Enhanced Cross Country Running Course Design: A Study of Historic and Recent Courses, Other Landscape-Based Sports, Athlete Psychology, and Course Elements

Audrey B. Lancaster

Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/etd

Part of the Landscape Architecture Commons

Recommended Citation

https://digitalcommons.usu.edu/etd/939
ABSTRACT

Enhanced Cross Country Running Course Design:
A Study of Historic and Recent Courses, Other Landscape-Based Sports, Athlete Psychology, and Course Elements

by

Audrey Lancaster, Master of Landscape Architecture
Utah State University, 2011

Major Professor: Dr. Sean Michael
Department: Landscape Architecture and Environmental Planning

Literature suggests that the original and “pure” elements of cross country course design have faded through time; in order to wholly enhance course design the original elements must be preserved and united with desired modern course elements. “Pure” sport is defined by an athlete’s struggle and persistence that occur amidst tough competition, rugged course elements, and physical pain. In addition to identifying the desired elements through literature review, case studies, and self-experience of cross country course design, it was necessary to confirm the desired elements through interviewing eight key informants. The key informants were renowned and accomplished NCAA cross country coaches selected to represent a wide geographic. These eight informants were interviewed to unveil which elements of cross country courses were desired, important, essential, would advance design, and are underutilized and present in their favored courses.
The results from the interviews confirmed a deep desire for enhanced course design by unionizing the elements present in the “pure” sport of cross country with contemporary desired elements. The new “pure” sport of cross country can be obtained through the utilization of the elements revealed within this thesis. Designing courses that will provide unchanged emotions from the “pure” sport of cross country, yet do not incorporate excessively rough course elements, will be the new “pure” sport of cross country.

Overall, the results show designing for the athlete, which includes safety, well-defined routing and proper carrying capacity, an accomplished sense of place, advanced technologies and facilities, sport appropriate and safe footing and reasonable terrain, and spectator engagement, would considerably improve design. In order to preserve the “pure” sport of cross country while also integrating modern desired and necessary elements, course designers must use pioneering design methods in order to incorporate all of the desired elements.

The main objective of this research was accomplished and has established a foundation upon which subsequent research efforts may begin. This work serves as a catalyst to improving cross country course design by attaining the knowledge of proper, intensified, and innovative design.

(150 pages)
ACKNOWLEDGMENTS

I would like to thank all of those that offered their time and effort to aid in the completion of this thesis. Specifically, I wish to thank my committee, Sean Michael, Keith Christensen, and Gregg Gensel, for all of their assistance and patience.

Also, I could not have completed this thesis without the help of the NCAA Cross Country Coaches who offered their time and valuable knowledge. In addition, I would like to thank all individuals with whom I spoke over the phone or in person, which aided me with my initial stages of this thesis.

Also, without the patience and help of my husband, Ryan, I could not have completed this work and I appreciated his support. In addition, Ellison and Jazzy, two incredible “Guide Dog for the Blind Puppies in Training,” offered joy throughout this process.

Audrey B. Lancaster
CONTENTS

Page

ABSTRACT ................................................................................................. iii

ACKNOWLEDGMENTS ............................................................................... v

LIST OF TABLES ......................................................................................... viii

LIST OF FIGURES ....................................................................................... ix

CHAPTER

I. INTRODUCTION .................................................................................. 1

II. THESIS OBJECTIVES/STATEMENT OF THE PROBLEM .................. 4

III. BACKGROUND .................................................................................. 10

   History of Cross Country ................................................................. 10
   Championship Races ........................................................................ 12
   The Sport of Cross Country ............................................................. 14
   Cross Country’s Standards and Need for Improved Design, 
   Especially in the U.S. .................................................................. 17
   Literature Review ........................................................................... 22

   Athlete Psychology ......................................................................... 22
   Golf Course Design ......................................................................... 33
   Cross Country Ski Design and Planning ......................................... 44
   Cross Country Running ..................................................................... 49
   Cross Country Courses Studied Through Personal Experience .... 49
   Choice Courses ............................................................................. 50
   Undesirable Courses ..................................................................... 53
   Brief Course Case Studies ............................................................... 55
   IAAF World Championship Cross Country Courses .................... 56
   Renowned Courses ......................................................................... 58

IV. PURPOSE/METHODS ......................................................................... 62

   Conducting Research and Determining the Areas of Literature 
   Research .......................................................................................... 62
   Focus and Course Typologies ....................................................... 63
   Additional Areas of Research ......................................................... 64
Course Elements.......................................................................................... 65
List of Course Elements............................................................................. 66
Determining the Desired Course Elements............................................. 73
Semi-structured Interviews...................................................................... 77
Types of Courses....................................................................................... 79

V. ANALYSIS AND RESULTS......................................................................... 83

Desired Elements....................................................................................... 85
Underutilized Elements............................................................................. 89
Elements Needing the Most Improvement.............................................. 90
Previewed Course Elements.................................................................... 90
Emulated Courses and Course Elements............................................... 91
The Most Important Influences and Groups in the Informant’s Designs.......................................................... 91
Detailed Elements and Types of Courses............................................... 92
Undesirable and Faulty Course Elements............................................... 95
International Courses............................................................................... 97

VI. CONCLUSIONS AND RECOMMENDATIONS.......................................... .98

Enhanced Design....................................................................................... .98
Designing for the Athlete......................................................................... 100
Significance of Element 9.......................................................................... 100
Spectator Engagement............................................................................. 101
Desired Course Settings and Opportunities in Design.......................... 103
Table of Course Typologies..................................................................... 104
Literature Review of Applicable Design Methods and Ideas.............. 107
Golf Course Design Applications............................................................ 107
Applied Athlete Psychology....................................................................... 109
Cross Country Ski Design Applications and Professional Design........................................................................ 110
Designers are Necessary for Enhanced Design.................................... 114
Future Research and Practices................................................................. 115
Future Research....................................................................................... 116
Future Practices....................................................................................... 116

REFERENCES............................................................................................... 117
APPENDIX.................................................................................................... 121
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1</td>
<td>Focus Classifications Diagram</td>
</tr>
<tr>
<td>4-1</td>
<td>Sub Course Element Titles</td>
</tr>
<tr>
<td>4-2</td>
<td>Course Typologies and Elements</td>
</tr>
<tr>
<td>5-1</td>
<td>Each Key Informant’s 3 Favorite Courses</td>
</tr>
<tr>
<td>6-1</td>
<td>Course Typologies and Each Elements Level of Existence in Each Course Typology</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2-1</td>
<td>Rim Rock Farm 6K race course</td>
</tr>
<tr>
<td>2-2</td>
<td>July 12, 1924 Olympic cross country race, Paris, France</td>
</tr>
<tr>
<td>3-1</td>
<td>Hare and hound cross country race</td>
</tr>
<tr>
<td>3-2</td>
<td>World-wide cross country championship races</td>
</tr>
<tr>
<td>3-3</td>
<td>World-wide cross country championship races</td>
</tr>
<tr>
<td>3-4</td>
<td>Sand Hills golf course</td>
</tr>
<tr>
<td>3-5</td>
<td>National championship race, Terre Haute, Indiana</td>
</tr>
<tr>
<td>3-6</td>
<td>Runners passing through the orange orchard in Riverside, California</td>
</tr>
<tr>
<td>3-7</td>
<td>Starting and ending segments of a championship course in Riverside, CA</td>
</tr>
<tr>
<td>3-8</td>
<td>Edinburgh’s course layout and profile</td>
</tr>
<tr>
<td>3-9</td>
<td>Spectators and runners at Rim Rock Farm</td>
</tr>
<tr>
<td>4-1</td>
<td>Geographic representation of the eight key informants</td>
</tr>
<tr>
<td>5-1</td>
<td>The number of key informants which selected each element as important</td>
</tr>
<tr>
<td>5-2</td>
<td>The number of key informants which selected each element as one which</td>
</tr>
<tr>
<td></td>
<td>would advance course design</td>
</tr>
<tr>
<td>5-3</td>
<td>The number of times each element was present in the informants’ favored</td>
</tr>
<tr>
<td></td>
<td>courses, moreover, only the elements the coach’s specified in their favorite</td>
</tr>
<tr>
<td></td>
<td>courses</td>
</tr>
<tr>
<td>5-4</td>
<td>The number of occurrences each type of land was present</td>
</tr>
<tr>
<td>6-1</td>
<td>Trail map and profile of the Thetford, Vermont cross country course</td>
</tr>
<tr>
<td>6-2</td>
<td>Cross country runners on the Thetford course in Vermont</td>
</tr>
<tr>
<td>6-3</td>
<td>The relationship of landscape architects’ skills to the needs in course</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Cross country is run through diverse landscapes with no true comparison from day to day, course to course, and time to time. Competition in a cross country race is ultimately man against man and man against nature. “It is pure sport,” stated Joe Henderson, renowned running coach, former cross country champion and editor of Runner’s World magazine (Henderson 1971, 3).

In research and discussion of cross country course layout and design, the word which is most often used to define the identity, spirit, and structure of cross country is “pure.” The “pure” sport of cross country is a connotation which is ill defined but frequently used by advocates of cross country to define the sport of cross country. Cross country’s “purity” appears to define the character and uniqueness of the sport, but is being used without defining what those characteristics are. What is the “pure” sport of cross country, and how is one to layout and design a course, especially with the guidelines and restrictions that have been placed upon many cross country courses, without compromising cross country as “pure” sport?

In order to solidify the definition of the “pure” sport of cross country the character which defines the unique value and structure of the sport must be analyzed. The “pure” aspect of cross country as a sport may pertain to such diverse facets as athletic challenge, varied terrain, unpredictable weather conditions, sense of place, outdoor ruggedness, and viewer curiosity. “Pure” sport is an athlete’s struggle and persistence which is occurring amidst tough competition, course elements, and extreme physical pain, all within the
natural setting and landscape of the existing environment. Identifying the characteristics, guidelines, and available resources of each individual course to produce a designed solution which encompasses each of these aspects with minimal compromise is the responsibility of the course designer and relies upon a clear conception of the sport’s essence.

The main, if not only, guidelines currently supplied are provided by the current leading governing bodies: the National College Athletic Association (NCAA), the International Association of Athletics Federation (IAAF), and the USA Track and Field (USATF). The NCAA Track and Field and Cross Country Rule Book, the IAAF Competitions Rule Book, and the USATF Rule Books only contain specific space, distance, and similar quantitative guidelines. Furthermore, the National Federation of State High School Associations (NFHS) has only one rule: course length must be between 2,000 and 5,000 meters.

Because the NFHS, NCAA, and IAAF currently have a paucity of material to aid in course design, excepting specific measurement rules by the NCAA and IAAF governing bodies, the cross country experience is being lost due to the haphazard way in which courses are designed and laid out. In effect, this can be attributed to the lack of trained and knowledgeable course designers. In the 2010-2011 IAAF guideline manual it states: “It must be accepted that the difference between very successful and unsuccessful events often lies in the natural characteristics of the venue and the abilities of the course designer.”

Problems in addressing issues of cross country running course design stem from the lack of directly related literature. Other limitations that affect this thesis may include:
absence of any external funding; the number of cross country courses which are designed for the sole purpose, or nearly sole purpose, of cross country running; and by the number of cross country landscapes that can be studied within the scope of a master’s thesis.
CHAPTER II

THESIS OBJECTIVES/STATEMENT OF THE PROBLEM

In recent decades cross country courses have evolved to incorporate many new characteristics. Courses have begun to offer increasingly faster times and less challenging terrain for athletes. Wide open terrain and reduced course interest have been turned to facilitate viewing during lengthy time segments, as well as perceived conveniences for coaches, officials, and the media. In addition, these characteristics are evolving in an ever increasing context of highly refined and manmade landscapes from which designers select course routings.

Courses that are being created with this recent mindset often lack unique and historic qualities which define cross country running as “pure” sport. Qualities such as athlete challenge and a high sense of motivation, viewer curiosity rather than total spectator viewing, capturing unique genius loci for each course, and a sport based on the natural terrain, are being compromised. Innovative and enhanced design, referred to within this thesis, will advise and enlighten course designers on how to preserve, or even reintroduce, the historic and original characteristics of a cross country course whilst continuing to improve modern design initiatives.

Enhanced cross country course design will embrace the historic and identifiable characteristics of cross country while also adhering to the desires for athlete safety, applicable guidelines, and other beneficial modern applications. Intensified design methods will also enhance the overall product. One design method which will improve the end product is educated and innovatively examined site selection, analysis, and
planning. Other intensified design methods that may be exploited for enhanced design include utilization of available resources, consideration of various social situations, as well as athlete, coach, and spectator perceptions.

The process through which the overall design will be improved will combine studies of landscape based sports and a variety of cross country running courses. In addition, research on athlete focus, mentality, and visual perception may lead to innovative cross country course design ideas and instruction.

In order to wholly enhance cross country course design, integration of modern styles and expectations is required. Nevertheless, by recapturing a *genius loci* original to cross country and creating more motivating and enjoyable course experiences, cross country running may yet again breed “pure” sport. There are very few courses like Rim Rock Farm in Kansas and when referring to this course, the USATF website stated, Rim Rock Farm is “considered one of the most difficult and most ‘pure’ cross country courses in the nation.” The Rim Rock Farm course consists of varied terrain and surfacing, interesting landmarks and inspirational statues and signs, bridge crossings, named course locations and viewer curiosity, see figure 2-1, thus many of these elements are considered “pure” elements of course design.

The history of championship cross country races was weakened when cross country was eliminated from the Olympics. However, because the sport has significantly evolved in the last few decades renowned cross country champions have petitioned to allow cross country back into the Olympics. The last Olympic cross country race, transpiring in 1924, was held in the afternoon amidst blistering conditions with
Figure 2-1. Rim Rock Farm 6 Kilometer course layout.
Source: www.kuathletics.com
temperatures soaring into the high 90’s; it was one of the hottest days ever recorded in Paris during that time. Thirty-eight runners toed the line at the start of the race, but with each passing mile one after another fell. After battling the extreme weather and course conditions of the 10,650 meter race only fifteen of the thirty-eight runners finished (Henderson 2001). The remaining twenty-three runners were rushed to the hospital and tended to for heat exhaustion and various other conditions (Balinsunset).

It was not only the weather conditions that decimated the runners, but also the condition of the race course. The course was laid on an uneven stone path with weeds and thistles protruding from the stone crevasses; some of the plants rose to knee high on the runners, see figure 2-2. Additionally, the site of the course was poorly selected; the location was adjacent to an energy plant that emitted toxic fumes (Henderson 2001).

Figure 2-2. July 12, 1924 Olympic cross country race, Paris, France. Nurmi in the lead, followed by Edvin Wide of Sweden (left). Ville Ritola is crossing the stone fence. Source: www.urheilumuseo.org
Sadly, with a well designed course there may have been little or no disastrous effects, which have led some to believe that cross country may have never been banned from the Olympics.

There have been many petitions and efforts to add cross country running to the winter Olympics, and the last petition is currently looking positive for the 2014 winter Olympics, the unruly disaster from lack of planning and design in the 1924 Olympics has debilitated the Olympic status for cross country thus far.

The IAAF and NCAA both contain a vague paragraph (in their respective rule book manuals) on the types of terrain and surfacing that should or can be used, but the NCAA is becoming more restrictive on what can be present in a cross country course. During an over-the-phone conversation, one west region cross country representative told of a former NCAA cross country runner who went on to run internationally. The runner was first taken aback by the wide variance in terrain and surfacing that was used compared to NCAA courses. In and after the race this runner realized the fun and excitement that was present due to the fluctuating course characteristics. Cross country running’s popularity, rugged attractiveness, uniqueness, and the addition of newly intensified design guidelines, planning, and ideas will further the imagination and intensity of cross country course design.

Desires and expectations of cross country participants, coaches, viewers, the community, as well as the land managers and hosts of cross country races will be heightened and realized through the study of “pure” sport. The main outcome sought from this research is to identify course elements that represent the “pure” sport within the modern applications of cross country courses. The objective of this thesis is to identify
and confirm desired course elements. After the desired elements have been recognized, design processes and applications will be identified and are greatly needed due to today’s lack of available course design instruction.
History of Cross Country Running

The historic past of cross country running is remarkable and is imperative to understanding the originality of the sport. Cross country racing, especially in the U.S., has consistently declined in sustaining its authenticity, by increasingly conducting meets on finely manicured parks or golf courses that were designed without consideration for cross country racing (Bloom 1978).

In the early era of cross country racing, courses were literally laid over the countryside. Daniel Defoe, a British journalist in the 1600’s, referenced several foot races across the country, stating, “running foot races seems to be the great sport or diversion of the country” (Cox and Jarvie 2000, 93). Even before foot races, young men across England would chase foxes across the countryside as hunters, dating the beginning of what has become cross country racing back to the 14th century (Henderson 2001).

Although foot races have been noted in early journals, Britain has been credited with the official establishment of cross country racing. Britain formally began the sport of cross country in the early 19th century; it was not until the latter part of the same century that they introduced cross country to the world. Cross country was originally added to the British school systems as a way for young men to demonstrate their qualities in an innate, yet very challenging, sport (Cox and Jarvie 2000).

A significant milestone in the evolution of cross country was the famous “Crick Run” that started in 1837 at Rugby School in Britain. This began a new phase of racing
during which many running clubs established runs of their own. These runs were routed through forests, streams, and flatlands, as well as across the countryside on varied terrain of sand, stone, and trails. In addition, there were many natural obstacles or hazard zones throughout the course. Hazards consisted of water body crossings, mud pits, fences, farm sites, fallen trees, sand hills, weed thickets, or other obstacles en route.

Cross country clubs began to form more widely in the mid-to-late 1800’s, including such organizations as the Thames Hare and Hounds in 1868, the Cheshire Tally-Ho Hare and Hounds in 1871, and the Ranelagh Harriers in 1881. The cross country clubs at this time often incorporated the word harrier into their title (this was characteristic of many of the finest athletic clubs during the time period) thus reflecting cross country becoming one of the leading sports in Britain. This remarkable epoch in cross country running allowed the sport to break free from the small amount of attention it had previously received (Cox and Jarvie 2000).

Another form of cross country concurrently gaining popularity was steeple chasing. Prior to 1840 steeple chasing had gained popularity in Scotland, England, and Ireland. Then in the 1840’s steeple chasing clubs were formed at Oxford University in Britain. Steeple chasing derived its name from the event of a runner racing another man, or a man and his horse, to a local church steeple. The finish did not have to be a church steeple; it could be any mutually agreed upon landmark. The competitors would take off from the starting line, each taking the shortest route they thought possible, navigating over any obstacle or natural terrain on course to the finish (Henderson 2001).

Like steeple chasing, paper chasing was another type of run which fathered cross country racing. Paper chasing consisted of two runners, or “hares,” that laid two trails
marked by strips of paper 20 to 100 yards apart, one of which was a diminishing false trail (Benyo and Henderson 2002). After a ten minute period the chasers, or “hounds,” would chase the hares, trying to follow the correct trail for victory, see figure 3-1 (Heywood 2005). Paper chasing, though first recorded in a journal excerpt from 1856, only lasted into the 1930’s, waning as competitive cross country boomed (Balunset).
became the administrative body for cross country and began the IAAF World Championships. This championship has remained the most prestigious cross country championship since 1973 (Henderson 2001). Other countries hold world-wide competitions throughout the season, many of which are very prestigious, to prepare for the IAAF championships. For instance, the English Cross Country Championships are very popular and have been held since the inaugural event in 1877. Today, this championship race attracts a vast field of runners and strongly promotes team competition (Cox and Jarvie 2000).

The field of runners that participate in and dominate long distance running has changed dramatically since the late 1800’s. In the beginning, England, Scotland, Norway, Great Britain, and similar countries controlled the field. Although every competitor in cross country is a contender for the winning title, the dominant crowd in cross country today is the Africans. Until 2001, Ethiopia, Kenya, and Tanzania were the only countries to win the men’s IAAF championship title for the preceding 20 years. Since 2002 the IAAF men’s cross country champion has been from Ethiopia, except one first place finish by Zersenay Tadese from Eretria.

Jason Henderson, writer for Athletics Weekly, commented on the originality and creative nature of cross country which continued to emerge throughout the world, “A moment’s inattention is enough to end the race in the ditch. The spirit too plays its part, surrounded by nature and struggling to overcome its hazards, there is a return to ancient sensations which were second nature to women and men who preceded us on the route toward the civilization of today” (Henderson 2001, 21).
This deep and unique history defining cross country’s distinctive features, which test both mental and physical strength and endurance, preserve it as “pure” sport. The original sport of cross country is defined by the diverse terrain, unique team approach, varied difficulty, and distinct style. Jason Henderson repeated the often considered defining aspect of cross country racing: “To plough through ankle-deep mud, grinding up hills and bounding down them represents sport in its purest form. It is man against man. Man against the elements. Winners come in all shapes and sizes, but will always share one thing in common: a heart as big as a lion’s” (Henderson 2001, 18).

The Sport of Cross Country

The definition of cross country running differs considerably from person-to-person. To some it may literally indicate running across the country (across the nation), to others cross country is defined as a race on roads, trails, or any open space. The meaning of cross country also varies significantly in different communities, states, and countries. The most common definition, and the one which will be used for the purpose of this paper, is that cross country is a race, not a training run, on mostly natural surfaces excluding any synthetic surfaces such as roads or tracks, and pitting teams and individuals one against another (Henderson 1971).

The structure of cross country racing further defines the sport from other similar sports such as road or track racing. In the U.S., cross country teams vary significantly in number depending on the level of competition, associated costs, and location. In high school, the cross country team can reach over 50 members or consist of just two to three
runners. Elite and college racing teams usually consist of five to twenty runners due to costs and participation restrictions in significant or championship races.

College and elite cross country races usually restrict the participation number of each team to between five and nine competitors. The number is restricted to let more teams participate at any one time. Similarly, only the top five members’ positions are included in team scoring. To calculate the score in cross country racing the runners receive points based on their finishing position. The first place runner gets one point; the second two points; and so on. At the conclusion of the meet the first five participants’ position numbers (point value) from each team are added together; the team with the lowest point total wins (Heywood 2005).

