OF CONTENTS

Table of Contents .................................................................................................................. i
List of Tables ............................................................................................................................ iv
List of Figures ........................................................................................................................... v
Introduction ............................................................................................................................... 1
Project Description .................................................................................................................... 1
Problem Statement .................................................................................................................... 1
Role of Researcher ...................................................................................................................... 2
Literature Review ....................................................................................................................... 4
Definitions and Background of Challenge Course ................................................................. 4
Benefits of Challenge Courses ................................................................................................. 6
Developmental Sequence ......................................................................................................... 7
Socializing Games ..................................................................................................................... 8
Group Initiatives ....................................................................................................................... 9
Low Elements .......................................................................................................................... 10
High Elements .......................................................................................................................... 11
Outdoor versus Indoor Courses ............................................................................................... 11
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana Collegiate Courses</td>
<td>13</td>
</tr>
<tr>
<td>Potential Users</td>
<td>14</td>
</tr>
<tr>
<td>Methods</td>
<td>16</td>
</tr>
<tr>
<td>Site Evaluation</td>
<td>16</td>
</tr>
<tr>
<td>Specific Regional Concerns</td>
<td>16</td>
</tr>
<tr>
<td>Hults Farm</td>
<td>18</td>
</tr>
<tr>
<td>Survey</td>
<td>21</td>
</tr>
<tr>
<td>Company Assessments</td>
<td>22</td>
</tr>
<tr>
<td>Alpine Towers</td>
<td>23</td>
</tr>
<tr>
<td>Adventure Based Experiential Educators</td>
<td>25</td>
</tr>
<tr>
<td>Project Adventure</td>
<td>25</td>
</tr>
<tr>
<td>Project Design</td>
<td>26</td>
</tr>
<tr>
<td>Course Layout</td>
<td>26</td>
</tr>
<tr>
<td>High Ropes Course</td>
<td>31</td>
</tr>
<tr>
<td>Taco Cargo Net</td>
<td>36</td>
</tr>
<tr>
<td>The Bridge</td>
<td>36</td>
</tr>
<tr>
<td>Multi Sky Log</td>
<td>38</td>
</tr>
<tr>
<td>Sky Log</td>
<td>38</td>
</tr>
<tr>
<td>Swinging Log</td>
<td>39</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1. Indiana Universities that have Challenge ................................................................. 14
Table 2. Challenge Course Survey Questions........................................................................ 22
Table 3. Low Ropes Course Elements................................................................................... 45
Table 4. Indiana Tree Species............................................................................................... 52
LIST OF FIGURES

Figure 1. Tuckman's Developmental Sequence .......................................................... 8
Figure 2. Indoor Course Layout ................................................................................. 12
Figure 3. Average Temperatures of Muncie, Indiana .................................................. 16
Figure 4. Shade Buying Tree Guide ........................................................................... 17
Figure 5. Driving Directions to Hults Farm ............................................................... 19
Figure 6. Map of Hults Farm .................................................................................... 21
Figure 7. Alpine Tower ............................................................................................ 24
Figure 8. Property Design ....................................................................................... 26
Figure 9. High Ropes Course Site ............................................................................ 27
Figure 10. Photos of Hults Farm Selected Site taken in the Summer of 2012 .......... 28
Figure 11. Photos of Hults Farm Taken in Summer 2012 ........................................... 29
Figure 12. Photos of Hults Farm Selected Site taken in the Winter of 2013 .......... 30
Figure 13. Cargo Net .............................................................................................. 32
Figure 14. Swinging Bridge ..................................................................................... 33
Figure 15. Taco Cargo Net ...................................................................................... 33
Figure 16. Aerial View of High Element Layout ...................................................... 34
Figure 17. High Element Layout ............................................................................ 35
Figure 18. The Bridge ............................................................................................. 37
Figure 19. Sky Log ................................................................................................. 38
Figure 20. Heeby Jeeby .......................................................... 39
Figure 21. Burma Buckets ..................................................... 40
Figure 22. Earthquake Bridge ............................................... 42
Figure 23. Entrance to the Low Ropes Trail ........................... 43
Figure 24. Low Element Layout .......................................... 44
Figure 25. Detailed View of Elements 1-3 ............................ 47
Figure 26. Detailed View of Elements 4-8 ............................ 47
Figure 27. Survey Results for Specific Elements .................... 48
Figure 28. Zip Line ............................................................. 49
Figure 29. Mohawk Walk .................................................... 50
Figure 30. Spider Web ......................................................... 51
Figure 31. Survey Results for Cost of Construction ................. 53
Figure 32. Helmets and Hardware ...................................... 54
Figure 33. Climbing Helmets .............................................. 55
Figure 34. Harnesses .......................................................... 55
INTRODUCTION

Project Description

The purpose of this creative project is to research, plan, and design a challenge course that meets the needs of the Indiana region and could be implemented at Ball State University (BSU). Qualitative surveys with existing course designers and facilitators were conducted. The project objectives are to: (1) designate appropriate land for construction; (2) research a variety of challenge course elements; (3) research factors that are unique to the Indiana region; (4) assess budget concerns and constraints. BSU has been presented a working document with designs and management plans of a potential challenge course that may one day be implemented at BSU or used for other areas in the state of Indiana.

Problem Statement

BSU has over 22,000 students enrolled and offers an extensive variety of recreational and leadership opportunities but no challenge course. Located in Muncie, Indiana, BSU opened the doors to its brand new $39 Million Student Recreation & Wellness Center in 2010. With the opening of the new facility also came the new Outdoor Pursuits (OP) program which includes: a 1500 square foot climbing wall, outdoor rental center, adventure trips, bike shop, and resources for participants to plan and organize their own trips. The goal of the OP program is to grow into a dynamic year-round program that runs smoothly and meets the needs of BSU students, faculty, staff,
alumni, and the East Central Indiana community (Outdoor Pursuits, 2011). As the program grows there is potential for additional facilities and programming.