Team emphasis is only one of the many defining aspects of cross country. However, the unique and varied terrain is the most defining characteristic. Cross country is run through diverse landscapes with no true comparison from day to day, course to course, and time to time. Competition in a cross country race is ultimately man against man and man against nature. “It is pure sport,” stated Joe Henderson, an outstanding long distance runner (Henderson 1971, 3). The diverse terrain may consist of hills, flat land, water features, forests, large open spaces, manicured grass, dirt paths, or any natural element suitable for cross country racing.

Cross country is most often compared to the 5,000 or 10,000 meter events in track, although dynamics, strategy, and athlete racing skill may differ greatly. Cross country is not only run over varied terrain, but is also run over a range of distances depending on the level of competition. Consequently, cross country races can range from 3,000 to 12,000 meters (Heywood 2005).
Cross country is also an extremely competitive sport due to the large field of athletes that participate. A cross country race often consists of competitors that specialize in various long distance races during the track season. Competitors whose track and road events are as diverse as the 800, 1,500, 3,000, 5,000, 10,000 meters, steeplechase, and marathon participate in cross country, making cross country races one of the most highly competitive and universal sporting events (Heywood 2005).

The current leading governing bodies for professional cross country include the International Association of Athletics Federation (IAAF) and USA Track and Field (USATF). Given that cross country has not been an Olympic event since 1924 the IAAF International Cross Country Championships has become the world’s most prestigious cross country race (Henderson 2001). In the U.S., the National College Athletic Association (NCAA) has been the governing body for colleges and universities since the first NCAA cross country championship in 1938 (Heywood 2005). The other official governing organization is the National Federation of State High School Associations (NFHS) which serves as the administrating body for high school cross country.

Although the IAAF and the NCAA organizations contain some distinct differences in guidelines, they will be referenced throughout this paper as their guidelines are more cohesive and well defined than high school course guidelines. These two organizations also disallow running on synthetic surfaces, with few exceptions, whereas high school cross country courses may be routed to include long stretches of road due to the lack of guidelines.
Cross Country’s Standards and Need for Improved Design, Especially in the U.S.

Today, cross country is run in parks, golf courses, farmlands, hills, valleys, and other diverse places. There has been recent effort to construct courses that are designed with the sole purpose of cross country racing. Also, many unique and great courses have been incorporated into multi-use spaces, such as historic parks or farmland, designed or reconstructed with cross country in mind. Unfortunately, there has also been a trend that has led the sport of cross country to suffer. This is the adaptation of cross country racing onto extremely transformed and confined terrain nearly entirely reconstructed by man, specifically golf courses.

Conversely, courses such as Terre Haute, Indiana; Rim Rock Trail, Kansas; and Big Cross, Washington have been designed specifically for cross country racing. All provide a matchless cross country experience and are excellent examples of cross country courses by design. Each of these provides a unique experience and are not laid onto excessively refined, man-altered terrain.

Cross country running’s name describes the most unique and exciting aspect of the sport. For other sports it may not be as important to retain their original purity, but if cross country wishes to remain true to its name, it is crucial for the sport. Cross country is not track, road or golf course racing; it is a race run across segments of the countryside. Although it is inappropriate, due to safety and fairness for the athlete for the majority of courses to include plowed fields, mud pits, or stream crossings as races once did, courses should continue to be designed consisting of varied terrain, surfaces, and surroundings.
Two aspects of cross country course design, especially in the U.S., that have led to races being run on manicured and nearly flat surfaces are safety and speed. Athletes and coaches are continuously expecting similar or equivalent race times to those that can be achieved on the track. Coaches are recording and reading quarter to half mile time splits throughout the race as if terrain had no impact on the run. Although sometimes it may be important to know time splits at the beginning of the race to prevent lactic acid build up, quarter or half mile splits throughout the entire race are not accurate or relevant for races that vary from one day to another and one course to the next. Common use of golf courses or refined terrain in the U.S. has led this country to become particularly renowned for manicured courses (Bloom 1978). Marc Bloom in Cross Country Running (1978, 38) noted the disfavor of running on such refined surfaces:

What can we conclude about a culture that sterilizes cross country running by stretching out on soft, manicured golf courses? In cross country, too, we are the affluent society. I prefer to think that American runners are cheated, not spoiled, by the dearth of authentic cross country runs in the United States. It is not that we must make a tough sport even tougher to further distinguish it; it is that we must try at times to meet the world standard, which is one that blends imagination and intensity, making cross country running an unforgettable experience.

While safety and speed are very important to cross country and must be implemented into course design, the world standard of cross country is one which not only radiates with authenticity, but also intensified, creative, and distinctive design. In Belgium, cross country races brought thousands of viewers packed into the stands and numerous viewers were glued to their TV screens to witness such a venture. Belgium cross country running was a spectacle with the fans cheering for their favorites and the terrain fierce with excitement. Manfred Steffney, an Olympic marathoner from West
Germany, relates a race held in Belgium in 1972. The pack of runners took off onto a muddy course due to the rain, which often accompanied cross country races in Belgium. Runners sank ankle deep every step with streams, fences, and marshes around every corner. Shoes were swallowed by the marsh and just when a runner feared being off course, they realized that the flags marking the course actually did go through the marsh and onto railroad tracks. The tracks had to be taken at even strides to avoid a seemingly certain injury (Bloom 1978).

After this section of the course the runner was counted at one lap, which meant there were eight laps remaining. The rough course radiated degradation and cruelty, but to quit a cross country race in Belgium was to surrender athletic stature. After a couple laps the race may actually have begun to seem somewhat enjoyable as each runner had learned to jump on the left of the fence or run on the right side of the marsh and was gratified by self accomplishment and not dispirited by the racing environment. The race concluded without timed splits or even comparable finishing times, only with the numbered position at the finish line (Bloom 1978).

In Germany, the transformation of cross country courses stemmed from the desire to be more competitive in the IAAF championship meets. Courses were transformed to be run over flat open spaces including meadows, forests, and fields. However, Germany also desired to keep the history that made German cross country what it is; adding and capitalizing on a site’s more challenging and rugged terrain (Bloom 1978).

Cross country racing in Britain is not only unique in history and style, but affords the popularity that the sport hopes for today. Beginning in the late 19th century cross country running became one of Britain’s finest sports. In a 1971 runner’s booklet, Wilf
Richards, a British writer, concluded from the massive amounts of runners that participated in the cross country championships that cross country was “immensely popular.” Richards also describes the setting of such a sport: “Torrential rain, snow, ice, gale-force winds, freezing temperatures – all these are accepted as part of the game.”

Mexico, New Zealand, Africa, and numerous other countries capitalize on the rugged countryside unique within their country, such as an exclusive uphill race in Mexico that finished at the summit of a mountain, or traversing the Kalahari Desert in Kenya. New Zealand utilizes the unique water systems in its country by routing cross country courses through numerous creeks, bogs, and streams, including the mud and all that comes with it. Barry Meyer, secretary of the New Zealand Amateur Athletic Association in 1977, speaking of New Zealand courses said: “Our courses are severe by world standards.... Most of our harriers like it that way” (Bloom 1978, 89).

Figure 3-2 and 3-3. World-wide cross country championship races. Source: http://hubpages.com/hub/An-Introduction-on-Cross-Country-Running-Race

The “world standard” for cross country is not easily identifiable, but two aspects are coupled and should equally be taken into consideration when defining the “world standard.” The first aspect is what each and every country considers “their” cross
country course. From the previous examples of cross country courses throughout the world it appears this component of the definition of the “world standard” are the rugged adventures that each country capitalizes on to design their courses. From the marsh pits in Belgium to the mountain climbs in Mexico, the varied courses are unique in each country, but the underlying ruggedness and spirit of the sport is the same.

The other aspect defining the world standard for cross country is the guidelines utilized by the IAAF. This world-wide governing body has provided guidelines and standards that attempt to equalize the difficulty for each country, as well as allow each hosting country to incorporate acceptable features unique to their natural resources and traditions. Although the world standard is difficult to identify, the combination of the IAAF guidelines and each country’s landscape offers adventure, natural obstacles, a unique and imaginative sense of place, and little to no synthetic surfaces. Course character and recognition are desired by all countries, including the U.S. This may be accomplished by course designers, coaches, and athletes working to meet and even improve upon the “world standard” for cross country course design. In the 2010-2011 manual written by the IAAF, the supreme world-wide governing body for cross country, it states, “There are extreme variations in conditions in which Cross-Country is practiced throughout the world and it is difficult to legislate international standardization of this sport. It must be accepted that the difference between very successful and unsuccessful events often lies in the natural characteristics of the venue and the abilities of the course designer.”
Literature Review

Athlete Psychology

Athlete psychology was selected as a subject of research because of the relation between psychological and physical emotions. The physical environment and opportunities affect the athlete’s psychology which affects the athlete’s experience and race performance.

*Psychology and Physical Pain of Distance Runners.* Jack Daniels, an elite athlete and coach, categorizes any distance from 3,000 to 15,000 meters a middle distance race, which includes most, if not all, cross country races. He strongly emphasizes that short distance races are intense, but that middle distances are “just plain hard and cruel; middle distance races are not only cruel, but very fatiguing to mind, body, and spirit” (Daniels 1998, 248). Mental and emotional thought processes greatly impact a distance runner’s performance because of the immense amount of mental and physical energy exerted (Daniels 1998). The design of a cross country course should be designed with the elements which offer the athlete the ability to maintain beneficial mental and emotional status through race challenges. Such elements are influenced by creating courses which provide positive and concentrated focus, both intrinsic and extrinsic focus, mental toughness, and motivation, yet relieve anxiety without reduced motivation.

*Psychological Factors Affecting Athletes.* Numerous psychological tests have been conducted through various research methods to test which psychological processes most affect athletes. These experiments were carried out by comparing less successful athletes to more successful athletes. Test results have created notable inventories of
psychological variables in sport. Each inventory is unique, but also reiterates the core variables on how athlete psychology affects performance (Dosil 2006).

Dosil, head professor of the doctoral course: “Current Perspectives of Physical Activity and Sport Psychology” at the University of Vigo in Northwest Spain, cites widely recognized psychology inventories created by renowned sports psychologists. The recurring variables include the following six inventories: the Psychological Performance Inventory (PPI) produced in 1986 by Loehr; the Psychological Skills Inventory for Sport (PSIS) created by Mahoney, Gabriel, and Perkins in 1987; the Athlete Coping Skills Inventory (ACSI) accomplished by Smith, Schutz, Smoll, and Ptacek in 1995; the Test of Performance Strategies (TOPS) designed by Thomas, Murphey, and Hardy in 1999; an inventory concluded from various sources of data by Williams and Krane in 2001; and the results of an interview technique conducted on U.S. Olympic champions by Gould and Dieffenbach in 2002 (Dosil 2006, 79, 274-275).

From those widely accredited inventories the top recurring psychological variables are: attention and concentration control, mental toughness, energized motivation, relaxation, confidence, control of anxiety and fear, and positive energy (Dosil 2006). While all of these psychological factors affect world class athletes, focus is “almost universally recognized as the most important key to effective performance in sport. Mental control is typically viewed as the deciding factor in competition in both individual and team sports” (Nideffer and Sagal 1993, 243). Dosil states, “Performance follows focus,” and the definition of focus is “the concentration of attention or mental energy” (Dosil 2006, 168). According to this definition, focus is a component of many of
the psychological variables listed above. Focus predominantly affects athletes’ attention and concentration, mental toughness, arousal and anxiety control, and directed energy.

The emotions of an athlete at the beginning of a race, as well as the ability for the athlete to control, maintain, and shift focus reflects on the outcome of the race. What the athlete focuses upon in crucial parts of the race is particularly critical, especially when the athlete is in pain (Nideffer 1976). It is common, if not inevitable, that endurance runners experience pain in a race (Orlick 1986). Daniels notes that for middle distance runners “the enemy is the total body.” There is usually not one specific spot that an athlete feels pain; but that the entire body is in pain. Often after a short initial segment of the race pain will stay consistent or even rise slightly. For this reason, the objective is not how to rid the body of pain, but how to manage the pain (Daniels 1998). The athlete must direct focus and energy on something other than negative thoughts or feelings because if psychological pain is permitted to increase physiological pain will increase (Nideffer 1976).

**Focus Classifications.** Athlete psychology research has grouped focus into specified classifications. Depending upon the source, similar classifications are presented with different labels, such as associative, internal, and self-oriented. Each category title is different yet describes a comparable focus strategy (Morgan 1980, Nideffer 1976).

In context of this work, types of focus will be measured according to width and direction based on the classifications employed by Robert Nideffer, renowned sports psychologist. The width of attention is measured from broad to narrow, and direction from internal to external. To analyze any given circumstance, width and direction must be equally considered. Resulting from the combination of width and direction, a focus
diagram is formed which generates four main types of focus: broad internal, broad external, narrow internal and narrow external, see table 3-1. The desired width and direction of focus vary according to sport and individual (Nideffer 1976).

**Focus Classification Diagram**

![Diagram]  

Table 3-1. Focus Classification Diagram.  
Source: Nideffer 1976

**Broad Focus.** Broad internal and external focuses are rarely used in distance running events. However, the most advantageous type of focus is not only determined by sport, but also the nature of the athlete.

**Narrow Focus.** To keep psychological pain at bay the most advantageous type of attention for a distance runner to utilize is narrow focus. Both narrow internal and narrow external focus benefit a distance runner’s race performance by allowing an athlete to lock into an initiated behavior, such as running, with little needed attention to distracting activities (Nideffer 1976).

**Narrow Internal Focus.** Employment of narrow internal focus results in the athlete’s attention and concentration narrowing intently on internal body systems (Nideffer 1976). These systems, such as leg movement, breathing, or form sustain
internal focus with little thought to their environs (Orlick 1980). The most advantageous use for narrow internal focus is when there are very few environmental changes, which allows the athlete to focus on internal systems. Focusing on rhythm or form will decrease the feeling and focus on pain, as well as heighten endurance and strength. Another benefit of narrow internal focus is the ability of the athlete to push themselves and concentrate on the goal rather than being distracted by external stimuli (Nideffer 1976).

**Narrow External Focus.** The other most common type of attention style used by endurance runners is narrow external. This type of focus is useful when a runner can lock into an initiated behavior, just as narrow internal focus, but concentrate on a particular point or object rather than internal systems. The ability for the athlete to focus on isolated external stimuli without becoming overwhelmed by the plethora of activity surrounding them will result in the management of pain. Narrow external focus also allows the athlete to use segmented goal oriented strategies. The capability to only focus on small sections of the race aids the runner psychologically by keeping pace and reaching each segmented goal (whether it is a tree or a blade of grass), which results in the attainment of the overall goal (Nideffer 1976).

Narrow external focus prevents an athlete from stewing over his or her own internal thoughts and fears. This type of focus is especially useful if the athlete’s internal thoughts are concentrated on negative aspects, such as doubt or pain. If an athlete is internally focusing on pain, the pain will not only hurt physically, but emotionally the athlete is defeated (Nideffer 1976).

**Narrow Internal and External Focus Applied.** The type of focus used by distance runners is influenced by the intensity of the competition and length of the race. Every
A study conducted by Silva and Applebaum in 1989 on the top fifty marathon finishers delivered results on the types of focus used in the beginning and latter parts of a race. The focus strategies were only associated with external and internal focus, therefore the width of direction is understood to be narrow. It was found that in the beginning part of the race, 0 to 8 miles, the marathon runners shifted between internal and external strategies. While in the concluding 8 to 10 miles of the race the marathon runners were more likely to utilize disconnected, or external, thoughts to manage pain (Baghurst, Thierry, and Holder 2004). External focus is offered by designing courses with elements such as are present in the Rim Rock Farm course; landmarks, interest points, and varied terrain and surfacing. Although a marathon is longer than a cross country race, strategies used in the beginning and latter part of the marathon can be associated with the strategies used in comparable segments of a middle distance race.

While the latter marathon study revealed the types of focus strategies used in the beginning and final stages of a race, it left unclear the mentality of the athlete in the middle section. Thoughts of slowing pace, losing contact with an opponent or teammate, or even quitting may run through an athlete’s mind in the middle of the race as a way to ease experienced pain. In order to make it through this part of the race shifting focus and intensely concentrating using narrow focus appears to be essential (Kabush 2001).

*Shifting Focus Results in Maximum Benefits.* Both narrow internal and external focus prove useful to long distance runners, but to maximize racing strategy and success an athlete ought to shift from narrow internal to narrow external, i.e. designed and natural
site elements, and vice versa. Alternating focus allows attentiveness to internal strengths and external stimuli resulting in maximum decreased awareness of experienced pain. Orlick, a renowned sport psychologist, noted, “Anything that takes your focus away from worry tends to reduce anxiety and improve performance” (1980, 124).

Internal and external focus can also be harmful to the athlete; therefore intermittently shifting focus is the most profitable strategy. An individual’s greatest strength is often also their biggest weakness. An athlete that has a very high level of internal focus may become too focused and therefore unaware of essential activity in their surroundings. This can lead to stumbling over small hills or sliding in the mud because the athlete is too intently focused on internal systems. Other athletes are very aware of the surrounding environment and are able to cope with the numerous changes in their environs, but may become easily distracted and may not perform at the level they are capable (Nideffer and Sagal 2001). In contrast, external focus, which is directed at relevant tasks, such as landmarks or the earth underfoot, relieves the athlete from focusing on pain and also helps the athlete to mentally stay focused on the race (Gill 1986).

Not only does disconnected or external attention help a runner focus on something other than pain, it also aids in accomplishing feats thought unattainable. Such feats have been exemplified by previous events; one such event took place in Tibet. The monks of Tibet would run messages in excess of 300 miles in 30 hours, thus averaging approximately 10 miles per hour, an unbelievable pace for such a long distance (Orlick 1980).
The monks achieved this feat by focusing on a distant point in their environs and pushing any other thought from their mind. This type of focused attention provided the power to persevere even though the body was encountering unforgiving pain (Orlick 1980). However, if only narrow external focus is used the mind may disengage from the body and the athlete may become unaware of injury. Bad performances and/or injury occur because of the intense attention paid to one type of focus and not utilizing each form (Nideffer and Sagal 2001).

Another aspect leading to anxiety and thus a lesser performance from narrow internal focus is that time may seem to go by more quickly, therefore heightening the arousal level (Nideffer and Sagal 2001, 16). This discovery seems to indicate that an athlete should always be intensely internally focused so that the race would appear shorter and quicker. However, if an athlete is in complete internal narrow focus and does not periodically shift from that concentration pattern the athlete may begin to worry and anxiety or fear will heighten (Nideffer and Sagal 2001, 18). Anxiety directly turns into increased arousal and stress, which is accompanied by a decreased level of performance (Gill, 1986).

**Applying External Focus Strategies.** One way to utilize dissociative strategies used in especially critical, mentally, or physically challenging parts of a race is to break the race up into shorter segments (Nideffer and Sharpe 1978). When a race is broken up into segments, making each isolated goal easier to achieve, “the outcome will take care of itself” (Nideffer and Sagal 2006, 389).

Performance at a high level is attained through breaking up the course with stationary landmarks and reaching the landmark indicating the end of each segment. The
athlete’s mind is solely focused on reaching the desired landmark without losing speed. Once the determined milestone has been achieved the athlete locates a new landmark. The landmark or goal should only be far enough away that the athlete is certain he or she can reach it while maintaining their current speed, whether it is 50 feet or 500 meters away (Stutz 2006). Athletes may “choke” because they are too caught up in the final outcome of the race and forget to focus on the process. Often if an athlete can intently focus on the process “the outcome will take care of itself” (Nideffer 1993, 249).

Motivation. Another psychological factor affecting athletes is motivation. “Motivation is at the heart of many of sport’s most interesting problems, both as a developmental outcome of social environments such as competition and coaches behaviors, and as a developmental influence on behavioral variables such as persistence, learning, and performance” (Pelletier et al. 1995, 36). Miller and Donohue identify two motivational methods to enhance performance, both of which are pre-race tactics. They have concluded that both, focusing on task-related cues and listening or repeating broad motivational statements, equally compare in performance enhancement (Miller and Donohue 2003).

Types of motivation relate to different parts of the training and competition experiences. Intrinsic motivators, such as motivated toward accomplishments or to experience stimulation, can be the single or one of multiple factors motivating an athlete. One type of intrinsic motivation is motivation Toward Accomplishments. This type of motivation is participating in an activity for the contentment or satisfaction from accomplishing a task or creation (Pelletier et al. 1995). Accomplishing a challenge or
significant segment in a race provides the athlete with motivation of accomplishment through mental toughness.

Pelletier et al. noted that part of Intrinsic Motivation Toward Accomplishments may be “trying to master certain difficult techniques in order to experience personal satisfaction represent an example of intrinsic motivation to accomplish things the sport domain” (Pelletier et al. 1995, 37). Also, this type of motivation may be encouraged by athletes that wish to “interact with the environment in order to feel competent and to create unique accomplishments” (Pelletier et al. 1995).

Another type of intrinsic motivation is to Experience Stimulation. Stand-out experiences creating pleasure and excitement from engaging in the activity creates stimulating feelings, such as the sense of pleasure or aesthetic experiences. These sensory emotions are the motivating factors for Experience Stimulation (Pelletier et al. 1995).

Another type of motivation is extrinsic motivation. External Regulation, Introjection, and Identification are the three primary types of external motivation factors. Each is affected by external pressures, identity, awards, or recognitions. These motivational factors may be present and materialize on race day dependent upon the source of motivation (Pelletier et al. 1995).

External motivation factors appear pre, mid, and post race. Gill noted a study in 1898 which revealed how one type of extrinsic motivation affects athletes. The results showed that motivational drive is increased when in close contact with other competitors. This test, conducted by Triplett, is widely acknowledged because of the reference to sport and investigational research. Triplett, a cycling enthusiast, conducted the experiment to
test the setting which provided the greatest results for top performance. He noted that
cyclists performed above average when they had a pacing machine, but performed even
better when cycling against other competitors. To prove his theory he tested children
fishing alone and in pairs. The results showed that children in pairs reeled faster than
children fishing alone. Conclusions from this study indicate that competitors racing near
other participants obtain faster race times (Gill 1986). In addition, the better the
competition the more the athlete’s motivation is heightened (Dosil 2006).

*Relaxation and controlled arousal and anxiety.* Although a course offering
motivational and exciting experiences provides the optimal setting for an athlete, there
are times, such as the warm up period, when athletes’ arousal levels may become
destructive. Anxiety directly translates into increased arousal and stress, which is
accompanied by a decreased level of performance (Gill 1986).

An athlete’s arousal level increases on race day due to the intense physical work
load they are expecting to experience. Serene thoughts as well as external input and
surroundings, whether physically or mentally, allow athletes to conserve physical and
mental energy for the race. Relaxing or isolated spaces allows relief of anxiety. Miller
and Donohue (2003) reiterate that distractions related to the event may prevent the athlete
from keeping relaxed and free from worry. Competitive stress may be lowered by a well
planned and designed course, structure, and administration. This allows the athlete to
focus on relaxing and not worry concerning the details of the upcoming event (Dosil
2006).
Golf course design is closely related to cross country running course design because it is also a land-based sport, and cross country running races have begun to be hosted on golf courses. The aspects of golf course design which relate to cross country running are the processes, and imaginative and intensified design that are present in successful golf courses. The aspects of golf which cross country should not emulate are the small undulating hills that look like egg cartons turned up-side down and extensively refined surfaces. Small undulating hills create unnecessary difficulty and unnecessary disrupted racing rhythm.

Doak states, “The difference between a good [golf] course and a mediocre one can’t be blamed on the construction budget but rather the lack of attention to detail on the part of the architect. The finest work will be as indistinguishable from natural contours as it is distinctively bold, imaginative and exciting” (1992, 43). Successful golf courses are designed to take advantage of natural and interesting approaches, segments of play, features, and contours (Hawtree 1983). The design process of landscape-based sports requires timely deliberation of design steps and the process to carry out each, from initial site visits, mapping and concepts, to the final details (Richardson 2002).

Available land options for courses which do not have the funds to purchase a costly site are widely available, but often narrowly acknowledged. Advantages of such sites lie in the possibilities that come from well planned and pioneering designs. Whether a site is selected due to cost limitations, size appropriation, or other aspects, a captivating sense of place is obtainable at any site, no matter the existing condition (Richardson 2002). The genius loci or ‘spirit of place’ results from the feelings generated from
significant aesthetic features as well as the surrounding landscapes and vistas.
Memorable points of play and sequential experiences add to the sense of place through emotions and perception (Bell 2008).

*Listening to the Land and the Design Process.* Similar to many design fields, golf course design begins by listening to the land, along with the client. While a client’s desires can be readily understood, designers should also ask themselves “if the land could talk what would it say?” (Richardson 2002, 304). To obtain knowledge of the land and what it has to offer, as well as to acquire a mental base map, an initial site visit should be conducted. If the chance to visit the site often is present, the land my present unforeseen design opportunities. As a designer there are several things to look for when doing an on-site visit. Features to contemplate may include: sunlight conditions, drainage, views within and beyond the course, prominent features, as well as tree and shrub diversity (Richardson 2002, 366). Besides topographical maps, which may be obtained from the client, internet mapping services, or other such services, a mental base map allows the designer to more fully understand and capture outstanding elements which are present on-site (Richardson 2002).

Following the site visit a general list of everything desired by the client should be completed, as well as what is required for the golf course to function. With the desired items configured into a list the next step is to determine the type of course desired, in golf options may be private, public, 18-hole, 9-hole, etc. In addition, the types of participants who will naturally congregate, or the type of members the client wishes to attract, are deliberated. The principal concerns when finding a place suitable for golf, which are also
applicable to cross country running course design, as well as the desired plan for the site are:

1. Value of the land and what it has to offer
2. Views that can be capitalized upon
3. How much of the land is usable and being offered
4. Potential access points
5. Potential beginning points
6. Potential areas for large use purposes, such as parking lots
7. Topographical limitations
8. Places that appear natural for a golf hole, pathway, or other elements of sport
9. An interesting and captivating course (Richardson 2002, 322)

*The Natural Course.* Too often golf course designers are so adamant in trying to get lengthy pars or specific par routing that they lose the potentially best natural holes (Doak 1992). Success in golf course routing relies upon the ability to utilize existing natural topography and not define the routing by bunkers or hazards. “If the routing is good… undulations do not have to be created” (Doak 1992, 25).

“The greatest courses do not simply fall back on the natural beauty of the property but are designed to enhance the beauty of the property by directing the golfer around the property to see it in all its aspects, and by adding features that blend into the landscape while helping to focus the golfer's view” (Doak 1992, 37). What makes the game of golf what it is, lies in the importance and influence the natural course offers (Richardson 2002). After describing the routing of Cruden bay in Scotland, Doak states: “The genius of all this is that the golf course is routed exactly the way you might be inclined to
wander the property if there were no golf course there” (2002, 37). Renowned golf course designers and players recognize the elevated value of a course designed in the manner in which a person would naturally proceed if there were no existing trails or pretenses; this is true for nearly all landscape based sports (Doak 1992).

History and Sense of Place. The sense of place, which is often greatly affected by proper routing and designing with the land, is prominent in many aged courses. Liddy, renowned golf course designer said, “Centuries-old links golf has much to teach us about the game. But I am afraid we are not listening” (Shiels 2008, 114).

Two of the top ranked golf courses in the U.S., as well as world-wide, are the Pine Valley Golf Club in Clementon, New Jersey and the Sand Hills Golf Club in Mullen, Nebraska. Both of these courses, as well as many highly ranked courses, were designed several decades ago, some near a century, and yet maintain the highest recognition and coveted status. The rich history and origin of golf attracts golfers from all ages, levels, and nationalities (Richardson 2002). Joel Zuckerman, golflinks.com, and ESPN noted that the history, momentous value, unique character, and variance of these courses are what create the identification and appreciation present. A golfer’s feelings will expand from the highly accomplished genius loci, which is especially apparent in historic and natural land driven golf courses.

Many golf courses today view highly refined perfect turf and vast amounts of green as a necessity. However, in 1898 Willie Park, one of the very first accomplished golf course designers, wrote an article which read, “Greens should only be constructed artificially as a last resource” (Hawtree 1983, 64). Two years after this article was written a specific turf standard for tees was mentioned and Hawtree replied, “We have
been burdened with them ever since” (1983, 64). Some of the most difficult obstacles
designers deal with, which tests the bounds of natural form and topography use, are first
the layers that must be created to “top-of-the-line” specifications. Such refined
landscapes often eliminate the subtleness of natural forms and edges that are appreciated
in mature courses (Doak 1992).

Nebraska’s Sand Hills Golf Club presents no trees, water bodies, or boundaries,
yet is proclaimed as one of the top courses in the world, see figure 3-4. The sense of
place radiating from this course is more than noteworthy and is not replicated in highly
artificial landscapes. Jack Nicklaus, one of the most renowned and accomplished golf
course designers, referring to the Sand Hills Golf Course, stated, “If you’re not a golfer,
then you think there’s nothing there. If you are a golfer, you look at the way the land
rolls, you picture the grass and high fescues, and you say, ‘Man, this is neat” (Olsen
2005, 2).

Figure 3-4. Sand Hills golf course.
Source: http://www.golf.com/golf/courses_travel/article/0,28136,1913299,00.html

Another prestigious golf course, the Pine Valley Golf Club in New Jersey, has
been ranked the number one golf course for numerous years according to Golf magazine
and Golf digest, as of 2009. It was designed in 1918 by George Crump. George Crump had peculiar requisites when designing golf courses. The historic value of the Pine Valley course is validated by these principles:

1. No hole should be laid out parallel to the next.
2. No more than two consecutive holes should play in the same direction.
3. Players shouldn’t be able to see any other hole than the one they are playing.
4. A round of golf at Pine Valley should require the player to use every club in the bag.

(twooverpar.com)

These design principles consist of elements which make the course one of the top world-wide. Only a course with numerous diverse elements will encourage golfers to draw on every club in their bag, including diverse hazards, directions, elevations, and numerous other facets of design which create varied landscapes, such is true for cross country running. The reason that Pine Valley is one of the top courses is not only because it is extremely diverse, but that it is “incredibly challenging” as noted by Joel Zuckerman, renowned golf associate. Sense of place and character of many aged and popular courses are not derived by patterned plans laid upon only the most highly desired landscapes, but the design which fuses with the natural landscape (Doak 1992).

Peter Oosterhuis, a celebrated golfer, said that the overall setting is the “key to any great course,” and that each course must have a unique sense of place whether it is already apparent in the land or must be captivated upon by the designer due to the lack of natural ambience. Courses surrounded by “unattractive” landscapes can either be designed to enclose the space or enhance the surroundings by framing or communicating emotions of interest or power through design (Richardson 2002).
A creative and innovative designer will utilize the surroundings no matter the condition or ‘lack’ of natural aesthetic value (Richardson 2002). Richardson notes that although the land setting and layout is very important, “the overall atmosphere is what makes the course unforgettable” (2002, 340). Courses that vary from location to location are what distinguish landscape-based sports from all others (Richardson 2002).

*Mystery, Legibility, and Complexity.* Some of the most applicable design areas for unique landscape-based sports are: space for future expansion or change, distinct character of each hole with overall coherence, beautiful and unique surroundings, variety, improved performance through interest of the course, and all weather playing capabilities. The three primary dimensions of landscapes preferred by golfers and the golf audience include complexity, legibility, and mystery (Hawtree 1983). Each of these dimensions plays a different role in the makeup of the overall aspect of beauty and enjoyable perception in a course. Cross country running courses’ design success could also largely benefit from these design principles.

1. Complexity

   Complexity is the amount of variables in a landscape. In general, the more elements present in a landscape the higher the scenic value, although this is not always the case and must not be strived for if the natural landscape does not agree. In golf course design the three primary elements adding to the complexity of scenery are: elevation changes, water elements, and differing landforms.

   a. Elevation changes

      Natural undulating landscape forms create diversity and interest, providing a more motivating and attractive course (Richardson 2002).
Flat courses tend to lose visual interest due to the lack of complexity. Though, if the land is flat, the course may offer complexity through intense design which utilizes contrasting colors, forms, and elements rather than high alterations of what the land actually had to offer (Richardson 2002).

b. Water elements

Water present in a landscape prevails over many other landscape elements. Water features that are or appear natural have more visual interest than artificial water bodies due to the contrast of land and water through complex edge forms and size, differing vegetation, and diverse sizes and systems of water features. The edges of natural water bodies are complex and rough with vegetation in or around the water system and detailed edge form (Richardson 2002).

c. Land form diversity

The third element leading to complexity in a course is land form diversity. The assortment of land form is shaped through vegetation, significant land elements, hazards, and color contrast. A significant landmark, such as large cacti, can make even the most simple of landscapes emanate with interest and provide a unique focal point (Richardson 2002).

2. Legibility

The next important component for creating an attractive course is legibility. Legibility is the coherence of a course from start to finish. Although repetition is not
desired, a landscape that has some organization and relevance throughout is appreciated. Although humans are comforted with knowledge of location, sometimes it is appropriate to feel ‘lost’. Feeling ‘lost’ relieves a person from surrounding environments and they may benefit from lack of context. Courses should maintain a good sense of place and direction, but also allow participants the opportunity to temporarily ‘lose’ oneself in the experience (Richardson 2002).

3. Mystery

The third dimension of preferred landscapes is mystery. Mystery intrigues the mind to look beyond the next bend, just over the rise, or into the near approaching clearing. Interest is peaked by the unknown (Richardson 2002). Renowned golf course designer Desmond Muirhead said, “If you play a golf course and know everything about it the first time out, then the designer has failed” (Richardson 2002, 299). Mystery is unleashed from the colors, movements, and changes betwixt the site. Not only does mystery create intrigue, but heightens motivation and excitement (Richardson 2002).

Psychology of Golf: Mystery and complexity elevates motivation and excitement, as well as the whole psychological experience. Land structure, terrain, features, and views influence the emotions, aesthetic perception, degree of difficulty, and the tempo of different segments in play (Richardson 2002). Speaking of the importance of course designers, Hawtree stated, “He [the course designer] is the only person able to handle the complicated relationship between site characteristics, method…. the game, and eventually, the psychological reactions of the players” (1983, 61). Routing, intensity, and frequent variation in golf course design will affect the emotions of a golfer, resulting in an adjustment to their physical ability (Richardson 2002).
Memorable Experiences and Golfer Mentality. In design, “anything that adds emotion to an experience tends to increase memory of the experience” (Richardson 2002, p. 299). A memorable course keeps participants motivated and excited about the sport, and especially about the course. The sequence of experience, as well as significant points throughout the course should be memorable, “engaging physical, emotional, and intellectual abilities” (Richardson 2002, p. 280).

Golf course designers often think that the first hole sets the mood for the entire game (Richardson 2002). However both the start and finish are especially memorable. A hole that is at a lower elevation than the tee provides the golfer with an excellent view in addition to a sense of power and security. Views can be captivated at these points to provide especially influential points of power, emotion, and motivation (Richardson 2002).

The difficulty sequence of holes largely effects the perception of the course; Richardson notes,” It affects the flow of play, the level of excitement, and the golfer’s stress level and confidence” (2002, 288). Early in the course, holes should be made relatively easy in order to build a golfer’s confidence. “The directions and pathways established in the planning stages will define the journey required of the golfer” (Richardson 2002, 288).

Perceptions and Hazards. Golf designers and players view hazards as an important part of the sequential experience throughout the game. If a golf course were laid out with large greens, easy holes, and easily avoidable hazards, a golfer may do well, but “the challenge of negotiating through and around hazards, which is such a vital part of the game, is missing from such routings” (Richardson 2002, 289).
Because advanced golf players focus more on the hole and not on the hazards, the hazards become landmarks for judging distances (Richardson 2002, 293). Golf bunkers, one of the infamous hazards in golf, may be perceived more exciting and difficult than a “rough,” therefore enhancing the energy of the game, but with little added difficulty. Some landmarks or “hazards” are easier to handle, but appear more adventurous and exciting; such hazards play an especially innovative role in landscape recreation design (Richardson 2002).

A golf course in Lancaster, Pennsylvania, designed by William Flynn, took advantage of an existing narrow creek. Though the creek appeared to be just as risky of a hazard as a pond, the average golfer can still recover from a shot into the creek because of the minimal depth. This is one way to design a course challenging, yet fun and recoverable. In addition, hazards should not appear too easy or bland, such as grass bunkers. A grass bunker does not appear interesting, exciting, or risky, yet is more difficult to get out of than a flat green or the fairway. The result from harsh elements, which do not appear tough or challenging, only elevates negative feelings about the course. As well, failure to avoid ‘easy’ hazards (such as the minute and non-threatening creek crossing mentioned above) does not allow an athlete to feel as though they defeated an obstacle, but that they failed at something which was not even threatening (Doak 1992).

Every design element, such as hazard variety and placement, achieved complexity, or creating a significant sense of place, determines the success of the outcome. Achieved golf course designs are mulled over and put forward by bold, imaginative, and intelligent designers. Jeffrey Brauer, past president of the American
Society of Golf Course Architects, notes one intelligent design philosophy: “Our designs encompass the philosophies inherited from the past with a realistic look at the needs of golf in the future” (Shiels 2008, 26).

**Cross Country Ski Design and Planning**

Cross country ski design was selected as a basis for research in this thesis because it is a similar landscape based sport, especially the parallel in competitive trail design. Successful cross country ski courses are designed to take advantage of the natural contours and significant characteristics of the land. Varied slopes, ridges, and opportunities are offered to a cross country ski athlete if the course is well designed.

*Programming and Process.* The sequence in which programming takes place is crucial to the success of the end product. The outcome of a well planned trail system will provide a quality experience for cross country skiers of all ages and abilities (Alberta Recreation and Parks). Cuerdon states that in the process to accomplish a successful design, “You don’t build trails by taking a compass bearing and then hacking your way into the woods. You need a plan” (Cuerdon 1990, 33). Cuerdon also notes, “Ski a well-designed and maintained trail and you remember the views and the fox that scooted in front of you…Ski a poorly designed trail and you remember the death-dive downhill track that made a 90-degree turn just inches in front of a giant oak, the intermittent icy and bare patches, and the feeling of cold slush filling your boots. Proper trail design spares you such memories” (Cuerdon 1990, 33).

The Alberta Recreation and Parks manual notes that trail designers may consider routing before the initial site visit. This system of programming may lose the advantage
which is available when going first to the site and doing a site analysis. David Lindahl, notable cross country ski trail designer and one of two principals at Morton Trails, begins the design process by identifying the client’s wants and desired competition classes. An on-site visit is conducted prior to routing to look for constraints, such as roads, constricted crossing areas, obstacles, and elevation changes. Lindahl notes that the routing should not just follow trails present on site, or be determined strictly by mapping. Often existing trails are not well routed for competitive landscape sports. An existing All-terrain-vehicle trail may require excessive effort such as climbing straight up a peak, while a previously family friendly paved pathway is too synthetic and may not contain any challenges or excitement. A latter step, which Lindahl suggests, is to consider the start/finish areas.

According to the Alberta Recreation and Parks manual the highest level of programming is trail layout and routing. The points which are taken into consideration when routing the trail are to avoid lengthy and exceptionally steep slopes, extreme dips and turns, provide views and vistas, and place the trail for conditions which best suite the particular sport; i.e., a cross country skiing trail should be placed on the north slope, if this agrees with the other aspects of design, in order to retain the snow longer. Inclines and hills ought to be interspersed throughout a cross country ski race, with limited inclines near the start or finish. Inclines and declines are best received when there is a level segment afterwards to recover from the physical and mental strain which they encompass. It is also important that the skier is able to see obstacles before reaching them. This provides ample time to prepare, as well as to allow the skier to not be frightened by the segment of course they cannot see (Ontario Ski Council 1980).
Appreciation of the Land. Environmental considerations are also very important in trail design. Not only do these considerations keep costs down and maximize the resilience of the trail, but reduces impact to the ecosystems on site. Considerations that will enhance the skier’s experience are to provide maximum comfort through aesthetic appeal and appreciation of the environs. The Ontario Ski Council observes, “From both the ski centre operator and the user’s standpoint, once the appeal of the environment has been ruined their best asset is lost” (1980, 26).

Trail Clearing. Trail clearing is a defining characteristic of cross country skiing trails in order to provide safe conditions over head and falling areas to the sides (Alberta Recreation and Parks 1979). While clearing of some trees may be necessary to provide the most advantageous course and should be done for this purpose, trees that have historic or economic value should try to be avoided. Although landscape sports have the unique ability to adapt and use various countryside, minor changes should take place to create the most advantageous course design. Cross country ski design also points out the significance of having shortcut trail routes for coaches, officials, and spectators to utilize in following the ski participants (Ontario Ski Council 1980).

Viewer Friendliness and Broadcasting of the Sport. The experience for visitors can be enhanced through varied terrain and grade, points of interest, such as historic or geographical points, and framing vistas and views on site. Frequent viewing opportunities are of utmost importance for spectators (Ontario Ski Council 1980). The cross country ski course in Les Saisies France, the 1992 Olympic Games site, was designed with minimal view points, only at the start and finish. Fans had to stand behind many others to catch only a glimpse of the race. This was considered a failure for
broadcasting and opening the scope and excitement of the sport (Cuerdon 1990). To avoid design ‘failure’, configurations of ski trails are often in a loop fashion with the start and finish in the same area. This also allows easy organization for officials and managers (Ontario Ski Council 1980).

**Homologation Manual and Certified Design Standards.** A great deal of time, money, and effort has been invested into furthering the sport of cross country skiing. A technical seventy-page Homologation Manual has been become standard for certified championship courses. The purpose, stated in the manual, is to “provide varied and challenging courses that require competent skiing abilities, as well as stadiums that meet the requirements of the new competition format.” The Homologation manual defines the process for administration: Federation Internationale de ski (FIS) inspectors appoint Homologation Inspectors (HI) and are responsible for continued overview and updated records of all certified homologation courses. The responsibility of the HI is to oversee the design process, but most importantly to care for the traditions of cross country ski course design.

David Lindahl, principal of Morton Trails, is one of only three certified HI inspectors in the U.S., as of 2009. Morton Trails is a widely recognized trail design firm renowned for their design, planning, and follow through construction of a variety of recreation, competitive, and certified sport trails. However, Morton Trail’s emphasis and strong design traditions are centered in cross country ski course design. Even so, not all of the courses Morton Trails designs are certified. In a phone conversation with Lindahl, in October 2009, only five courses were homologation certified, however the importance of certification is rapidly becoming recognized
The purpose of the Homologation Manual is to improve the sport of cross country skiing; however, Lindahl recognizes that the strict regulations make it difficult to create a strong identity, an intimate and interesting course, and highly unaltered landscapes. The ability to successfully maintain and emphasize these significant qualities of cross country skiing and comply with the regulations for a certified course is accomplishable, but requires advanced effort and motivation by the designer.

*Motives of Design.* During an interview conducted to proceed with this thesis, Lindahl stated significant motives used by Morton Trails: adhering to the selected land and environs while creating interest and identity. Some design elements Lindahl incorporated into his designs he did not confirm by designated titles, yet he not only incorporated these elements into his overall design, but they played a crucial role in the design process. Athlete psychology is one such design feature. Lindahl’s accredited experience in the sport offers him the ability to decipher preferred design for cross country ski athletes. He skis on-site while assessing the ability to handle each turn or maneuver each hill. Being an athlete and expert designer, Lindahl is able to engineer a trail which incorporates both athlete psychology and numerous landscape design elements.

Lindahl, a qualified cross country ski designer demonstrates the exceeding success of design which can occur if it is done by a qualified designer. Lindahl is beyond that of other designers who simply follow a book without site visits and client meetings. People throughout the nation come to Lindahl and Morton Trails because of their success in trail design. From this, it is concluded that successful course design is dependent upon the abilities and qualifications of the course designer.
Golf and ski course design were crucial to this study because of the relation to cross country running course design and is the reason that each of these subjects were studied extensively. By combining research on golf course design, cross country ski design, and athlete psychology with cross country running course studies led to successfully discovering a number of elements of course design.

**Cross Country Running**

Land becomes known as a runner’s foot unites with the earth’s floor. An appreciation of the environment is reared mile after mile (Robinson 2008). Robinson observes, “I run for the feel of the textures of the earth under my feet – I know of no time when I am more fully alive, or more intimately at one with the physical world” (2008, 35). From the first run around the school yard to international elite athletes running a unique and exciting competition, each ‘sees’ and ‘feels’ the land (Robinson 2008).