With the addition of OP, the administrators have discussed the possibility of introducing a challenge course. Administrators have determined that there is a need and interest in the challenge course facility and its curriculum. The BSU challenge course will be available for students to use as an educational, developmental, recreational, and therapeutic medium to enhance both personal and professional growth (Attarian, 2005). The course will provide an environment for students to strengthen skills such as: problem solving, self-efficacy, self-concept, trust, teamwork, and communication.

BSU has a wide variety of active student organizations and clubs including: Greek, departmental, professional, multicultural, performing arts, religious, service, sports, and housing organizations. The challenge course curriculum will provide the right tools to foster team cohesiveness develop problem solving skills, enhance communication and leadership skills, and promote trust.

Role of Researcher

My role as the developer of the challenge course has been inspired my work experience in outdoor education and recreation. I have been employed in the outdoor industry since 2010 and have had the opportunity to facilitate at two challenge courses and lead programming for several college outdoor programs. I have a passion for the outdoors and want to share that with others.
My work as a facilitator has helped me realize the importance of outdoor recreation. I have seen firsthand the gains and benefits of the challenge course experience. I have encouraged participants to challenge themselves and build trust within their group or organization.

I am currently a graduate student at BSU where I am employed as the Outdoor Pursuits Graduate Assistant. The goal of my project is to lay the ground work for future professionals to implement the proposed project. It is important for me to design a facility that is user friendly and maintainable for professionals.
LITERATURE REVIEW

Definitions and Background of Challenge Course

A challenge course is defined as a collection or series of events or obstacles suspended from trees, utility poles, and other structures; and/or activities that provide participants with unique problem solving opportunities for self-discovery, physical challenge, risk-taking, and group support (Attarian, 2005). The challenge course is broken up into four program activities: socializing games, group initiatives, low elements, and high elements. Most courses will include two to four of these activities depending on the availability of elements and the participants’ goals. The activities are organized in order to build onto the skills acquired during the previous activity. Each course will vary on chosen activities or available elements options but the progression of activities will remain the same.

Challenge courses were first developed in the 1960s. The initial course was constructed in Colorado at the first U.S. Outward Bound School to train Peace Corps volunteers. The courses were designed to mimic military obstacle courses. Since this time they have been used for the purpose of experiential education (EE).

EE has been defined by the Association for EE (AEE) (2012) as:

“EE is a philosophy that informs many methodologies, in which educators purposefully engage with learners in direct experience and focused
reflection in order to increase knowledge, develop skills, clarify values, and develop people's capacity to contribute to their communities.”

By using challenge courses as a tool for EE that experience will accomplish the following:

1. Experiences are supported by reflection and critical thinking. Each activity is followed by a debriefing with the group to encourage communication and share ideas to become more efficient.

2. Experiences are designed to require the participant to take initiative and be held accountable for those decisions.

3. Participants are actively engaged. Participants are encouraged to ask questions, try different approaches, assume responsibility, and be creative with problem solving.

4. Participants’ gains are personal and transferrable.

5. During the experience the participant may experience success, failure, adventure, risk-taking and uncertainty, because the outcomes of the experience cannot totally be predicted. Experience includes the possibility to learn from natural consequences, mistakes and successes (What is Experiential Education?, 2012).

EE was originally based on long expeditions to create artificial stresses and obstacles for participants to overcome and gain confidence. Educators realized they could offer the same type of stresses and challenges in a shorter amount of time (Wolfe, 2005).
The first Outward Bound Schools developed the industry we know today. It is estimated that in the early 1980s, up to 700-800 courses existed in the United States. In 2001, it was recorded that there were over 15,000 courses operating in the United States alone (Attarian, 2001). Challenge courses are installed in wide variety of places – schools, camps, park districts, and outdoor education centers, as well as in corporate training centers. Each course can serve a single group, such as students in a school, or multiple groups, such as a park district course which might serve student and adult groups. The single identifying feature is that most often, it is an intact group which comes together to share the challenge course experience, and that a curriculum is designed for the specific outcome desired by that group (Association for Challenge Course Technology, 2012).

Benefits of Challenge Courses

A few specific perceived benefits include: perceived self-efficacy for high school students, resiliency for low-income minority youth, increased cooperation within families, enhanced teamwork in organizational settings, and enhanced self-concept for college students (Wolfe, 2005). Other goals of these programs include building confidence, becoming more assertive, developing problem solving skills, increasing motivation, and improving leadership skills (Long, Lindenmeier, & Robertson, 2003). The benefits include taking the knowledge learned from the challenge course experience and being able to transfer that to another situation. By utilizing the metaphoric transfer the challenge course experience can be used as a metaphor for the classroom, study habits, work environment, educational goals, and personal struggles. Transferring the
experience itself and the benefits gained from the experience into how it affects a participant’s daily life has been a strong emphasis in challenge courses (Odello, Hill, & Gomez, 2008).

Developmental Sequence

The progression of the activities will build the skills acquired during the previous activity and creates the process of group development also known as the forming, storming, norming, and performing process that was introduced by psychologist Bruce Tuckman (Tuckman, 1965). Practitioners of experiential education programs often use variations of Bruce Tuckman's stage model of group development in facilitator training and as a basis for group program design and facilitation. Tuckman's model, published in 1965, remains one of the most commonly cited models of group development today (Cassidy, 2007). Tuckman’s model suggests that any group must first progress through the first three stages of development to successfully achieve stage four (Johnson, 2010). Outdoor educators use this stage model during challenge course facilitation. Challenge course curriculum and program designs are based on Tuckman’s model. Each portion of the challenge course is designed to achieve one of the four stages in the model.
Socializing Games

Socializing games are designed to introduce group members to one another and introduce the facilitators to the group. Every challenge course should begin with a socializing activity to get the group acquainted. During this stage, participants have the opportunity to learn the names and personality characteristics of everyone who will be involved in the events.