**Cross Country Courses Studied Through Personal Experience**

This section embodies a significant part of this thesis due to relative dearth of written material available about cross country course design. After obtaining data on athlete psychology, cross country ski and golf course design, this alone was determined not able to develop the elements of course design. Thus, cross country running course case studies from International and NCAA Championships to all levels of intercollegiate racing were required. The courses were selected based on varying geographic regions and by the degree of influence of both choice and distasteful courses.
Choice Courses

**Big Cross in Pasco, Washington.** There is no fine growing grass or even a single tree on this course, but even with this ‘lack’ of natural radiance, the course is memorable for athletes and spectators. The course is laid into the natural surroundings consisting of sandy rolling hills, varied surfaces, and interesting pathways to navigate. The starting line is a wide firmly-packed sand space leading the runners toward the rolling hill adventure. Once the gun fires the athletes take off up the narrowing, compacted dirt path traversing packed sand, grass covered trails, and small sections of loose sandy gravel. As well, uncultivated grass tufts are scattered through the sandy hills surrounding the pathway route. Running over each section the adjustment of footing allows excitement, character, and personal connection to the course, without compromising safety.

For an effective and interesting view of the course, spectators can perch upon a hill and watch the runners as they crest and descend. Just after the last gravel trap, the runners crest the last lengthy incline. The runners then view the distant finish line and begin descending down, picking up speed to make for an exciting and fast finish. After viewing a college competition on this course, Marvin Golightly, questioned in February of 2010, liked the long start and finish areas because of the excitement.

**Lavern Gibson Course in Terre Haute, Indiana.** The Lavern Gibson course has been the site for the NCAA National Cross Country Championship meet for the last several years and is designed and maintained especially for cross country running. The large field of elite athletes participating in meets held at this location significantly plays into the sense of place. This course is unique primarily because it exemplifies the ability
of a course to handle a large field of runners without taking away from the feeling that is present in Indiana’s rural countryside. See figure 3-5.

Figure 3-5. NCAA National Championship Race, Terra Haute, Indiana.

The course is set upon a grassy field with slight inclines and declines and is surrounded by vast fields and forest stands. The course elements in this course come from accomplished crowd control, ease of movement for the media, to furthering the broadcast of cross country and accomplished genius loci. Marvin Golightly noted that he, as a spectator, enjoyed this course because he could see the runners throughout almost the entire race, although he was only in cheering distance a couple of times.

Riverside, California. This course provides variance in scenery and structure as it is sitting in a citrus orchard, see figure 3-6. The course creates natural partitioning due to the varied scenery affording ease and structure in the athlete’s mind. Flat paths lead runners between two large groups of orange spotted fruit trees, after which there is a quick downhill descent on a packed dirt path past a dense shrub hillside. One large dead tree lay nearly into the running path, creating a landmark rather than an obstacle. When approaching the finish the course comes up a small hill and runs by a small canal on one side and rows of trees on the other. Then just as the runners peek around the orchard
they descend down the packed sand hill toward the finish line, see figure 3-7. Marvin Golightly thought the scenery was refreshing and unique with interesting views, but disappointed in the small amount of opportunities to see the runners.

Figure 3-6. Runners passing through the orange orchard in Riverside, CA.

Figure 3-7. Starting and ending segments of a championship course in Riverside, CA.
Undesirable Courses

*Bozeman, Montana.* The first impression of this course was unpleasant; as teams began to warm-up on the golf course the driving range remained open. Golf balls whizzed near the starting segment of the course pre, during, and post race. This segment of the course corresponded with the warm-up area and although it was very unlikely to be hit by a ball, the motion, activity, and distraction harmed the genius loci of the race course. Furthermore, golf balls lay wedged into the racing path, making an unsafe surface.

The mid section of the course was unremarkable and was followed by an intense and dreaded finish segment. The ending was a never-ending stretch of small undulating grass mounds. Due to the selected finish the runners ran with an anticlimactic finish. The athletes exerted an extreme amount of mental and physical energy without returned rewards.

*Logan, Utah.* Similar to the course at Bozeman, Montana the Logan’s racing course was held at the Logan Golf and Country Club. This course was not necessarily undesirable, but showed the lack of accommodation which may occur when a cross country race is held on a golf course. Also comparable to the Bozeman, Montana course, the Logan golf course was not only designed for golf and not a cross country race, but was not prepared or planned for the athletes on race day. At the Logan golf course the landscape was not only unprepared for a cross country race, but was actually prepared to hinder the runners. The day just prior to the race, the golf course had been aerated. The aerated plugs lay thickly scattered along the entire race path. Although the course had
some appealing trees, elevation changes and secluded sections, the experience was lost
due to the ill preparation for the runners. The surfacing created heavy feet and instability.

Today, Logan’s cross country course is located at a heritage farm and has a
unique and strong sense of place. The mountains, farmland, and unique history of the
Logan area are conveyed in the course. The location change from the golf course to the
heritage farm has been remarkable, not only physically but mentally for athletes, teams,
and viewers.

Lubbock, Texas (NJCAA Nationals). The course used at Lubbock, Texas for the
2000 NJCAA National Championship race lay on a park split by a road. Not a single hill
or exciting variance in surfacing is located on the entire course, except a small ditch
which lacked interest and motivation but did trap runners who fell into the deceptively
deep ice glazed water. The course was all grass except a few road crossings which were
required to get to the other side of the park. The course went back and forth several times
in a North, South direction slowly maneuvering down the park with a view of the course
path on both sides of the trail. There was little sense of place, varied terrain and
surfacing, and excitement. The most exciting aspect of this race was the heavy snow.
The route seemed viewer friendly because of how tightly packed the pathway was as well
as the flatness. However, the sharp back and forth design disturbed the runners and the
spectators because the spectators had a very difficult time traversing the runners pathway
to view the runners.

Ricks College course in Rexburg, Idaho. The Ricks College course is on an
extremely flat and grassy golf course with little variance in footing, scenery, or elevation.
The course is difficult to follow due to the surface monotony, which may hinder runners from staying on the designated route. An insignificant dip is the only elevation change.

The golf course lies on the outskirts of the town adjacent to a badly maintained airport site. A note worth mentioning is that the Big Cross, Pasco, Washington course, listed in the choice courses, is also sited adjacent to an airport, yet does not detract from the course’s genius loci, but adds to it. The ending stretch of the race, and in fact numerous other segments in the race, are deceptively long. There are few if any remarkable landmarks or points of interest to break up the seemingly endless straight-aways. This race course is exactly what a cross country course is not.

**Brief Course Case Studies**

On the USATF website, cross country courses from around the world are added to a data base, after which the courses are scrutinized and judged by coaches, athletes, and spectators. Despised and loved courses reveal the wishes and desires of advocates of cross country running. The variety of courses added to this database are vast and the input from cross country runners, etc. is invaluable, however the courses listed usually have few comments and are unfamiliar. Nevertheless this data reveals the many different attitudes toward different aspects of each course. Each course has a story and a challenge and from that each person builds their unique story. The challenges, sense of place, and significance of each course become a part of each person’s story; if a course was not significant to a runner they would not have a tale to tell. Some courses are criticized but this is valued to a course designer whom wishes not to make the same mistakes.
Also on the USATF website elite athletes express the feel, textures, terrain, and environs of cross country courses that they have and/or are about to race on. Michael Spence, Team USA member at the 2007 IAAF Cross Country Championship course in Mombosa, Kenya, speaking of the course stated: “The footing is quite good, except for the sand which mixes things up, but that’s what cross country is supposed to be. The course itself looks good; there’s some good rises, but not any extended hills, but a couple of good abrupt changes of pace” (Usatf.org). The design of a course, either high or low quality, equates to the overall experience and emotions of an athlete; it is the sense of place.

**IAAF World Championship Cross Country Courses:**

**2007, 35th IAAF World Cross Country Championship Course in Mombosa, Kenya.** This championship course is a two kilometer loop on the Mombosa Golf Course. The route follows and winds around the fairways along the Indian Ocean with windy pathways, hills, turns, and numerous sand traps en route, which were created for the championship to cover roadway crossings. Following are USA cross country team members thoughts, noted on the USATF website, previous to the race: “It's a windy course, hard packed, except for the sand traps that we navigate through, which will make it interesting. Other than that, the course looks pretty decent. The short climbs and the sharp turns look like some places to do something” (Josh Edmonds).

“I thought that this is one of the most beautiful courses. What people in the press said about the course, with it being picturesque next to the Indian Ocean is entirely true. They put sand on the part of the course where we cross the asphalt road, which I've never
seen before! At first sight, this course looks easy, but with the sand, and tricky turns, this course is harder than I thought. The footing is perfect; the grass is as perfect as you can get it. With the sharp turns, you can really lose people” (Renee Metivier Baillie).

2008, 36th IAAF World Cross Country Championship Course in Edinburgh, Great Britain. The 36th World Cross Country Championships were held at Holyrood Park in Edinburgh, Scotland. The course is routed through a series of large and small loops centered around a high rocky outcrop called Haggis Knowe. This rocky outcrop serves steep climbs, descents, and rocky pathways “as well as offering a superb spectator position with views of the entire course” (Usatf.org).

The layout and profile of the Edinburgh course are shown below, see figure 3-8. The image illustrates the lap count, elevation changes, and challenging points in the race. The large knoll in the race is named Haggis Knowe and is reached and descended on Queen’s Drive. Each race travels Haggis Knowe at least twice while maneuvering the long laps which provide challenge, excitement, and a great feat for the athletes. As well, the finish peaks with a climb to the top of the knoll and runners mentally and physically jockey for position. At the crest of Haggis Knowe the finish line is in view; athletes descend rapidly and excitement is elevated while battling to the finish line.

Team USA members describe their feelings, noted on the USATF website, following the Edinburgh course preview:

“It looks like the organizers did a great job of putting this together. The hill (at the end of the loops) looks awesome. It’s pretty narrow towards the top, and then you run down a steep downhill” (Benjamin Johnson).
“The course is surprisingly more difficult, with a very big hill in the race. It's not as muddy as I was expecting. The first half of the race is going to be pretty quick, with the hill coming in the second half. A smart race plan is going to come into play. The course gets narrow pretty quickly after you run about 450 meters, so a lot of people are going to be jockeying for position, and going out hard to make sure they solidify their spot. I think it's going to be a race of attrition” (Renee Metivier).

Renowned Courses

*Van Cortlandt Park Course, in New York City.* Van Cortlandt Park in New York City, New York, radiates a historic and unique excitement for cross country runners. The
significant history of the course at Van Cortlandt Park makes it one-of-a-kind. Being one of the very first courses in America many cross country veterans tell of their unique experience there. The steep climb up Cemetery Hill, leading into a momentous cemetery, is widely talked about and greatly adds to Van Cortlandt Park’s unique sense of place. Whether the rugged climb is liked or disliked, it is one of the most well-known due to its history (Bloom 1978). On the USATF course database, noted earlier, there are two comments about this course and both agree, but one candidly proclaims that the Van Cortlandt race is the “Mecca of cross country.”

Mission Bay Course in San Diego, California. Cross country meets have recently been hosted by both the USATF and NCAA programs at the Mission Bay Course. The course is set along the Pacific Ocean and is laid on highly refined terrain. Fast times and flat terrain are course elements present in this course. Mission Bay declares to be spectator-friendly, flat, and fast. It is also set into an astounding surrounding environment (http://members.cox.net/sd_race_maps/mb2k/missionbaywinternationals.htm).

An NCAA coach and committee representative, who asked to remain anonymous, spoke of his feelings of the course at Mission Bay. The individual observed that the surrounding environs were astounding, but the course did not live up to its surroundings. The course ran in repetitive loops on a narrow landscape, which limited viewing opportunities, created sharp turns for runners, and was too “compact.” Besides the uninteresting terrain and refined turf, runners also had to maneuver road crossings. Because the surroundings were amazing, but the course did not take advantage of this
superior opportunity the probability for a physical and emotional connection was compromised.

*Rim Rock Farm in Lawrence, Kansas.* The Rim Rock cross country course is located on a farm previously owned by Bob Timmons, former head track and field and cross country coach at Kansas University. Timmons donated the course to the school and the course is now taken care of by the current head coach, Steve Heffernan (http://www.kuathletics.com).

On Kansas University’s athletic website the Rim Rock course, see figure 3-9, is described this way, “Any runner or spectator will say that the course is quite challenging and unusual. In addition to having two covered bridges as part of the course, Rim Rock Farm also features specific hills, turns and other landmarks that are named after former Jayhawks greats. Dispersed throughout the course are silhouette statues of seven legendary Jayhawks distance runners.”

Timmons observes, “There is something for everyone at Rim Rock Farm. Parents are afforded the opportunity to walk around throughout the course and find all the wonderful places to observe. Spectators can catch the runners three or four times throughout the event and explore the different elevations. And the runners can navigate a course that will challenge them with its obstacles and amaze them with its beauty. That’s what makes Rim Rock Farm so exciting” (http://www.kuathletics.com/).

These case studies show the importance of significant views, markers, and uniqueness in the landscape to the athlete’s overall experience. Not only do the surrounding natural elements create an extraordinary course, but innovative design ideas.
Cross country courses which accommodate many different distances, level of athletes, and remain inimitable are remembered and will be utilized.

Figure 3-9. Spectators and runners at Rim Rock Farm. Source: www.kuathletics.com
CHAPTER IV
PURPOSE/METHODS

The purpose of this study is to determine the desired elements of cross country running courses and to what extent each element is desired. The study involves conducting semi-structured interviews to eight prominent NCAA coaches to determine the desired elements of course design. The expectation was that the coaches greatly desire elements present in “pure” cross country courses, but that the occurrence of these elements are fading amidst modern design initiatives combined with a lack of design direction. Also expected is that course design may greatly improve if elements of cross country courses original to the sport are unionized with desired modern advancements.

Conducting Research and Determining the Areas of Literature Research

The process began by trying to locate any published material on cross country course design. Research, through the internet, the Utah State University library as well as the Inter-loan nation-wide library, periodicals in running and/or landscape architecture works, and previous thesis and dissertations, revealed extremely little published information on cross country running course design. The information received offered a background on cross country, but no design applications or direction. While researching cross country running course design the lack of published information and instruction given by coaches and athletes made apparent that the most relevant topics to cross country running course design was golf and cross country ski course design, and athlete psychology. Golf course design is closely related because it is also a land based sport,
and cross country running races have begun to be hosted on golf courses. Athlete psychology was studied because of the tie between psychological and physical emotions. The physical environment and opportunities affect the athlete’s psychology which affects the athlete’s experience and race performance. Cross country ski was selected because it is a similar landscape based sport, especially the parallel in competitive trail design, and thus is another foundation to this thesis. Cross country equestrian course, cycling, and recreational trail design were also considered as basis for the study on cross country running course design, but after reviewing literature these topics were not as closely related or offered as much data as golf course, cross country ski course, and athlete psychology. Also, athlete psychology, golf, and cross country ski course design, were diverse subjects and thus offered a sufficient and ample array of information that could be covered within the scope of this thesis.

**Focus and Course Typologies**

Originally the focus of this thesis was to study types of courses to reveal which types of courses were desired. The course typologies encompass nearly every type of course that has existed since the earliest courses world-wide. The course typologies are as stated below:

*Course typologies*

1. Early courses worldwide
2. Historic courses in the mid to late 1900’s
3. Modern courses
   3.a. Courses designed specifically for cross country racing
3.b. Incorporation of cross country courses into open space venues, excluding golf courses

3.c. Courses laid over highly refined and man-made terrain, particularly golf courses

Sub typologies:

1. NCAA and USATF qualifying courses
2. IAAF qualifying courses
3. No qualifications

After the course typologies were reviewed it became apparent that studying types of courses would reveal the elements of course design, but without validation and definition of the elements thus would only be speculation. Therefore, course typologies could not be studied before the elements of course design were researched and made known. For that reason, the aim of this study is to determine the desired elements of course design. However, the study between the desired elements and the course typologies will be assessed, according to the desired value of each respective element, for further research and study.

Additional Areas of Research

After obtaining data on athlete psychology, cross country ski and golf course design, and cross country running, as well as determining that course elements had to be studied before the study of course typologies, additional areas of research were conducted to better determine the desired elements of course design. The literature review alone could not be used to accurately develop the elements of course design. Thus, cross
country running course case studies from International and NCAA Championships to all levels of intercollegiate racing were selected on the basis of variety in levels of competition, the quality of the course, and various course settings. The course case studies were developed from the internet, running periodicals, minimal published literature, and athlete, spectator, and coaches’ experiences with those courses.

Course Elements

The purpose of this research is to identify the elements which notable cross country advocates desire. The course elements were selected from the history, literature review, case studies, and self experience. According to the elements presence in different course types it could be determined which desired elements were present in the original sport of cross country, current courses, or both. By this information the “pure,” modern, and combination presented the elements of course design desired and thus revealing that recent cross country course design is losing the “pure” elements of course design, yet they are still very highly desired. Nevertheless some of the modern initiatives enhance the sport, and design direction of how to combine pure elements of course design and the modern initiatives is lacking.

The original sport showed athlete motivation, adventure, and viewer curiosity and offered a strong sense of place and races open to the public. Literature review presented elements such as well defined routing, viewer friendliness, and safety, as well the liking of a sense of place and designing for the athlete’s motivation and excitement. The elements present in courses true to the sport of cross country and in current courses were
confirmed in the case studies and are thus labeled and defined in the list of course elements.

**List of Course Elements**

1. **A well routed and defined course for runners and viewers alike**
   
   a. If a course is well routed and defined the runners can easily decipher the route and direction of the course path. In addition, a well defined course enables the runners to know where they are located in the race, both distance wise and in relation to other runners. Flag strips, ropes, netting, arrows, spectator formations, and racing staff often aid runners in going the right direction. However, an extraordinarily well defined path may include edging of hills, trees, or tall grasses.

   b. A well routed course necessitates little or no path crossing for the viewers or coaches. Crossing the course path is difficult and hard to maneuver back and forth for the spectator and also distracts the runners. A well routed course for viewers allows for minimal spectator movement while still providing a view of many parts of the race.

   c. A well routed course also allows viewers, coaches, and officials the opportunity to locate themselves in less crowded viewing areas. The ability to seclude oneself in a less crowd populated area creates an opportunity for coaches or other viewers to be heard and to aid the runners in time splits and knowledge of what is going on behind them. Creating
such an opportunity also allows supporters to help and cheer for the runners through more isolated areas of the race.

d. Spectators are guided by maps, signs, or well defined pathway markers. Maps or signs aid spectators in selecting the best viewing location(s) for their needs, and desires.

Element 2 and 3. Prior to contemplating elements 2 and 3, additional information is required: Number 3, viewer curiosity, and number 2, viewer friendliness are similar, but the emphasis is placed on different aspects of spectator design. Both viewer friendliness and viewer curiosity aim to achieve the most advantageous design for spectators.

2. Viewer friendliness

a. Viewer friendliness is present in a course that provides as many viewing opportunities possible no matter what the land “says.” In addition, a course that offers easy access to the viewing points offers elements available in a viewer friendly course. For some spectators courses which require little to no movement to see the entire, or almost the entire race, is what creates a pleasurable course.

3. Viewer curiosity

a. Viewer curiosity is the desire and excitement of the onlooker to see who is coming around the distant bend or how one runner handles diverse terrain different than another. Viewer interest peaks at locations that offer excited situations, such as which athletes will make it through the sandy surfaces
without tripping, becoming discouraged, or slowing down. In addition, how one obstacle may change a facial expression or running stride seizes spectator attention.

b. A course designed with high viewer curiosity captures a deep interest and mysterious excitement during the race. Spectators see the athlete’s physical and mental emotions rise to the surface and play out. Viewers are able to see the runners go up the hill or over the ditch or through a sandy surface, each runner pitted against another.

4. **A course with a characteristic and felt “sense of place,” or genius loci**
   
a. Many elements play into capturing a unique and desired sense of place. A felt sense of place is what an individual feels and senses at any location, both large and small scale. The excitement, motivation, and sensations which an athlete, spectator, or coach may feel is surrounding or captivating them, is the felt sense of place.

b. A strong and desired *genius loci* is achieved by utilizing the site’s natural characteristics, its surroundings, and by capitalizing on elements that make a course unique and beyond comparison. Both in what you are exposed to, and the sequence or approach to these elements are the created genius loci. Following are examples of courses, which have been kept confidential so as to not sway the participants, that have a unique sense of place, and especially why each one does:
Course 1: This course is laid into the natural surroundings with sandy rolling hills, varied surfaces, and interesting pathways to navigate. Cross country meets held at this location host high school teams, as well as competitions which mingle all divisions of NCAA teams. The start/finish area has motivating pre-race music and a large area for warm up, individual calming, or team gathering. Once the gun fires the athletes take off up a large compacted dirt path traversing varied surfaces and gentle rolling hills. For an effective and interesting view of the course a viewer can perch oneself upon a hill and see the runners pop up and down over each hill, creating a sense of anticipation. The finishing segment includes a loose gravel pathway which breaks and slows strides for an interesting last chance to pass runners less experienced with rugged terrain. Just after the gravel, the runners crest the finishing hill and pick up speed running downward to make for an exciting and fast finish. Each element included in this sequence of experiences is what creates such a strong sense of place.

Course 2: This course has hosted the National Championship meet for the NCAA several years and was designed and is maintained especially for cross country running. The large field of elite athletes participating in meets held at this location significantly plays into the sense of place. This course is unique primarily because it exemplifies the ability of a course to handle a large field of runners without taking away from the feeling that is present in Indiana’s rural countryside. The course
is set upon a grassy field with slight inclines and declines and is
surrounded by vast fields and forest stands.

Course 3: This course radiates a historic excitement which makes
any cross country advocate wish to race at this unique and significant
location. The history of this course makes it one-of-a-kind. This course
was one of the very first in America and many cross country veterans can
tell you of their unique cross country experiences at this course. The steep
climb up a renowned hill, leading into a momentous cemetery, is widely
talked about and greatly adds to the unique sense of place. Whether the
rugged climb is liked or disliked, it is one of the most well-known due to
its history.