Following Tuckman’s model of group development, socializing games are important to the challenge course program because it is a vital part of the forming stage. The forming stage is the orientation stage. Individual roles and responsibilities are unclear prior to this stage (Chapman, 2012). The forming stage allows the group to
decide on the purpose and structure of the group and the roles within that structure (Johnson, 2010).

Socializing games are also designed to break down barriers and allow individuals to become more comfortable with the group. During socializing games, participants may realize they have more in common with each other than they had previously assumed.

**Group Initiatives**

Group initiatives are activities designed to help the group take steps toward trust and cooperation and these are conducted after the forming stage. Initiatives are group problem-solving activities aimed at promoting team development (Priest, 1996). These activities involve solving problems in the form of physical obstacles presented by the facilitator(s). During this phase, participants are encouraged to share ideas and to think outside of the box. The group learns to compromise and to make decisions as a whole versus individually. Communication and problem solving are essential to completing the activities.

Tuckman’s storming stage may begin with the group initiatives. The storming stage will create conflict, criticism, and confrontation that are generated by a struggle for leadership or disagreements within the group. For example, after being presented with a challenge or puzzle that may have several options the group may begin to argue for one solution over another. Even though the storming stage may be unpleasant for the group observers of group development have noted that for a group to become an effective team, it must go through a period of internal strife (Johnson, 2010). Progressing through the difficulties of the storming stage will result in feelings of accomplishment, cohesiveness,
and a sense that “we’re all in this together” as the group and progression of activities moves into the norming stage.

Low Elements

Low elements start at one foot off the ground and go up to twelve feet using pre-constructed equipment. A low element consists of a series of obstacles or contains an objective that the team must work together to achieve. Some low elements are valuable for teaching teamwork and cooperation, while others are concerned with balance and concentration. All the elements help foster trust, respect, care, and concern for every person. While using low elements, a safety technique is used called “spotting.” Spotting requires the group to work together and hold each other accountable for the group’s safety. Low elements always precede the high elements (Low Ropes Course, 2013).

It is important that the group has successfully accomplished the forming stage and has begun if not completed the storming stage before entering the low elements. The participants are held accountable for one another’s emotional and physical safety during the low elements. Each group is different; it is the facilitator’s job to monitor the group’s progression from one stage to another. If the group is asked to do a task that they are not ready for it could cause additional conflict and a safety hazard. Facilitators are trained to only present elements that match the group’s developmental stage (Association for Challenge Course Technology, 2012).

Some groups may complete the norming stage before or during the low elements. Roles have been established by the norming stage. Participants have taken note of each other’s differences, strengths, and weaknesses. Tasks have been assigned based on skills
and abilities (Johnson, 2010). The group begins to “groupthink” or conform thoughts and actions. Participants develop a stronger commitment to the group’s goals.

High Elements

High elements are challenges experienced by individuals, partners, and groups at a height of 12 to 40 feet above ground level. Heights above 40 feet may be obtained if trees, structures, and taller poles are available. All high elements require a safety mechanism called a belay system. The elements produce powerful memories and provoke deep thoughts and emotions, while challenging physical abilities (Wolfe, 2005). Most activities teach balance, coordination, and concentration along with a great sense of confidence, positive view of self, and leaping beyond the barriers of perceived limits. High elements typically conclude the course activities.

The performing stage is reached before or during the high elements. The performing stage is when effective collaboration truly occurs (Johnson, 2010). Participants have formed a cohesive relationship and are committed to the success of the group and the members’ individual success. During this stage, individual differences are no longer viewed as strengths or weakness but simply accepted by the group. Decisions are now made through open discussions and disagreements are handled openly as a group.

Outdoor versus Indoor Courses

When weather conditions prevent the use of an outdoor challenge course facility, many programs turn to their indoor courses. Indoor challenge course designs consist of a prefabricated “superstructure” that serves as the overhead support system - offering ideal
positioning of both events and event decks/platforms. From these airy decks, participants can initiate individual and partnered challenge course elements, moving horizontally from one event to the next. The steel framing system and construction techniques produce an easily managed, user friendly and low maintenance challenge course structure (Indoor Series, 2012).

Figure 2. Indoor Course Layout. Retrieved January 12, 2013, from: http://www.sonofieldhouse.com/high-ropes-challenge-course.html

Indoor courses differ from outdoor courses for several reasons. An indoor course allows for programming to be conducted year round with no cancellations due to inclement weather or temperature highs and lows. Indoor courses allow for night programming as well. By eliminating the natural elements of an outdoor course, the organization lowers its cost of replacement and maintenance by protecting the hardware from humidity, precipitation, and storm damage. An indoor course also allows for maximum protection against vandalism, theft, and trespassing.
The suspended structure can be attached directly to an existing roof/ceiling trusses. An indoor course would be ideal for an organization with limited outdoor space but may have a retired gym or arena available. Because the structure allows for uninterrupted floor space below the course could be implemented above a gym floor, swimming pool, or multi-purpose room that is being used for programming of other activities.

Like an outdoor course, participants still receive the same structure and facilitation. The elements in either space accomplish the same goals but in a more controlled environment in the indoor space. By moving the experience indoors we are eliminating the much needed nature experience. All factors will play a role in the decision to build indoor or outdoor. An organization must reflect on its mission statement, budget concerns, and space availability to make those decisions.

Indiana Collegiate Courses

There are twenty-two universities in Indiana (Indiana Colleges and Universities, 2012). There are five universities that currently have a challenge course. There is a need for additional courses in the Indiana region due to lack of existing collegiate courses. The five schools range from enrollment from 3,000 to 42,000 students (Grove, 2012).

Studies have proven that challenge course benefits, particularly for college students, include enhanced teamwork in organizational settings and enhanced self-concept (Wolfe, 2005).
Table 1. Indiana Universities that have Challenge Courses. Retrieved January 12, 2013 from: http://collegeapps.about.com

<table>
<thead>
<tr>
<th>Universities Located in Indiana</th>
<th>Students Enrolled at University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butler University</td>
<td>4,505</td>
</tr>
<tr>
<td>Indiana State University</td>
<td>11,422</td>
</tr>
<tr>
<td>Indiana University</td>
<td>42,347</td>
</tr>
<tr>
<td>Purdue University</td>
<td>41,052</td>
</tr>
<tr>
<td>Taylor University</td>
<td>2,559</td>
</tr>
</tbody>
</table>

Potential Users

The area has a large body of potential users. As stated before, challenge courses are used to develop teamwork within an organization that includes church groups, youth camps, businesses, and schools. The city of Muncie is home to 67,430 residents which is located in Delaware County that has a population of 118,769. Muncie-Delaware County has 46 major employers (Major Employers, 2012). BSU alone employs close to 4,000 individuals and has over 22,000 students enrolled. BSU has a wide variety of active student organizations and clubs including: Greek, departmental, professional, multicultural, performing arts, religious, service, sports, and housing organizations. The city of Muncie also has thirty-two faith based organizations (Places of Worship, 2012).

The challenge course will be available for community members and students to use as an educational, developmental, recreational, and therapeutic medium to enhance both personal and professional growth (Attarian, 2005). The course will provide an environment for students and community members to strengthen skills such as: problem
solving, self-efficacy, self-concept, trust, teamwork, and communication. The challenge course curriculum will provide the right tools to foster team cohesiveness develop problem solving skills, enhance communication and leadership skills, and promote trust.
METHODS

Site Evaluation

Specific Regional Concerns

When designing any facility one must consider the regional and area concerns. Factors specific to the Indiana region would be the temperature averages. The average lows for Muncie, Indiana are below 60 degrees nine months out of the year. The average highs are below 60 degrees five months out of the year (Monthly Averages for Muncie, IN, 2012).

Figure 3. Average Temperatures of Muncie, Indiana
There is no national temperature standard for when to keep students inside during the winter months, the U.S. Department of Education says. Most schools do cancel outdoor recreation and activities when the temperatures are around 40 degrees Fahrenheit or lower (Rice, 2011). According to the figure above, the course would only be available for six or fewer months out of the year.

With Indiana’s extended winter season and high chances of snowfall, course designers often include portable elements in the budget. Portable elements are small versions of the low elements that can be moved indoors if need be.

With lower temperatures, the course plan may require less shade and more direct sunlight to warm participants during colder events. Canvas platforms that provide shade can cost up to $10,000 per platform. Other courses may use foliage to protect its participants from the heat and sunlight.

Other concerns that may be affected by weather would be dates and times of operation, for example, if one was researching to build a course on Maui Island in Hawaii they could consider a much broader operational schedule.

_Hults Farm_

The Juanita Hults Environmental Learning Center is one of six properties managed by the Field Station and Environmental Education Center at BSU. The land became property of BSU in 1986 when Juanita Hults Maley passed away and donated the land to the university. She donated the land with intentions of BSU returning the land to its natural state (NREM).

The property is currently being used as an education center but has seen very low participation numbers in the past few years. With the implementation of additional programming and facilities, educators expect to see a participation increase. The property is located just 13.5 miles for BSU and the driving route is simple and somewhat isolated from main highways and heavy traffic.
Figure 5. Driving Directions to Hults Farm. Retrieved January 12, 2013 from: www.maps.google.com

The property contains several habitats that are common to Indiana including wetland, tallgrass prairie, farmland, and forest. A portion of the property is leased to a local Agriculturalist that farms and maintains the land (Eflin, 2012). With the variety of habitats, challenge course participants will be exposed to a vast variety of flora and fauna. With each changing season, repeat participants will have something new to look forward to.
The land has several protected areas that will remain untouched by the implantation of this project but there are sections of the property that would be available and suitable for construction.

The area north of the wetlands and east of the highway 165 would be ideal for such construction. The land is flat with tree coverage running along the property line adjacent to the highway. The location will give the participants the experience of being in a natural area but still offers plenty of open space for a variety of socializing games and group initiatives. This section of land presents no limitations to construction. Because the land is currently being used for agricultural purposes and has been cleared of vegetation there will be no removal of foliage. Additional native plants and trees will be planted during the construction process to enhance the aesthetics and outdoor experience. To honor the original landowner’s wishes this property will be managed to maintain its natural features and inhabitants.