5. Fast and refined courses

a. An uncomplicated course is one that has very few, if any, challenging
   components.

b. Courses susceptible to fast times may vary in hill length and height,
   elevation change, and featured small obstacles. However, the course will
   remain uncomplicated and provide fast times through refined surfaces, few
   sharp turns, existing compacted pathways, and other design tactics leading
to greater speed for the athletes. Firm ground, whether grass, gravel, or
dirt, in addition to minimal obstacles adds to the ability of attaining faster
times. These courses may or may not be highly manmade.
6. **Well organized, designed, and planned facilities**
   
a. A course consistent with well planned facilities consists of restrooms near the beginning of the race, as well as other nicer restrooms, benches, and possibly shelters for severe weather.

b. The design of the course has considered official, coach, viewer, and athlete movements, camera setup locations, power locations, a well thought out start/finish area, and other conveniences. In addition, parking for visitors and athletes will be well defined and signs or other maps will be used to help visitors locate the race course.

7. **Cross country race courses open to the public**
   
a. A cross country race open to the public is one that may or may not have school or other elite cross country events, but offers a race open to the public. Public cross country races are often held on historic or extraordinary cross country course locations, such as Van Cortland Park.

b. Sometimes open space venues, especially sites that are used for purposes which conflict with cross country racing (e.g., golf courses), will not allow public cross country races.

c. A race open to the public not only creates an opportunity for the public to be involved, but further broadcasts the scope and uniqueness of the sport.
8. Safety

Safety for cross country athletes appears in many forms, although the most common safety issues are usually thought to be the course structure, terrain, surfacing, and pathway configuration. Safe courses do not have barbed wire crossings, but also obstacles such as extremely uneven surfaces and disastrous downhill sections. In addition, crowd control and abiding by the maximum carrying capacity for runners and viewers alike will significantly add to improved safety.

9. Courses designed for the athlete; creating athlete challenge and a high sense of motivation and excitement

a. A course that is designed for the athlete contains components that heighten athlete interest, motivation, and enjoyment. A course which has excitement and energy stimulates and prepares the athlete to compete due to the energy and motivation present at such a course.

b. Components such as landmarks for reference, differing terrain and surfacing, varied environs, and other such components can contribute to a course designed to benefit the athlete. Varied environs spawn interest and motivate athletes to discover each successive segment of the race subsequently providing a unique experience throughout each environment. In this way courses offer runners one of the most sport specific aspects of cross country and athletes experience a continually unfolding experience of new and surprising landscapes.
c. Athlete challenge does not mean there are high fences to maneuver or long steep inclines, but that the athlete feels they encountered, responded to, imposing course impediments throughout the race. A course designed for the athlete will create a unique opportunity and experience for the athlete taking part in the race to text him or herself. A motivated and challenged athlete will experience a great sense of energy and self accomplishment after overcoming the sequence of experience from start to finish.

**Determining the Desired Course Elements**

Surveys, in-depth case studies, and interviewing different groups of people were considered before deciding that semi-structured interviews would be the most valuable and direct in determining the desired elements of course design. By obtaining the information from semi-structured interviews conducted to renowned, skilled, and educated informants the results would be considerably valuable and accredited. After selecting interviews as the method to answering the questions, official authorization was given by the Institutional Review Board at Utah State University.

The semi-structured interviews consisted of eighteen main questions and were conducted by Audrey Lancaster. Due to the diversity in locations; regional terrain, weather, athletic views, etc., the informants were selected based on their prominence in the sport as well as to represent each geographic region. Two informants were selected from each of the following U.S. geographic locations: the West, Mountain, Midwest and East. Figure 4-1 shows the general location of the eight key informants and is followed by the specific location and name of each informant.
The significant prominence, contribution, and recognition were also used to select the key informants. The eight key informants are NCAA coaches and/or directors that coach at the highest level of collegiate competition (NCAA Division I).

Eight prominent NCAA coaches were contacted and asked to participate in the interview. Eight out of eight coaches asked to participate in this study agreed. Seven out of eight coaches were interviewed over the phone for a duration of 30 to 100 minutes. One coach was interviewed face-to-face resulting in the same duration as the interviews conducted over the phone. Once the informants had agreed to participate they were sent, via email, fax, or mail, the consent form and descriptions of the nine course elements. After which the interview time was scheduled. When beginning the interview the coaches confirmed the consent form, after which the interview continued.

The informants have all coached and/or directed the sport for innumerable years; the least coaching 14 years, and the most 45. Each has also received numerous awards in the sport of cross country and track and field, which are listed below by each coach’s name. The informants’ noteworthy experience as coaches and directors of the sport helped to determine the reason for selecting each. The coach’s names are listed according to geographic location and do not coincide with their identification number in the tables in the appendix for some level of confidentiality.
Geographic Representation of the Eight Key Informants

Figure 4-1. Location of the eight key informants

West:


*Cal Polytechnic State University*

*San Luis Obispo, California*

**Mike Reilly**, Assistant Athletic Director at the University of Oregon, previously held positions of assistant coach, administrator, and director at Stanford (goducks.com).

*University of Oregon*

*Eugene, Oregon*
Mountain:

**Gregg Gensel**, Head Track and Field and Cross Country coach at Utah State University, Coach at Utah State for 27 years. Member of the NCAA Division I Track and Field subcommittee, 24 time Conference Coach of the Year (usumag.com).

*Utah State University*
*Logan, Utah*

**Mark Wetmore**, Head Cross Country and Track and Field Coach at the University of Colorado, Coach at Colorado for 15 years (cubuffs.com).

*University of Colorado*
*Boulder, Colorado*

Midwest:

**Richard Ceronie**, Head Cross Country and Track Coach at Miami University in Ohio for 24 years. Member of the NCAA Division I Track and Field subcommittee, multiple-time Mid-American Conference Coach of the Year (www.golobos.com)

*Previously: University of Miami*
*Oxford, Ohio*
*Present: University of New Mexico*
*New Mexico*


*Indiana State University*
*Terre Haute, Indiana*

East:

**Bob Braman**, Head Cross Country and Track and Field Coach at Florida State University. Coach for 28 years. NCAA Division I Cross Country Executive Committee President. 23 time coach of the year (www.seminoles.com).

*Florida State University*
*Tallahassee, Florida*
Dave Walker, Head Coach at East Tennessee State University for 45 years. Inducted into the U.S. Track Coaches Association Hall of Fame. More than 20 coach of the year honors and district coach of the year 10 times (www.etsubucs.com).

East Tennessee State University
Johnson City, Tennessee

Semi-structured Interviews

The semi-structured interviews showed elements present in different types of courses as well as the background each coach had in designing cross country running courses. The answers to the questions also revealed much needed information on cross country course design and the aspects that are desired today. Each element’s significance and value to cross country running was assessed by placing the answers into tables which were based on the outcome of the interviews. The tables were then used to find similarities, patterns, and determine the desired elements, course types, and land settings.

The outline of the semi-structured interviews is as follows:

**Interview Questions**

1. From the list of course elements, which I previously sent in the mail or via email:
   a. Which ones do you feel are important and essential for a well designed cross country course?

2. Are there any elements you feel would advance course design which are not currently being taken advantage of in cross country courses?

3. Besides the course elements discussed, is there anything else you value in a cross country course?

4. Out of the many courses that you have run, been to, or otherwise experienced, which 3 courses are your favorites?

5. What type of course is each? (e.g. NCAA championship course, non qualifying trail course, etc.)
6. What elements are present in each of these 3 courses? (either ones from the list I gave you or other ones which were not listed)

7. Tell me about specific parts of your favorite courses that you recall, and why they are memorable.

8. Are there any courses that contain faults which detract from the whole experience? What were these faults?

9. Are there certain experiences or knowledge you desire that athletes learn from a course? If so, what?

10. What characteristics in a cross country course will help athletes achieve the experience or knowledge you wish for them to gain?

11. What features of cross country courses do you feel need the most improvement?

12. Have you ever been disappointed about a course experience? What particular courses and what parts were below par? Why were they disappointing?

13. Do you pre-run a course? If so, to learn what?

14. Have you designed or laid out any cross country courses?
   a. Did you do it by yourself or have help?
      i. If you did have help, who was involved?
   b. Did you emulate any existing courses or parts of courses?
      i. If so, what course or what course elements?
   c. How long did it take to design and build the course from start to “finish”?
   d. If so, what was the process, in a step-by-step sequence?
   e. What was the most important factor in the design of the course? (E.g. length, routing, start/finish area/ ease of design, athlete excitement, sense of place, etc.)
   f. Did you use a map or aerials?
   g. What pressures do you feel when designing a course? For example, would you feel free to incorporate a creek crossing or a rough surface such as sand?
      i. If you do feel pressures are they from expectations?
         1. If so, what are these expectations and who do you feel is burdening you with these pressures?
   h. Do, or did, you wish to add any course elements that you did not add due to pressures or expectations?
   i. When creating a course who, or what group of people, do you consider first?
15. Would you like to see courses, especially championship courses, selected not only for qualifying standards, but excitement, a highly developed sense of place, designed to aid runner’s psychological race and performance, or other similar qualities?

16. Would you like to see the scope of cross country furthered? (e.g., more media, spectators, interest, or knowledge of the sport)

17. Do you believe changes in course design could achieve any of those advancements?

18. Besides NCAA courses do you have any experience with Early or historic courses, IAAF, USATF courses, etc.

---

**Types of Courses**

The informants’ favored courses and the elements present in those courses showed which type of courses contained desired elements. In addition, the types of courses and course elements the informants disliked were revealed. After determining the typologies and elements, the elements were broken up, outlining each element into sub-titles, table 4-1. The sub-titles are preceded by the number which directly relates to the definition of the corresponding element number. The course typologies, previously noted, and elements from table 4-1, were used to create table 4-2, which is intended for further research on the relation between course types and elements. Table 4-2 will be analyzed in the discussion section, creating table 6-1. Each sub-element title will then be ranked in accordance with the level it is present in the previously listed course typologies.

Table 6-1 will be analyzed by comparing the desired elements to the elements present in the types of courses which are listed. The table is a resource for further study in this area, suggesting that certain desired elements of cross country courses are being lost, compromised, or spoiled by the recent selection of cross country running course landscapes, specifically golf courses and other highly man-made landscapes.
Table 4-1. Elements more finely detailed.

<table>
<thead>
<tr>
<th>Sub Course Element Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Well defined route for runners</td>
</tr>
<tr>
<td>1. Signs, maps or other information for viewers so that they know where the runners will go and some suggested viewing spots</td>
</tr>
<tr>
<td>1. Ease of movement for viewers and coaches</td>
</tr>
<tr>
<td>2. Frequent viewing opportunities</td>
</tr>
<tr>
<td>2. Ease of viewing the race</td>
</tr>
<tr>
<td>3. Spectator views of exciting or challenging sections of the race</td>
</tr>
<tr>
<td>3. Varied terrain and course elements</td>
</tr>
<tr>
<td>3. High spectator interest and excitement</td>
</tr>
<tr>
<td>4. Accomplished <em>genius loci</em></td>
</tr>
<tr>
<td>4. Advantageous use of the natural landscape</td>
</tr>
<tr>
<td>4. Designed to fit the land and surroundings</td>
</tr>
<tr>
<td>4. High sense of athlete motivation and excitement</td>
</tr>
<tr>
<td>5. Challenging components</td>
</tr>
<tr>
<td>5. Refined surfaces</td>
</tr>
<tr>
<td>5. Firm ground with good footing</td>
</tr>
<tr>
<td>5. Flat terrain</td>
</tr>
<tr>
<td>6. Excellent facilities, parking, bathrooms, concessions, shelters, etc.</td>
</tr>
<tr>
<td>6. Accomplished crowd control</td>
</tr>
<tr>
<td>6. Accommodations and ease for media</td>
</tr>
<tr>
<td>6. Power opportunities, TV/camera locations, technology advancement</td>
</tr>
<tr>
<td>7. Further broadcasts the scope of cross country running</td>
</tr>
<tr>
<td>7. On-site races open to the public</td>
</tr>
<tr>
<td>8. Athlete safety</td>
</tr>
<tr>
<td>8. Appropriate carrying capacity, including correct width, distance, and space for the runners</td>
</tr>
<tr>
<td>8. Quality crowd control</td>
</tr>
<tr>
<td>9. Athlete challenge and opportunities for defeat</td>
</tr>
<tr>
<td>9. Obstacle components</td>
</tr>
<tr>
<td>9. Designed for the athlete</td>
</tr>
<tr>
<td>9. Varied terrain and course elements</td>
</tr>
<tr>
<td>9. High sense of athlete motivation and excitement</td>
</tr>
</tbody>
</table>
The methods used to determine the means of research as well as the defining of the course elements were intensely studied before determining by which means of attaining information on course design would make known the most accurate and valuable information. In addition, the types and methods of study were determined

Table 4-2. Course typologies and elements

<table>
<thead>
<tr>
<th>Course Typologies</th>
<th>1. Early courses worldwide</th>
<th>2. Historic courses in the mid to late 1900’s.</th>
<th>3. Modern course sub-typologies</th>
<th>3.a. Sites designed specifically for cross country running</th>
<th>3.b. Courses incorporated into open spaces (parks, historic or cultural venues, farms, preserved open space, etc.) other than golf courses or other highly refined sites</th>
<th>3.c. Golf courses (i.e., highly refined sites)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Well defined route for runners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Signs, maps or other information for viewers so that they know where the runners will go and some suggested viewing spots</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ease of movement for runners and coaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ease of viewing the race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Spectator views of exciting or challenging sections of the race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Varied terrain and course elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. High spectator interest and excitement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Accomplished genus loci</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Advantageous use of the natural landscape</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Designed to fit the land and surroundings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. High sense of athlete motivation and excitement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Challenging components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Refined surfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Firm ground with good footing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Flat terrain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Excellent facilities, parking, bathrooms, concessions, shelters, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Accomplished crowd control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Accommodations and ease for media</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Power opportunities, TV/camera locations, technology advancement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Further broadens the scope of cross country running</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. On-site races open to the public</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Athlete safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Appropriate carrying capacity, including correct width, distance, and space for the runners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Quality crowd control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Athletic challenge and opportunities for defeat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Obstacle components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Designed for the athlete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Varied terrain and course elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. High sense of athlete motivation and excitement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
because they would fill a large gap in research on cross country running course design within the scope of a master’s thesis.
CHAPTER V
ANALYSIS AND RESULTS

The eight prominent informants that were interviewed unveiled which elements of cross country course design are important, present in courses they favor, and which need improvement. The interviews were also conducted to identify which elements coaches feel are modern and necessary to incorporate in order for cross country to evolve into a sport which is safe for the athletes.

Each element was extensively discussed and deliberated by each key informant; however, one of the elements did not accurately reflect the discussion which was inspired by that particular element. The original description of element 5 referred to significantly refined landscapes, especially golf courses, and other flat terrain which offered fast racing times for the athletes. The portion of element 5 that the coaches greatly desired was high-quality and safe footing, but not to the extent of extensively refined surfaces or terrain. Quality footing and terrain without undue hindrances was extensively desired by all key informants but was only a small part of the original definition of element 5. Extensively refined surfaces, as noted in the original definition of element 5, were actually seen as a disappointment in the sport of cross country. Highly manicured surfaces are mainly present in golf courses; however the coaches were not denoting golf courses when they spoke of their desire for safe and quality footing. Therefore, element 5, as noted henceforth, will be referred to by the following revised definition.
*Revised element 5.

**Quality footing; Surfaces and terrain without undue hindrances**

Definition: Surfaces and terrain which do not cause undue harm or hindrance to the athletes. In addition, element 5 does not encompass golf course surfaces or other extensively refined terrain yet does include stable footing. Quality footing, and surfaces and terrain without unneeded hindrances includes not routing the course on synthetic surfaces.

For purposes of this and succeeding sections element 5 will be referred to by the revised definition, and not the previous definition. The eight remaining elements had little to no change, subsequently minor to no change of the title. The titles of certain elements have been altered due to the information received from the informants, which is revealed in the analysis section. See section IV for the original descriptions and titles of the elements.

**Revised Course Elements:**

1. A well routed and defined course for runners and viewers alike
2. Viewer friendliness
3. Viewer curiosity
4. A characteristic and felt “sense of place,” or genius loci
5. *Revised - Quality footing; Surfaces and terrain without undue hindrances*
6. Well organized, designed, and planned facilities
7. Cross country courses open for public race events at times other than when competitive races are taking place
8. Safety
9. A design that benefits the athlete; creating athlete challenge and a high sense of motivation and excitement

**Desired Elements**

Five of the key informants confirmed that each element presented within the list of elements was important and essential to cross country course design, as well as being an all-encompassing list. The remaining informants mentioned nearly each element as desirable. However, the level of importance of individual elements was revealed through the different insights offered by the informants. The value of each element was determined by comparing the elements that the informants identified as important and essential, those that would advance course design and the elements present in the informant top three chosen courses.

The eight informants each spoke of elements that they thought were important and essential to course design. All informants noted that elements 1, 8, and 9 were important and essential for course design. Viewer friendliness was noted by seven coaches and viewer curiosity, a strong genius loci, quality footing and reasonable terrain, and advanced facilities and technologies by six of the eight coaches, see figure 5-1.

Figure 5-2 illustrates the elements that coaches felt would advance course design and are often being underutilized. The informants named each element as advancing design, excluding element 7. Furthermore, every coach named several elements that would advance course design.

Figure 5-3 illustrates the number of occurrences each element was present in the informants’ favored courses. The informants listed several elements present in
almost all of their favored courses. The coaches only specified elements present in 21 of the 26 favored courses; therefore the total number of occurrences are evaluated from a total of 21 courses.

**Figure 5-1. The number of key informants that selected each element as important.**

A safe, well-defined, routed, and space appropriate course (which are all incorporated in the definition of element 1) and a course designed for the athlete, are the most desired elements, as illustrated by these tables. Sense of place and quality footing were also highly desired by the coaches. Additionally, spectator friendliness and curiosity, in every facet, were desired. Although spectator friendliness and curiosity appeared to be less desirable than many of the other elements, the coaches speaking of
spectator engagement could not express deeply enough the importance and value in this area of design.

According to the coaches, besides the elements which were directly discussed and universally determined, one of the most crucial aspects of design was creating a “fair” course. The word “fair” was discussed interview after interview without being introduced by the interviewer. Creating a course that is “fair” for the athletes was merited and fundamental according to the informants.

![Figure 5-2. The number of key informants that selected each element as one which would advance course design.](image)

According to the coaches a “fair” course is defined as a course that is designed for the athlete which includes a safe, interesting, and appropriately challenging course. Elements
referred by the informants when discussing “fair” were: safety, well-defined routes, crowd control, suitable carrying capacity, high-quality footing, few if any sharp turns, and ample space especially at the beginning of the race. Structure, terrain, and surfacing that are not overly difficult were also important to the informants.

Figure 5-3. The number of times each element occurred in the informants’ favored courses, moreover, only the elements the coaches specified.

Also valued in cross country are the elements present in a “pure” cross country course. Coach Bob Braman from Florida State stated that the elements essential to cross country course design are those supported by “real cross country.” According to Braman, this includes a course that is fun and interesting; a course designed for the athlete. Coach
Wetmore of Colorado State, speaking of cross country, stated “it is a beautiful sport; it is colorful and dramatic.” He noted that there is an opportunity for growth and interest in the sport if spectators were more involved. Wetmore also added that growth could be accomplished by designing courses which are more intriguing for spectators. He concluded that creating course intrigue for the spectator inspires a greater level of emotion through superior view-ability and curiosity, thus further promoting the sport.

The informants felt spectator opportunity, engagement, and interest were crucial to a well-designed course. A “fair” and “pure” course designed for the athletes, combined with spectator opportunity and curiosity, drives quality design, according to the key informants. One example of designing a spectator friendly course was exhibited by Coach McNichols who drove out to a plot of land, which was going to be the future cross country course for Indiana State University, and had the surveyor park his truck on the land’s highest point. Using this marker, he routed the course so that the truck was always visible, therefore guaranteeing total spectator viewing from that point.

All of the elements have been discussed in this section, but for a complete list of all answers to the interview questions that were given by informants, see the appendix. In the appendix the answers from each of the eight informants were compiled into tables organized in the order that interview questions were posed.

**Underutilized Elements**

According to the informants, there are several elements that are not being used in design. The coaches acknowledged that the elements are available and would enhance design, but several have not yet progressed, developed, or are even existent in course
design. Many, if not all, of the elements which are not being utilized are present in the list of elements that are important and valued by the informants. Elements the coaches felt are not being utilized in current course design are safety and a well-defined and routed course. Other design methods that were not being used were courses designed for the athlete, with a sense of origination and sport including cross-country-athlete-appropriate footing. In addition, accommodating facilities and advanced technology were seen as under-utilized.

**Elements Needing the Most Improvement**

The coaches reinforced the need for improvement to create a “fair” course. Media, marketing, technology and facilities have great potential, yet require vast improvement in order to advance the sport according to the key informants. Coach Rich Ceronie noted that courses are being changed without thought to the loss of historic value and are therefore losing their unique history. Ceronie spoke of one course which had maintained the same route for several years, after which the route was altered. The times that athletes had compared from year to year dwindled with this sudden change. The athlete’s times became abruptly unrelated to the race times of previous momentous races.

**Previewed Course Elements**

Each coach said that they always run or walk the course prior to the race; this was done to get a feel of the course, especially its footing, terrain, and roadmap of the race. A roadmap of a race consisted of cues such as mentally tough sections, landmarks, turns, surfaces, and lay of the land. Especially crucial sections of the race are the start and
finish, and sections in the middle of the course where the runners may lose sight of the
front runners or where it is ideal to maintain speed or advance over the competitors.

Emulated Courses and Course Elements

Every coach interviewed has designed and/or laid out a cross country course.
Seven of the eight coaches said that they did not, or at least consciously did not, emulate
any other courses. These seven coaches said that they were working with land and terrain
which may have not been ideal but was what they were afforded and thus it dictated their
design. However, unlike the other coaches, Coach John McNichols of Indiana State
University, when replying to whether he emulated parts of other courses, stated, “Oh yes,
this became a big part of the determined design.” He spoke of the importance of studying
features in several different courses in order to emulate the good and discard the bad.
McNichols looked at the Furman, Iowa State, and University of Wisconsin-Parkside
courses as these courses were also laid onto land used specifically for cross country. The
courses were open and had excellent sight lines for viewers. He also took a heavy
interest in the parking, an aspect of element 6, as many of the courses he had visited did
not have well designed parking space.