The property currently offers a trail system to and from the proposed construction area. The trail would be ideal for several low elements to be advantageously placed along the route to allow time and space between each element. The space between elements allows the participants time to process and debrief the previous activity while also engaging them in a nature walk. During construction, the trail system may need to be expanded upon. Well-planned trails will minimize off-trail short cuts that could result in land erosion and impact to native vegetation.
Figure 6. Map of Hults Farm. Author: NREM

Survey

A survey was created to evaluate existing collegiate challenge courses in the nation. The survey was designed on surveymonkey.com and was administered through the AORE and NIRSA member email listserv. Participation in the survey was voluntary and required the participant to have prior experience on challenge courses and be 18 years or older. The survey was designed to allow participants to share ideas and designs of existing courses. The survey included the following questions:
Table 2. Challenge Course Survey Questions

<table>
<thead>
<tr>
<th>Challenge Course Survey Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Name of University</td>
</tr>
<tr>
<td>2. How many students are enrolled on campus?</td>
</tr>
<tr>
<td>3. How many low elements does your course have?</td>
</tr>
<tr>
<td>4. How many high elements does your course have?</td>
</tr>
<tr>
<td>5. My course has …… Please check all that apply.</td>
</tr>
<tr>
<td>6. Additional elements:</td>
</tr>
<tr>
<td>7. The course is handicap accessible.</td>
</tr>
<tr>
<td>8. Where is the course located?</td>
</tr>
<tr>
<td>9. What year was the course constructed?</td>
</tr>
<tr>
<td>10. What company constructed the course?</td>
</tr>
<tr>
<td>11. Roughly how many facilitators do you have on staff?</td>
</tr>
<tr>
<td>12. How many professionals oversee the program?</td>
</tr>
<tr>
<td>13. Under which department is the course funded and managed by?</td>
</tr>
<tr>
<td>14. How did your department fund construction of the challenge course?</td>
</tr>
<tr>
<td>15. How many events does your course host annually?</td>
</tr>
<tr>
<td>16. How many participants do you serve annually?</td>
</tr>
<tr>
<td>17. If you could do it all over again, which elements would you leave out and what additional elements would you add?</td>
</tr>
<tr>
<td>18. Do you have a pricing structure that is unique to your university?</td>
</tr>
<tr>
<td>19. What was the total cost of the challenge course construction?</td>
</tr>
<tr>
<td>20. Any advice or suggestions for further challenge course research?</td>
</tr>
</tbody>
</table>

Company Assessments

There are a variety of challenge course companies to choose from. During the company assessments there were three that were researched. These companies were chosen due to the high response rates of the Challenge Course Research survey. The company assessments will give a brief overview and history of each company. Each company is a professional vendor member of ACCT and all construction meets ACCT standards. Founded in 1993, ACCT is the world’s leading and largest American National Standards Institute Accredited Standards Developer focused specifically and solely on the challenge course industry (Association for Challenge Course Technology, 2012).
Alpine Towers International (ATI) designs, builds, services, and equips experiential learning and recreational environments. ATI was initiated in 1989 and has since constructed over 700 facilities (Alpine Towers, 2012). ATI was the first to introduce the Alpine Tower concept that was created a decade ago. The Alpine Tower design is incredibly strong and capable of withstanding extremely high wind loads (100 mph), as well as tremendous weight (twelve 400 lb. people climbing on the Tower).

The Alpine Tower consists of a dynamic belay system. On a dynamic course, participants are connected to a rope, which someone on the ground will be holding onto and belaying the participant on the course. Participants on a dynamic course remain on a
belay the entire time: climbing up to the element, doing the activity, and being lowered to the ground after.

The Tower experience provides three distinct program opportunities. Group problem solving initiatives can be accomplished in the Tower base which focuses specifically on leadership objectives. The Tower can be used for individuals and presents the same challenges as rock climbing and high ropes course elements. This programming option addresses the same objectives as the group initiatives (due to the climber/belayer relationship) as well as encouraging people to simply try their best (Alpine Towers, 2012). The Alpine Tower series can engage up to 36 participants simultaneously and is ideal for small areas or urban locations.

Adventure Based Experiential Educators

Adventure Based Experiential Educators (ABEE) is a full-service Challenge Course and Canopy / Zip Line Tour company that provides services in adventure education and experiential program design both nationally and internationally to educational institutions, camps, conference and outdoor education centers, resorts, health care providers, and corporations. ABEE’s main focus has been working with educational institutions. ABEE has been in business since 1983 and is a charter member of ACCT (ABEE, 2012).

Project Adventure

Project Adventure (PA) was founded in 1971 and believes that the best challenge course is not necessarily the largest, the flashiest or even the most expensive. PA has installed thousands of courses, in all 50 states and more than 20 countries around the world. PA strives to build courses that are closely aligned with the educational goals of each program (PA, 2012).
PROJECT DESIGN

Course Layout

The following map was created to present a layout of both the high and low elements. The eight low elements will be placed along the existing quarter of a mile hiking trail. Modifications will be made to the storage building closest to the trail to house the challenge course equipment and provide a space for orientation, waivers, and introductions. A small amphitheatre is available for a meeting place as well.

Figure 8. Property Design. Author: Jessica Edenfield
The location of the high ropes course was chosen because it is the most suitable land for construction. The area also offers a variety of aerial views for participants to enjoy while being active on the high ropes course. The site is located north of the wetlands and west of the farmland and forest.

The site is located on an existing trail near established facilities that could be remodeled to offer storage, meeting space, and restrooms. As participants are exiting the trail they will experience an open panoramic view of the course and the surrounding natural features.

Figure 9. High Ropes Course Site. Author: Jessica Edenfield
Figure 10. Photos of Hults Farm Selected Site taken in the Summer of 2012. Author:

Jessica Edenfield
Figure 11. Photos of Hults Farm Taken in Summer 2012. Author: Jessica Edenfield
Figure 12. Photos of Hults Farm Selected Site taken in the Winter of 2013. Author:

Jessica Edenfield
High Ropes Course

After researching the variety of elements available and accessing the regional needs, there has been a course that has been identified to meet programmatic goals and has all the bells and whistles an organization would need. The course is designed by Adventure Based Experiential Educators (ABEE) and has been implemented in several existing locations with the University of Wisconsin – Eau Claire (UW- Eau Clarie) being one of them. The UW- Eau Clarie Recreation website states the following:

The Eagle's View Challenge Ropes Course was constructed by ABEE, a Wisconsin company that is at the forefront of construction and training in state-of-the-art standards of practice. (UWEC, 2010).

The static course is designed to engage more people. With a static course, participants are attached to an upper wire, belay cable, with lobster claws for safety. If the participant dangles, they will be caught by the wire. Advantages of a static course include needing fewer facilitators, being able to get more participants up on the course at one time, and allowing participants to do multiple elements without having to be lowered and climb back up after each.

The course offers lots of options which allow more people to be engaged in the activity (Olsen, 2013). The course is equipped with six individual static events, giant swing, taco cargo net, a universal area, zipline, and a variety of other customizable features. The course is able to be expanded upon if need be in the future.
ABEE designed this course with steel crossbeams at every intersection that will resist mold and deterioration. The steel beams require little maintenance compared to wooden beams (Olsen, 2013).

Designers used 50 foot poles for the course with seven feet underground (Olsen, 2013). The height of the poles above ground are 43 feet but the element platforms are about ten feet lower meaning participants will never reach a height higher than about 35 feet. Below are several still photos of the proposed design.

Figure 13. Cargo Net
Figure 14. Swinging Bridge

Figure 15. Taco Cargo Net
The placement of the course allows participants to view the wetlands, farmland, and forest while traversing each element. The following figures give examples of the layout and views that are to be expected.

Figure 16. Aerial View of High Element Layout. Author: Jessica Edenfield
Figure 17. High Element Layout. Author: Jessica Edenfield

With each element being unique and specific to this design, the following section explains the objective and transition of each high element. As the participant progresses from one element to another they are building their skills and confidence needed to complete the next task.
**Taco Cargo Net**

The course begins with a Taco Cargo Net. All participants will enter the course this way. Participants will climb the net facing north with the tree line in their direct view. The Taco Cargo Net is designed to cradle the participant if he or she falls. The net is designed at an angle that safely holds the participant if they were to let go. Participants do not need to be attached or on belay during the cargo net.

Participants with mobility issues have the option to be raised to the top of the element by a pulley system (Olsen, 2013). Once participants have summited the cargo net they will attach their Smart Belay to the cable above.

**The Bridge**

Challenge course facilitators have options to lead participants either west or east. If participants traverse east, they will enter the Bridge. The Bridge consists of two foot cables that are attached together by small boards. These boards are spaced at various lengths from each other and the participant must walk across them. This becomes difficult because some of the boards can move and the whole bridge swings, making balance difficult (Challenge Course High Elements, 2013).
The Bridge is the participant’s first encounter with the high element and feeling of uncertainty. The Bridge requires concentration, balance, and trust. Participants must trust their own judgment and the safety of the equipment. It is important to have the remainder of the group there for support. The group will be expected to cheer on their teammates and offer verbal suggestions to help them succeed.

Participants will have the farmland and wetlands in their peripheral view while concentrating on the bridge ahead. After each element, participants will reach a platform where they transition from one element to another.
**Multi Sky Log**

Participants will enter the multi sky log after completing the Bridge. This is a great activity for balance and self confidence. Participants walk along several suspended beams to the other side. This element shows how fear affects our perception. Participants who easily cross a log at ground level suddenly are hesitant and nervous, or even paralyzed when the log is 30' higher. This element is excellent as a team activity too (High Ropes Course Elements, 2013).

**Sky Log**

If participants move north onto the connected triangle of elements they will encounter an element much like the previous. The next element is identical to the multi sky log but has only one log. The participant can no longer use the additional logs for support or balance. If participants felt hesitant or challenged before the sky log will encourage users to face those fears.

**Swinging Log**

The Swinging Log is strategically placed after both sky logs. The Swinging Log encourages participants to again challenge themselves. This element is similar to the Sky Log with the exception that it is not stable. The participant must step out onto a wobbly, unsteady log and cross without any hand lines for assistance. It sways with the participant’s movements and with the natural elements such as wind. Participants must remain calm and focused during this event.

**Heeby Jeeby**

The triangle of elements ends with the Heeby Jeeby. The Heeby Jeeby requires the participant to traverse a thin cable while holding onto hand lines. The hand lines form an X shape and require the participant to transition from one hand line to another. While using the hand lines, participants are forced to look down. The Heeby Jeeby is not only mentally challenging but physically taxing.

Each element in the triangle portion of the course builds onto the skills and confidence obtained from the previous element. This portion of the course focuses on balance and trust.

![Image](http://ropescourse.biz/gallery_hi.php#HEEBY)

Figure 20. Heeby Jeeby. Retrieved on March 25, 2013 from:

http://ropescourse.biz/gallery_hi.php#HEEBY
Burma Buckets

Moving south from the Multi Sky Log, participants will enter the Burma Buckets. The location of this element gives participants a direct view of the pond and wetland ahead. Participants will traverse the element with just loops of rope for the feet making balance and walking more difficult and challenging. Participants are able to use the loops for support while crossing from one loop to another. With plenty of stability and support, fear and self motivation are the chief obstacles to overcome (High Ropes Course Elements, 2013)

**Horizontal Cargo Net**

Continuing south from the Burma Buckets, participants will encounter the Horizontal Cargo Net. The Horizontal Cargo Net is similar to the Taco Cargo Net with the exception that participants traverse this cargo net horizontally versus ascending the previous. The Cargo Net is ideal for all ages and abilities. The Cargo Net is challenging but has so many options for climbing. Unlike a Rock Wall, you always have a hand hold and a foot hold which makes it simpler, but no less of a challenge (High Ropes Course Elements, 2013).