The Most Important Influences and Groups
in the Informants’ Designs

When the coaches considered the routing of the course, some enjoyed and thrived
when they had freedom in routing and design, and other coaches desired only to lay out
the course with utmost ease. However, no matter the effort the informants wished to put
into the design of their course, each spoke passionately about courses being interesting, unique, and fair for the athletes.

Six of the eight coaches staunchly exclaimed that runners were the first group of people they considered. The two remaining coaches felt that runners and spectator should be considered equally. The start and finish (many times the start and finish are at the same location) of the coaches’ courses were an especially important part of their designs because they desired to create a “fair” start for each athlete. Besides the importance of designing for the athlete, the coaches felt spectator friendliness, accommodations, and involvement aided in the quality of their overall design, yet did not wholly determine the design.

**Detailed Elements and Types of Courses**

The key informants discussed specific aspects of each element in further detail. Coach Rich Ceronie from the University of New Mexico (previously coach at the Miami University, Ohio) and Assistant Athletic Director Mike Reilly from the University of Oregon noted the advantage and value of designing a course on land completely designated to the sport of cross country. When Ceronie talked of historic design, he said, that “some days the weather may change, but the design can become legendary should it remain nearly unchanged.” In effect, Ceronie noted that courses may become historic and significant if they lie on land that does not change; specifically land which is only used for the sport of cross country.

Coach Reilly believed that if a course was designated for the sport of cross country it was afforded opportunities no other course setting is able to offer. Other
coaches also noted an opportunity which could be taken advantage of in cross country courses used solely for the sport: the design and use of infrastructure. Several of the informants not only value advancements in technology, but see many potential possibilities if a course lay on land which can be customized to the sport of cross country. Coach Reilly fabricated a title to explain the highest opportunity for media, marketing, technology, and athlete and spectator experience; he introduced the concept for a “Cross Country Stadium,” which he said was most likely to be realized on land designated to the sport of cross country. While all coaches valued the elements present in a “cross country stadium,” the specific advancements were detailed by Reilly. Excitedly Reilly listed video boards, TV camera platforms, chip timing and team updates on the course, spectator stands, broadcasting on the Internet and possibly even televised, as grand design opportunities for cross country. In addition, benches, restrooms, and concessions would be included in a “cross country stadium.”

Coach McNichols recognized many of these opportunities in the design of his own cross country designated course and desired for the advancements to spread nationwide. He hoped for this advancement to occur while still enhancing the improvements within the design of his own course. TV broadcast, platforms, internet broadcast, and chip timing have been realized at the Terra Haute “stadium,” yet still has room for advancement. The potential in technological and infrastructure design is achievable according to the coaches, and is affirmed by the number of favored courses which rest upon land designed solely for cross country.

Many of the courses favored by the coaches were designed exclusively for the sport of cross country. In fact, 12 of the 26 favored courses were designed on land
designated solely to the sport of cross country running. Seven courses were designed in conjunction with another purpose, land type, or in a historic setting. The remaining seven of the favored courses were laid onto golf courses, see figure 5-4. In addition, 13 of the 26 courses have hosted, or are qualified to host, the NCAA National Cross Country Championships. Moreover, every favored course has hosted Conference or higher qualifying races within their division. Each informant’s favored courses are listed in table 5-1.

Figure 5-4. The percentage of each type of land was present in the informant’s favored courses

Further results significant to this study are that the only courses being repeated by more than one coach as one of their favored courses are courses on land designated to the sport of cross country. The only courses mentioned by more than one coach were:

1.  *Indiana State's Terra Haute (Lavern Gibson course), noted by six coaches*

2.  *Furman University's cross country course, noted by two coaches*

3.  *University of Kansas's (Rim Rock Farm), noted by two coaches*
All of these courses are on land designated for the sole purpose of cross country running.

Table 5-1. Each key informant’s 3 favorite courses

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Each Key Informant’s 3 Favored Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. University of Alabama's&lt;br&gt;2. Furman University's&lt;br&gt;3. Notre Dame's</td>
</tr>
<tr>
<td>2</td>
<td>1. Indiana State's Terra Haute course (Lavern Gibson course)&lt;br&gt;2. Brigham Young University's&lt;br&gt;3. Miami University's</td>
</tr>
<tr>
<td>3</td>
<td>1. Indiana State's Terra Haute (Lavern Gibson course)&lt;br&gt;2. Wichita, Kansas' (Echo Hills Golf Course)&lt;br&gt;3. Lowell Massachusetts’s</td>
</tr>
<tr>
<td>4</td>
<td>1. University of Kansas's (Rim Rock Farm)&lt;br&gt;2. Eugene Oregon's (Pre's Trail)&lt;br&gt;3. Utah State University's (American West Heritage Farm)</td>
</tr>
<tr>
<td>5</td>
<td>1. Indiana State's, Terra Haute (Lavern Gibson course)&lt;br&gt;2. University of Wisconsin at Park Side&lt;br&gt;3. Southern Illinois University's&lt;br&gt;Also: Purdue</td>
</tr>
<tr>
<td>6</td>
<td>1. Indiana State's, Terra Haute (Lavern Gibson course)&lt;br&gt;2. Oregon State's&lt;br&gt;3. Stanford's&lt;br&gt;Also: University of Arizona's, Furman University's course, Mount Sac</td>
</tr>
<tr>
<td>7</td>
<td>1. Indiana State's Terra Haute (Lavern Gibson course)&lt;br&gt;2. Furman University's&lt;br&gt;3. University of Indiana's</td>
</tr>
<tr>
<td>8</td>
<td>1. University of Kansas's (Rim Rock Farm)&lt;br&gt;2. New Jersey's (Homedale Park)&lt;br&gt;3. Indiana State’s Terra Haute (Lavern Gibson course)</td>
</tr>
</tbody>
</table>

Undesirable and Faulty Course Elements

Faulty course experiences within specific sections or aspects of the course were present and affected each coach’s overall experience. Faults which altered the
informants’ experiences were unnecessary, unsafe, and unfair impediment, hurdles, and difficulties. In addition, coaches thought courses not designed for the athlete were often “boring.”

Ceronie spoke of a course which had six big trees just 100 meters in front of the athlete’s starting boxes 30 to 35 (a box is the space allotted for each team). He stated, “That is ridiculous.” Another informant, Reilly voiced a faulty course design element in a championship course. The course was designed to unnecessarily require athletes to run over and “ride” the hills. The athletes were often running parallel to the contours of the hills therefore footing, stride, and injury were potentially destructive to their race. Reilly said the designers of this course tried to “manufacture” the course. The course was designed to include unnecessary difficulty and challenge, which caused one runner to finish with a broken foot.

When Coach Gregg Gensel of Utah State University spoke of a course in Southern Utah, he stated that the course was a “mountain course”; even some of the best athletes had to walk a minimal distance because it was extremely and unreasonably difficult. In the NCAA manual the only mention of slope is where it states, “The finish area shall be on fairly level ground.” Other informants shared similar experiences and were extremely upset about courses which were exceedingly taxing on the athlete.

Another poor design characteristic, which many informants mentioned, was the lack of utilizing available opportunities. When racing at a university course one of the key informants spoke of its unhelpful “bowling alley” routing. The path was routed repetitively back and forth creating a mess of athletes and spectators. Also, it is very gusty at this location and has opportunities which are not being taken advantage of, such
as the wooded area at the bottom of the course, which may have reduced the highly windy course. Additionally, because the runners and spectators are jammed into a small section the spectators were unable to view much of the race.

The key informants repeatedly spoke of a specific design problem, a lack of attention to sharp turns or unsafe widths, distances, and constricted running space. Many coaches were familiar with the Terra Haute course in Indiana, which has held several NCAA National Championship cross country races and is selected as an extremely well designed and favored course. However, fairly recently a section of the course was changed to direct the runners into a small loop with a sharp turn which made it difficult for runners to run the race fairly as some athletes had to slow or maneuver to run that section. This also resulted in a reduced quality of surface. These aspects of the design were looked on poorly by many of the key informants. The disappointing courses were most often chosen due to one or two elements which the coaches felt were faulty in several courses.

**International Courses**

When speaking of international courses, Coach Mark Wetmore noted, “Their standards for safety and athlete accommodation are significantly lower than mine.” Courses safe and accommodating for the athletes were highly desired by each informant, and according to Wetmore numerous current international courses do not meet that standard. The informants reiterated the need for course design to incorporate safety, fairness, and purity and that this is greatly desired and is required for enhanced and successful design.
CHAPTER VI
DISCUSSION AND CONCLUSIONS

Rule 250 in the cross country section of the 2010-2011 IAAF guidelines manual, it states, “It must be accepted that the difference between very successful and unsuccessful events often lies in the natural characteristics of the venue and the abilities of the course designer” (227). Course designers are armed with little knowledge about course design due to the lack of previous research and published information on cross country course design.

The interviews conducted in this study provide a foundation in showing which elements contribute to a successful, original, safe, memorable, inspiring, and exciting course, even beyond the vision of the coaches. The results illustrate how to successfully design a course using its natural characteristics and opportunities. Herein lies the strength of the results and demonstrates how each element contributes to successful designs.

Enhanced Design

Recently, a number of courses have been designed with repetitive, and often monotonous, segments in order to facilitate total spectator view-ability rather than passionate spectator engagement and athlete stimulus. There has been an added emphasis on greater conveniences for groups other than the athletes to the point of compromising the athlete’s experience. Many courses designed in this manner lack the element coaches find most important, desired, and favored: designing for the athlete. Designing for the athlete is defined by the athlete’s heightened level of motivation, excitement, interest, and
success, but without unnecessary difficulty. Two other key elements, both of which embrace improving a course to largely benefit the athlete, are first, safety, and second, element 1 which includes a course with a well-defined route, proper carrying capacity, and excellent crowd control. A number of recent courses are also evolving in an ever increasing context of highly refined and manmade landscapes, not designed for the sport of cross country. These characteristics of design have resulted in a fading of defining characteristics of cross country.

A comprehensive list of the elements “pure” to cross country are: a course designed for the athlete (including challenges and motivation), varied terrain, weather conditions, sense of place, designing with the land, and viewer curiosity. The coaches strongly desire to preserve and enhance the elements present in the original sport of cross country, while at the same time desire modern design enhancements, such as safety and a well defined route without intertwined pathways or distracting spectator movements. As suggested by the interviewees, other desired modern advancements include technological, amenity, and facility enhancements, as well as quality footing, reasonably strenuous terrain and surfacing, and improved viewer friendliness.

In order to wholly enhance cross country course design, integration of modern styles and desires is required, yet these must thrive within the setting of a “pure” cross country course. By recapturing the elements present in the original sport of cross country and integrating modern developments, cross country running will breed an advanced and enhanced pure sport. The advanced and enhanced “pure” sport of cross country will recover and improve the significant elements present in the historic sport of cross country
and embrace advanced, safe, and “fair” course elements important today. A fair course being one that is, “designed for the athlete.”

**Designing for the Athlete**

Each coach desired, and repeated throughout the interview, the need to design for the athlete, i.e. a “fair” course, in order to advance and preserve the sport. Elements referred by the informants when discussing “fair” were: safety, routing, crowd control, proper carrying capacity, high-quality footing, few if any sharp turns, and ample room to jockey for position, especially and perhaps even specifically at the start of the race.

Also characteristic of a “fair” course is one that has a well defined route for runners, as well as the athletes being able to judge distances and positions. Structure, terrain, and surfacing that are not overly difficult were also important for a “fair” course; a course should be challenging, but not unnecessarily difficult. A “fair” course was discussed again and again, showing the value of this in design. Also desired was for courses to be selected not only for qualifying standards, but excitement, a highly developed sense of place, design to aid runners’ psychological development, and faster and more competitive races.

**Significance of Element 9**

According to the coaches, one of the most crucial elements to successful design is element 9. When designing courses, almost all of the coaches said that designing the course for the athlete was seen as top priority. The key informants deemed that designing for the athlete included a safe, fair, exciting, and motivating course.
In order to create safe and “fair” courses, excessively difficult components must be changed, but the athlete’s excitement and emotional changes need not be lost. The obstacles may not be the same (and cannot be in order to keep the course safe and fair), but the motivation, feeling of accomplishment and defeat, inspiration, and variation can be the same; this is “pure” cross country. While talking to a cross country athlete, Ceronie stated, “You talk about pure sport, I wouldn’t expect anybody to understand what pure sport is except for long distance runners, long distance swimmers, and wrestlers, but even wrestlers are done after 3 minutes and swimmers do not have the impact on their bodies, there is nothing more pure than what you do.” “Pure” sport is defined by an athlete’s struggle and persistence which is occurring amidst tough competition and physical pain, occurring despite the weather and encountered environs.

**Spectator Engagement**

When discussing the group of people to consider first when designing a course, the coaches were adamant in having athletes as the highest or one of the two highest groups being considered for design. The other group of people was spectators. Spectator friendliness and curiosity did not appear as highly valued overall as some other elements on the list, but the coaches emphasized the importance, value, and crucial need for improvement in this area of cross country course design. Spectators not only wish to see the athletes, but to observe the athletes drive and fight through changing emotions. During nearly any cross country race one of the most grueling sections is the end due to runners’ physical exertion and intense pain, thus by offering spectators the opportunity to
view a lengthy finish segment they become very engaged. Coach Ceronie noted that one
of his most memorable and loved design aspects was the finish of his previous home
course. On that course there was a long straight stretch where, as he stated, “the athletes
are going through this hell” and the spectators are able to see the athletes for a long
stretch as athletes’ emotions are rising.

The informants viewed spectator engagement as a gateway to publicizing the
sport, attracting numerous fans, and furthering the support from the public as well as
cross country advocates. Designing to improve a viewer’s experience will further
broadcast the sport according to every coach. Ceronie stated, “If we are going to succeed
in the future we must have a course that is fairly designed for the athletes, so that you can
have an equitable competition, and where fans of the sport, and especially TV, are able to
provide what we need to grow the sport.” Spectators play a crucial role in the
advancement of cross country and this may be realized by uniting all of the desired
elements and then planting them into the design of a “cross country stadium.”

Of the three courses favored by more than one coach, which were all on land
designated to the sport of cross country running, two were donated by former cross
country advocates passionate about the sport. Love of the sport leads to protection,
investment, and growth of the sport which is exemplified by the love and success of the
Lavern Gibson and Rim Rock Farm courses. If more people know, enjoy, and
understand the sport, further protection and investment will occur. Enhanced spectator
engagement is crucial to the sport of cross country.
**Desired Course Settings and Opportunities in Design**

Nearly half of the informants’ favored courses were built on land designed solely for cross country. Bearing in mind that the 8 key informants are some of the most renowned and travelled coaches and were unaware of more than just a couple of courses on land designated solely to the sport of cross country nationwide designed on, this is extremely significant. One national ranking collegiate cross country team ran on only one course that was designed solely for cross country running, during a two year span. Considering the minimal number of courses designed for cross country, it is astounding and noteworthy that so many of the coaches favored courses are designed specifically for cross country. In addition, as the only courses repeated as favored by more than one coach are set upon land solely designated to the sport of cross country there is significant data that these courses are deeply desired and enjoyed.

Reilly noted the endless opportunities one has if they are given the chance to design a course set upon land solely designated to the sport of cross country. Opportunities offered by cross country designated courses offers freedom of routing, which allows designers to enhance the good parts of the land and to discard the bad. Designers are able to take advantage of each space and avoid areas which may be unsafe or restrict the runners. The routing is not determined by where the trees in the park are or where the greens on a golf course, but by the route a cross country runner would wish to run. When a designer looks over the landscape the land’s natural trail, the route a runner would follow if there was no trail or direction, becomes apparent. The ability to route the running path to follow the habitual trail is achievable on land designed solely for cross country running.
Another important part of cross country is the coaches and spectators; given the opportunity to design land for the sport of cross country each group can be considered and designed for. Spectators should be afforded spaces to view lengthy and interesting segments of the race along with having the conveniences of quality facilities and parking. Bleachers, TV boards, and updated timing scores can be included for the spectators if the land is used solely for cross country. Permanent features and improvements can continue without conflicting groups or venues if the land can be designed for the sport of cross country. Also, advantageous to land designated to cross country is the ability to design and maintain the terrain and surfacing specific to the sport of cross country.

**Table of Course Typologies**

The purpose of the following table, table 6-1, is to inform designers which of the desired elements are present in the different types of courses. Table 6-1 details which elements (out of the favored, important, and need advancing) were present in modern versus the historical and original sport of cross country. The table can then be used as a tool for designers to determine what types of courses to use and emulate in order to enhance course design to the furthest degree. Each element is rated to the degree it is present in each type of course. Each element’s presence in each type of course is rated on a scale of 1 to 5, 5 being the most present and 1 the least. The table reveals the type of course that should be emulated for specific design characteristics as well as which types of courses should not.
The elements most highly desired by key informants are more present in courses designed specifically for cross country, specifically those which qualified to host NCAA and USATF championships, than in any other type of course. The majority of the remaining elements are prevalent in historic and early courses in the U.S. and worldwide. Courses in earlier times throughout the nation are exemplar courses for many elements; however they also contain elements that should not be emulated, such as compromised

<table>
<thead>
<tr>
<th>Course elements</th>
<th>1. Early courses worldwide</th>
<th>2. Historic courses in the mid to late 1900's</th>
<th>3. Modern course sub-typologies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NCAA/USATF</td>
<td>IAAF</td>
<td>None</td>
</tr>
<tr>
<td>1. Well defined route for runners</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>2. Signs, maps or other information for runners so</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>that they know where the runners will go and some</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>suggested viewing spots</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ease of movement for viewers and coaches</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4. Frequent viewing opportunities</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5. Easy to view the race</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6. Varied terrain and course elements</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>7. High spectator interest and excitement</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>8. Accomplished genus loci</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9. Advantageous use of the natural landscape</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>10. Designed to fit the land and surroundings</td>
<td>4.5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>11. High sense of athlete motivation and</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>challenge components</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>12. Challenging components</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>13. Varied terrain and course elements</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>14. High sense of athlete motivation and excitement</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>15. Accomplished crowd control</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>16. Excellent facilities, parking, bathrooms,</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>concessions, shelters, etc.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>17. Accommodation and ease for media</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>18. Power opportunities, TV/camera locations,</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>technology advancement</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>19. Further broadcast the scope of cross country</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>running</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>20. Chargers open to the public</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>21. Athlete safety</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>22. Appropriate carrying capacity, including</td>
<td>2</td>
<td>2.5</td>
<td>4.5</td>
</tr>
<tr>
<td>correct width, distance, and space for the runners</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>23. Quality crowd control</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>24. Obstacle challenge and opportunities for driven</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>25. Obstacle components</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>26. Varied terrain and course elements</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>27. High sense of athlete motivation and</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>excitement</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

5 = More prevalent
1 = Less prevalent
safety and an ill defined route. Also, many of the desired elements were significantly absent from cross country courses that used existing golf courses, (e.g., a lack of viewer curiosity, sense of place, and opportunities for infrastructure and design freedom).

McNichols told of a course, which was not designed for cross country, where a runner ran into a tree because it was at the beginning of the race where the runners were spread out and the tree was within the course path. The key element - designing for the athlete - is often denied at facilities other than those placed on land designated for the sport of cross country.

One element that was not extensively discussed by the coaches was element 7. Element 7 was defined as courses open for public racing, but not in the same race as the athletes. Study of this element is recommended as a subject for further research in order to better understand the respondents’ disinterest. This element of design has the potential to further the publicity of the sport, which was highly desired by each informant. Races offered to the public were often seen in the early and historic courses as many people ventured out to run a cross country race. The designs of that time period cannot be discounted because it was also the time period with the greatest spectator interest and numbers. The public was exceptionally engaged in the sport, watching it intently and excitedly. Early cross country races were intently followed by spectators, and had elements of enhanced viewer curiosity, strong genius loci, and design for the athlete present. The sport was broadcasted extremely well, through excitement, media, and public involvement and opportunities, including such stadium features as bleachers and announcers.
Literature Review of Applicable Design Methods and Ideas

After determining the desired elements of cross country running course design, the applications of athlete psychology, and golf and ski course design were revealed. The methods and ideas from golf and ski design that may aid in cross country running course design are outlined here. Golf course and cross country ski design and athlete psychology applications will enhance cross country running course design.

Golf Course Design Applications

Resulting from the information received by the key informants and the study of golf course design there are elements and processes of golf course design that may significantly improve cross country running course design if applied directed to the sport of cross country. Also, shown by the results are some elements of golf course design that should not be emulated in cross country running course design in order to improve and remain true sport.

Design ideas which should be utilized to enhance cross country running course design are: thorough site analysis, exploring new ideas, thinking imaginatively and intensely, and producing concepts and master plans beyond the vision of the coaches. Like golf, largely regarding the sense of place and natural resources offered by the land during site analysis would significantly improve cross country running course design. From capitalizing on views to routing the pathway following the natural trail, cross country course design will be enhanced by design exploration and exploiting the land. Through innovative and intensified design practices and direction, found in successful golf course design, cross country course design will evolve.
Also comparable to golf, cross country would be enhanced by the complexity, mystery, and diversity of the landscape. Elevation changes, water elements, and differing land forms can be constructed to add mystery, and at the same time be utilized to make the course more legible. Water is one of the most diverse and interesting feature in a landscape and is almost always utilized in golf course design. The rough edges or movement of natural water forms provide a unique and constant focal point. At one NJCAA Cross Country Championship course, held on a golf course, there was a large pond centered in one part of the course that the runners ran by three different times. There were two different unique edges of the pond that created a strong focal point. Even without the knowledge of formally using landmarks as a focusing technique, one runner vividly recalled a rough edge, slight uphill curve, and vegetated frame when passing the first and third times and the second time the trail followed the edge of the long curved perimeter of the pond. Different courses have unique features, but it is up to the course designer to emphasize and bring out and express the matchless features.

Many elite cross country runners have gained a level of experience in the sport such that they are able to use landmarks in a similar manner as golfers use “hazards.” In cross country, “hazards” or landmarks may include anything from trees on the side, rocky structures in the distance, or varied surface segments. Unreasonable hazards should not be used, but hazards that provide little added difficulty without compromising safety will bring the course to life and the experience of the athlete will be enhanced.