**Swinging Bridge**

If the participant goes west after entering the course they will experience the Swinging Bridge. Moving east from the taco net gives the participant the direct view of the tree line adjacent to the highway. The Swinging Bridge is similar to The Bridge and Swinging Log. The Swinging Bridge provides yet another challenge that requires participants to be aware of not only physical, but inner balance, focus, and determination.
Earthquake Bridge

The Earthquake Bridge is a series of wooden planks suspended by cables. The planks are moving and present similar challenges as the Swinging Log and Burma Buckets.

Figure 22. Earthquake Bridge. Retrieved on March 25, 2013 from: http://www.indiatravelite.com/weekendgateway/weekendgetawayhorsleyhillsandhrapradhshpic10.JPG

Low Ropes Course

The low ropes course is not visible from the high ropes course. Participants must travel the adjacent trail to view any of the low elements. The courses have been purposely designed to not be visible to one another but to create the element of curiosity when progressing from one element or course to the next.

The eight low elements will be placed along the existing quarter of a mile hiking trail. The low ropes trail will require some tree removal to provide a safe area around each element. The trail will need to be widened to offer more room for larger groups using the trail.
Each element on the low ropes course is meant to build from the previous experience. The elements start with basic tasks and progress. It is important that the participants start with element 1 and move from there. The facilitator must be mindful of the group’s developmental process and assign tasks according to the phase the group is in.

Figure 23. Entrance to the Low Ropes Trail. Author: Jessica Edenfield
A layout of the low ropes course was created to give users and facilitators a map of where each element will be placed along the trail.

Figure 24. Low Element Layout. Author: Jessica Edenfield *not to scale

The table below shows the approximate location, number, and name of each element on the low ropes course.
Table 3. Low Ropes Course Elements. Photos by Jessica Edenfield

<table>
<thead>
<tr>
<th>Element 1</th>
<th>Whale Watch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element 2</td>
<td>Spider Web</td>
</tr>
<tr>
<td>Element 3</td>
<td>Log</td>
</tr>
<tr>
<td>Element 4</td>
<td>Mohawk Walk</td>
</tr>
<tr>
<td>Element 5</td>
<td>Tension Traverse</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>Element 6</td>
<td>Trust Fall</td>
</tr>
<tr>
<td>Element 7</td>
<td>Wild Woozy</td>
</tr>
<tr>
<td>Element 8</td>
<td>The Wall</td>
</tr>
</tbody>
</table>
Figure 25. Detailed View of Elements 1-3. Author: Jessica Edenfield

Figure 26. Detailed View of Elements 4-8. Author: Jessica Edenfield
Description of Specific Elements

According to the survey results for specific elements, the Zipline, Mohawk Walk, and Spiderweb were among the most popular elements to include in the course design. The following information will briefly describe the individual elements that can stand alone or be incorporated in a connected course layout.

![Survey Results for Specific Elements](image)

Figure 27. Survey Results for Specific Elements
**Zip Line**

A pulley system is attached to a long cable suspended between two trees or poles. The participant is connected to a multi line tether that hangs underneath the cable. There is either a built in braking system or a gravity brake that prevents the participant from hitting the end support. The zip line is typically attached to several elements that must be ascended before reaching the zip platform. Once the participant reaches the platform there is a transfer point when the facilitator will safely attach the participant to the new line (Farlex, 2013).

![Zip Line](http://www.caverntours.com/zip_line_photos/pages/zip_line_07.htm)

Figure 28. Zip Line. Retrieved January 12, 2013, from:
http://www.caverntours.com/zip_line_photos/pages/zip_line_07.htm
**Mohawk Walk**

A cable is installed between 4 - 6 zigzagging trees or poles 12" - 18" above the ground. The objective of this element is for the group or parts of the group to join hands, forming a human chain, and attempt to walk from one end of the cable to the other. The only balance assistance offered is the hands of your teammates (Low Ropes Course, 2013).

Figure 29. Mohawk Walk. Retrieved January 12, 2013, from:


**Spider Web**

A web rope about 5' (ft.) high containing varying sizes of holes is stretched between two trees. Each participant must go through a different hole without touching the web. Proper spotting and lifting techniques are especially important for this element. The group may lift participants and pass them through the openings (Low Ropes Course, 2013).
Additional Recommendations

The “footprint” of the course and trails should not be larger than necessary to minimize the clearing of trees and brush. The more compact the layout, the easier the course will be to maintain especially with respect to the groundwork and woodchipping (Johnson K. E., 1999). Woodchipping is used to cushion falls around low elements and will minimize erosion and soil compaction. It is vital to include the woodchipping in the original construction to avoid it being neglected. Woodchipping is necessary to minimize erosion and soil compaction. There are several options when purchasing woodchips. Course grade chips last longer when compared to bark mulch and fine grade chips that you typically see in landscaping. According to Johnson (1999), there are no challenge course industry standards regarding the depth of chips necessary to prevent injury and soil impact but the playground industry does require twelve inches of wood chips to prevent injury as the result of falls.
When clearing the property there are several issues the course designer must take into consideration because not all types of clearing are equivalent. For example, clearing shorter-lived species is preferable to clearing longer-lived species. Fragile habitats should be avoided when selecting a site. Land that is suffering from impact or provides a natural habitat for wildlife should be avoided at all cost, as well. Botanists suggest clearing species that are not native and/or offer little benefit to wildlife (Gruver, 2013). The following table represents common species in Indiana.

Table 4. Indiana Tree Species

<table>
<thead>
<tr>
<th>Suitable to Clear</th>
<th>Avoid Clearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invasive/Lesser Ecological Value</td>
<td>Native/Contribute to Habitat</td>
</tr>
<tr>
<td>Yellow Poplar</td>
<td>Red and White Oak</td>
</tr>
<tr>
<td>Red and Sugar Maple</td>
<td>Walnut</td>
</tr>
<tr>
<td>Bush Honeysuckle</td>
<td>Hickories</td>
</tr>
<tr>
<td>Autumn Olive</td>
<td>Bitternut</td>
</tr>
<tr>
<td></td>
<td>Chestnut</td>
</tr>
<tr>
<td></td>
<td>Black Cherry</td>
</tr>
</tbody>
</table>

Timeline for Construction

Course construction almost always requires vehicle access to the site. For courses in wooded settings, minimizing the impact of the construction vehicles means taking advantage of any pre-existing trail, and may also mean planning construction around the wet spring and summer months (Johnson K. E., 1999).
Challenge course construction companies suggest that customers avoid construction in the spring and summer because of fragile soil conditions and that time of year is the peak season for challenge course staff training sessions.

According to the ABEE CEO, the full construction and installation would be complete in five or six weeks (Olsen, 2013). Many of the elements are prefabricated at the company’s local warehouse to expedite the construction process.

Budget Concerns

According to the survey results, depending on the elements and design, challenge course construction can range anywhere from $28,000 to over $400,000. The average challenge course cost around $175,000. The estimated cost of construction for the design presented earlier is around $200,000; that includes engineering, construction, and six to eight low elements.

Figure 31. Survey Results for Cost of Construction
The course itself may seem like the most important budgetary need but if the organization has not considered the additional cost for hardware, harnesses, helmets, ropes, and trainings the program will not be possible.

![Challenge course equipment](https://www.facebook.com/photo.php?fbid=10100157789251383&set=pcb.10100157790389103&type=1&theater)

Figure 32. Helmets and Hardware. Retrieved January 12, 2013 from:

Challenge course equipment is load bearing and life dependent therefore it is an investment and very costly. For example, the self belay device used for static courses cost $300-$400 a pair and the course will require 10-20 pairs for basic facilitation.

Helmets are a required for all staff and participants. Helmets can range anywhere in price from $65-$105 apiece.
Climbing harness will run a program $50-$100 apiece. Each challenge course will require a variety of sizes to fit all participants. Depending on the body shape of the participant chest harness may be required as well that cost around $30 apiece.

Staff training may be the most important investment for a program. Even with all the high tech and top of the line safety gear, your participants are only as safe as their leadership. Entry level training will cost each staff member around $750 (Aerial
Adventure Certification). The level I and II courses require 40 hours of instruction and may require staff members to travel.

These are just a few items that a program will not only need to invest in during the initial purchase but maintain and replace throughout the life of the program. The challenge course facility, equipment, and training are not a onetime purchase; programs need to analyze the operational costs that are associated with it.

Maintenance and Inspections

Upon installing the challenge course, there will be ongoing maintenance costs refresher training for staff (depending on turnover, recommended on an annual or bi-annual basis), equipment replacement, and maintenance of elements (PA, 2012). Pricing is based on several factors: your geographic location, the number of challenge course elements you have and the potential of scheduling inspections with other clients in your area at the same time (Olsen, 2013).

During an inspection, the institute will be given details of the condition of an element, recommendations to using it most effectively, and opinions as to when it might need attention or repair in the future.
DISCUSSION

Opportunities for Future Development

As stated before, BSU has over 22,000 students enrolled and offers an extensive variety of recreational opportunities but no challenge course. With the addition of the new OP program, the administrators have discussed the possibility of introducing a challenge course. Administrators have determined that there is a need and interest in the challenge course facility and its curriculum. The plans presented in the project could be used to implement the challenge course program at BSU. With any course there is always room for growth and additions.

Challenge course and outdoor leadership academic courses are available at some colleges and universities. If the facility were to be built it could be used to offer such courses and provide endless opportunities to BSU students who are looking to gain experience as an outdoor facilitator or leader. BSU could extend its existing Natural Resource and Environmental Management degree program to offer courses that directly pertain to outdoor recreation and challenge courses for outdoor professionals to gain experience working and studying on the proposed course.

Not only thinking about BSU students, the program could be utilized by surrounding schools, corporations, and organizations. The course could host retreats, camps, and private rentals.
Personal Reflection

This project has been an instrumental part of my professional development as an outdoor administrator. I have enjoyed the process and the opportunity to research a topic I am so passionate about. Through this process I have learned more than I ever thought possible about the elements themselves, trending challenge course products, and the design process.

The writing process has helped me focus on outlining the subject and has made me a better researcher and writer. During the process of compiling my research and design I have gained additional experience working with Microsoft word, Google Earth, Surveymonkey.com, and photo editing. I know that they skills that I have obtained throughout the writing process will be tools that will benefit me in any career path.

I have accomplished so much throughout my master’s education and this project is a measurable testimony of that educational development. This project is a product I hope to present throughout my career and will be used as a stepping stone as I proceed into the professional world of outdoor recreation.
WORKS CITED


Gruver, J. (2013, February 1). NREM Professor. (J. Edenfield, Interviewer)


http://www.ultimatecampresource.com/site/camp-activity/mohawk-walk-low-ropes-course.html

*Major Employers*. (2012). Retrieved March 11, 2013, from Chamber of Commerce:


*NREM*. (n.d.). *Field Station and Environmental Education*. Retrieved 2 1, 2013, from Ball State University:
http://cms.bsu.edu/academics/centersandinstitutes/fseec/properties/hultsenvironmentallearningcenter


http://bsu.edu/recreation/outdoor-pursuits.html
PA. (2012). Challenge Courses. Retrieved February 12, 2013, from Project Adventure:
http://www.pa.org/

Places of Worship. (2012). Retrieved March 11, 2013, from City of Muncie:


Project Adventure. (2013). Retrieved February 25, 2013, from Project Adventure:
www.pa.org


http://www.uwec.edu/Recreation/activities/ropescourse/development.htm