Golf course design elements that should not be emulated are the land forms that hinder or disturb running. From the small undulating hills, often present in golf course design, to directing the path along the contours of the hill, this creates undue hindrances,
overly difficulty mentally, and excessively disturbed running rhythm. Another element of golf course design that should not be emulated is the use of excessively refined turf; according to the key informants, stable footing is greatly desired, but not extremely refined and man-made turf.

Successful golf courses are made by golf course managers who hire qualified and renowned designers to develop concepts, utilize unique natural and advantageous characteristics, and produce innovative master plans. Cross country courses that are, or at least may be in the future, designed by an equivalently qualified cross country running course designer may aid in the promotion of the sport through enthusiasm and successful designs.

**Applied Athlete Psychology**

The psychology of an athlete does affect their performance and design principles can aid in positively enhanced athlete psychology. Courses designed for the athlete offer enhanced psychological and therefore physical performance. Simple variables such as creating a distant landmark can be used by the athlete as a mental short term goal during tough sections of the race. For distance runners it is nearly impossible to focus on one thing the entire race and doing so can have negative effects. By keeping intense focus, but shifting the focus to different aspects of movement, course layout, or other course aspects, athletes’ performances will increase through the ability to keep focused on the race (Dosil 2006, 274-275).

Other types of external stimuli may be spaces that are motivating or mood changing. One way to encourage helpful athlete focus when designing a course is to use
natural undulating forms. When an athlete encounters different environments, such as a forested trail with tall trees, it may bring physical relief from environmental factors, such as the heat or sun, but just as importantly a difference in scenery will help the athlete to focus on the race.

One of the most significant landmarks in any course is the finish line. Being able to see the finish line from a distance creates an external point to run toward and a clear view of the other competitors. Near the finish, runners are in extreme pain and need to narrow their focus into their body, or onto external race cues to distract themselves from the pain.

An athlete’s arousal level will increase on race day because of the intense physical work load that they are expected to perform. Creating a motivating and fun course is optimal, creating places or warm up places that are serene or calm will significantly help the athlete to remain calm and not waste energy before the race. Course design does affect an athlete’s performance and experience; an athlete wishes to feel they keyed up and defeated course elements and the course as a whole.

Cross Country Ski Design Applications and Professional Design

Aspects of cross country ski design that are nearly identical to that of a successful cross country running course are: opportunities for the athletes, varied elevations, slopes, and taking advantage of the natural contours and significant characteristics of the land. The parallel of ski and running in competitive trail design is astounding.

The planning process is crucial in ski and running course design. Many of the coaches emphasized that the start and finish areas were crucial aspects of design and
some coaches said that the start and finish of some courses were decided before the site analysis, design and concepts had even begun. Although the start and finish are crucial to a well-designed and fair course, the whole course is equally important for the athlete. Even one of the most prestigious ski course designers noted that although the start and finish areas are significant, it is important that the design is not determined by any one aspect. In addition this prestigious designer noted that determining the start and finish area is done in the latter part of the design process.

Trails that exist on a landscape before the analysis and design process begin may not be suitable for competitive landscape sports. Part of element 1, routing, was considered one of the most important aspects of design by the coaches. Creative and deep thinking processes must occur so that designers are not influenced by previously existing trails.

Also significant to the success of cross country skiing is the spectators. The experience for visitors can be enhanced through varied terrain and grade, points of interest, and capturing the essence and views of the surroundings. The ability of the spectator to have frequent viewing opportunities enhances the experience and therefore growth of the sport.

In the cross country ski homologation manual it notes that a course should be designed to require competent skiing abilities. Cross country running courses should also be designed to require competent running abilities.

Morton Trail’s designers, John Morton and David Lindahl, specialize in designing trails for cross country skiing, yet often incorporate other trail uses into their designs, such as hiking and running. Morton Trails has designed courses specifically for cross
country running. Several of Morton Trails’ designs do incorporate cross country running into the layout and design. Figure 6-1 is a map of the 5K cross country trail map used by Thetford Academy, Vermont’s oldest secondary school. The course, designed by Morton Trails, sits in Thetford Hill State Forest and is surfaced mostly of grass with some dirt and woodchips. The course was designed to offer varied course lengths to accommodate high school and NCAA races. This course, figure 6-2, has been the site for several State and New England Championships (Mortontrails.com).

Morton Trails is a pioneering design firm and has been very successful having been hired to design numerous courses since they were established. As qualified

Figure 6-1. Trail map and course profile of the Thetford, Vermont cross country course.
designers and accomplished athletes they are able to design courses with intrigue, reasonable obstacles, safety, quality and varied footing, as well as create a sense of place and fan friendly courses.

By skiing the course, Lindahl designs and understands the thoughts a cross country ski athlete may have. Lindahl confirmed that the elements of cross country course design listed in this thesis were nearly identical to those used in cross country ski design. Nearly every element that was mentioned in this thesis is used in Lindahl’s designs. Lindahl designs for athlete challenge and motivation, memorable courses experiences, and well routed courses.
Designers are Necessary for Enhanced Design

When asked if changes in course design could achieve advancements in the sport of cross country, Reilly echoed more than a few coaches’ responses when he said “Absolutely!” All key informants desired improved design; from the coaches’ answers, the ability to create a course that balances a “fair” and interesting experience for the athletes and one engaging for the spectators is achievable, desirable, and valuable.

If each of the elements discussed in this study were incorporated into a course’s design the overall product may exceed the highest expectations and desires for a successful cross country course. In order for landscape architects to create successful designs, intensified, imaginative, and regulation abiding design is required, which can be offered by a qualified landscape architect professional. Knowing when, where, and how to incorporate and take full advantage of each of the informant’s desired elements, which were revealed in this thesis, defines a landscape architect’s skills.

There is a lack of qualified individuals, as well as design direction, to successfully design cross country courses, thus qualified landscape architects, especially those in the specialized field of trail or recreation design, are needed. Lindahl noted that he did not know of any other firm that designs cross country running courses. A team of professionals, namely landscape architects, athletic directors, campus planners/designers, coaches, and construction consultants can design successful cross country courses with proper qualifications and collaboration.

Due to faulty course design Olympic cross country championships were banned in 1924 after twenty-three of thirty-eight runners were unable to finish the race. Course designers are critical at every level of cross country course design, but even more is the
direction for designers. Landscape architects possess the skills to create a course with the elements desired by the informants and are the gateway to future successful cross country running course designs, see figure 6-3.

<table>
<thead>
<tr>
<th>Necessitated for Improved Design:</th>
<th>Qualified Landscape Architect’s Skills:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensified design</td>
<td>Intense evaluation and analysis and study of the site, noting all of the opportunities and constraints and its unique sense of place</td>
</tr>
<tr>
<td>Imaginative design</td>
<td>Knowledgeable and creative design methods</td>
</tr>
<tr>
<td>Regulation abiding design</td>
<td>Design according to standards and regulations</td>
</tr>
<tr>
<td>Innovative Design</td>
<td>Innovative and successful designs</td>
</tr>
<tr>
<td>Design specific to cross country running, i.e. open space and trail design</td>
<td>Purpose specified design</td>
</tr>
<tr>
<td>Qualified individuals who can successfully design cross country courses.</td>
<td>Design specific to the client’s needs</td>
</tr>
<tr>
<td>Collaborative design between landscape architects, athletic directors, campus planners/designers, coaches, and construction consultants.</td>
<td>Ability to work together with many specialists to afford the most successful design</td>
</tr>
</tbody>
</table>

Figure 6-3. Relationship of a landscape architect’s skills to the needs in course design

**Future Research and Practices**

A general lack of published information on and scarcity of research targeted at cross country course design has hindered the creation of effective and well-rounded courses nationally. Successful courses are not frequent; this is recognized because of the many course faults the informants listed. This thesis opens a wide field for further research, including design methods and course implementation. Further study within this subject is essential in order to understand the numerous branches of cross country course design.
Future Research

Not only did future research become evident within this document, it was already apparent due to the limited scope that can be covered in one thesis and the vast amount of opportunity for improvement in this area of design. Future research topics include a study of how to design a course with the application of the desired elements revealed within this thesis. Several other research methods and studies may be to develop a manual for future course designers and to aid coaches on improved design and research specific ways to broadcast the sport. A future innovative research topic would be to study and illustrate how to successfully design a cross country course for the winter Olympics, especially considering that it has not yet been officially accepted back into the Olympics, but has made large strides and will likely be reintroduced within a short time period.

Future Practices

Achieving successful future practices includes hiring qualified and knowledgeable designers. Enhanced design and more qualified designers may have already started as people study this thesis. In the future designers should utilize the information from this thesis to design a course that includes the desired and essential elements of design. Designers should search and select cross country suitable and opportune land as well as intensify the design process through analysis, planning, and research through innovative and imaginative design.
REFERENCES


Balisure. *An introduction on cross country running race.*


Appendix
### Key Informant’s Interview Answers

1. From the list of course elements, which I previously sent in the mail or via email: Which ones do you feel are important/essential for a well designed cross country course?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Important and/or Essential Elements to Cross Country Course Design</strong></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>A course exciting and interesting for the athletes. &quot;Real cross country&quot; elements. A fair course; one which is wide enough, gives the opportunity to race, consists of challenges, but is not overly difficult.</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Spectator friendliness. Broadcasting of the sport. Historic preservation qualities. An interesting and fair course for the athletes, without compromising spectator's viewing opportunities.</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Each of the elements listed. Spectator friendly, challenging but fair for competitors; hills and challenges are more captivating and interesting for the spectator. Not overly difficult terrain. Fairness: some undulation, wide enough space, spectator friendly. Amenities. Multi-purpose facility.</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Each of the elements listed. Especially how the course is laid out: specifically the start and finish.</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>&quot;Design the course for racing, not jogging.&quot; Undulation of terrain. Grass surfacing. Not slanted terrain, take out unneeded havoc. Enough space to move. Follow the rule book.</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Fair for the athletes. Accomplished spectator viewing, interest, engagement and involvement.</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Correct widths, distances, and space. Safety. Challenges, but not to the extreme. Crowd control.</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Each of the elements listed. Especially safety.</td>
</tr>
</tbody>
</table>
2. Are there any elements you feel would advance course design which are not currently being taken advantage of in cross country courses?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elements which would advance current course design if utilized</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>High-quality footing.</td>
</tr>
</tbody>
</table>
| 2                               | 2               | Take advantage of advanced technology.  
                                   | High-quality footing |
| 3                               | 2               | Fairness and challenges.  
                                   | Accommodating spectator viewing and interest. |
| 4                               | 2               | Consistency.  
                                   | A well defined course route. |
| 5                               | 2               | Course by course evaluation.  
                                   | Sufficient length at the beginning of the race. |
| 6                               | 2               | Infrastructure: restrooms, concessions, video boards, chip timing with immediate score updates, etc.  
                                   | A "cross country stadium".  
                                   | Taking advantage of opportunities. |
| 7                               | 2               | Marked pathway for the entire race.  
                                   | Maps, both paper ones that you can follow while on the course and a large permanent map.  
                                   | Crowd control. |
| 8                               | 2               | Courses built on land designated for cross country racing.  
                                   | Courses being built for cross country running. |

3. Besides the course elements discussed, is there anything else you value in a cross country course?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Other valued course features</td>
<td></td>
</tr>
</tbody>
</table>
| 1                               | 3               | Interest and good footing for athletes.  
                                   | It is not track; the course should not go in small repetitive loops. |
| 2                               | 3               | The historical value.  
                                   | Don't make major changes unless necessary.  
                                   | Courses become legendary with tradition in course layout and route. |
| 3                               | 3               | The list was very comprehensive.  
                                   | Conveniences, both pre and post race.  
                                   | Make the athletes comfortable and relaxed.  
                                   | A place for the athletes to prepare for the race, physically and mentally. |
| 4 | 3 | Great and historical settings.  
Places which allow for imaginative design. |
|---|---|---|
| 5 | 3 | Spectator consideration.  
Do anything to improve visibility of runners. |
| 6 | 3 | Opportunities.  
Infrastructure. |
| 7 | 3 | Space to pass during the race. |
| 8 | 3 | No, the list was very comprehensive of desired course elements. |

4. Out of the many courses that you have run, been to, or otherwise experienced, which 3 courses are your favorites?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Informant's 3 Favorite Courses</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1 | 4 | 1. University of Alabama's  
2. Furman University's  
3. Notre Dame's |
| 2 | 4 | 1. Indiana State's Terra Hautte (Lavern Gibson course)  
2. Brigham Young University's  
3. Miami University's |
| 3 | 4 | 1. Indiana State's Terra Hautte (Lavern Gibson course)  
2. Wichita, Kansas' (Echo Hills golf course)  
3. Lowel Massachusette's |
| 4 | 4 | 1. University of Kansas' (Rim Rock Farm)  
2. Eugene Oregon's (Pre's Trail)  
3. Utah State University's (American West Heritage Farm) |
| 5 | 4 | 1. Indiana State’s Terra Hautte (Lavern Gibson course)  
2. University of Wisconsin at Park Side  
3. Southern Illinois University's  
Also: Purdue |
| 6 | 4 | 1. Indiana State’s Terra Hautte (Lavern Gibson course)  
2. University of Oregon’s  
3. Stanford's  
Also: University of Arizona's course, Furman University's, Mount Sac |
| 7 | 4 | 1. Indiana State’s Terra Hautte (Lavern Gibson course)  
2. Furman University's  
3. University of Indiana's |
| 8 | 4 | 1. University of Kansas (Rim Rock Farm)  
2. New Jersey's (Homedale Park)  
3. Indiana State’s Terra Hautte (Lavern Gibson course) |
5. What type of course is each? (e.g. NCAA championship course, non qualifying trail course, etc.)

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1. University of Alabama, (Harry Pritchet Running Park) - Currently NCAA Regional qualified and utilized. Used exclusively for cross country (Previously the university's golf course).&lt;br&gt;2. Furman University - NCAA Regional qualified, at one time hosted the NCAA National Championships. Previously the university golf course, but now it is used only for cross country.&lt;br&gt;3. Notre Dame - Notre Dame Invitational (one of the Nation's oldest and largest intercollegiate cross country races). University golf course.</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>1. Indiana State's Terra Hautte course, (Lavern Gibson course) - NCAA National qualifying course on land specifically for the use of cross country.&lt;br&gt;2. Brigham Young University course - Regional qualifying course on golf course.&lt;br&gt;3. Miami University - Conference qualifying course on University campus.</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>1. Indiana State’s Terra Hautte course, (Lavern Gibson course) - NCAA National qualifying course on land specifically for use of cross country.&lt;br&gt;2. Wichita, Kansas course, (Echo Hills golf course) - Division II championships&lt;br&gt;3. Lowell Massachusetts golf course - Division II championships</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>1. University of Kansas, (Rim Rock Farm) - designated cross country course, Regional qualifying for smaller regions. Can fit about 18 teams.&lt;br&gt;2. Pre's trail, in Eugene Oregon - public park running trail, high school competitions and collegiate invitationals.&lt;br&gt;3. Utah State University, (American West Heritage Farm) - Historical farm, Conference meet qualified.</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1. Indiana State’s Terra Hautte course, (Lavern Gibson course) - NCAA National qualifying course on land specifically for use of cross country.&lt;br&gt;2. University of Wisconsin Parkside, (Dannehl Cross Country Course) - located on the university's campus, USATF qualifying&lt;br&gt;3. Southern Illinois University - located on the university's campus&lt;br&gt;Also - Purdue - golf course&lt;br&gt;Also - Crystal Springs in Bay area - Designated cross country course, holds many major meets.</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>1. Indiana State’s Terra Hautte course, (Lavern Gibson course) - NCAA National qualifying course on land specifically for use of cross country.&lt;br&gt;2. University of Oregon course - NCAA, USATF qualifying. On the university’s golf course&lt;br&gt;3. Stanford - NCAA qualifying golf course.</td>
</tr>
</tbody>
</table>
1. Indiana State’s Terra Hautte course, (Lavern Gibson course) - NCAA National qualifying course on land specifically for use of cross country.
2. Furman Course - At one time it was a NCAA National championship qualified course, but not anymore. Previously the university golf course, but now it is used only for cross country.
3. University of Indiana - Regional, and previous national, qualifying course on cross country/golf course.

1. University of Kansas, (Rim Rock farm) - designated cross country course, Regional qualifying for smaller regions. Can fit about 18 teams.
2. New Jersey, (Homemade Park, State Park) - New Jersey's High School State Championship Course
3. Indiana State’s Terra Hautte course (Lavern Gibson course) - NCAA National qualifying course on land specifically for use of cross country.

6. What elements are present in each of these 3 courses? (either ones from the list I gave you or other ones which were not listed)

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Elements present in the favored courses</td>
</tr>
</tbody>
</table>
| 1                               | 6              | 1. University of Alabama - Excellent footing, some hills, not repetitive loops  
2. Furman University - Excellent footing, not repetitive loops  
3. Notre Dame - Excellent footing, not repetitive loops (like track), has a loop, but you run the opposite way the second time, so it feels entirely different. |
| 2                               | 6              | 1. Indiana State’s Terra Hautte course (Lavern Gibson course) - level of competition  
2. Brigham Young University course - Scenic, beautiful weather surroundings, etc and well laid out. Lush and well-maintained. Viewer friendly and good footing.  
3. Miami University - Start in a beautiful location, interesting terrain and spaces |
| 3                               | 6              | 1. Indiana State’s Terra Hautte course - Fairness, team areas, adequate parking, access, and amenities.  
2. Wichita, Kansas course - Fairness, team areas, adequate parking, access, and amenities.  
3. Lowell Massachusetts’s course - Fairness, team areas, adequate parking, access, and amenities. |
|   |   | 1. University of Kansas, Rim Rock Farm - Significant tradition and the setting. Well designed start and finish. Good variety of surfacing, terrain, and surroundings. However, it does criss-cross a lot and is not logistically qualified to host Nationals anymore.  
2. Pre's Trail, in Eugene Oregon - Historic, nice running surface (grass and bark) and surroundings (forested areas), fair start and finish, but has limited team space.  
3. Utah State University, American West Heritage Farm - freedom of design in a spectacular setting, variety of terrain  
4. Indiana State’s Terra Hautte course (Lavern Gibson course) - Emotional ties, Every year they add something that makes it better, but the spectator friendliness has not caught up yet. They are able to hold a large field of athletes, amazing course. Just get out and run!  
5. University of Wisconsin Parkside - loops are interesting, athletes run fast and have fun there with pretty good challenges and hills.  
6. Southern Illinois University  
also - Purdue - Get to athletes frequently  
also - Crystal Springs in Bay area - Challenging with well thought out switch backs. It is fair for the athletes. Permanent finish area.  
7. Stanford - It is fair - There are challenges, loops, and it is fun for the spectators to watch. Equalizing element - generally even weather so you don't have to change race strategy. Also - Mount Sac because of the history. Compare times from now to 30 years ago because it is the same course. It is a tough and historic course.  
8. University of Kansas, Rim Rock Farm - A well routed course, High viewer curiosity, safe course, and designed for the athlete. This course is exceptionally designed for the athlete.  
2. New Jersey, Homedale Park - A well defined and routed course, strong sense of place, safe, and designed for the athlete. It is not especially designed for sedentary viewers.  
3. Indiana State’s Terra Hautte course (Lavern Gibson course) - A well routed and defined course, spectator friendly and curiosity, probably the best facilities of any course in the world because it is built solely for cross country racing. It is also a very safe course. |
7. Tell me about specific parts of your favorite courses that you recall, and why they are memorable.

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Memorable sections of the informant's favored courses</strong></td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>No specific parts of the three courses mentioned, but one memorable attribute in a different course was a coach’s trail. The coaches were able to easily maneuver around the course to see their runners.</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>3. Miami University - Variety of terrain and surroundings. There is a nice wooded area and a large hill named the &quot;Gauntlet of Death&quot;. The last part of this race!!! The athletes and the spectators get to see who has the guts on a long finish stretch.</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>All of the courses for the same reasons: Long final straightway, fair start, positioning ability is fair, spectator friendly, wide courses therefore there was room for passing and can just run freely. Final straightway because everybody is tired and fighting, the spectators love that. Fun for the athletes too.</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>1. University of Kansas, Rim Rock Farm - Lower wooded valley  2. Pre's trail, in Eugene Oregon - Section ran specifically on Pre's trail (very meaningful and historic), set by the river, but there were problems with spacing on the bridges.  3. Utah State University, American West Heritage Farm - The section leading to the trail in a filtered canopy and the section by the stream.</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>1. Indiana State’s Terra Hautte course (Lavern Gibson course) - The noise was loud and quiet, loud and quiet, which created opportunities for differing encouragement and focus. The segment around the far turn where the coaches, advisors, and teammates can give individual assistance and inform the athletes.  3. Stanford - At first there are many spectators present, and then the athletes cross over a long wooden bridge where they are engulfed by silence and focus on their own due to the lack of spectators. Then there is a long hill which is mentally tough because there are few spectators and it is near the end of the race when you are spread from teammates.</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Other courses are memorable due to the elevation, terrain, and section diversity. There was one course that had different levels of terrain; tiered plateau sections. It was a fun course. Also, a course that made the whole race experience great (this was done by having shuttle buses, amenities, and they really took care of the people, etc.)</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>1. University of Kansas, Rim Rock farm - Bridges, wide open spaces, fun trails  2. New Jersey, Homedale Park - Difficult with long hard hills.  3. Indiana State’s Terra Hautte course (Lavern Gibson course) - It is a good for Nationals, but is not charismatic.</td>
</tr>
</tbody>
</table>
8. Are there any courses that contain faults which detract from the whole experience? What were these faults?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>Course Faults</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Terra Hautte - There are large holes and difficult obstacles to traverse while going from one side of the course to the other. Also, the change of route from the regular large loop to a small finger where the athletes are jammed into the middle of the course where the footing is not very good and there is a sharp turn. 2. University of Indiana - &quot;Bowling alley&quot; routing. Back and forth, it is very windy and has opportunities that are not taken advantage of, such as the wooded area at the bottom of the course. They have parking and infrastructure, but the course is bad. The runners and spectators are jammed into a small section and the spectators may not see much. It is often windy at this location, so they could really take advantage of the natural forested area below where the wind would be reduced.</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>1. Arizona State - 200 meters from the starting line there was a 90 degree left turn. Then through 2 sand traps. Other than that it was beautiful. 2. Another Arizona course - From boxes 30 to 3 there were 6 large trees that the athletes had to go around. That is ridiculous.</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>No course has a fault as long as it is fair. If a course is hilly or contains any other components which athletes view as too hard, then the athlete is psyching themselves out, it is not that it is an unfair course.</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>Too hard for the runners, too steep of hill, unnecessary difficulty, unsafe and unfair running conditions: 1. San Louis Obispo - too steep 2. Santa Barbara - The athletes are running up hill or along the side of the hill. 3. Fresno Woodward Park - unnecessarily routed on a lot of cement and asphalt, went for ease of mapping rather than designing for athletes, etc. 4. Southern Utah - Even some of the best athletes had to walk a minimal distance because it was way too difficult.</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>1. Indiana course - Running on the side of a hill, creating an unfair and uncomfortable running experience. Doesn't like running there overall.</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>1. Arizona - designed to unnecessarily make athletes go over and ride the hills. The athletes were often riding the hills and the footing, stride, and potential injury that came from running parallel to the contours of the hills. They tried to &quot;manufacture&quot; the course. One runner finished the race with a broken foot due to faulty course design.</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>University of Texas - Too flat and boring. Fuhrman - Footing was terrible Deep South's weather is not fun or advantageous to running</td>
</tr>
</tbody>
</table>
Unsafe courses. Don't want to get hurt running, especially as the season progresses. Don't want rocky patches, exposed roots, steep downhill sections with abrupt turns, etc. At Van Cortlandt Park they have what runners call the "Black roller coaster", which has a steep downhill that leads to a 90 degree turn. There is a chain link fence at the turn to make sure that nobody falls over the cliff.

9. Are there certain experiences or knowledge you desire that athletes learn from a course? If so, what?

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>Focus on footing. The shortest route is not always the best route; it may be wise to take a slightly longer route to avoid sharp turns, mud, or uneven surfacing, in order to keep rhythm.</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>Learn who you are and what you are made of.</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>How to handle components that have similarities with the championship courses.</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>To enjoy the experience and challenge of the race.</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>How to run and pace yourself on different course components</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>Absolutely! Wish to condition the athletes to run the NCAA meet well. If you want to do well, then you need to go out fast, after which athletes should settle down to find teammates.</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>N/A</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>Communication between one's sensory data and the typography. An art to it. What the athletes learn may be valuable not only while running, but outside of running.</td>
</tr>
</tbody>
</table>

10. What characteristics in a cross country course will help athletes achieve the experience or knowledge you wish for them to gain?

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>N/A</td>
</tr>
</tbody>
</table>

| Characteristics of a course which will help the athletes gain the desired knowledge |
11. What features of cross country courses do you feel need the most improvement?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>Features of cross country courses needing the most improvement</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>Footing! Fair and interesting for competitors</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>Footing, preserve the history of the course, spectator friendliness, and media opportunities</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>Add variety and make it fair for the athletes, but also spectator friendly.</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>Marketing. Enhancing spectator and athlete experience.</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>Creating more spectator opportunities</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>Real time scores during the race. Chip timing and pads to increase how often the scores are presented Technology and software advancement.</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>Crowd control, facilities, and the ability to produce scoring quickly.</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>Space. The courses are usually not wide enough. SAFETY!</td>
</tr>
</tbody>
</table>

12. Have you ever been disappointed about a course experience? What particular courses and what parts were below par? Why were they disappointing?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>Disappointing courses and course experiences</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>University of Indiana. It was a huge mud fest and extremely unfair. The winding path was ridiculous and potential opportunities had not been taken advantage of.</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>Faulty routing. Usually it is a structural fault</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>Not really, a bad experience is due to not running up to par, not the fault of the course.</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>If a course leaves an unpleasant memory there was a lack of course experience.</td>
</tr>
</tbody>
</table>
One Indiana course had a tree on the outer edge of the course where some runners had to begin. A runner ran straight into the tree due to the lack of proper starting space. Runners do not run on the outside of the course when they warm-up, this course was not fair and not safe.

A Stanford Pac 10 meet at a Southern California park. It was a public park and they were unable to repair or prepare will for the race due to the lack of access.

Yes, many courses in Texas are too flat. They are like a track.

Yes, many times. Asks "why did they have it here." Some courses are routed over a lot of street surfacing, traffic is despised, and railroads are despised.

### 13. Do you pre-run a course? If so, to learn what?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12</td>
<td><strong>If and why the informants pre-run a course</strong></td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>Navigate the course to see tangents and footing</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>Yes, to see where the holes, dips, and terrain changes were. Make note of safety issues. Places in the middle of the course where the runners may lose sight of the front runners. Where to maintain speed and where to advance. Have a good road map of the race.</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>Yes, To learn the typography, lay of the land, starting position, and how the last 600 or so meters is routed.</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>Yes, &quot;Try to get a &quot;feel&quot; of it.&quot; Study the start and finish areas. Take care of the athletes in every way possible (hotel, food, etc.) so all that they have to worry about is racing</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>Yes, the routing, terrain, etc.</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>Yes, The main reason to pre-run a course is to make sure the runner knows the path of the course. Runners pick up cues, landmarks, turns, the earth underfoot, and a feel for the entire course.</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>Absolutely! To study the footing, where changes have been made (maybe the grass has not yet grown here), the shortest route.</td>
</tr>
</tbody>
</table>

### 14. Have you designed or laid out any cross country courses?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12</td>
<td><strong>If the informants designed or laid out a course and what course(s)</strong></td>
</tr>
<tr>
<td>Informant Identification Number</td>
<td>Question Number</td>
<td>Response</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>14 a</td>
<td>With help - always brings along one other key person and the assistance coach(s)</td>
</tr>
<tr>
<td>2</td>
<td>14 a</td>
<td>Primarily by himself</td>
</tr>
<tr>
<td>3</td>
<td>14 a</td>
<td>Had help and co designed with another college and some surrounding high schools. It is owned by a local community college.</td>
</tr>
<tr>
<td>4</td>
<td>14 a</td>
<td>Not by himself. Has a lot of help from staff, people at the facilities. Tries to get everyone involved; take advantage of different people's strengths. He oversees the whole thing, but allows each person make decisions on the parts of the course that they have experience with.</td>
</tr>
<tr>
<td>5</td>
<td>14 a</td>
<td>With help, from volunteering building, the guy that donated the land, etc.</td>
</tr>
<tr>
<td>6</td>
<td>14 a</td>
<td>Primarily by himself, but definitely invited other's input and direction</td>
</tr>
<tr>
<td>7</td>
<td>14 a</td>
<td>Laid the route with one other key person.</td>
</tr>
<tr>
<td>8</td>
<td>14 a</td>
<td>Have always had help from assistance coaches, athletes, and others</td>
</tr>
</tbody>
</table>

a. Did you do it by yourself or have help?
   i. If you did have help, who was involved?

Yes, Florida State University. Course on land specifically for cross country running. Previously: University of South Florida, on a golf course and one on the Mississippi green way, but the county took it away from them because it was designed for passive use.

Yes, Miami State University, Ohio

Yes, Cal Poly, CA course

Yes, many, but the most recent is the one located at the American West Heritage Center by Utah State University.

Yes, Terra Hautte (other course designers have come to Terra Hautte to study the course for their designing purposes)

1. Stanford
2. University of Oregon

Yes, routed one on a golf course

Yes, enough times that he never wishes to do it again. The most recent is his home course, Buffalo Ranch, at University of Colorado.
b. Did you emulate any existing courses or parts of courses?
   i. If so, what course or what course elements?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14 b</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>If the informants emulated other courses</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14 b</td>
<td>Not self consciously - But did think of other courses footing examples. It is not a blank palette, every course has something different to work with. Emphasize the strengths and minimize the weaknesses.</td>
</tr>
<tr>
<td>2</td>
<td>14 b</td>
<td>No (I would say kind of though) - because the course had been run before, he just made changes. Took ideas</td>
</tr>
<tr>
<td>3</td>
<td>14 b</td>
<td>Not really. Designed with what they had because there were many hills so had to manage energy output and make plenty of space for runners to pass.</td>
</tr>
<tr>
<td>4</td>
<td>14 b</td>
<td>Not really, it was based on what was available.</td>
</tr>
<tr>
<td>5</td>
<td>14 b</td>
<td>Oh YES. This is one of the best courses ever and it is one of the only ones that took many examples of courses and emulated the good and the bad parts. This became a big part of the determined design. Looked at Fuhrman and Iowa State courses as these courses were also laid onto land used specifically for cross country. The courses were open and had excellent site lines for viewers. Took a heavy interest in the parking as many of the courses he has been to have not had high quality parking situations.</td>
</tr>
<tr>
<td>6</td>
<td>14 b</td>
<td>Not really, it was dictated by fairways and how they went from one to the next. Terrain dictated.</td>
</tr>
<tr>
<td>7</td>
<td>14 b</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>14 b</td>
<td>No, just had to work with the terrain available, 2/3 of the land was useless as it was a gravel quarry.</td>
</tr>
</tbody>
</table>

b. How long did it take to design and build the course from start to “finish”?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Length of time it took for the informants to design their course</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14 c</td>
<td>6 months, but continuous Depends upon the course.</td>
</tr>
<tr>
<td>2</td>
<td>14 c</td>
<td>4 months</td>
</tr>
<tr>
<td>3</td>
<td>14 c</td>
<td>Continuous (as the money comes in), but initially to clear and lay out the course it took 3-4 months.</td>
</tr>
</tbody>
</table>
Continuous over 3 years, but the bulk in 5 months; it is an ongoing process in order to make the course better and possibly qualify for bigger meets.

A few months to do the initial groundwork. The work continues, especially because of the standards required for such a prestigious course. Seeding, reseeding, additional amenities and features are always being added.

1. Stanford - One month
   Oregon - 2 weeks, they didn't take long because they were on golf courses. Oregon even took less time because of it being a 2k loop course.

4 to 5 months of mostly weekends just to get it rudimentary. There is a lot of public traffic, including traffic difficult on terrain such as motorcycles, horses, etc., on this area and the course requires a lot of preparation.

d. If so, what was the process, in a step-by-step sequence?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Informant’s sequence of course design and build</td>
</tr>
</tbody>
</table>
| 1                               | 14 d            | 1. Look at the piece of land you have to work with, how big and the shape  
                                |                 | 2. How to get from point to point, which points  
                                |                 | 3. Where to locate the start and finish  
                                |                 | Then, just make it run able from start to finish |
| 2                               | 14 d            | 1. Site visit, walk course  
                                |                 | 2. Started practicing on the field and it was aesthetically pleasing and there was a previously used start and finish area |
| 3                               | 14 d            | 1. Clear the course  
                                |                 | 2. Build a bridge over the creek bed  
                                |                 | 3. Consider maintenance (The course may get covered in rain, become overgrown, etc.).  
                                |                 | 4. continually trying to raise funds to plant trees, buy mile markers, picnic tables, and other amenities |
| 4                               | 14 d            | 1. Spoke with the director about where he would allow the course to be routed  
                                |                 | 2. Measured different loops on map and measuring wheel and placed distances on the map.  
                                |                 | 3. Decipher the best locations and longest distance for the start and finish areas. |
| 5                               | 14 d            | 1. Started designing, took a truck out there with another person and drove to the highest point and then routed the course so that he could always see the truck. |
Terrain dictated the design. Whenever possible he designed the course to curve around a natural barrier, avoid pavement, and make each course as straight as possible. The reason to create a straight course is so that athletes could get into a rhythm without the constant turns.

Went around the golf course on a golf cart and with a wheel. Figure start and then where to come back to and get as many reasonable hills on the route.

1. Find a piece of property  
2. Run or walk the area and get a feel for the land.  
3. Couldn't run very well because of the cactus and rocks so rented a weed murdering machine and blazed a trail.  
4. Took measurements.  
5. Looped together

e. What was the most important factor in the design of the course? (E.g. length, routing, start/finish area/ ease of design, athlete excitement, sense of place, etc.)

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14 e</td>
<td>Most important factor in the informant's designs</td>
</tr>
<tr>
<td>2</td>
<td>14 e</td>
<td>Make it interesting, unique, and fair (place woods, hills, etc. in the most strategic place). Don't just run around a field and don't make too tough of challenges. Make room for spectators. (so…..routing, athlete excitement, sense of place, surfacing)</td>
</tr>
<tr>
<td>3</td>
<td>14 e</td>
<td>Locating the huge tree at the start/finish area as an excellent landmark. Then there was a building right behind there with electricity, hose, etc.</td>
</tr>
<tr>
<td>4</td>
<td>14 e</td>
<td>A course that was doable on the given land. Make the course challenging and fair, as well as spectator friendly.</td>
</tr>
<tr>
<td>5</td>
<td>14 e</td>
<td>Fairness to the runners (especially for the start and finish). Routed along the best potential championship course.</td>
</tr>
<tr>
<td>6</td>
<td>14 e</td>
<td>Being able to see the entire race. Following the rules. Spectator friendliness, accommodations, and involvement (including media factors)</td>
</tr>
<tr>
<td>7</td>
<td>14 e</td>
<td>The starting line and how far you could take the course before the next turn. (Fair start), otherwise the race is determined in the first 400 meters of the race. It was dictated by the widest fairway.</td>
</tr>
<tr>
<td>8</td>
<td>14 e</td>
<td>Ease of laying the route. The start and finish areas. Safe, but tough challenges</td>
</tr>
<tr>
<td>8</td>
<td>14 e</td>
<td>Freedom of routing and was not required to accommodate other sports or purposes.</td>
</tr>
</tbody>
</table>
f. Did you use a map or aerials?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether the informants used maps or aerials when designing their course</td>
</tr>
<tr>
<td>1</td>
<td>14 f</td>
<td>Yes, used topography maps provided by the county. Started with the map and then went straight to the land.</td>
</tr>
<tr>
<td>2</td>
<td>14 f</td>
<td>No, it was long ago. Back 25 years ago he just walked the course and became familiar with the property.</td>
</tr>
<tr>
<td>3</td>
<td>14 f</td>
<td>Yes, to initially layout the measurements then used a wheel to determine accurate measurements.</td>
</tr>
<tr>
<td>4</td>
<td>14 f</td>
<td>Yes, satellite aerials</td>
</tr>
<tr>
<td>5</td>
<td>14 f</td>
<td>Initially done at ground level.</td>
</tr>
</tbody>
</table>
| 6                              | 14 f            | 1. Stanford - the golf pro layout of the course was used to aid in the design process.  
2. Oregon - they use Google maps because that was a recent mapping tool. It was determined by the best “real estate” (best land). Whatever was simple, without cuts, twists, etc. |
| 7                              | 14 f            | No, it was back in the 60's |
| 8                              | 14 f            | Had some maps, but it was before you could zoom in on Google earth |

g. What pressures do you feel when designing a course? For example, would you feel free to incorporate a creek crossing or a rough surface such as sand?  
i. If you do feel pressures are they from expectations?  
   1. If so, what are these expectations and who do you feel is burdening you with these pressures?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether the informants felt pressure when designing their course</td>
</tr>
<tr>
<td>1</td>
<td>14 g</td>
<td>Yes - economic pressures. As time goes on you get more money and then can make some improvements. Can't put everything you want in because the resources aren't available.</td>
</tr>
<tr>
<td>2</td>
<td>14 g</td>
<td>Yes - At one time the course was considered too hard by one team and they went home. So he made the course only go through the hill area one time.</td>
</tr>
<tr>
<td>3</td>
<td>14 g</td>
<td>No, there was a lot of support for the course.</td>
</tr>
<tr>
<td>4</td>
<td>14 g</td>
<td>No, the land directors were extremely facilitating and the athletic director was uninterested.</td>
</tr>
<tr>
<td>5</td>
<td>14 g</td>
<td>No, felt that he had total freedom. He was going from scratch, pioneering a cross country running specific design, and was therefore able to creatively and freely design.</td>
</tr>
</tbody>
</table>
Yes - by himself. Self expectations. Wanted the race to be fair. He did not want his design to determine the outcome of the race. Desired a high quality starting and end. Wanted the course to fulfill the needs of the athletes.

Some from the golf course administration. Only wanted the course on the outside edges of the course and not even near any greens

Only from himself.

Do, or did, you wish to add any course elements that you did not add due to pressures or expectations?

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether and which elements were not added due to pressures or expectations</td>
</tr>
<tr>
<td>1</td>
<td>14 h</td>
<td>Yes - If I had an endless amount of financial resources, then he would have made the course wider, better surfaced, NCAA qualifying course.</td>
</tr>
<tr>
<td>2</td>
<td>14 h</td>
<td>The hill area and a section of the course had to be changed because the art museum did not want them to run by an old sculpture, a.k.a. &quot;rusty piece of crap&quot;</td>
</tr>
<tr>
<td>3</td>
<td>14 h</td>
<td>No, just did what was feasible with the given land.</td>
</tr>
<tr>
<td>4</td>
<td>14 h</td>
<td>No, he included everything that he wanted.</td>
</tr>
<tr>
<td>5</td>
<td>14 h</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>14 h</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>14 h</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>14 h</td>
<td>No</td>
</tr>
</tbody>
</table>

When creating a course who, or what group of people, do you consider first?

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>What group of people the informants considered first during design</td>
</tr>
<tr>
<td>1</td>
<td>14 i</td>
<td>Runners!</td>
</tr>
<tr>
<td>2</td>
<td>14 i</td>
<td>50/50 Runners(athletes)/spectators</td>
</tr>
<tr>
<td>3</td>
<td>14 i</td>
<td>The runners, high school and collegiate runners, the community so that it could be multiple use area for the public.</td>
</tr>
<tr>
<td>4</td>
<td>14 i</td>
<td>Runners!</td>
</tr>
</tbody>
</table>
15. Would you like to see courses, especially championship courses, selected not only for qualifying standards, but excitement, a highly developed sense of place, designed to aid runner’s psychological race and performance, or other similar qualities?

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether courses should be selected for qualifying standards as well as excitement, sense of place, and design to aid athlete psychology for improved race performance</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>Absolutely. It is a &quot;student athlete experience&quot;, that is what the NCAA says.</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>All he really cares about is if it is fair for the athletes.</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>Yes, that is important. Tradition is important.</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>Yes!</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>Absolutely, courses should be fair to the athletes. But also have to consider spectators and TV. To ignore this causes faulty design and therefore poor presentation. &quot;Don't do things that hurt the sport&quot;</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>YES. Conference, Regionals, and Nationals. There are characteristics away from the course, such as local amenities which would enhance the quality of the experience.</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>N/A</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>Yes. First the turns, safety, and parking should meet the requirements. Ease of access.</td>
</tr>
</tbody>
</table>

16. Would you like to see the scope of cross country furthered? (e.g., more media, spectators, interest, or knowledge of the sport)
Yes, obviously exposure to the sport is important. A new proposal to move Nationals to a Saturday may help and pick places where the weather is good and it is easy to expose the sport.

Absolutely!

Yes, absolutely. Capture the media, televise meets, promotional websites.

Yes!

Yes, have to really work at it.

Absolutely! At one meet, the Nike Cross Championship, the race is broadcast over the entire country on the internet. There are 3 or 4 locations with cameras and they do not move so individuals can see where the runners are located within the race. The race is a high school race and is run as teams and not as individuals.

Yes

Yes, of course. It is a beautiful sport; it is colorful and dramatic. If it were televised on prime TV the sport would grow. "If you build it they will come".

17. Do you believe changes in course design could achieve any of those advancements?

N/A – Answers were either not provided or did not apply to the question

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether changes in course design could advance the sport of cross country</td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>Absolutely - yes.</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>Yes! Coaches may be resistant to change or progressive thinking; if they had a manual sitting right in front of them, then that would definitely be a tool in the advancement of course design. This is GROUNDBREAKING!!! It would give them a tool to further design of potential and/or existing courses.</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>Yes, courses need to be camera friendly, television accessibility, etc.</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>Yes,</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>Absolutely, this is critical. Courses need to be designed with more spectator involvement and opportunities</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>“Absolutely. To the degree that designers design for that need, could absolutely play into better courses.” Golf courses are temporary cross country courses. But if the course is permanent there is great opportunity for advancements through course design.</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Yes, after fairness and safety are accommodated then if that can be combined with drama, color, terrain, etc. That would be absolutely great. People would not want to sit at home watching runners go in loops; design would enhance the spectator involvement in the sport.

18. Besides NCAA courses do you have any experience with Early or historic courses, IAAF, USATF courses, etc.

<table>
<thead>
<tr>
<th>Informant Identification Number</th>
<th>Question Number</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whether informant's have had experience with cross country courses besides NCAA courses, and if they have, what they thought of those courses</td>
</tr>
<tr>
<td>1 18</td>
<td></td>
<td>Not really</td>
</tr>
<tr>
<td>2 18</td>
<td></td>
<td>No!</td>
</tr>
<tr>
<td>3 18</td>
<td></td>
<td>Yes, he competed in the PAC, the competition which is now known as the USATF. Many good courses from coast to coast. One meet that stands out in his mind is when the meet was held in Pocatello, Idaho. The course had variables, altitude changes, and natural and varied surfacing - it was &quot;true&quot; cross country.</td>
</tr>
<tr>
<td>4 18</td>
<td></td>
<td>Not really.</td>
</tr>
<tr>
<td>5 18</td>
<td></td>
<td>Not really. The ones he does recall were almost all on golf courses.</td>
</tr>
<tr>
<td>6 18</td>
<td></td>
<td>The course used at Stanford hosted the USATF meet. Franklin Park in Boston hosted the IAAF meet in the 90’s. In Europe the courses are old school and sloppy. Athletes must be prepared to go out fast.</td>
</tr>
<tr>
<td>7 18</td>
<td></td>
<td>Not really, but attended one International meet in Ireland. It was wet, and strung far so that the spectators did not have a lot of opportunities to see the runners. Seems that international meets are tougher for the runners.</td>
</tr>
<tr>
<td>8 18</td>
<td></td>
<td>Yes, have had experience with 10 or so IAAF courses. They seem to be more interested in accommodating the officials than fun or safe for the athletes. They tend to be benign and repetitve. A recent one was rocky, bumpy, and narrow - not safe or fair for the athletes. A world championship course needs to at least be safe. The courses are not made for cross country running, they have been hosted in the same city before, but that he knows they have never been in the same location. He &quot;can't remember of a single one that he saw and thought, &quot;this would really be a cool place to race.&quot;</td>
</tr>
</tbody>
</table>